1. Introduction

In this paper we analyze Serial Verb Constructions (SVCs) in Motion Predicates (MP) as an instance of a *complementation structure* used to syntactically represent the sub-eventive components of (mono-eventive) predicates, including the *process, telicity* and *result(ing) state* substructures, as in (1). Using a video-animated app designed for this purpose (Benedicto 2017/2019), we can meaningfully compare the structures thus elicited across spoken and sign languages, from different linguistic families and different geographic locations (thus ruling out genealogy and linguistic contact as sources of similarities). The similarities found can, therefore, be traced back to properties of the Faculty of Language. We use data from Taiwan Mandarin (Sinitic), Southern Tati (Indo-Iranian), Ghanaian Student Pidgin-GSP (English-based Creole), Mayangna (Misumalpan), LIS (Italian Sign Language), and ASL to illustrate our theoretical points.

(1) Syntactic representation of a motion predicate with different sub-eventive components (adapted from Benedicto, Branchini and Mantovan (2015)).

2. Data

We used a self-paced application including 175 short animated video prompts for data elicitation (Benedicto 2017/2019). The video-clips were organized around a variety of 19...
themes including animate and non-animate participants (e.g., a bird, a goose, a ball, etc.). The application was designed to include minimal pairs addressing several variables within motion predicates. One of the variables the prompts were designed to elicit is the different planes of a 3D Cartesian Coordinate System (Horizontal, Vertical and Deictic) involved in the vectorization of the motion trajectory or Path. This vectorization of the 3D-Path constitutes the process component, (see the substructure π in (1) above). Another variable addressed by the prompts corresponds to telicity and includes three values: telic, underspecified-atelic (with a potential unrealized goal), and unspecified-atelic (with no goal).

This paper draws from the data collected from a subset of 162 clips (78 telic and 84 atelic) which were designed to elicit data on the parameter of (a)telicity. These video prompts were organized into triplets and pairs. Figure 1, 2 and 3 are examples of a triplet:

Figure 1. Example of a telic prompt: a bird flying from a fence to the top of a tree.

Figure 1 is a series of stills of the animation shown to participants to elicit a telic sentence. This video shows that a bird perching on a fence takes off, flies towards a tree, and finally arrives at the top of it. The video, therefore, clearly shows motion from the origin-point (the fence) to the end-point (tree).

Figure 2. An unspecified atelic event: a bird flying off into the distance.

Figure 2 is a series of stills that shows an atelic event, in which the bird takes off just as in Figure 1, but there is no tree for it to go and land on. The video ends while the bird is still flying into the horizon.
Figure 3 shows an (underspecified) atelic event, in which the bird flies from the fence and appears to be moving towards the tree in the distance; however, the video clip ends before the viewer can determine whether it gets there or not.

Data were elicited from speakers/signers of multiple languages, including Taiwan Mandarin (Sinitic), Ghanaian Student Pidgin (GSP henceforth, an English-based Creole), Southern Tati (Indo-European and Indo-Iranian), as well as from Mayangna (Misumalpan), LIS (Italian Sign Language), and ASL. Comparing languages from diverse linguistic families and in different modalities allows us to attribute their syntactic similarities to the Faculty of Language and rule out language contact as a source of such similarities.

The elicited utterances were coded in ELAN according to the use of a number of linguistic elements. For instance, we looked at whether an utterance has a marker for telicity, which in SVC languages is typically realized as a verb that denotes the reaching of an endpoint. Utterances were also coded based on the use of verbs that denote Horizontal, Vertical, and Deictic movement. By doing so, we can examine the distributional patterns and restrictions of these motion verbs.

Follow-up interviews were conducted. During the interviews, participants were asked to confirm their responses to certain prompts or to come up with different ways of describing them. They were sometimes asked to give acceptability judgments to sentences of motion events, some of which were not included in the set of prompts they had seen.

3. Goals

We hypothesize that the sub-eventive predicate structure related to telicity and resultativity is encoded via a V-complementation structure resulting in an SVC (see (2) below and examples (3)-(5)); this piece of the puzzle contributes to show that inner aspect is not encoded in the lexical entry of individual verbs but is rather built up in the syntax, as proposals like, e.g., Borer’s (2005) have argued for. The same SVC strategy can be used to add an Agent to an (otherwise) intransitive Motion Predicate. Finally, a complementation SVC can also be used to represent the vectorization of Path (corresponding to the process of the complex event, $\pi$ in (2) below) into a 3D spatial Cartesian Coordinate System (see (5) with specification for Vertical, Horizontal and Deictic planes).
We first show that the structures in (3)-(5) are indeed complementation structures, then we address two sets of issues related to the nature of complementation: one is the lack of an argumental and thematic relation and selectional restrictions between the head and its structural complement; and another set concerns the mono-eventivity of the V-complex, the shared internal DP argument and the lack of functional application as a semantic operation to yield the meaning/denotation out of the syntactic Merge operation that results into a complementation structure. We will propose that all these properties are in fact related and can be derived from the same points.

4. Structural Complementation

That SVC’s are in a V-Complementation structure was first proposed in Larson (1991) as an extension of his work on ditransitives and resultatives. Evidence for this complementation relation between the verbal sub-units of an SVC (as in (2) above) can be obtained through a variety of tests. Among these tests, we use the following: Bound Variable readings, where an operator in the ‘object’ position, the DP in (2), c-commands a variable in the Locative constituent, the XP-loc in (2); Negative Polarity items, where an NPI in the lower structural units, e.g., in the XP-loc in (2), is licensed by a c-commanding NEG; and by wh-extraction from the lower structural units. A complementation structure predicts a grammatical output out of all these tests; however, a juxtaposition (a subtype of coordination) analysis, a common alternative analysis for SVCs, predicts ungrammaticality (under the intended reading).
We discuss these tests in more detail in the following subsections.

4.1. Bound Variable Readings

The premise of the bound-variable test is that a variable can only be bound by an operator that c-commands it. We apply the test to Mandarin, GSP, and Southern Tati to show that this c-command relation between operator and variable holds in these languages.

If the hypothesis that motion predicates have an SVC structure is true, an operator in the Figure DP should be able to bind a variable in the Locative constituent. This prediction is borne out by the Mandarin sentence below (see (6)a), in which the numeral yi (‘one’) has a variable reading available; that is, the sentence can have an interpretation that the birds were taken to separate nests instead of all being taken to one single nest. In contrast, the numeral in sentence (6)b, which has a coordinated structure with an overt conjunction, does not have a variable reading because the numeral is not c-commanded by the operator mei (‘every’).

(6)  a. Nan-hai song mei zhi xiao-niao dao yi ge niao-chao li. [TW-Mandarin]
    Boy send every CL small-bird arrive one CL bird-nest inside
    ‘The boy took every birdie to a nest.’

    b. #Nan-hai song mei zhi xiao-niao bing dao yi ge niao-chao li.
    Boy send every CL small-bird and arrive one CL bird-nest inside

Note that the test also yields the same result in GSP, as shown by the following pair in (7). In sentence (7)a, the pronoun in can have a bound variable reading and refer to each bird in the set specified by the domain of the quantifier every. The same pronoun in sentence (7)b, which has a coordination structure, does not have that bound variable reading because it is not c-commanded by the quantifier every.

(7)  a. The boy release every bird go catch in nest inside. [GSP]
    D boy release every bird go reach 3SPD nest inside
    ‘The boy released every bird (all the way) into its own nest.’

    b. #The boy release every bird wey e go catch in nest inside.
    D boy release every bird and then 3SSUB go reach 3SPD nest inside
    *‘The boy released every bird (all the way) into its own nest.’
    ‘The boy released every bird and then he went into his own nest.’

The same test result is found in Southern Tati as well. Consider the series of verbs in example (8)a. This series is made of five verbs: oˈgo ‘picked up’ denoting the agent-figure contact, baˈʃin ‘threw’ denoting the agent-figure contact break-off, bæˈʃæ ‘went’ for the figure’s movement along the locational Path, beræˈsæs ‘reached’ for the figure’s reaching the region denoted by the XP-loc, and ɒˈniʃ ‘sat’ denoting the figure’s result state of sitting in that region.1 A complementation structure for the series of verbs like (8)a predicts that a variable

1 Note that the verbs denoting contact and separation in (8)a are conjugated for the agent tilːiː ‘the girl’ while the rest of the verbs are conjugated for the figure iʃɛlu ‘the sparrow.’
lower in the structure will be bound by an operator higher in the structure. Applying the bound-variable test to our verbal series in (8)a with the pronoun -ef as a variable on XP_{LOC} and hær ‘each’ as an operator modifying the figure tʃɛlu ‘the sparrow,’ we see that a grammatical result arises. The result of the test is shown by (8)b.

(8)

\[ a. \quad \text{SR} \quad \text{títítjē} \quad tʃɛluʃ \quad o’go \quad \text{bóʃin} \\
\quad \text{UR} \quad \text{títič} \quad tʃɛlu-e-ef \quad \text{o-gor-d} \quad \text{be-ŋʃiŋ-d} \\
\quad \text{Gloss} \quad \text{girl.F} \quad \text{sparrow.M-DEF-3S.AGR} \quad \text{PV-pick_up-PST} \quad \text{PV-throw-PST} \\
\quad \text{Role} \quad \text{agent} \quad \text{figure} \quad \text{contact} \quad \text{separation} \\
\quad \text{SR} \quad \text{bæʃʃæ} \quad \text{beræ’sæs} \quad \text{b’niʃ} \\
\quad \text{UR} \quad \text{be-ʃɛi-Ø} \quad \text{be-ræs-aest-Ø} \quad \text{b-niʃ-t-Ø} \\
\quad \text{Gloss} \quad \text{PV-go.PST-3SM.AGR} \quad \text{PV-reach-PST-3SM.AGR} \quad \text{PV-sit-PST-3SM.AGR} \\
\quad \text{Role} \quad \text{Path} \quad \text{reach} \quad \text{result} \\
\quad \text{SR} \quad \text{deræʃteʃ} \quad \text{sær} \quad \text{[Southern Tati]} \\
\quad \text{UR} \quad \text{deræʃt-e-ef} \quad \text{sæ} \quad \text{[Southern Tati]} \\
\quad \text{Gloss} \quad \text{tree-K-3S.GEN} \quad \text{PV-go.PST-3SM.AGR} \quad \text{PV-reach-PST-3SM.AGR} \quad \text{PV-sit-PST-3SM.AGR} \quad \text{PV-throw-PST} \\
\quad \text{Role} \quad \text{(XP-loc)} \quad \text{Path} \quad \text{reach} \quad \text{result} \quad \text{reach} \quad \text{result} \\
\quad \text{'The girl [pick_up] threw the sparrow [go] [reach] [sit] on the tree top.'}^{2} \]

\[ b. \quad \text{SR} \quad \text{títítjē} \quad \text{hær} \quad tʃɛluʃ \quad o’go \quad \text{bóʃin} \\
\quad \text{UR} \quad \text{títič} \quad \text{hær} \quad tʃɛlu-e-ef \quad \text{o-gor-d} \quad \text{be-ŋʃiŋ-d} \\
\quad \text{Gloss} \quad \text{girl.F} \quad \text{sparrow.M-DEF-3S.AGR} \quad \text{PV-pick_up-PST} \quad \text{PV-throw-PST} \\
\quad \text{SR} \quad \text{bæʃʃæ} \quad \text{beræ’sæs} \quad \text{b’niʃ} \\
\quad \text{UR} \quad \text{be-ʃɛi-Ø} \quad \text{be-ræs-aest-Ø} \quad \text{b-niʃ-t-Ø} \\
\quad \text{Gloss} \quad \text{PV-go.PST-3SM.AGR} \quad \text{PV-reach-PST-3SM.AGR} \quad \text{PV-sit-PST-3SM.AGR} \\
\quad \text{SR} \quad \text{deræʃteʃ} \quad \text{sær} \quad \text{[Southern Tati]} \\
\quad \text{UR} \quad \text{deræʃt-e-ef} \quad \text{sær} \quad \text{[Southern Tati]} \\
\quad \text{Gloss} \quad \text{tree-K-3S.GEN} \quad \text{top} \quad \text{[Southern Tati]} \quad \text{top} \quad \text{[Southern Tati]} \\
\quad \text{'The girl [pick_up] threw eachi sparrow [go] [reach] [sit] on itsi tree top.'} \]

As shown by (8)b, the operator-variable c-command produces a one-to-one correspondence relationship, such that each sparrow is interpreted to end up with its own tree. On the other hand, a structure based on coordination for the verbal series in (8)a, predicts that the operator hær ‘each’ would not be able to bind the variable pronoun -ef because the variable would fall out of the c-command domain of the operator and in a separate clause. The prediction above is played out in the example below in (9), wherein the coordinating conjunction mʊmp ‘but’ breaks the event in our original SVC in (8)a into two separate clauses, as shown by its

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^{2} Since using syntactic dependency devices for English translations might be interpreted as multi-causality of events, the translation of the information connoted through seriality is added into English translations through brackets in this study. Still, the translations assume that all the verbs in Tati SVCs occur in a single event.
expected interpretation in 9(a). As a result, (9) does not convey an interpretation with a one-to-one correspondence reading (b) in which each sparrow sits on its associated tree. This provides further evidence for the existence of a complementation structure for Tati verbal series like (8)a.

(9)  
\[
\text{SR} \quad \text{titijɛ́} \quad \text{hær} \quad \tilde{t}ɛluɛ́f \quad \text{o’go} \quad \text{bo’ʃin} \quad \text{ʊmʊmp}  \\
\text{UR} \quad \text{titie} \quad \text{hær} \quad \tilde{t}ɛlu-e-ʃɛ́ \quad \text{o-gor-d} \quad \text{be-ʊʃin-d} \quad \text{ʊmʊmp}  \\
\text{Gloss} \quad \text{girl.} \quad \text{each} \quad \text{sparrow.M-DEF-3S.AGR} \quad \text{PV-pick_up-PST} \quad \text{PV-throw-PST} \quad \text{CONJ}
\]

SR \quad \text{bœ’ʃɛ́} \quad \text{beræ’šæs} \quad \text{v’niʃ}  \\
UR \quad \text{be-ʃɛi-ɬ} \quad \text{be-ræs-æst-ɬ} \quad \text{v-niʃ-t-ɬ}  \\
Gloss \quad \text{PV-go.PST-3SM.AGR} \quad \text{PV-reach-PST-3SM.AGR} \quad \text{PV-sit-PST-3SM.AGR}

SR \quad \text{dəræxɛ́f} \quad \text{sær} \quad \text{[Southern Tati]}  \\
UR \quad \text{dəræxɛ́-eʃɛ́} \quad \text{sær}  \\
Gloss \quad \text{tree-K-3S.GEN} \quad \text{top}

a. ‘The girl [pick_up] threw each sparrow. Then, it went [reach] [sit] on itsi tree top.’

b. ‘The girl [pick_up] threw each sparrow [go] [reach] [sit] on its tree.’

4.2. Negative Polarity Items

Another way to show that motion predicates have an SVC structure is to use a negative polarity item (e.g., \textit{any}), which needs to be licensed by a negation marker that c-commands it. Since this c-command relationship can be established in an SVC structure, we should predict that a negative polarity item in the constituent that denotes the reaching of a goal (i.e., \textit{REACH-VP}) will be properly licensed by a negation marker. The following examples from Mandarin, GSP, and Southern Tati confirm this prediction. Note that the sentences become ungrammatical when changed into a coordination structure:

(10)a. Xiao niao \textit{mei} qu dao \textit{renhe} shu shang. [TW-Mandarin]  
Small bird \textit{NEG} go arrive \textit{any} tree top  
‘The birdie did not fly over to \textit{any} tree.’

b. *Xiao niao \textit{mei} qu \textit{bing} dao \textit{renhe} shu shang.  
Small bird \textit{NEG} go and arrive \textit{any} tree top

(11)a. The boy \textit{no} release the bird go \textit{dey} \textit{any} nest inside [GSP]  
D boy \textit{NEG} release D bird go be.at \textit{any} nest inside  
‘The boy didn’t release the bird into \textit{any} nest.’

b. The boy \textit{no} release the bird \textit{wey} e go \textit{dey} \textit{any} nest inside  
D boy \textit{NEG} release D bird C \textit{3SSUB} go be.at \textit{any} nest inside  
‘*The boy didn’t release the bird and then it went into \textit{any} nest.’
(12)  

a. SR  \textit{titijɛ} \textit{tiʃɛluʃ} o’-\textit{no-go}  ‘bnɛʃinijɛ  
UR  \textit{titiɛ} \textit{tiʃɛlu-ɛ-ɛf} o-\textit{ne-gor-d}  be-\textit{ŋɛʃin-ɪɛ}  

Gloss  girl.F sparrow.M-DEF-3S.AGR PV-NEG-pick\_up-PST PV.  \textbf{SBJV}-throw-3SF.  

b. \textbf{SR}  *\textit{titi} jɛ  \textit{tiʃɛluʃ} o’-\textit{no-go}  ‘bnɛʃinijɛ  
UR  \textit{titi} jɛ  \textit{tiʃɛlu-ɛ-ɛf} o-\textit{ne-gor-d}  be-\textit{ŋɛʃin-ɪɛ}  

Gloss  girl.F sparrow.M-DEF-3S.AGR PV-NEG-pick\_up-PST PV.  \textbf{SBJV}-throw-3SF.  

4.3. WH-Extraction

A third test commonly used to detect complementation structure is based on a property associated with wh-extraction, namely, the inability to extract a wh-word out of a conjunct (either overtly or covertly, depending on the language), as exemplified by the following sentences:

(13)  
a. You have to \textbf{rest and} take medications on time when you are sick.  
b. *What do you have to \textbf{rest and} take on time when you are sick?
Since motion predicates have a complementation structure rather than a coordination structure, wh-extraction should not lead to ungrammaticality, and this is the right prediction:

(14) a. **Where** the boy release the bird go catch ti? *[GSP]*
    ‘Where did the boy release the bird into?’

    b. #**Where**, the boy release the bird wey *go* catch ti?

Data from Mandarin and Southern Tati further confirm this prediction.

(15) Wo-men lai dao-le **sheme-difan**? *[TW-Mandarin]*
    1st-PL come arrive-PFV what-place
    ‘Where have we arrived?’

(16)

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<thead>
<tr>
<th>a.</th>
<th>SR</th>
<th>titijej</th>
<th>jfelu</th>
<th>o’go</th>
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<tr>
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<td>UR</td>
<td>titie</td>
<td>jfelu-e-ef</td>
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<td>Gloss</td>
<td>girl.F</td>
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<td>be-raes-astr-∅</td>
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<td>Gloss</td>
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</table>

‘**Where** did the girl [pick_up] threw the sparrow [go] [reach] [sit]?’

<table>
<thead>
<tr>
<th>b.</th>
<th>SR</th>
<th>titijej</th>
<th>jfelu</th>
<th>o’go</th>
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<td>jfelu-e-ef</td>
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<td>Gloss</td>
<td>girl.F</td>
<td>sparrow.M-DEF-3S.AGR</td>
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<tr>
<td></td>
<td>a.</td>
<td>‘The girl [pick_up] threw the sparrow, but <strong>where</strong> did (it) go [reach] [sit]?’</td>
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<tr>
<td></td>
<td>b.</td>
<td>#‘<strong>Where</strong> did the girl [pick_up] threw the sparrow <strong>but</strong> (it) [go] [reach] [sit]?’</td>
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As shown by (16)a, as an SVC, WH-extraction produces a grammatical result such that *kn* ‘where’ has scope over all verbs. On the other hand, in (16)b, as a coordination of two separate clauses, *kn* ‘where’ does not have scope over the whole event (shown in [b]). Instead, it only has scope over the clause it is part of (i.e., *bœ’jœ bere’šæs v’niʃ kn*).
The results of the bound-variable, negative polarity item, and WH-extraction tests for Mandarin, Southern Tati, and GSP show that the verbal series in these languages are made of complementation structure rather than other alternatives such as coordination.

5. Non-Standard Properties of Complementation in SVCs

In this section we address, first, the contrasting properties of these SVCs and regular complementation. We then consider the nature of the linking between the sub-eventive structures in the V-V-V complex and finally we propose an analysis that will also consider the implications for crosslinguistic parametrization.

5.1. In a standard V-CP complementation structure, we find 3 usually concomitant properties: there is a Head-Argument relation, a theta-role assignment (from V to CP) and selectional restrictions imposed by V onto CP. In the subeventive structures we are considering, neither of those three properties hold: no head-argument relationship, no theta-role assignment and no selectional restrictions.

We can see that the verbal sub-units in Motion SVCs do not stand in a Head-Argument relation because the ‘complement’ V is not obligatory. Consider the pairs in (17) and (18) for Taiwan Mandarin and GSP, respectively. In the a-cases in both sets, we can observe the presence of the REACH-V2 (dao and catch, respectively) following the PATH-V1 (qu and go, respectively); in the b-cases, both REACH-V2’s are absent. In a regular Head-Argument relation, the Argument is an obligatory constituent; here, on the other hand, the ‘complement’ REACH-V2 is not.

(17) a. Xiao niao fei $qu$ $dao$ shu-shang. [TW-Mandarin]
   Small bird fly go arrive tree-top
   ‘The birdie flew (all the way) to the tree top.’

   b. Xiao niao $qu$ (shu shang).
   Small bird go (tree top)
   ‘The birdie went away (towards the tree.)’

(18) a. The $bird$ fly $go$ $catch$ the tree top. [GSP]
   V1- PATH  V 2- REACH
   The bird flew (all the way) to the tree top.

   b. The $bird$ fly $go$ (the tree top in-direction).
   V1- PATH  V 2- REACH
   The bird flew (towards the tree top).

Along the same lines, there is no theta-relation between the PATH-V1 (qu/go) and the REACH-V2:

(19) $V_{1^* \text{PATH}} V_{2^* \text{REACH}}$
There is, however, a certain kind of (reverse) selectional restriction, in the sense that a *telic* REACH-V₂ can only be merged with a *process* PATH-V₁:

$$V₁^\text{PATH} \quad V₂^\text{REACH}$$

The same applies to the last sub-eventive structure in (2): a RESULT-V₃ can only be merged with a *telic* REACH-V₂. We see that in (21a) for GSP with the RESULT-V₃ *tap*, and in (21b) for the LIS example with the *result* sub-eventive classifier $\text{CLSFx+BE_ATy}$: (from Benedicto, Branchini and Mantovan, 2015):

(21) a. The boy release the bird go catch the tree tap im branch.  [GSP]

D boy release D bird go reach D tree sit 3SPD branch

‘The boy released the bird (all the way) into the tree sit(ting) on its branch.’

b. BIRDx TREEy CLSFx+GO CLSFx+REACHy CLSFx+BE_ATy  [LIS]

‘The bird went (all the way to stand in) to the tree.’

In these cases, the SVC-complementation structure is possible only if a well-formed sub-eventive structure is formed, that is, if a *process-telic(-result)* sub-eventive structural sequence is formed. The co-existence of a *result*(ing) state sub-eventive structure after the REACH *telic* substructure is interesting because of its unusual and unexpected nature: in non-Motion Predicates, it is usually assumed that an added *result* is what makes a predicate telic, and in Motion Predicates, it is assumed that it is a bounded path (see, e.g., Ramchand 2008). Here we can see both substructures. However, this option is subject to language-particular restrictions: Taiwan Mandarin³ does not allow that double substructure, as seen below in (22).

(22) Xiao niao fei qu dao shu shang *zai shu-zhi shang [Tw-Mandarin]

Small bird fly go arrive tree top be_at tree-branch top

That interaction between sub-eventive structures takes us into the issue of the nature of the relation between substructures and how it is accomplished.

5.2. The properties mentioned above lead us to inquire into the nature of the structural relation between the sub-eventive structures and how the linking between them is obtained.

Three issues need to be taken into consideration in relation to this. The first one is that the full multiple-V structure is mono-eventive. If every V comes in with an event(uality) argument, as is commonly assumed in Neo-Davidsonian approaches, then we would expect multiple events (one for each V), not a mono-eventive predicate as is the case.

The second issue is that regular functional application cannot calculate the meaning of the Merge operation, either among the different V’s within the PATH substructure $\pi$ (in (2)), or

³ See also C
between Path and its complement, the telic \textit{REACH} substructure $\tau$. Consider, for instance what happens in the Vectorization calculation that takes place within the path substructure $\pi$ in a case like (5), repeated here as (23):

\begin{equation}
\text{(23)} \quad \text{Kâma tât munah kil yaklâ kiuña [Mayangna]} \text{iguana plank via.P go_up.ø cross.ø go.pst.3S}
\end{equation}

\begin{quote}
‘The iguana went up (a tree) by the plank.’
\end{quote}

If we calculated the meaning of \textit{kil}, \textit{yaklâ} and \textit{kiu-} in a compositional way, the vector denoted would be something like the one in (24a); what obtains, however, is the (intersective) vector in (24b):\footnote{See Benedicto and Salomón (2014) for details.}

\begin{align*}
\text{(24) a.} & \quad \text{b.} \\
& \quad \text{kiu-} \\
& \quad \text{yaklâ} \\
& \quad \text{kil}
\end{align*}

Finally, notice also that there is also only one single DP (internal) argument shared by the whole V-V-V complex, \textit{kâma} in (23).

\textbf{5.3.} Based on these considerations, we propose a three-pronged analysis for these SVC complexes. First, we do maintain a Neo-Davidsonian approach that has every V with its own event argument ([1] in (25)). We also assume a (version of the) \textit{Event Identification} operation (expanding on Kratzer 1996, 2005\footnote{Notice that some of the \textit{REACH} head come up here, e.g. in the linking \textit{argument.}} and others), concomitant with each V-Merge operation ([2] in (25) below). A hand-in-hand \textit{Merge} with \textit{Event Identification} will yield exactly the expected interpretation of (24b) and not the one in (24a). Finally, all the V-subunits in (2) are structurally below one single $\nu$-head. This head, we propose, licenses them categorially and introduces the (internal) argument they all share (the \textit{Figure} of the motion; [3] in (25)). In that sense, then, the individual V-heads carry only the event argument but not an internal (DP) argument.

These three elements combine in the tree in (2):

\begin{equation}
\text{(25)}
\end{equation}
With these three provisions, we capture the single event reading, the sharing of the internal argument and the type of 3D-single vector in (24b) that (5)/(23) produces.\(^6\)

Finally, there are some considerations to be made about the nature of parametrization of the Principles of the Faculty of Language, in particular, what allows mono-eventivity with multiple V’s. There may be some candidates for parametrization. First, we may consider access to an operation like \textit{Event Identification}; but we know that this is universally available in every language, so it is an unlikely candidate. Alternatively, we may consider the ability of \(v^0\) to license multiple V’s in its domain. This option goes along Larson’s observation about the restriction in English to have resultative APs and PPs but not VPs: it may be an indication that \(v^0\) in English cannot license more than one V. We know, independently, that languages may vary in the way a head remains active after having been involved in an operation. Along these lines, we may also think of the availability of alternative operations to overcome this single-use nature of some functional heads: incorporation has been mentioned in ongoing work by Chen about Taiwan Mandarin in comparing Mandarin’s restriction on 2 Vs in the \textit{PATH} substructure, as opposed the 3 Vs in Mayangna in (23).\(^7\)

6. Extension to Agentive Motion Predicates.

The system outlined in (25) above can be extended to cases involving an external Agent, transitivizing intransitive (unaccusative) motion predicates. The case of GSP in (26) below exemplifies this.

\begin{equation}
(26) \quad \text{The boy } \textbf{release} \quad \text{the bird} \quad \text{go} \quad \text{catch the tree} \quad \text{tap im-branch}. \quad \text{[GSP]}
\end{equation}

\begin{equation}
V_{\text{AGENT}} \quad V_{\text{PATH}} \quad V_{\text{REACH}} \quad V
\end{equation}

‘The boy release the bird (all the way) into the tree sit(ting) on its branch’

In such cases, we would postulate an additional agentive \(v^*\) which introduces the Agent argument, resulting in a split \(v\) system, one dedicated to the internal argument (the theme/undergoer/figure) and another higher one, dedicated to the external agentive argument. The \(v^*\) head could come in, at least, two flavors: one being a single grammaticalized purely functional head; another one a semi-grammaticalized V, including a combination of lexical manner-of-action meaning and the purely argument adding \(v^*\). Languages may end up having one or the other, or both. The case of (26) exemplifies the second option (\textit{release} encodes both a lexical manner-of-action and a \(v^*\) adding an external agent argument). The following would be the tree underlying (26):

\[\text{[GSP]}\]

\(v^*\)-head could come in, at least, two flavors: one being a single grammaticalized purely functional head; another one a semi-grammaticalized V, including a combination of lexical manner-of-action meaning and the purely argument adding \(v^*\). Languages may end up having one or the other, or both. The case of (26) exemplifies the second option (\textit{release} encodes both a lexical manner-of-action and a \(v^*\) adding an external agent argument). The following would be the tree underlying (26):

---

\(^6\) It may be that the \textit{Event Identification} that takes place between the three V’s in the \textit{PATH} substructure is not exactly of the same type as the one between \textit{PATH} and \textit{REACH}. We leave this for future pondering.

\(^7\) Kratzer (2005) also addresses the possibilities of incorporation with non-V heads, in the context of resultatives in Norwegian (2005:71), citing Åfarli (1984) and Collins (2002). As to the question of whether the heads under need to be bare non-inflected or not, see Aboh (2009).
7. Conclusion

In this paper, we have presented a case for SVCs in Motion Predicates (MP) as an instance of (i) a strictly structural complementation structure which (ii) syntactically represents the sub-eventive components (i.e. process, telicity and result(ing) state) of mono-eventive motion predicates (with an optional agentive substructure). These components, we have shown, have non-standard properties of complementation in that they have no head-argument relation, theta-role assignment or selectional restrictions; however, they respond to purely structural complementation tests. We have proposed to use already existing tools and combinatorial operations (such as event arguments in each V, and Event Identification operations concomitant with syntactic Merge operations), together with a parametrizable property of the v-head to license more than one head, to derive the observed properties in these Motion Predicates. The data we have provided from a diverse set of genealogically and geographically unrelated languages, together with the proposed analysis, open a window to explore the crosslinguistic parametrization of the structural properties observed.

References


Zheng, Carol Chun. 2015. *An analysis of motion events across three Chinese languages: Suan1tao5Uê7 (Chaoshan), Mandarin & Cantonese*. Preliminary Paper, Purdue University.


**List of abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
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<tr>
<td>#</td>
<td>Unavailable interpretation</td>
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<tr>
<td>-</td>
<td>Morpheme boundary</td>
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<tr>
<td>1</td>
<td>1st person</td>
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<td>2</td>
<td>2nd person</td>
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<td>F</td>
<td>Feminine</td>
</tr>
<tr>
<td>K</td>
<td>Eigenplace projection</td>
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</tbody>
</table>
NEG  Negative morpheme
M     Masculine
NPI   Negative Polarity Item
P     Plural morpheme
PD    Possessive Determiner
PRS   Present tense
PST   Past tense
PV    Preverb (either in the form of a vowel or be-)
S     Singular
SBJV  Subjunctive modality
SUB   Subject
1. Introduction\footnote{I thank Maria Luisa Zubizarreta, Roumyana Pancheva, Stefan Keine, Andrew Simpson, Sengül Gündogdu, Barbara Tomasiewicz, Daniel Piesniak, Deniz Ozyildiz and Omer Demirok for their helpful feedback on the analysis and various versions of the paper. All errors are my own.}

Traditionally, attitude verbs have been analyzed to quantify over worlds, restricted by the doxastic alternatives (DOX), which restrict the quantification to the set of worlds compatible with the attitude holder’s belief (Hintikka 1962). Recent research, however, revealed that these alternatives may be encoded in the complementizer rather than the verb, at least in English (Kratzer 2006, Moulnon 2009a, b). The aim of this paper is to show that complementizer indeed encode more meaning than previously thought but so do verbs, based on data from Turkish. I will aim to achieve this goal by using evidential meaning. Investigating this will also lead to a more fine-grained distinction between what has been previously considered as attitude verbs. It will show that some attitude verbs seem to encode world alternatives lexically whereas others don’t in Turkish. This validates both sides of the discussion in the literature. It supports the traditional view because some attitude verbs do indeed encode world alternatives. But it also supports the recent developments, as some other attitude verbs do not seem to have lexically encoded world alternatives. It is up for discussion whether this is a typological distinction, namely whether attitude verbs in some language encode world alternatives whereas those in others do not. I will have some discussion pointing out that this could explain the differences between English and Turkish, although more research on these languages and others is needed to reach a conclusion. Thus, what is ultimately needed is compatibility between the information encoded on each side. The attitude verbs in focus in this paper are doxastic verbs dream/imagine, believe, hope, think, know, forget, remember, recall and perception verbs see, hear, notice, perceive. The discussion will revolve around the concept of assertion, which I will define as “an expression of what the speaker knows or believes (Hacquard 2010: 37, based on Alonso-Ovalle & Menendez-Benito 2003)”.
2. Data

Turkish does not have a complement directly equivalent to English *that*. But it has at least two different complementation types with specific meanings and functions. The type that will form the focus here is exemplified in (1) under the doxastic verb *remember*:

(1) a. Merve [Ali gel-diye] haturl-iyor²
   M A come-PST diye remember-IMPF
   ‘Merve remembers [diye Ali came] but Ali did not come’

   M A come-FUT diye remember-IMPF
   ‘Merve remembers [diye Ali came] but Ali did not come’

   M A come-IMP diye remember-IMPF
   ‘Merve remembers [diye Ali came] but Ali did not come’

*diye* (morphologically *say*+linker) is a complementizer-like element whose complement makes all tense-aspect distinctions possible in matrix clauses, some of which are exemplified in (1). Because of this, I take the complement of *diye* to be a full TP (to be contrasted with defective TP under nominalizers), semantically a proposition. It introduces the subject’s view on the embedded proposition (how the subject remembers this proposition in (1)) and implies that the speaker also has an opinion on the same embedded proposition, indicated via the continuation in italics in (1). In (1), the speaker ends up disagreeing with the subject about the truth of the embedded proposition, which is the most easily available reading, but s/he can also express doubt or agreement.

There are also various nominalized complement types in Turkish. Here, I focus on the one given in (2):

(2) [Kardec-im-in] gel-diğ-in] haturl-iyor-um
    sibling-1S-3GEN come-DIK-3S-ACC remember-IMPF-1S
    ‘I remember that my sibling came’

–*DIK* is a nominalizer, attaching to a verbal root (*gel-* ‘come’ in (2)). The outermost layer in both is nominal (DP), as evidenced by the genitive marking of the subject (von Heusinger & Kornfilt 2005) and by the person agreement marker that follows the nominalizer. –*DIK* clauses are indicative, make future/non-future distinction (Kornfilt 2003)³ and denote a proposition (Demirok 2018). I will focus on the non-future version of the marker here, namely –*DIK*, which indicates realized events, unless forced to be non-factive under non-factive verbs (Özyıldız 2017).

³ The future form of –*DIK* is –(y)EcEK, which is the same future form used in matrix clauses.
–DIK clauses introduce propositions, which are eventive core-event with its participants; syntactically VP-anchored to time (syntactically TP, but a defective one because the only contrast is between future and non-future, as has been pointed out). There are various ways to show the propositional meaning of –DIK clauses. I will use two here. One is based on what types of predicates they are compatible with when they are in the subject position. –DIK clauses are not compatible with predicates that refer to events (3) but they are compatible with those that refer to truth values (4) (Demirok 2018):

(3) *[Suzan-in hata-yı bul-duğ-u] harika bir olay-dı
   S -3GEN mistake-ACC find-DIK-3S amazing one event-PS
   ‘Intended: That Susan found the mistake was an amazing event’

(4) [Suzan-in hata-yı bul-duğ-u doğru-ydu
   S -3GEN mistake-ACC find-DIK-3S true-PST
   ‘It was true that Susan found the mistake’

The other point, also related, is causative subjects, given in (5). –DIK clauses are not allowed in this position because propositions cannot cause emotions. Compare this with another nominalization structure headed by the nominalizer –mE, which is not discussed here but which refer to events in (5b) (Demirok 2018). –mE clauses are possible in this position because events can cause emotions:

(5) a. *[Ali-nın gel-diğ-i] ben-i üz-dü
   A -3GEN come-DIK-3S I-ACC make.sad-PST
   ‘Intended: That Ali came made me sad’

b. [Ali-nın gel-me-si] ben-i üz-dü
   A -3GEN come-mE-3S I-ACC make.sad-PST
   ‘That Ali came (lit. Ali’s coming) made me sad’

During the discussion, the diye complementizer will form the basis of the proposal and analysis whereas nominalized complements will flesh out details. To that end, the behavior of diye under perception verbs will play a crucial role. The meaning of diye will be discussed in contrast with –DIK nominalizations, as the complements to both are TPs and semantically propositional. I start with the clearest distinction under the verb hear, namely in reportative meaning:

   M E -ABL A come-PST diye hear-PST
   ‘Merve heard from Ece [diye Ali came] but I think Ali did not come’

a’. Merve Ece-den [Ali gel-di diye] duy-du ve ben de geldi diye düşünüyorum
   M E -ABL A come-PST diye hear-PST
   ‘Merve heard from Ece [diye Ali came] and I also think he came’

   M E -ABL A -3GEN come-DIK-3S ACC hear-PST
   ‘Merve heard from Ece [diye Ali came] *but Ali did not come’

   M E -ABL A -3GEN come-DIK-3S ACC hear-PST
   ‘Merve heard from Ece [diye Ali came] and I also think he came’
‘Merve heard from Ece [diye Ali came] and I also think Ali came’

Although both diye clauses and –DIK nominalizations can occur under hear, there is a difference. The embedded proposition in (6b) is presupposed, hence it is not negatable, as indicated by the unacceptability of the continuation given in (6b). The speaker can agree with the subject’s view (6b’), which complements the presupposition of truth, but it sounds a bit redundant because it confirms what is presupposed to be true. (6a), on the other hand, does not establish whether the embedded proposition is true. It only states that the subject heard from someone that it is true, but the speaker might have a different opinion as in (6a). The speaker might also agree with the subject without leading to redundancy (6a’). The main difference between (6a) and (6b) is that the former only implies that the subject has reportative evidence for a proposition without presupposing truth whereas in (6b), there is a presupposed proposition by the speaker, which has been learnt about by the subject in a reportative way. This difference indicates that although both diye clauses and –DIK nominalizations have a proposition and availability of evidence, the former merely states the evidence for the proposition whereas in the latter, the speaker presupposes the proposition without evidence but indicates that the subject has evidence for the same proposition. Thus, these examples show that diye is used to indicate the availability of evidence to make an evaluation about a proposition rather than presupposing the proposition. One can see this more clearly when the subject and the speaker has clearly distinct evidence types, leading to different truth values for the embedded proposition. In this case, diye is a very natural choice of complementation:

(7) Merve sees someone entering Ali’s home and thinks it is Ali always comes at that time. I know that it was Ali’s brother because he told me so. I say to my friend, implying that Merve is wrong:

   M  A come-PST diye see-PST
   ‘Merve saw Ali come’

b. #Merve [Ali-nin gel-diğ-in]-i gör-dü
   M  A 3GEN come-DIK-3S-ACC see-PST
   ‘Intended: Merve saw Ali come’

In (7), there is a perception event, seeing someone come, but there is independent evidence leading to different conclusions about what has been seen. The subject has inferential evidence for the embedded proposition, Ali’s usual arrival time, whereas the speaker has reportative evidence. This is a context that makes diye a natural choice. –DIK clauses, on the other hand, are not acceptable. They are only possible if the event is presupposed by the speaker and the subject saw it, namely, under a reading where the only thing reported is the perceptual event:

(8) Merve saw Ali entering his home and I saw this event happening. I tell that to my friend:

a. #Merve [Ali ev-e gel-di diye] gör-dü
   M  A house-DAT come-PST diye see-PST
   ‘Intended: Merve saw [diye Ali come home]’

b. Merve [Ali-nin ev-e gel-diğ-in]-i gör-dü
   M  A 3GEN house-DAT come-DIK-3S-ACC see-PST
   ‘Merve saw Ali come home’
One last point about the contrast between diye clauses and –DIK nominalizations under perception verbs is about the verb *hear*. Reportative evidence is not the only way one can construct an indirect context with this verb. A similar context to (6) can be constructed as in (9), where the subject has inferential evidence whereas the speaker’s evidence is first-hand in that s/he brings about the event:

(9) Merve hears someone’s footsteps downstairs and thinks it is Ali because it sounds like his way of walking. But it was me and I was just imitating his walking style. I say to my friend, implying that Merve is wrong:

a. Merve \[Ali gel-di \_diye\] duy-du \_ama aslinda o bendim
   M A come-PST diye hear-PST
   ‘Merve heard [diye Ali came] *but it was really me*’

b. #Merve \[Ali-nin gel-diğ-in\]-i duy-du
   M A -3GEN come-DIK-3S-ACC hear-PST
   ‘Intended: Merve heard Ali come’

The examples so far indicate that *diye* is compatible with contexts where the subject (and the speaker) has evidence for the embedded proposition. However, having evidence does not necessarily indicate that the proposition is true. That is why it is possible to disconfirm the conclusion by both the subject (10a) and the speaker (10b) with *diye*. In (10a), the speaker disconfirms the subject’s conclusion but this does not mean that the speaker’s own conclusion is non-negatable, as (10b) shows:

   M E -ABL A come-PST diye hear-PST
   ‘Merve heard from Ece [diye Ali came] *but I think Ali did not come*’

   M A come-PST diye remember-IMPF
   ‘Merve remembers [diye Ali came] *but Ali did not come*’

   B: Yok canım, geldi tabi ki. Hatıramıyorum musun sana da uğramıştır?
      ‘No, of course he came. Don’t you remember that he dropped by you as well?’

The full function of *diye* clauses can be summarized as the following: the subject evaluates the embedded proposition based on his/her own evidence. Recall that *diye* clauses are not presuppositional. Therefore, they indicate assertions in that the subject asserts his/her conclusion (Hooper & Thompson 1975 on the complementarity of assertiveness and presuppositionality). The speaker then evaluates the same proposition associated with the subject’s assertion based on his/her own evidence and makes an associated assertion. Since both evaluations are subjective, both can be challenged. This also follows from the conclusions being in the form of an assertion, since assertions are “expressions of belief/knowledge (Haugard 2010)”.

The last data point I need to point out is about the bigger environment the focused complement types occur in. When we look at which embedding verbs *diye* and –DIK clauses are compatible with based on the examples so far, we can say that *diye* clauses are compatible with doxastic verbs and perception verbs. When combined with the latter, they indicate the existence
of evidence rather than reporting a mere perception event (I will refer to these perception verbs as belief-introducing perception verbs, adapted from Moulton 2009a; but this term will be slightly modified later). DIK nominalizations are compatible with doxastic verbs and perception verbs, but not when they indicate belief.

3. Proposal & Analysis

I propose that for Turkish, doxastic alternatives, defined in (11a), can be specified as or rather replaced by evidence alternatives, as shown in (11b). This quantification is similar to \( W_{EA} \) in Kim (2016), defined as “worlds that are evidentially accessible to some viewpoint holder at some anchoring time, regardless of whether that individual has obtained the evidence directly or indirectly, or the evidence that he/she has if of good quality or not (p. 353)”. By introducing these alternatives, we make sure that we evaluate the proposition only in accordance with the evidence the evaluator has in the actual world. Evidence here should be taken as whatever the holder accepts as evidence. One could take evidence alternatives as the foundation of belief (hence doxastic alternatives). Since diye is correlated with evidence alternatives, the representation of diye is given in (11c):

\[
\begin{align*}
(11) \text{a. } & \text{DOX}_{x,w} = \lambda x. \lambda w. \{w' : \text{it is compatible with what } x \text{ believes in } w \text{ that } w' \text{ is the world } x \text{ lives in} \} \\
\text{b. } & \text{EV}_{x,w} = \lambda x. \lambda w. \{w' : \text{w' is compatible with the evidence } x \text{ has in } w\} \\
\text{c. } & [\text{diye } e_0 e_1] = \lambda p. \lambda e_0. \lambda e_1. \forall w' \in \cap \text{ CON } (e_0) [p(w')] \land \forall w' \in \cap \text{ CON } (e_1) [p(w')] \\
& \quad \text{where } \cap \text{ CON } (e_0) = \text{EV} (tx \text{ Holder } (x, e_0)) \\
& \quad \quad \quad \land \cap \text{ CON } (e_1) = \text{EV} (ty \text{ Holder } (y, e_1))
\end{align*}
\]

Diye is composed of the parts say+linker. Due to the say component and the previous discussion of data indicating that diye is an assertion-introducing marker, let us assume that it introduces two speech events \( e_0 \) and \( e_1 \) with propositional content (adapted from Özyürediž et al. 2018) that consists of the subject’s and speaker’s evidence alternatives, respectively. CON(\( e \)) is a function that picks out the set of propositions associated with \( e \). In other words, \( e \) has associated ‘content’ which consists of the subject’s or the speaker’s evidence alternatives. In this framework, all sentences are relative to an event of evaluation, mediation is done by diye. For example, for the sentence in (12a), we get the representation in (12b):

\[
\begin{align*}
M \text{ A come-PST diye remember-IMPF} \\
\text{‘Merve remembers [diye Ali came] but Ali did not come'} \\
\text{b. } & \lambda e_0. \lambda e_1. [\tau \text{ diye } e_0 e_1 [\tau \text{ Ali geldi}]] \\
\forall w' \in \cap \text{ CON } (e_0) [\text{Ali geldi (w')}] & \land \forall w' \in \cap \text{ CON } (e_1) [\neg \text{Ali geldi (w')}] \\
& \text{where } \cap \text{ CON } (e_0) = \text{EV} (tx \text{ Holder (Merve, e_0)}) \\
& \quad \quad \quad \land \cap \text{ CON } (e_1) = \text{EV} (ty \text{ Holder (Speaker, e_1)})
\end{align*}
\]

The structures of the embedding verbs and complement types in Turkish are as in (14). Assume that evidence alternatives reside in the E(evidence)P layer in syntax:
(13a) is a representation of perception verbs (when they do not indicate belief) and attitude verbs when they combine with −DIK nominalizations whereas (13b) is diye combined with an embedding verb, be it a perception verb or an attitude verb.

The replacement of doxastic alternatives with evidence alternatives causes some change in the meanings of clauses with doxastic verbs (and belief-introducing perception verbs). A sentence as in (14a) can now roughly be translated as (14b) and (15a) as (15b):

(14) a. I remember that he arrived early.
    b. I have evidence that leads me to remember that he arrived early.

(15) a. I think that he will arrive early.
    b. I have evidence that leads me to think that he will arrive early.

Thus, doxastic verbs express the result of an evaluation process based on evidence. In other words, the subject has some evidence that relates to the truth of the embedded proposition. S/he evaluates this proposition based on his/her evidence and expresses it in the form of the attitude. This expression is an assertion, which is why diye clauses are not presuppositional. This also correlates with the say component of diye.

All this means that doxastic verbs can be represented as in (16a). When they combine with diye via Restrict, evidence alternatives introduced by the attitude verb itself and those introduced by diye are matched. That is, the evidence alternatives related to the assertion event in diye and the attitude in the doxastic verb match because they are related to the same holder and content (similar to vacuous quantification in Haegard 2010). (17) shows this with a concrete example. The holder of the first speech event is the subject, Merve, and so is that of the attitude’s:

(16) a. [[remember]] = λe.λp.λx.λw. Holder (e,x) & remember’ (e,w) ∀w’ ∈ CON(e):
    [p(w’)], where ∩ CON (e)=EV (tx Holder (e, x), w)

    ‘Merve remembers [diye Ali came] but Ali did not come’

b. [diye Ali came]] = λe0. λe1. [CP diye e0 e1 [TP Ali came]] ∀w’ ∈ ∩ CON (e1) [Ali came (w’)] & ∀w’ ∈ ∩ CON (e) [¬Ali came (w’)]
    where ∩ CON (e0)=EV (tx Holder (Merve, e0))
EVIDENCE ALTERNATIVES IN ATTITUDE VERBS

& ∩ CON (e₁)=EV (ty. Holder (Speaker, e₁))

b. \[\text{[remember diye Ali came] = } λx.λx.λw. \forall w' ∈ EV \text{ Holder (Merve, Ali-come)}
& \text{remember}' (Ali-come, w')
& ∃ e₀. ∃ e₁. [\text{cp diye } e₀ e₁ [\text{cp Ali came}] \forall w' ∈ ∩ CON (e₀) [\text{Ali came } (w')] \forall w' ∈ ∩ CON (e₁) [\neg\text{Ali came } (w')]\]
where \(\cap\) CON (e₀)=EV (ty. Holder (Merve, e₀))
& ∩ CON (e₁)=EV (ty. Holder (Speaker, e₁))

(16) implies that even in the absence of \textit{diye}, doxastic verbs have an evidential component even in the absence of \textit{diye}. This is supported by the following data set. One can probe into the evidence of the subject even in the absence of \textit{diye} with doxastic verbs (18a) but not with perception verbs (18b):

(18) a. A: Merve [Ali-nin gel-diğ-in]-i hatırliyor
M A-3GEN come-DIK-3S-ACC remember-IMPF
‘Merve remembers that Ali came’
B: Niye öyle hatırlıyor?
‘Why does she remember it like that?’
A: Çünkü eve girerken görmüş
‘Because she saw him coming into the house’

b. A: Merve [Ali-nin gel-diğ-in]-i gör-müş
M A-3GEN come-DIK-3S-ACC remember-INDPST
‘Merve saw that Ali came’
B: #Niye öyle gör-müş?
‘Why did she see it like that?’

This brings us to the representation of perception verbs. The difference between doxastic verbs and perception verbs is that only the former encodes evidence alternatives lexically. Perception verbs only introduce an event, so they are mere reports of perception events (19). This is supported by the contexts such as (7)-(9), where the availability of independent evidence makes acceptability judgment differences. Note that perception events can be combined with \textit{diye}, in which case they indicate belief. This is presumably due to the event type they introduce (similar to the argument for verbs of speech in Moulton (2009b)), a topic which I leave for future research:

(19) a. \[\text{[see direct]} = λe.λx.λw. \text{Holder } (x,e) & \text{see'} (e,w)\]

In the next section, I will discuss two major implications of this proposal for the literature: content argument and the differences between doxastic and perception verbs.

4. Discussion

The debate on the interaction between verbs and complements revolves around the issue of what piece of structure encodes the information that ultimately produces the output meaning: complements or subcategorizing verbs? There are arguments for both and the aim of this paper is to show that both contribute mutually compatible parts of the overall meaning.
Early studies grouped verb types based on their subcategorization for the type of complementizer(s) they take (e.g. Kiparsky & Kiparsky 1971; Grimshaw 1979). In that approach, verbs choose their complements, thus it is their semantic/syntactic requirements that play a crucial role in producing the output meaning and structure. That is, matrix verbs subcategorize for certain complement types, which makes the verbs determine the structure of their complement. See the examples below, from Grimshaw 1979, (92a), (93a)).

(20) a. I asked [what answer he gave].
    b. They asked [the answer he gave]

(21) a. I wonder what answer he gave.
    b. *I wonder the answer he gave.

*Ask and wonder are both verbs that require an interrogative complement. However, only ask allows a DP complement whereas wonder does not (due to case-assignment abilities of the verbs, as the argument goes).

Another relevant example is ECM structures, from Kiparsky & Kiparsky (1971). Only non-factive predicates allow ECM constructions, as exemplified in (22). The structure of the complement, again, is determined by the verb in that we can predict whether a complement type is allowed based on the verb’s meaning. For these examples, I assume that ECM complements have a different structure than non-ECM complements. These examples show that complements to different verb types have different structures:

(22) a. *I resent Mary to have been the one who did it.
    b. I believe Mary to have been the one who did it.

Recently, there has been more focus on what meaning the complementizer encodes. See (23) for a representative set of data from Moulton (2009a): p. 2, ex. (1a), (1d), (1e), respectively; see also Bresnan 1972 for examples pointing to the same conclusion):

(23) a. John saw Fred leave early.
    b. John saw Fred to be a party-pooper.
    c. John saw that Fred left early.

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>bare infinitive</td>
<td>direct perception</td>
</tr>
<tr>
<td>infinitive</td>
<td>belief</td>
</tr>
<tr>
<td>finite clause</td>
<td>factive</td>
</tr>
</tbody>
</table>

The selecting verbs in (23) are all the same as well as the matrix subject and embedded subject. So, the differences in meaning derives from the complement itself. More specifically, the structure of the complement seems to make the meaning differentiation in (23a)-(23c).

There is a contrast between (22) and (23), specifically (23b), that highlights the main point of discussion in the literature. Notice that the complement in (23b) is an ECM structure and so are the complements in (22) –grammatical or not-. Yet, the conclusions that have been drawn about

---

4 When I refer to ‘the structure of the complement’ here, I mostly refer to the highest node in the complement. However, internal structure might be important as well, as the Turkish data will show (i.e. elements with the same outermost layer might still have different effects based on other, lower phrase levels).
the role of structure parts have been different: Looking at (22), it was concluded that it is the verb that plays the major role and the complement's role was not discussed in detail (if at all). (23), however, indicates that the complement is the main source of meaning distinctions. These are conclusions drawn based on the same type of complement: ECM complements. It therefore looks like we need to investigate both sides in more detail rather than expecting one side to be the only contributor. This is the position the current study takes. I have argued that dyre encodes world alternatives (as opposed to \(D\)K, which does not). However, attitude verbs also encode world alternatives, as opposed to perception verbs.

The proposal and the analysis in this paper also have implications for the representation of attitude verbs. The traditional analysis of attitude verbs says that they quantify over worlds, restricted by the function doxastic alternatives defined in (25), which restricts the quantification to the set of worlds compatible with an attitude holder's belief. This meaning is represented as in (24) (Hintikka 1962):

\[
(24) \quad [\text{believe}(p)(x)(w)) = 1 \text{ iff } \forall w' \in \text{DOX}(x, w): p(w') = 1
\]

\[
(25) \quad \text{DOX}_{x,w} = \lambda x. \lambda w. \{ w' : \text{it is compatible with what } x \text{ believes in } w \text{ that } w' \text{ is the world } x \text{ lives in } \}
\]

Although this analysis has been fruitfully applied in many studies, recent research pointed out to phenomena not directly explainable by (24). Here, I will focus on the issue of sub-classes of attitude verbs. It seems that not all verbs that have been considered as attitude verbs behave the same. This issue will be better understood when another problem is understood, so I will start with this other problem: the issue of the content argument. This problem is exemplified in (26a) (Kratzer 2006: 1). That nouns like story are content nouns is supported in (26b) from (Moulton 2009b: 4), as the contents of these nouns are fleshed out via a complementizer clause. Notice that verbs like believe are compatible with these nouns. In fact, most doxastic verbs are compatible with such nouns in English. This contrasts with another type of attitude verb classes, verbs of speech (27):

(26) a. I believe this story.
    b. Pinchwife does not believe the rumor that Horner is impotent because, as he well knows, rumors are unreliable.
    c. Pinchwife does not believe that Horner is impotent because, as he well knows, rumors are unreliable.

(27) a. *Fred said the rumor.
    b. *Fred said the rumor that Horner is impotent.
    c. Fred said that Horner is impotent.

This showed that 'attitude verbs' as a blanket term may not be the right way to go, as not all that fall under that term (Pearson 2015) behave the same. This has led to studies investigating sub-classes of attitude verbs (e.g. Moulton 2009b, Anand & Hacquard 2014). Here, I focused on the distinction between doxastic verbs and perception verbs. I argued that doxastic verbs encode evidence alternatives whereas perception verbs merely indicate an event lexically, but they can be combined with a complement (diye) that introduces the evidence-alternatives. Is there a way to show how this distinction affects the use these classes? I believe there is and the underlying concept seems to be stativity versus agentivity. In other words, verbs that encode world
alternatives encode ‘mental states’, hence (more) stative, whereas those that do not are (more) agentive.

Recall from (23b) that an accusative-infinitive complement indicates belief. Moulton (2009a), following Pesetsky (1991), notes that all verbs that can take an accusative-infinitive argument in English are stative:

(28) believe, consider, fancy, hold, judge, suspect, presume, recognize, remember, understand, figure, find, imagine, reckon, regard, feel, know, take, gather

However, when combined with non-accusative-infinitive complements, these verbs can be combined with the progressive, which indicates an eventive reading:

(29) a. John was considering his options.
    b. #John was considering his options to be bad.

If doxastic verbs always indicated belief in English, even without an accusative-infinitive complement, they would be unable to combine with the progressive. Based on this behavior, Moulton suggests that doxastic verbs also may not indicate belief lexically in English (i.e. doxastic alternatives may not be lexically encoded in the verb).

Turkish doxastic verbs behave differently. The progressive test cannot be directly applied to Turkish, as the progressive/imperfective does not indicate only agentivity but is also used for what is considered statives in English, presumably because the language otherwise lacks a ‘present tense marker’. However, it might be suggestive to note that doxastic verbs perception verbs have a different meaning with the imperfective than doxastic verbs:

(30) a. Merve [Ali-nin gel-diğ-in]-i görüyor (*taşındığından beri)\(^5\)
    M   A -3GEN come-DIK-3S-ACC see-IMPF
    ‘Merve is seeing that Ali came’
    b. Merve [Ali-nin gel-diğ-in]-i hatırlıyor (taşındığından beri)
    M   A -3GEN come-DIK-3S-ACC remember-IMPF
    ‘Merve remembers that Ali came’

When combined with the imperfective, the perception verb indicates an event that is happening now, hence a continuous situation starting in the past is not compatible (similar to perfect in English). In other words, the event must be happening right now. If an extended time period is enforced on the perception verb, then the only reading available is iterative. This is different with doxastic verbs, however. As shown in (30b), the combination of the imperfective and an attitude verb easily refers to an extended time of remembering (state), as shown by the acceptability of the continuation. The meaning distinction is also indicated in the translations. The difference is that the doxastic verb is stative, and as such can be extended, but the perception verb is not stative but rather it is eventive. Note that neither of the verbs have a belief component indicated by their complement as both have the factive complement. Thus, the verb itself must be responsible for this difference.

\(^5\) Unless the seeing events are iterative
We can also see this difference when these verbs appear in the complement of relative clauses headed by *durum* ‘state/situation’ and *olay* ‘event’. Again, I use a factive complementizer to eliminate potential belief effects coming from *diye*:

(31) a. Merve-nin [Ali-nin gel-diğ-in]-i görme-si #durum-u/olay-i
M A -3GEN come-DIK-3S-ACC see-mE-3S state-3S/event-3S
   ‘The state/event of Merve seeing Ali come’

b. Merve-nin [Ali-nin gel-diğ-in]-i hatırla-ma-si durum-u/#olay-i
M A -3GEN come-DIK-3S-ACC remember-mE-3S state-3S/event-3S
   ‘The state/event of Merve remembering Ali came’

Another potential indicator that doxastic verbs have a (belief) state component is the variability in judgments of negatibility when doxastic verbs combine with the factive complement. When compared with *diye*, one can see that *DIK* nominalizations under doxastic verbs lead to a factive reading where the embedded proposition is presupposed and thus cannot be negated, whereas *diye* does not presuppose it and therefore negating is possible. Negatability is important because it shows that the embedded event is presented from someone’s viewpoint and not in the actual world, hence it indicates the existence of a belief component (i.e. if it was evaluation in the actual world, we would not be able to dispute the proposition):

(32)  
      M A -3GEN come-DIK-3S-ACC remember-IMPF
      ‘Merve remembers that Ali came #but Ali did not come’

      M A come-PST diye remember-IMPF

Although I do not like propositions with *DIK* as in (32a) to be negated, it turns out that there is speaker variation and there are people who actually do not like it (Özyıldız, p.c.). Even for speakers like me who do not like it, however, negating *DIK* clauses sound better under doxastic verbs when compared to negating them under perception verbs ((33) indicates my judgments when the two verb classes are compared):

      M A -3GEN come-DIK-3S-ACC remember-IMPF
      ‘Merve remembers that Ali came #but Ali did not come’

  b. Merve [Ali-nin gel-diğ-in]-i gör-di #ama Ali gelmedi
      M A -3GEN come-DIK-3S-ACC see-IMPF
      ‘Merve saw that Ali came #but Ali did not come’

Making the statements into a two-way conversation illustrates this difference better, at least according to my judgments:

---

*Olay* is possible only if one refers to the exact moment the remembrance state starts, similar to ‘Then I knew the answer’ type of sentences in English.
Therefore, doxastic verbs in Turkish have a stative component even in the absence of a complement that indicates it. This leads to the conclusion that the verbs must lexically encode it. This supports traditional analyses of attitude verbs, where doxastic alternatives are in the definition of the verbs (and also more recent studies that argue that doxastic verbs encode mental states (e.g. Anand & Hacquard 2014)):

\[(\text{believe } (p(x)(w))) = 1 \text{ iff } \forall w' \in \text{DOX} (x, w) : p(w') = 1\]

I speculate that it is the evidence component that causes this difference between English and Turkish. As I stated before, I take the attitude verb to indicate the result of an evaluation process (of embedded proposition) based on evidence. Hence, *I think that Ali came* informally means ‘I have evidence that Ali usually comes at this time and based on this evidence, I think that he came’. Thus, the result point of this evaluation process is a thinking state (or remembering state, hoping state etc.).

5. Conclusion

In this paper, I investigated various complementation types in Turkish and their behavior under doxastic and perception verbs and argued that the former encodes world alternatives (more specifically, evidence alternatives) lexically whereas the latter does not but can be combined with a complement that encodes them (Moulton 2009a). This goes against recent work on attitude verbs that argue that world alternatives are (only) in the complement rather than the verb (e.g. Moulton 2009a), but it is yet to be seen if this is subject to cross-linguistics variation. It is also the case that some attitude verbs, e.g. perception verbs, do not have world alternatives in their lexical representation, which supports these recent studies.
References


1. Introduction

This paper investigates “dual” selectional requirements on complementation, focusing on complementizer stacking in Japanese and Korean exemplified by (1) and (2). In (1, 2), two complementizers, i.e. the interrogative complementizer ka/nya ‘Q’ and the declarative complementizer to/ko ‘that’, are stacked at the right edge of the complement clause:

(1) John-wa Bill-ni [dare-ga kita ka to] tazuneta (Japanese)  
John-TOP Bill-DAT who-NOM came Q that asked  
‘John asked Bill who came.’

John-TOP Mary-DAT that problem-ACC solved Q that asked  
‘John asked Mary whether she solved the problem.’

I argue that complementizer stacking clauses like (1) and (2) involve “dual” selectional requirements, i.e. semantic selection between the matrix predicate ‘ask’ and the interrogative complementizer ka/nya ‘Q’ and syntactic selection between the matrix predicate ‘ask’ and the declarative complementizer to/ko ‘that’. Given the sisterhood condition on selection, it remains unaccounted for why the matrix predicate ‘ask’ can semantically select the interrogative complementizer ka/nya ‘Q’ skipping over the declarative complementizer to/ko ‘that’. I propose that labeling conflicts allow “relabeling” to apply as part of LF-Transfer, which accounts for the “dual” selectional requirements in complementizer stacking clauses. Since “relabeling” is an operation where labeling applies without Merge, the proposed analysis presents further evidence for the symmetric Merge coupled with labeling algorithms approach (Chomsky 2008, 2013, 2015), which claims that Merge and labeling are independent operations. It also supports the view that labeling is needed not only for interpretations at the interfaces but also for selection as advocated by Chomsky (2008) and Blümel (2017).

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The organization of this paper is as follows. Section 2 investigates complementizer stacking clauses in Japanese. It is shown that complementizer stacking clauses involve “dual” selectional requirements. Section 3 presents evidence against a direct quotation analysis of complementizer stacking clauses. Section 4 discusses complementizer stacking clauses in Korean. Section 5 proposes a “relabeling” analysis of complementizer stacking clauses, which gives us an account of “dual” selectional requirements. Section 6 makes concluding remarks.

2. Complementizer Stacking in Japanese

2.1 Semantic Selection

Predicates like tazuneru ‘ask’ semantically select an interrogative clause. They can take a clause headed by the interrogative complementizer ka ‘Q’ as shown in (4b) whereas they cannot take a clause headed by the declarative complementizer to ‘that’ as shown in (4a):

(a) John-wa Bill-ni [ Mary-ga kita to] tazuneta
    John-TOP Bill-DAT Mary-NOM came that asked
    Lit. ‘John asked Bill that Mary came.’
(b) John-wa Bill-ni [ dare-ga kita ka] tazuneta
    John-TOP Bill-DAT who-NOM came Q asked
    ‘John asked Bill who came.’

2.2 Complementizer Stacking

As pointed out by Fukui (1986), Saito (2010), Hoshi (2011), and Miyagawa (2011), these two complementizers, i.e. the interrogative complementizer ka ‘Q’ and the declarative complementizer to ‘that’ can be stacked at the right edge of the complement clause selected by predicates like tazuneru ‘ask’ as shown in (1) (repeated here as (4)):

(4) John-wa Bill-ni [ dare-ga kita ka to] tazuneta
    John-TOP Bill-DAT who-NOM came Q that asked
    ‘John asked Bill who came.’

Given that selection is ‘local’ in the sense that an element can only select its sister, a question arises how the matrix predicate can semantically select the interrogative complementizer ka ‘Q’ skipping over the declarative complementizer to ‘that’ in (4).

2.3 Syntactic Selection

One might argue that if we assume that the declarative complementizer to ‘that’ is transparent for selection in (4), we can account for the “dual” selectional requirements. As pointed out by Saito (2010), however, not all matrix predicates allow complementizer stacking. For example, predicates like sirigagaru ‘want-to-know’, tyoosasuru ‘investigate’, and hakkensuru ‘discover’ semantically select an interrogative clause as shown in (5) whereas they cannot take complementizer stacking clauses as shown in (6):

(5) a. * John-wa Bill-ni [ Mary-ga kita to] tazuneta
    John-TOP Bill-DAT Mary-NOM came that asked
    Lit. ‘John asked Bill that Mary came.’
(b) John-wa Bill-ni [ dare-ga kita ka] tazuneta
    John-TOP Bill-DAT who-NOM came Q asked
    ‘John asked Bill who came.’

Given that selection is ‘local’ in the sense that an element can only select its sister, a question arises how the matrix predicate can semantically select the interrogative complementizer ka ‘Q’ skipping over the declarative complementizer to ‘that’ in (4).

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The contrast between (4) and (6) shows the difference of syntactic selection between predicates like *tazuneru* ‘ask’ and those like *siritagaru* ‘want-to-know’; predicates like *tazuneru* 'ask' can syntactically select a declarative clause headed by *to* ‘that’ whereas predicates like *siritagaru* ‘want-to-know’ in (6) cannot.

### 2.4 “Dual” Selectional Requirements in Japanese

I argue that “dual” selectional requirements are involved in complementizer stacking clauses like (4); (i) semantic selection between *tazuneru* ‘ask’ and the interrogative complementizer *ka* ‘Q’ at LF, and (ii) syntactic selection between *tazuneru* ‘ask’ and the declarative complementizer *to* ‘that’ in overt syntax as a driving force of Merge. In the traditional analysis, there are two possible structures of (4), *i.e.* the head complement structure (7a) and the adjunction structure (7b):

\[
\begin{align*}
(7) & \quad \text{a. Head-Complement} & & \text{b. Adjunction} \\
& \quad \text{that} & & \text{ask} \\
& \quad \text{Q} & & \text{that} \\
& \text{TP} & & \text{Q} \\
& \text{Q} & & \text{that} \\
& \text{TP} & & \text{Q} \\
\end{align*}
\]

Given the sisterhood condition on selection, the “dual” selectional requirements cannot be captured by either head-complement structure or adjunction structure. The head-complement structure (7a) can capture syntactic selection but not semantic selection whereas the adjunction structure (7b) can capture semantic selection but not syntactic selection. What we need is therefore a “dual” structure, where one syntactic object may have more than one structure, *i.e.* both the head-complement structure and the adjunction structure.

One might argue that if we allow the Q-feature of the interrogative complementizer *ka* ‘Q’ to percolate up the higher phrase headed by *to* ‘that’, the matrix predicate *tazuneru* ‘ask’ can satisfy the “dual” selectional requirements. I do not adopt such a partial percolation analysis, however, since the *that*-clause would end up having both an interrogative feature [+Q] and non-interrogative feature [-Q], which is contradictory; this would result in an anomalous interpretation at LF.

### 3. Evidence against a Direct Quotation Analysis

Before turning to an analysis, I will show that complementizer stacking clauses are not direct quotations but complement clauses.
3.1 Polite Forms
First, as argued by Miyagawa (1987), direct *wh*-questions with *ka* ‘Q’ are deviant if the verb is in the plain form without the polite suffix -masu, as shown by the contrast between (8a) and (8b):

(8) a.  *Dare-ga kita* ka (plain form)
who-NOM came Q
‘Who came?’

b. Dare-ga *kimasita* ka (polite form)
who-NOM came Q
‘Who came?’

In the complementizer stacking clause in (4) (repeated here as (9)), *ka* ‘Q’ is used with the plain verb form *kita* ‘came’. This shows that the complementizer stacking clause (9) does not involve a quoted direct *wh*-question but a complementation:

(9) John-wa Bill-ni [dare-ga kita ka to] tazuneta (plain form)
    John-TOP Bill-DAT who-NOM came Q that asked
Lit. ‘John asked Bill who came.’

3.2 Extraction
Second, direct quotations are opaque to extraction as shown in (10) and (11):

(10)* **What** did Mary say, “I am going to buy it?”

(11)* Sono situmon-ni Mary-ga, “Dare-ga t tadasiku kotaeta no kasira”
that question-DAT Mary-NOM who-NOM correctly answered Q PART
to tazuneta rasii that asked seem
Lit. ‘**That question**, it seems that Mary asked, “Who answered it correctly?”’

Extraction out of a complementizer stacking clause, on the other hand, is allowed as shown in (12). This also shows that complementizer stacking clauses are not direct quotations but complement clauses:

(12) Sono situmon-ni Mary-ga [dare-ga t tadasiku kotaeta ka to] that question-DAT Mary-NOM who-NOM correctly answered Q that
tazuneta rasii asked seem
Lit. ‘**That question**, it seems that Mary asked who answered it correctly.’

3.3 Pronominal Binding
Third, direct quotations are opaque to pronominal binding as shown in (13) and (14):

(13) Mary₁ asked John, “Who cheated her₁/₂?”
(14) Mary$_1$-ga John-ni, “Dare-ga kanozyo$_{1/2}$-o damasita no kasira,” to
Mary-nom John-dat who-nom she-acc cheated q part that
asked seem
tazuneta rasii
‘It seems that Mary asked John, “Who cheated her?”’

In (13) and (14), the pronoun within the direct quotation cannot be coreferential with the
matrix subject Mary. The pronoun kanozyo ‘she’ within the complementizer stacking clause
in (15), on the other hand, can be coreferential with Mary. Hence, complementizer stacking
clauses are not opaque to pronominal binding:

(15) Mary$_1$-ga John-ni [dare-ga kanozyo$_{1/2}$-o damasita ka to] tazuneta rasii
Mary-nom John-dat who-nom she-acc cheated q that asked seem
‘It seems that Mary asked John who cheated her.’

3.4 De re Readings

Fourth, descriptions in direct quotations may not be interpreted as de re. In (16a), for instance,
my mother in the direct quotation can only be interpreted as de dicto but not as de re. This is
in contrast with (16b), where his mother in the complement clause can be interpreted as either
de dicto or de re:

(16) a. Oedipus said, “My mother is pretty.”
   De dicto: Oedipus knows she is his mother.
   *De re: Oedipus doesn’t know she is his mother.
   
   b. Oedipus said his mother is pretty.
   De dicto: Oedipus knows she is his mother.
   De re: Oedipus doesn’t know she is his mother.

This contrast regarding the de dicto and de re readings between direct quotations and
complement clauses can also be observed in Japanese. In (17a), for example, sensei ‘teacher’
in the direct quotation cannot be interpreted as de re; (17a) is deviant in the given context. In
(17b), on the other hand, sensei ‘teacher’ in the complement clause can be interpreted as de re;
(17b) is acceptable:

(17) Context: Mary saw Jack talking with the man who was a stranger to her. She asked me
who Jack was talking with. She doesn’t know Jack is a teacher. In the classroom, I say
to someone else:
   a. #Mary-ga, “Sensei-wa dare-to hanasiteita no kasira,” to boku-ni
   Mary-nom teacher-nom who-with was.talking q part that I-dat
   tazuneta yo
   asked part
   ‘Mary asked me who the teacher was talking with.’
b. Mary-ga [sensei-ga dare-to hanasiteita ka] boku-ni
tazuneteita yo
asked PART
‘Mary asked me who the teacher was talking with.’

The complementizer stacking clause (18) is acceptable in the same context as (17), which that sensei ‘teacher’ in the complementizer stacking clause can be interpreted as de re. Hence, complementizer stacking clauses are not direct quotations but complements.

(18) In the same context as (17):
Mary-ga [sensei-ga dare-to hanasiteita ka to] boku-ni
Mary-NOM teacher-NOM who-with was.talking Q that I-DAT
tazuneteita yo
asked PART
‘Mary asked me who the teacher was talking with.’

3.5 Temporal Modifiers

Fifth, temporal modifiers within direct quotations are evaluated relative to subjects. In (19), for instance, the temporal modifier tomorrow within the direct quotation is evaluated relative to the subject Mary; tomorrow is interpreted as the day after Mary’s saying or asking. In (20), on the other hand, tomorrow in the complement clause is evaluated relative to the speaker; tomorrow is interpreted as the day after speech act:

(19) a. Mary said, “I will come to the party tomorrow.”
   b. Mary-ga John-ni, “Dare-ga asita paatii-ni kuru no kasira,”
Mary-NOM John-DAT who-NOM tomorrow party-to come Q PART
tazuneteita yo
asked PART
‘Mary asked John, “Who comes to the party tomorrow?”’

(20) a. Mary said she would come to the party tomorrow.
tazuneteita yo
asked PART
‘Mary asked John who would come to the party the next day.’

In the complementizer stacking clause (21), tomorrow is interpreted as the day after speech act, which shows that complementizer stacking clauses are complements:

(21) Mary-ga [dare-ga asita paatii-ni kuru ka to]
John-ni tazuneteita yo
John-DAT asked PART
‘Mary asked who would come to the party the next day.’
3.6 Evaluative Predicates

Sixth, evaluative predicates within direct quotations are evaluated relative to subjects whereas those within complement clauses are evaluated relative to speakers. In (22), for example, *that idiot* in the direct quotation is evaluated relative to the subject *Mary*; it is *Mary* who thinks that he is an idiot. In (23), on the other hand, *that idiot* in the complement clause is evaluated relative to the speaker; it is the speaker who thinks that he is an idiot:

(22) a. Mary said, “I love that idiot.”
   b. Mary-wa John-ni, “Dare-ga ano orokamono-ni taikin-o
      Mary-TOP John-DAT who-NOM that idiot-DAT a lot of money-ACC
      watasita no kasira,” to tazuneta
gave Q PART that asked
   ‘Mary asked John, “Who gave a lot of money to that idiot?”’

(23) a. Mary said she loves *that idiot*.
   b. Mary-wa John-ni [ dare-ga ano orokamono-ni taikin-o
      Mary-TOP John-DAT who-NOM that idiot-DAT a lot of money-ACC
      watasita ka] tazuneta
gave Q asked
   ‘Mary asked John who gave a lot of money to that idiot.’

When *that idiot* appears in the complementizer stacking clause, it is evaluated relative to the speaker as shown in (24). This shows that complementizer stacking clauses are complements:

(24) Mary-wa John-ni [ dare-ga ano orokamono-ni taikin-o
      Mary-TOP John-DAT who-NOM that idiot-DAT a lot of money-ACC
      watasita ka to] tazuneta
gave Q that asked
   ‘Mary asked John who gave a lot of money to that idiot.’

3.7 Deictic Terms

Finally, deictic terms within direct quotations are evaluated relative to subjects whereas those in complement clauses are evaluated relative to speakers. In (25), for instance, the deictic term *this* within the direct quotation is evaluated relative to the subject *Mary*; *this picture* is near *Mary*. In (26), on the other hand, the deictic term *this* within the complement clause is evaluated relative to the speaker; *this picture* is near the speaker:

(25) a. Mary said, “I want *this* picture.”
   b. Mary-wa John-ni, “Dare-ga kono e-o kaita no kasira,”
      Mary-TOP John-DAT who-NOM this picture-ACC drew Q PART
to tazuneta
   ‘Mary asked John, “Who draw this picture?”’
(26) a. Mary said that she wanted this picture.
   b. Mary-wa John-ni [ dare-ga kono e-o kaita ka] tazuneta
Mary-TOP John-DAT who-NOM this picture-ACC draw Q asked
   ‘Mary asked John who draw this picture.’

The deictic term this in the complementizer stacking clause is evaluated relative to the speaker as shown in (27), which indicates that complementizer stacking clauses are complements:

(27) Mary-wa John-ni [ dare-ga kono e-o kaita ka to] tazuneta
Mary-TOP John-DAT who-NOM this picture-ACC draw Q that asked
   ‘Mary asked John who draw this picture.’

4. Complementizer Stacking in Korean

4.1 Semantic Selection

Having investigated complementizer stacking clauses in Japanese, I will then look at complementizer stacking clauses in Korean. In a Korean complementizer stacking clause, a matrix verb semantically selects a mood markers within its complement clause as exemplified by (28-31):

(28) John-nun [ Mary-ka ku mwuncey-lul phwul-ess ta/*nya/*la/*ca ko]
John-TOP Mary-NOM that problem-ACC solved DECL/Q/IMP/EXH COMP
cwucangha-ess-ta
claimed
‘John claimed that Mary solved the problem.’

(29) John-nun Mary-eykey [pro ku mwuncey-lul phwul-ess *ta/*nya/*la/*ca ko]
John-TOP Mary-DAT that problem-ACC solved DECL/Q/IMP/EXH COMP
mul-ess-ta
asked
‘John asked Mary whether she solved the problem.’

(30) John-nun Mary-eykey [pro ku mwuncey-lul phwul *ta/*nya/*la/*ca ko]
John-TOP Mary-DAT that problem-ACC solve DECL/Q/IMP/EXH COMP
myengryengha-ess-ta
ordered
‘John ordered Mary to solve the problem.’

(31) John-nun Mary-eykey [ pro ku mwuncey-lul phwul *ta/*nya/*la/ca ko]
John-TOP Mary-DAT that problem-ACC solve DECL/Q/IMP/EXH COMP
ceyanha-ess-ta
suggested
‘John suggested to Mary to solve the problem together.’
As shown above, the matrix verbs *cwucangha* ‘claim’, *mul* ‘ask’, *myengryengha* ‘order’, and *ceyanha* ‘suggest’ semantically selects the declarative mood marker *ta*, the interrogative mood marker * nya*, the imperative mood marker *la*, and the exhortative mood marker *ca*, respectively. Similarly, a matrix noun semantically selects a mood marker within its complement clause as exemplified by (32-35):

(32) [John-i ku mwuncey-lul phwul-ess ta/*nya/*la/*ca nun] cwucang
    John-NOM that problem-ACC solved DECL/Q/IMP/EXH that claim
    ‘the claim that John solved the problem’

(33) [John-i ku mwuncey-lul phwul-ess * ta/*nya/*la/*ca nun] cilmwun
    John-NOM that problem-ACC solved DECL/Q/IMP/EXH that question
    ‘the question whether John solved the problem’

(34) [pro ku mwuncey-lul phwul * ta/*nya/*la/*ca nun] myenglyeng
    that problem-ACC solve DECL/Q/IMP/EXH that order
    ‘the order to solve the problem’

(35) [pro ku mwuncey-lul phwul * ta/*nya/*la/*ca nun] ceyan
    that problem-ACC solve DECL/Q/IMP/EXH that suggestion
    ‘the suggestion to solve the problem together’

The matrix nouns *cwucang* ‘claim’, *cilmwun* ‘question’, *myenglyeng* ‘order’, and *ceyan* ‘suggest’ semantically select the declarative mood marker *ta*, the interrogative mood marker * nya*, the imperative mood marker *la*, and the exhortative mood marker *ca*, respectively.

4.2 Syntactic Selection

A question arises how the matrix predicate can semantically select a mood marker skipping over *ko/*nun* in (28-35). We cannot simply assume that *ko* and *nun* are transparent for selection. As shown by the contrast between (36) and (37), matrix verbs take *ko* but not *nun* whereas matrix nouns take *nun* but not *ko*. This shows that matrix verbs syntactically select *ko* whereas matrix nouns syntactically select *nun*:

    John-TOP Mary-NOM that problem-ACC solved DECL that
    cwucangha-ess-ta claimed
    ‘John claimed that Mary solved the problem.’

b. John-un Mary-eykey [pro ku mwuncey-lul phwul-ess nya *ko/*nun]
    John-TOP Mary-DAT that problem-ACC solved Q that
    mul-ess-ta asked
    ‘John asked Mary whether she solved the problem.’
4.3 “Dual” Selectional Requirements in Korean

I argue that “dual” selectional requirements are also involved in Korean complementizer stacking clauses; (i) semantic selection between a matrix predicate and a mood marker at LF, and (ii) syntactic selection between a matrix verb/noun and ka/nun ‘that’ in overt syntax as a driving force of Merge.

5. A Proposal

This section proposes a “relabeling” analysis of “dual” selectional requirements in Japanese and Korean complementizer stacking clauses. Before coming on to that, I will briefly explicate Merge, labeling algorithms, and labeling conflicts that are crucial in the proposed analysis.

5.1 Merge and Labeling Algorithms

Merge is a uniform operation that constructs a structure. In Chomsky's (1995) formulation of Merge (38), labeling is part of Merge, which makes Merge asymmetric:

\[(38) \text{Asymmetric Merge} \]

\[
\text{Merge} (\alpha, \beta) =_{\text{def}} \{ \gamma, \{ \alpha, \beta \} \}, \text{where } \gamma \in \{ \alpha, \beta \}
\]

In the asymmetric formulation of Merge (38), every node must have a label, but this is a
residue of phrase structure grammar. It is therefore better to separate the labeling part from Merge. Under this view, Chomsky (2008, 2013, 2015) formulates Merge as a symmetric operation as formulated in (39)

\[(39)\] Symmetric Merge
\[
\text{Merge} (\alpha, \beta) =_{\text{def}} \{\alpha, \beta\}
\]

In (39), labels are not created by Merge, but rather determined by labeling algorithms. I adopt Chomsky’s (2008) version of labeling algorithms (40):

\[(40)\] Labeling Algorithms (Chomsky 2008: 145)

\[\begin{align*}
&\text{a. } \text{In } \{H, \alpha\}, H \text{ an LI, } H \text{ is the label.} \\
&\text{b. } \text{If } \alpha \text{ is internally merged to } \beta, \text{ forming } \{\alpha, \beta\}, \text{ then the label of } \beta \text{ is the label of } \{\alpha, \beta\}.
\end{align*}\]

According to (40a), it is always a head that projects. (40b), which is concerned with Internal Merge, requires that the target of Internal Merge should always project. I also assume with Chomsky (2008) and Blümel (2017) that labeling is needed for selection as stated in (41):

\[(41)\] Each SO [syntactic object] generated enters into further computations. Some information about SO is relevant to these computations. In the best case, a single designated element should contain all the relevant information: the label (the item “projected” in X’-theories; the locus of the label-free system of Collins 2002). The label selects and is selected in EM [External Merge], and ...

(Chomsky 2008: 141; see also Blümel 2017; supplements and underlines T.I.)

Since Merge and labeling are independent operations under the symmetric Merge coupled with labeling algorithm approach, we should expect that labeling can apply without Merge. I argue that labeling without Merge applies in complementizer stacking. More specifically, I propose that when a labeling conflict arises, “relabeling,” i.e. labeling without Merge, may apply as part of LF-Transfer, which accounts for the “dual” selectional requirements in complementizer stacking clauses.

5.2 Labeling Conflicts
The notion of labeling conflict has been proposed by Donati (2006), Chomsky (2008), and Cecchetto and Donati (2010; 2011). Let us consider (42) as an illustration:

\[(42)\]

\[\text{Suppose that } \alpha \text{ is a lexical item, } i.e. \text{ a head, and } \beta \text{ is not a head. } \alpha \text{ undergoes Internal Merge with } \beta. \text{ The labeling algorithms (40) make conflicting predictions. According to (40a), } \alpha, \text{ which is a head, should be the label. According to (40b), on the other hand, } \beta, \text{ which is the}
\]
target of Internal Merge, should be the label. They claim that a labeling conflict makes two different labels available, which creates an ambiguous structure.

As a concrete example, they argue that a labeling conflict explains free relatives and indirect questions exemplified by (43). When *what* moves to the initial position, a labeling conflict arises. (40a) requires that *what*, which is a head, should become the label whereas (40b) requires that *C*, which is the target of Internal Merge, should become the label. If *what* becomes the label, it creates a free relative as in (43a). If *C* becomes the label, it creates an indirect question as in (43b):

(43) \[what \ [C \ [you \ read \ what]]\]
    a. I read \[DP what you read\].
    b. I wonder \[CP what your read\].

5.3 A "Relabeling" Analysis of Complementizer Stacking Clauses

Extending their labeling conflict analysis, I argue that labeling conflicts create not only ambiguous structures but also "dual" structures because of "relabeling" as part of LF-Transfer. What I mean by "dual" structures is that one syntactic object has different structures in overt syntax and LF. I assume with Shlonsky (2006) that cartographic structure is created by self-attachment of *C* as stated in (44):

(44) a. The initially merged *C* is associated with an ordered set of LIs (bundles of features if *C* is null) \(<C_1, \ldots, C_n>\), which corresponds to Rizz's (1997) Fin, Foc, Top, etc.
    b. The computational system accesses and activates these LIs (bundles of features) one by one in terms of Merge (Internal or External Merge); each time *C* is merged, the leftmost LI (or the leftmost bundle of features) in the set is activated.
    c. Once an LI (a bundle of features) is activated, it is no longer accessible to the computational system later in the derivation.

Let us look at how a "relabeling" analysis can account for "dual" selectional requirements on complementizer stacking clauses, taking (4) (repeated here as (45)) as an example. The derivation of (45) is represented in (46):

(45) John-wa Bill-ni [ dare-ga kita ka to] tazuneta
    John-TOP Bill-DAT who-NOM came Q that asked
    ‘John asked Bill who came.’
(46) a. \[\textit{C}: \langle \text{\textipa{ka'Q}}, \text{\textipa{to-'that'}} \rangle\]

\[
\text{b.}
\begin{array}{c}
\text{TP} \\
\text{\textipa{ka'Q}} \\
\langle \text{\textipa{ka'Q}, \text{\textipa{to-'that'}}} \rangle
\end{array}
\]

\[
\text{c.}
\begin{array}{c}
\text{TP} \\
\text{\textipa{ka'Q}} \\
\langle \text{\textipa{ka'Q}, \text{\textipa{to-'that'}}} \rangle
\end{array}
\]

\[
\text{d.}
\begin{array}{c}
\text{TP} \\
\text{\textipa{to-'that'}} \\
\langle \text{\textipa{ka'Q}, \text{\textipa{to-'that'}}} \rangle
\end{array}
\]

\[
\text{e.}
\begin{array}{c}
\text{TP} \\
\text{\textipa{ka'Q}} \\
\langle \text{\textipa{ka'Q}, \text{\textipa{to-'that'}}} \rangle
\end{array}
\]

The initially merged C consists of the ordered set \(\langle \text{\textipa{ka'Q}}, \text{\textipa{to-'that'}} \rangle\) (46a). As represented in (46b), \textit{ka'Q} is accessed and activated by the initial merger of C, \textit{i.e.} External Merge of C with TP. According to the labeling algorithms (40), \textit{ka'Q}, which is a head, becomes the label. At the next stage (46c), \textit{to-'that'} is accessed and activated by the next merger of C, \textit{i.e.} Internal Merge (self-attachment) of C. It should be noted that \textit{ka'Q}, which was activated in the previous Merge, is no longer accessible to the computational system at this stage. A labeling conflict arises; the labeling algorithm (40a) requires that \textit{to-'that'}, which is a head, should become the label, whereas the labeling algorithm (40b) requires that \textit{ka'Q}, which is the target of Internal Merge, should become the label. This labeling conflict allows us to have two labeling options; either \textit{to-'that'} becomes the label or \textit{ka'Q} becomes the label. In this case, we take the former option; \textit{to-'that'} becomes the label in accordance with (40a) in overt syntax, as represented in (46d). This labeling drives External Merge with the matrix predicate \textit{tazuneru 'ask'}, thereby satisfying the syntactic selection of \textit{tazuneru 'ask'}. When we come to stage (46e) where Transfer applies, “relabeling” applies as part of LF-Transfer; \textit{ka'Q} becomes the label in accordance with (40b). This labeling satisfies the semantic selection of the matrix predicate \textit{tazuneru 'ask'} at LF. Hence, we can account for the “dual” selectional requirements on complementizer stacking clauses in terms of “dual” structures through
“relabeling” due to a labeling conflict. Korean complementizer stacking can be accounted for in the same way.

Let us next consider predicates like *omou ‘think’. These predicates syntactically and semantically select a complement clause headed by to ‘that’ as shown in (47):

(47) a. John-wa [ Mary-ga kita to] omotta
    John-TOP who-NOM came that thought
    ‘John thought that Mary came.’

    b. *John-wa [ dare-ga kita ka] omotta
    John-TOP who-NOM came Q thought
    Lit. ‘John thought who came.’

These predicates can also take a complementizer stacking clause as shown below:

(48) John-wa [ dare-ga kita ka to] omotta
    John-TOP who-NOM came Q that thought
    Lit. ‘John thought who came.’

Under our analysis, the derivation of (48) proceeds as represented in (49):

(49) a.  C: <ka ‘Q’, to ‘that’>

    b.  ka ‘Q’
        
        TP   <ka ‘Q’, to ‘that’>

    c.  <ka ‘Q’, to ‘that’>
        
        TP   <ka ‘Q’, to ‘that’>

    d.  to ‘that’
        
        ka ‘Q’   <ka ‘Q’, to ‘that’>
        
        TP   <ka ‘Q’, to ‘that’>

    e.  to ‘that’
        
        ka ‘Q’   <ka ‘Q’, to ‘that’>
TP  

\(<\text{ka ‘Q’}, \text{to ‘that’}>\)

The initially merged C consists of the ordered set \(<\text{ka ‘Q’}, \text{to ‘that’}>\). As represented in (47b), \(\text{ka ‘Q’}\) is accessed and activated by the initial merger of C, \(i.e.\) External Merge of C with TP. According to the labeling algorithms (40), \(\text{ka ‘Q’}\), which is a head, becomes the label. At the next stage (47c), \(\text{to ‘that’}\) is accessed and activated by the next merger of C, \(i.e.\) Internal Merge (self-attachment) of C. A labeling conflict arises; the labeling algorithm (40a) requires that \(\text{to ‘that’}\) should become the label, whereas the labeling algorithm (40b) requires that \(\text{ka ‘Q’}\) should become the label. Among the two labeling options this labeling conflict makes possible, we take the option where \(\text{to ‘that’}\) becomes the label as represented in (47d). This labeling drives External Merge with the matrix predicate \(\text{omou ‘think’}\), thereby satisfying the syntactic selection of \(\text{omou ‘think’}\). Since “relabeling” as part of LF Transfer is optional, we do not apply “relabeling” in this case; \(\text{to ‘that’}\) remains as the label at LF. This satisfies the semantic selection of the matrix predicate \(\text{omou ‘think’}\) at LF. Hence, complementizer stacking clauses with predicates like \(\text{omou ‘think’}\) can be accounted for.

5.4 Complementizer Stacking in Slovene

In “dual” selectional requirements on Japanese and Korean complementizer stacking clauses discussed above, matrix predicates semantically select inner complementizer and syntactically select outer complementizer. In (45) (repeated here as (50)), for instance, the matrix predicate \(\text{tazuneru}\) semantically selects the inner complementizer \(\text{ka ‘Q’}\) and syntactically selects the outer complementizer \(\text{to ‘that’}\):

\begin{align*}
\text{(50) } & \text{John-wa Bill-ni [ dare-ga kita ka to] tazuneta} \\
& \text{John-TOP Bill-DAT who-NOM came Q that asked} \\
& \text{‘John asked Bill who came.’}
\end{align*}

Our “relabeling” analysis of complementizer stacking clauses would predict that there should also be cases where matrix predicates semantically select outer complementizer and syntactically select inner complementizer. I argue that such cases can be found in Slovene. Unlike in languages like English, the fronted \(\text{wh}-\text{phrase}\) can appear with an overt complementizer in Slovene as shown below:

\begin{align*}
\text{(51) a. } & \text{?R} \text{ad bi vedel [ koga ali je Peter videl]} \\
& \text{I.like would know who whether be Peter saw} \\
& \text{Lit. ‘I would like to know who Peter saw.’} \\
\text{b. } & \text{Sprašujem se [ koga ali Špela lujbi]} \\
& \text{I.wonder myself who whether Špela love} \\
& \text{Lit. ‘I wonder who Špela loves.’}
\end{align*}

(Marvin 1997: 50; Tatjana Marvin p.c.)

In (51), the fronted \(\text{wh}-\text{phrase}\) \(\text{koga ‘who’}\) appears with the interrogative overt complementizer \(\text{ali ‘whether’}\), which shows that the matrix predicates \(\text{vedel ‘know’}\) and \(\text{sprašujem ‘wonder’}\) can semantically select an interrogative complement. When the fronted
wh-phrase appears with the declarative overt complementizer *da* ‘that’, *vedel* ‘know’ can appear as the matrix predicate, but not *brašujem* ‘wonder’ as shown by the contrast between (52a) and (52b):

(52) a. Rad bi vedel [koga da je Peter videl]
   I.like would know who that be Peter saw
   Lit. ‘I would like to know who Peter saw.’

b. *Sprašujem se [koga da Špela lujbi]
   I.wonder myself who that Špela love
   Lit. ‘I wonder who Špela loves.’

(Marvin 1997: 50; Tatjana Marvin p.c.)

Since the *wh*-phrase koga ‘who’ cannot be in the Spec of the declarative complementizer *da* ‘that’, I claim that there should be a null interrogative complementizer whose specifier position is occupied by the *wh*-phrase koga ‘who’ as represented in (53):

(53) [koga [C[+Q] [da [ ... who that

Under this analysis, although both predicates like *vedel* ‘know’ and those like *brašujem* ‘wonder’ *semantically* select interrogative clauses, predicates like *vedel* ‘know’, but not those like *brašujem* ‘wonder’, *syntactically* select declarative clauses. In other words, predicates like *vedel* ‘know’ syntactically select the declarative complementizer *da* ‘that’ in the inner complementizer position skipping over the interrogative null complementizer C[+Q] in the outer complementizer position. Our “relabeling” analysis can account for such “dual” selectional requirements in Slovene complementizer stacking clauses like (52a). Under our analysis, the derivation of (52a) proceeds as represented in (54):

(54) a. C: <da ‘that’, ϕ ‘Q’>

b. 

```
    da ‘that’
    <da ‘that’, ϕ ‘Q’> TP
```

c. 

```
    <da ‘that’, ϕ ‘Q’>  da ‘that’
    <da ‘that’, ϕ ‘Q’> TP
```

d. 

```
    da ‘that’
    <da ‘that’, ϕ ‘Q’>  da ‘that’
```
The initially merged C consists of the ordered set \(<da \ ‘that’, \ ϕ \ ‘Q’\>, consisting of the declarative complementizer \(da \ ‘that’\) and the null interrogative complementizer \(ϕ \ ‘Q’\). As represented in (54b), \(da \ ‘that’\) is accessed and activated by the initial merger of C, i.e. External Merge of C with TP. According to the labeling algorithms (40), \(da \ ‘that’\), which is a head, becomes the label. At the next stage (47c), \(ϕ \ ‘Q’\) is accessed and activated by the next merger of C, i.e. Internal Merge (self-attachment) of C. A labeling conflict arises; the labeling algorithm (40a) requires that \(ϕ \ ‘Q’\), which is a head, should become the label, whereas the labeling algorithm (40b) requires that \(da \ ‘that’\), which is the target of Internal Merge, should become the label. This labeling conflict makes it possible for us to have two labeling options; either \(ϕ \ ‘Q’\) becomes the label or \(da \ ‘that’\) becomes the label. In this case, we take the latter option; \(da \ ‘that’\) becomes the label in accordance with (40b) in overt syntax, as represented in (47d). At the next stage (47e), the \(wh\)-phrase \(koga \ ‘who’\) undergoes Internal Merge to the Spec of C; \(da \ ‘that’\) becomes the label in accordance with (40b). This labeling drives External Merge with the matrix predicate \(vedel \ ‘know’\), thereby satisfying the syntactic selection of \(vedel \ ‘know’\). “Relabeling” then applies as part of LF Transfer; at LF, \(ϕ \ ‘Q’\) becomes the label of the node which is formed by self-attachment of C. \(ϕ \ ‘Q’\) also becomes the label of the whole structure (47f) at LF concomitantly. This satisfies the semantic selection of the matrix predicate \(vedel \ ‘know’\) at LF. Hence, complementizer stacking clauses in Slovene also follow
6. Conclusion

This paper has first investigates complementizer stacking clauses in Japanese and Korean. It was shown that complementizer stacking clauses involve the “dual” selectional requirements, which cannot be accounted for by either the traditional head-complement or adjunction structure. I have then proposed “relabeling” as part of LF Transfer due to labeling conflicts, which gives us a principled account of the “dual” selectional requirements in complementizer stacking clauses.

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The subjunctive complementizer in Korean: the interaction between inquisitiveness and nonveridicality

Arum Kang & Suwon Yoon
Korea University & University of Texas, Arlington

1. Introduction

The goal of current work is to identify the novel type of subjunctive mood selection in Korean. Thus far, the study of subjunctive mood has been extensively conducted in a variety of European languages such as in Greek, Portuguese, Italian, Catalan, Spanish and French. As far as our knowledge goes, however, the precise nature of complementizer and its relations with subjunctive mood in Korean have yet to be discussed. In traditional grammar, subjunctive mood selection refers to the phenomena where modal predicates expressing the weak commitment (i.e. irrealis) on the truth of the proposition select subjunctive marking device. Crosslinguistically, subjunctive mood is generally marked in the embedded clauses by means of overt verbal inflections in Latin and Romance languages. For example, as shown below, the desire verbs vouloir ‘want’ in French obligatorily selects subjunctive on the verbs in an embedded clause (Giannakidou and Mari 2017, (2b)):

(1) a. Marc sait que le printemps *soit/est arrivé. [French]
   "March knows that the spring arrived."

   b. Marc veut que le printemps soit/est long.
   "March wants the spring to be long."

Normally, it has been known that indicative and subjunctive exhibit complementary distributions. The types of modal predicates have been suggested as the specification on the list of indicative and subjunctive governors, shown as follows (Portner 2018):

(2) Indicative governors (mood selection in complement clause):
   a. predicates of knowledge and belief (e.g. know, believe)
   b. predicates of assertion (e.g. say)
   c. predicates of inquiry (e.g. ask)
   d. natural faetive predicates (e.g. remember)
   e. predicates of fiction and mental creation (e.g. dream)
   f. commissive predicates (e.g. promise)

---

1 In line with many previous works (Villata 2008; Anand and Hacquard 2013, a.o.), our fundamental assumption is that subjunctive triggering verbs have modal force with ordering source as follows (Villata 2008, pp. 481): "A proposition \( p \) that is the complement of the matrix predicate requires the subjunctive mood if the matrix predicate introduces an ordering relation between propositions and compares \( p \) to its contextually available alternatives."
(3) Subjunctive governors (mood selection in complement clause):
   a. Predicates of inquisitiveness (e.g. wonder)
   b. Preference predicates (e.g. want, hope)
   c. Directive predicates (e.g. demand)
   d. causative and implicative predicates (e.g. make)
   e. negative counterparts of predicates of knowledgebelief and predicates of assertion (e.g. doubt)
   f. modal predicates (e.g. necessary, possible, probable)

The valid types of modal predicates vary across language and it is hard to simply generalize the categorization of subjunctive selecting verbs. Table 1 summarizes the observations with respect to the cross-linguistic mood selection (Marques 2004):

<table>
<thead>
<tr>
<th>Context where the proposition P occurs</th>
<th>Veridical</th>
<th>Non-veridical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-evasive</td>
<td>be good that P</td>
<td>know that P</td>
</tr>
<tr>
<td>Episemic</td>
<td>imagine that P</td>
<td>want that P</td>
</tr>
<tr>
<td></td>
<td></td>
<td>doubt that P</td>
</tr>
<tr>
<td>Portuguese</td>
<td>INDICATIVE</td>
<td>SUBJUNCTIVE</td>
</tr>
<tr>
<td>Romanian, Hungarian, (Modern) Greek</td>
<td>SUBJUNCTIVE</td>
<td>INDICATIVE</td>
</tr>
</tbody>
</table>

Table 1. modal contexts and selection of indicative or subjunctive in complement clauses

Although the above languages exhibit flexibility in the modal predicates triggering subjunctive and reveals distinct marking strategies, what they have in common is that i) they exhibit complementary distributions between indicative and subjunctive, ii) mood appears in a declarative complement, and iii) subjunctive marking does not produce semantic contribution but reflects modal properties of the context in which it occurs.

Based on these fundamental aspects, recently, the extended spectrum of subjunctive has been suggested as follows: First, languages show flexibility in the modal predicates triggering subjunctive. For example, in (4), the meaning of Italian crede (which means ‘believe’) is ambiguous in terms of subjunctive selection in (4a) and indicative selection in (4b) (Mari and Portner 2018, (7)):

(4) a. Gianni crede che Maria sia incinta. [Italian]
   G. believes that M. be.3sg.SUBJ pregnant
   b. Gianni crede che Maria é incinta.
   G. believes that M. be.3sg.IND pregnant
   ‘Gianni believes that Mary is pregnant.’

Second, unlike the traditional view of subjunctive markings by means of overt verbal inflections, it’s also marked on the subordinate complementizer. For example, in Modern Greek, the desire verb theta ‘want’ selects subjunctive mood on the complementizer na in (5b) (Giannakidou and Mari 2017, (4), (5)):

(5) a. O Pavlos kseri *na/oti efije i Roxani. [Greek]
   The Paul knows-3SG that-SUBJ/that-IND left-3SG the Roxani
Third, rogative predicates also can be mood governors. In (6a), the predicate of inquiry selects indicative mood whereas the predicate of inquisitive in (6b) selects subjunctive mood. On this, Portner suggests that Inquiry ask is an interrogative counterpart of verb of assertion (i.e. ‘want to be told’) whereas the inquisitive wonder is an interrogative counterpart of verb of belief/knowledge (i.e. ‘want to know’):

(6) Rogative predicates can be mood governors (Portner 2018, pp. 70):
   a. Mi avevo chiedo se ci sono corsi d’inglese [Italian]  
      him have-1sg asked if there be.3PL..INDC courses of English  
      ‘I asked him whether there are English courses.’
   b. Mi chiedo se ci siamo corsi d’inglese  
      me wonder if there be.3PL..SUBJ courses of English  
      ‘I wonder whether there are English courses.’

The the phenomena of Korean subjunctive deeply involve the above three aspects of extended spectrum. Korean employs overt particles to mark questions and interrogative complementizers. The criteria of interrogative complementizers are further subdivided into ordinary complementizer ci and modalized complementizer (u)l-kka (Kang and Yoon 2019). As shown below, both ci and (u)l-kka are compatible with the inquisitive verb wonder in (7) and (8), but only (u)l-kka shows distributional restriction with the inquiry verb ask in (10). More importantly, as revealed in the translation, the sentence marked by (u)l-kka contains an epistemic modal ‘might’ in the subordinate clause, whereas ci does not exhibit such modal property.

   M.-Top C.-Nom party-Loc come-Asp-whether wonder-Pst-Decl  
   ‘Mina wondered whether Chelswu would come to the party.’
   M.-Top C.-Nom party-Loc come-Mod-whether wonder-Pst-Decl  
   ‘Mina wondered if Chelswu might come to the party.’
   M.-Top C.-Nom party-Loc come-Asp-whether ask-Pst-Decl  
   ‘Mina asked whether Chelswu would come to the party.’
(10) #Mina-nun Chelswu-ka pathi-ey o-l-kka mulepo-ass-ta.  
    M.-Top C.-Nom party-Loc come-Mod-whether ask-Pst-Decl  
   ‘(lit.) Mina asked if Chelswu might come to the party.’

It leads us to assume that the application of (u)l-kka comes with a semantic effect. Another crucial evidence for the status of semantic operator as subjunctive comes from the following example. In (11), (u)l-kka combines with the polysemous verb siph. In addition of its main meaning of volitional ‘want’, siph additionally conveys the meaning of ‘believe/think, fear, hope, intend.’ In a given situation, siph is compatible with (u)l-kka and among the five interpretation, the doxastic meaning is chosen. By doing this, the speaker makes the non-commitment to the truth of the proposition, which is the main function of subjunctive.
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Context: Mina is talking with Kim about the guests coming to the party tonight. Kim asks Mina if Chelswu is coming. With full of uncertainty, Mina says,


C.-Nom party-LOC come-Mod-whether think/believe-Decr

a. ‘I am uncertain whether Chelswu might come to the party.’
b. ‘I doubt if Chelswu might come to the party.’

If we have indicative proposition in this context, it would be infelicitous because the given context does not allow the speaker to assert a true proposition. This brings us to the main question of the present work, as follows: First, what is the semantic-pragmatic contribution of (u)l-kka? Second, how its behavior is different from the ordinary interrogative ci-complementizer? Given these questions, we want to explore the empirical dimension and figure out how the distinct behaviors of subjunctives in Korean and other languages relate to each other. As will be seen in detail soon, we argue that (u)l-kka is a grammatical category of sub-type of subjunctive in the interrogative complement clause. We treat (u)l-kka exhibiting speaker/subject’s epistemic uncertainty in her doxastic space, and the function of (u)l-kka in the embedded clause is suggested as an epistemic subjunctive. In this vein, from now on, we term it as a subjunctive-interrogative complementizer (SUBJ-Q-Comp, henceforth), and gloss it as ‘whether.SUBJ’.

Building on the basic assumption that the subjunctive morphemes have presuppositions that they have the subject’s nonveridical private space, we aim to capture the semantic role of (u)l-kka under the general theory of nonveridical subjectivity (Giannakidou and Mari 2017). Our claim will be further supported by corpus study on the type of predicates selecting (u)l-kka SUBJ.Q-Comp and/or ci Q-Comp. Developing such an account will provide us with an empirically more adequate perspective.

The paper proceeds as follows: In Section 2, we discuss the core properties of (u)l-kka by observing the distinct types of predicates that take (u)l-kka SUBJ.Q-Comp and ci Q-Comp, and conducting corpus study. The status of subjunctive interrogative complementizer is further evidenced by the role of modalized question marker in an unembedded clause. In Section 3, we present the semantic analysis of (u)l-kka-complementizer, which is sensitive to epistemic subjunctive mood. We conclude in Section 4 with the theoretical implications.

2. Core properties of (u)l-kka

2.1 Different types of interrogative predicates wth ci vs. (u)l-kka

Before jumping into the main discussion of Korean propositional predicates, let me briefly explain on the general view of interrogative predicates. Traditionally, interrogative predicates requiring clausal complements fall in different categories depending on the kind of complements that they can embed. These contrasts in embedding are widely supported by cross-linguistic data (Karttunen 1977; Lahiri 2002). For the classification of question embedding predicates, we build on the Lahiri (2002)’s category:

(12) Predicates that take interrogative complements

```
  
  Respondive

  Veridical
  know, remember, forget.

  Non-veridical
  be certain, agree on.

```
An anti-rogative verb like believe takes only declarative complement in (13). The rogative verb like wonder takes only interrogative complement in (14). On the other hand, the responsive verb like know in (15) and be certain in (16) take both declarative and interrogative complement.

(13) Anti-rogative
   a. Mina believes that Chelswu will come to the party.
   b. *Mina believes whether Chelswu will come to the party.

(14) Rogative
   a. *Mina wonders that Chelswu will come to the party.
   b. Mina wonders whether Chelswu will come to the party.

(15) Veridical responsive
   a. Mina knows that Chelswu will come to the party.
   b. Mina knows whether Chelswu will come to the party.

(16) Nonveridical responsive
   a. Mina is certain that Chelswu will come to the party.
   b. Mina is certain whether Chelswu will come to the party.

Among them, responsive predicates are further characterized by the fact that they express a relation between the holder of an attitude and a proposition which is an answer to the embedded question:

(17) a. “Mina knows whether Chelswu will come to the party” is true iff Mari knows $p$, where $p$ is the true answer to “Will Chelswu come to the party?”
   b. “Mina and Bill agree on whether Chelswu will come to the party” is true iff Mina and Bill agree that $p$, where $p$ is a possible answer to “Will Chelswu come to the party?”

Given the above observations, Lahiri divides responsive predicates into two sub-classes of veridical and non-veridical (adapted from Egré and Spector 2007), as follows:

(18) a. Veridical-responsive is predicates that express a relation to the actual true answer
   b. Non-veridical responsive is predicates that express a relation to a potential answer

Veridical-responsive predicates express a relation between an attitude holder and a proposition. Here the proposition is the actual complete answer to the embedded question. The sentence “Mina knows whether Chelswu will come to the party” entails that Mari has a true belief as to whether Chelswu will come to the party. On the other hand, non-veridical responsive predicates express a relation between an attitude holder and a proposition that is simply a potential complete answer to the embedded question. The sentence “Mina and Bill agree on whether Chelswu will come to the party” is true even if Mina and Bill both believe that the Chelswu will come to the party while in fact it isn’t.

Then let’s consider Korean data. Traditionally, in Korean, the declarative complementizer $\textit{ko}$ and the interrogative complementizer $\textit{ci}$ has been known to form a split morpho-syntactic system corresponding to English that and whether respectively. Just like English complementizers, $\textit{ko}$ and $\textit{ci}$ exhibit the complementary distribution with verbs in terms of Lahiri’s typology. The behavior of $\textit{ul-kko}$ can be understood along similar lines with $\textit{ci}$. As shown below, the interrogative complementizer $\textit{ci}$ can occur in complement clauses of the rogative verb $\textit{kwangkunhwa}$ ‘wonder’ in (19a), but not of the anti-rogative (i.e. declarative) verb $\textit{mit}$ ‘believe’ in (19b). Likewise, in (20b), (ui)-kka-questions can appear with the verb $\textit{kwangkunhwa}$ ‘wonder’ whereas it exhibits distributional restrictions in that they never co-occur
with the declarative verbs in (20a):

(19) Anti-rogative: believe
   a. #Mina-nun Chelswu-ka pathi-ey o-nun-\textit{ei} mi-tess-ta.
      M.-Top C.-Nom party-Loc come-Asp-whether believe-Pst-Decl
      ‘#Mina believed whether Chelswu would come to the party.’
   b. #Mina-nun Chelswu-ka pathi-ey o-\textit{l-kka} mit-ess-ta.
      M.-Top C.-Nom party-Loc come-Mod-whether.SUBJ believe-Pst-Decl
      ‘#Mina believed if Chelswu might come to the party.’

(20) Rogative (inquisitive): wonder
   a. Mina-nun Chelswu-ka pathi-ey o-nun-\textit{ei}
      wonder-Pst-Decl
      ‘Mina wondered whether Chelswu would come to the party.’
   b. Mina-nun Chelswu-ka pathi-ey o-\textit{l-kka}
      wonder-Pst-Decl
      ‘Mina wondered if Chelswu might come to the party.’

In light of the above data, we might assume that the occurrences \textit{(u)l-kka} are acceptable only if they display the semantics of embedded question just like \textit{ci}, which is not true. However, \textit{ci} and \textit{(u)l-kka} exhibit distinct distributional restrictions in crucial aspects: First, only \textit{(u)l-kka} is incompatible with the inquiry verb \textit{ask} in (21b):

(21) Rogative (inquiry): \textit{ask}
      M.-Top C.-Nom party-Loc come-Asp-whether ask-Pst-Decl
      ‘Mina asked whether Chelswu would come to the party.’
   b. #Mina-nun Chelswu-ka pathi-ey o-\textit{l-kka}
      ask-Pst-Decl
      ‘(lit.) Mina asked if Chelswu might come to the party.’

Further, \textit{ci} co-occurs with the veridical responsive factive verb \textit{at(l)} ‘know’ in (22a), and implies that the subject Mari knows \textit{the true answer} to “is the winner John?” On the other hand, \textit{(u)l-kka} cannot take the veridical responsive predicates, which presupposes the true answer. The occurrence of \textit{(u)l-kka} is strictly prohibited with the veridical responsive verbs \textit{at(l)} ‘know’ in (22b):

(22) Veridical responsive: \textit{know}
      M.-Top C.-Nom party-Loc come-Asp-whether know-Asp-Decl
      ‘Mina knew whether Chelswu would come to the party.’
b. #Mina-nun Chelswu-ka pathi-ey o-l-kk'a al-ko.iss-ess-ta.
   M.-Top C.-Nom party-Loc come-Mod-whether.SUBJ know-Pst-Deel
   ‘(lit.) Mina knew if Chelswu might come to the party.’

As an interrogative complementizer, o is also compatible with the non-veridical responsive predicate hwaksinha ‘be certain’ (23b), and implies that the subject Mina is certain the potential answer to “is the winner John?” On the other hand, the (u)l-kk'a-clause cannot take the non-veridical responsive predicate, which is unexpected from the typical declarative and ordinary interrogative complementizer:

(23) Non-veridical responsive: be certain
      M.-Top C.-Nom party-Loc come-Asp-whether be.certain-Asp-Deel
      ‘Mina was certain whether Chelswu would come to the party.’
   b. #Mina-nun Chelswu-ka pathi-ey o-l-kk'a
      M.-Top C.-Nom party-Loc come-Mod-whether.SUBJ
       hwaksinha-ess-ta.
       be.certain-Pst-Deel
      ‘(lit.) Mina was certain if Chelswu might come to the party.’

The most interesting property of (u)l-kk'a is the case where it co-occurs with the polysemous verb such as siph. As we mentioned earlier, siph has five different meanings such as ‘want, believe, fear, hope and intend’. Among these meanings, as shown in (24a), the primary meaning is the volitional ‘want’, which can be achieved with the co-occurrence of the declarative complementizer ko:

(24) Non- Veridical responsive II: think/believe
   siph ‘want; think/believe; fear; hope; intend’
   a. ppang-ul mek-ko siph-ta
      bread-Acc eat-that want-Deel
      ‘I want to eat bread.’
   b. Chelswu-ka o-l-kk'a siph-ta
      C.Nom come-whether.SUBJ think/believe-Deel
      ‘I am uncertain/doubt if Chelswu might come.’
   c. nulu-ka na-lul po-l-kk'a siph-ta
      who-Nom l-acc see-Mod-whether.SUBJ fear-Deel
      ‘I fear someone would see me.’
   d. ilekik ea-ss-umeyn siph-ta
      early sleep-Pst-if hope-Deel
      ‘I hope to sleep early.’
   e. o-pi-ey ka-l-kk'a siph-ta
      home-Loc go-Mod-whether.SUBJ intend-Deel
      ‘I intend to go home.’

As in (25b), when (u)l-kk'a combines with siph, the doxastic meaning is chosen and it gives rise to conjecture reading. On the other hand, o does not allow such combination in (25a):

(25) a. #Mina-nun Chelswu-ka pathi-ey o-nun-ci
    M.-Top C.-Nom party-Loc come-Asp-whether
The subjunctive complementizer in Korean: the interaction between inquisitiveness ...

siph-ess-ta
think/believe-Pst-Decl
‘intended’ Mina thinks that Chelswu will come to the party.’

b. Mina-nun Chelswu-ka pathi-ey o-l-kka
M.-Top C.-Nom party-Loc come-Mod-whether.SBJ
siph-ess-ta.
think/believe-Pst-Decl
‘Mina was uncertain if Chelswu might come to the party.’
‘Mina doubted if Chelswu might come to the party.’

The set of above data leads us to the following prediction: Reporting on the consideration of a set of alternative possibilities, (u)l-kka expresses subject’s noncommitment on the truth of the proposition. In this vein, it inevitably involves the subjunctive mood. The further empirical evidence to support this comes follows. As shown below, when (u)l-kka combines with morphologically negative verbs like mol(u) ‘not.know’, it yields a dubitative reading in (26b) interpreted as ‘doubt’ rather than ‘not.know’ induced by ci in (26a):

(26) Morphological negative epistemic factive: not. know
C.-Nom party-Loc come-Asp-whether not.know-Decl
‘I don’t know whether Chelswu would come to the party.’

b. Chelswu-ka pathi-ey o-l-kka mol-la.
C.-Nom party-Loc come-Mod-whether.SBJ not.know-Decl
‘I doubt if Chelswu might come to the party.’

The table 1 summarizes the distinct categorizations of attitude predicates co-occurring with ci and (u)l-kka.

<table>
<thead>
<tr>
<th>Attitude predicates</th>
<th>ci</th>
<th>(u)l-kka</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-rogative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rogative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veridical response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-veridical</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Difference types of attitude predicates with ci and (u)l-kka

The above table reveals the important property of (u)l-kka like this: the verbs taking (u)l-kka should be compatible with situations where an epistemic subjective/speaker is unsure about the realization of the embedded propositional content. For the further empirical data, in what follows, we conduct corpus study.

2.2 Corpus study

In order to observe the list of predicates selecting (u)l-kka and ci, we collected data from Sejong 21 sense tagged corpus, consisted of approximately 12 million words of written texts. We extracted predicates co-
occurring both with *ci* and (*u*)-kka in a given corpus by using Perl program. We examine this by means of the frequency aspect and the statistical method.

First, we found that 26 predicates co-occurring both with the SUBJ.Q-Comp (*u*)-kka and the Q-Comp *ci*. The following table 3 and 4 show the list of predicates co-occurring with (*u*)-kka and *ci*. As shown in table 3, the total frequency of rogative and veridical predicates are 53, which is 2.74% of whole 26 target predicates co-occurring with (*u*)-kka-Comp, whereas the total frequency of non-veridical predicates are 1872, which takes 97.24%. It leads us to the fact that (*u*)-kka frequently combine with the non-veridical predicates. On the other hands, in table 4, the total frequency of rogative and non-veridical predicates are 282, which is 7.76% of whole 26 target predicates co-occurring with *ci*-Comp, whereas the total frequency of veridical predicates is 3349, which takes 86.22%.

<table>
<thead>
<tr>
<th>Rogative (2.86%)</th>
<th>Veridical (0.15%)</th>
<th>Non Veridical (97.24%)</th>
<th>Emotive (37.66%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>kungkumha ‘wonder’ (33), kwungliha ‘wonder/ponder’ (10), mut ‘ask’ (4), uyaha ‘wonder’ (2), alapo ‘investigate’ (1)</td>
<td>a’i ‘know’ (1), hwakinha ‘verify’ (1), ihayha ‘understand’ (1),</td>
<td>ha ‘conjecture’ (78), siph ‘believe/think’ (214), sayngkahka ‘think’ (136), molu ‘doubt’ (4), uysimsulep ‘doubt’ (4), kanumha ‘guess’ (1), cincaha ‘conjecture’ (1),</td>
<td>po ‘for fear’ (580), twulaye ‘be fearful/afraid of’ (38), korinha ‘agonize; being concerned’ (24), kekcrengha ‘be anxious’ (21), wulwetwoy ‘be concerned’ (18), kekcrengtwoy ‘be worried’ (14), yenlepyow ‘fear for’ (11), mvusep ‘be fear for’ (10), yemleypselep ‘fear for’ (4), kepna ‘be feared’ (4), pumulaha be ‘anxious’ (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1925</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Predicates co-occurring with (*u*)-kka-Comp

Second, for the statistical verification, we use keywords statistics - the Dunning (1993)’s Loglikelihood (L.L, henceforth) based on the frequency data. Briefly, L.L is an extraction of significant bigrams from the text, which allows comparisons between the significance of the occurrence of rare and common features (Dunning 1993: 67). The significance level (p-value) was set at 0.05. Table 5 and 6 below present the list of predicates which are most strongly co-occurred with the (*u*)-kka-Comp and *ci*-Comp. The results of L.L value (G2) in these tables show that there is a statistically significant difference between the occurrence of (*u*)-kka-Comp and *ci*-Comp.

<table>
<thead>
<tr>
<th>Regitative (6.69%)</th>
<th>Veridical (81.22%)</th>
<th>Non Veridical (7.07%)</th>
<th>Emotive (1.07%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>kwungliha ‘wonder/ponder’ (6), mut ‘ask’ (130), kungkumha ‘wonder’ (33), uyaha ‘wonder’ (14), alapo ‘investigate’ (61), molu ‘not know’ (1801), a’i ‘know’ (1209), hwakinha ‘verify’ (73), po ‘investigate’ (7), ihayha ‘understand’ (41),</td>
<td>ha ‘guess’ (67), cincaha ‘conjecture’ (36), siph ‘believe/think’ (11), sayngkahka ‘think’ (68), uysimsulep ‘doubt’ (45), kanumha ‘guess’ (11),</td>
<td>twulaye ‘be fearful/afraid of’ (5), korinha ‘agonize; being concerned’ (5), wulwetwoy ‘be concerned’ (3), kekcrengha ‘be anxious’ (6), yemleypselep ‘fear for’ (1), mvusep ‘be fear for’ (2), kekcrengtwoy ‘be worried’ (5), yemleypselep ‘fear for’ (1), kepna ‘be feared’ (1), pumulaha be ‘anxious’ (10),</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3631</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Predicates co-occurring with *ci*-Comp
As shown above, the word frequency lists are sorted by the resulting LL values. For these tables, a G2 of 3.8 or higher is significant at the level of p < 0.05. This gives the effect of placing the largest LL value at the top of the list representing the word which has the most significant relative frequency difference between (u)l-kka-comp and ci-comp.

2.3 (u)l-kka as a modalized question marker

In unembedded clause, (u)l-kka exhibits a dual function of modalized questions (MQs, henceforth). Cross-linguistically, MQs are formed by the combination of epistemic modal marker and question marker, shown as follows (Kang and Yoon, to appear: (1)-(3)):

(27) Yurie-wa wain-o nomu darou-ka.
    Yurie-TOP wine-ACC drink DAROU-Q
    ‘I wonder if Yurie drinks wine.’

(28) lan-as=ha=k’a
    already=3.SUBJ=YNQ=INFER take.DIR.3.ERG
    ni=n-s-mets-cäl=a.
    DET.ABS=1sg.Poss-NOM=write.ACT=EXIS
    ‘I wonder if she’s already got my letter.’
    ‘I don’t know if she got my letter or not.’

(29) na tou milise (arage)?
    SUBJ him talked-3sg Q
    ‘Might she have talked to him’

<table>
<thead>
<tr>
<th>predicates</th>
<th>u-kka_freq</th>
<th>ci_freq</th>
<th>LL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mok/’not know’</td>
<td>4</td>
<td>1001</td>
</tr>
<tr>
<td>2</td>
<td>al/’know’</td>
<td>1</td>
<td>1250</td>
</tr>
<tr>
<td>3</td>
<td>mat/’ask’</td>
<td>4</td>
<td>103</td>
</tr>
<tr>
<td>4</td>
<td>hwakinha/’verify’</td>
<td>1</td>
<td>73</td>
</tr>
<tr>
<td>5</td>
<td>aiaipo/’investigate’</td>
<td>1</td>
<td>81</td>
</tr>
<tr>
<td>6</td>
<td>kungkumha/’wonder’</td>
<td>33</td>
<td>171</td>
</tr>
<tr>
<td>7</td>
<td>ihyea/’understand’</td>
<td>1</td>
<td>41</td>
</tr>
<tr>
<td>8</td>
<td>cimnaka/’conjecture’</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td>9</td>
<td>usyimsusep/’oubli’</td>
<td>4</td>
<td>45</td>
</tr>
<tr>
<td>10</td>
<td>kanumha/’guess’</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>uyaha/’wonder’</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>12</td>
<td>pwularha/’be anxious’</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 5. Predicates most strongly co-occurred with the (u)l-kka-Comp

<table>
<thead>
<tr>
<th>predicates</th>
<th>u-kka_freq</th>
<th>ci_freq</th>
<th>LL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ha/’conjecture’</td>
<td>767</td>
<td>57</td>
</tr>
<tr>
<td>2</td>
<td>po/’for fear’</td>
<td>580</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>alsip/’believe/think’</td>
<td>214</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>sayngaka/’think’</td>
<td>136</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>twulyp/’be fearful/afraid of’</td>
<td>38</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>kominha/’agonize’</td>
<td>24</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>wulyetwy/’be concerned’</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>kocengha/’be anxious’</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>yemityetwy/’fear for’</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>kocenghwy/’be worried’</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>mwusep/’be fear for’</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>kwungnha/’wonder/ponder’</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>yemlyseup/’fear for’</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>kepria/’be feared’ (4)</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 6. Predicates most strongly co-occurred with the ci-Comp
In Korean, (u)l-\textit{kka} functions as a MQ marker in an embedded clause:

(30) Korean MQ (C. Lee 2011, 2012 (49b));

\begin{tabular}{l}
\text{pi-ka} & o-ass-(u)l-\textit{kka} (Q) <conjectural Q, wondering> \\
\end{tabular}

\begin{tabular}{l}
\text{(with the modal \textit{\text{-ul}})} \\
\text{‘I wonder/don’t know if it has rained.’} \\
\end{tabular}

In Kang and Yoon (to appear), the semantic contribution of MQ has been analyzed as reporting on the speaker’s consideration of a set of possibilities of the given propositional content:

(31) \[\text{\text{[MQ]}^{MQ}} = [\text{that it is possible that } p] \cap [\text{that it is not possible that } p]\]

It is further evidenced with the following example:

\begin{tabular}{l}
\text{Context: John and Mary are talking about Santa Clause. Although they aware that Santa Clause does} \\
\text{not exist in a real world, they wonder how old Santa would be if he exists. John asks Mary:} \\
\end{tabular}

(32) \text{santa-nun myech-sal-i-l-\textit{kka}?} & [MQ] \\
\text{Santa-Top what-age-be-Mod-Q} \\
\text{‘How old might Santa Clause be?’} \\

Here, MQ marked with (u)l-\textit{kka} forms a weaker inquiry in the sense that it is a question about the possibility of given proposition rather than asking about the real state of affairs. In a given context, since we know that Santa does not exist in the real world, it is strange to ask a question using an ordinary question in (33) because the speaker expects an actual answer from the hearer:

(33) \#\text{santa-nun myech-sal-i-ni?} & [Ordinary Q] \\
\text{Santa-Top what-age-be-Q} \\
\text{‘How old Santa is?’} \\

In addition, MQs express speaker’s epistemic uncertainty on the given propositional content. In (34), the speaker infers that \text{‘today is Friday’} has a good possibility of being true, while allowing an equal likelihood of being false.

\begin{tabular}{l}
\text{Context: John flew from Seoul to London on Friday, not knowing the time difference between Seoul} \\
\text{and London. When arrived in London, he was not sure whether it was Friday or not. With full} \\
\text{uncertainty, John said (to himself):} \\
\end{tabular}

(34) \text{onul-i kunyoi-i-l-\textit{kka}?} & [MQ] \\
\text{today-Nom Friday-be-Mod-Q} \\
\text{‘Might today be Friday?’} \approx \text{‘I am uncertain whether today is Friday.’} \\
\approx \text{‘I conjecture (the possibility) that today might be Friday.’} \\

(35) \#\text{onul-i kunyoi-i-ni?} & [Ordinary Q] \\
\text{today-Nom Friday-be-Q} \\
\text{‘Is today Friday?’}
In this section, we observed that the employment of a (으)l-kka strongly indicates the epistemic subject/speaker’s indeterminacy concerning the realization of the content of the embedded proposition. The uncertainty may originate either from the subject’s presumption of the medium/low-possibility of the event given by contextually available information or from the subject’s lack of information on the matter. Further, the above facts collectively support our claim that (으)l-kka reduces speaker’s commitment to the truth of the sentence. We take this to argue that a strong connection exists between the non-veridical reading and the subjunctive mood since both are related to speaker/subject’s non-commitment to the truth of proposition. This was firmly evidenced by the corpus studies and the dual function of (으)l-kka as an MQ marker in an unembedded clause.

3. Analysis

In this section, we show that the addition of (으)l-kka as a SUBJ.Q-Comp in embedded clauses produces a weakening, nonveridicality effect (Giannakidou 1995, et seq.). By doing this, it specifies the degree of certainty about the proposition in embedded question and gives rise to epistemic uncertainty or doubt interpretation. As mentioned above in Section 2, the non-veridical responsive predicates taking (으)l-kka express a relation between the holder of an attitude and a proposition which is a possible answer to the embedded question. Given that the semantics of embedded questions comprises all potential answers, the employment of an interrogative complementizer introduces both positive and negative cases as equal possibilities of p or ¬p. If the speaker chooses (으)l-kka, epistemic weakening arises; she additionally expresses the subject’s weakest commitment to the possibility of propositional content, as follows:

(36) a. Mina-nun Chelswu-ka pathi-ej c-l-kka
   M.-Top Chelswu Nom party-loc come-Mod-whether SUBJ
   spih-ess-ta.
   think-believe-Pst-Decr
   ‘Mina is uncertain whether Chelswu might come to the party.’

b. (36a) is true if Mina believes that p, where p is a potential answer to will Chelswu come to the party? & Mina is undecided as to where the actual world is on the possible answer sets (epistemic uncertainty)

Given that conjecture and doubt trigger a non-homogeneous doxastic space, subjunctive is naturally predicted. In this vein, (으)l-kka can be taken as an epistemic subjunctive complementizer. The epistemic SUBJ.Q-Comp questions the subject’s belief and knowledge and expresses her epistemic uncertainty on the possible answer sets. The epistemic SUBJ.Q-Comp (으)l-kka presupposes that they contain the subject’s private space which will be nonveridical partitioned into equal spaces (i.e. the state of nonveridical equilibrium; Giannakidou 2013).

The subjunctive mood and (으)l-kka SUBJ.Q-Comp have in common in the sense that they are representation of ‘subjectivity’. Traditionally, subjunctive is deeply tight to the notion of subjectivity, i.e. consideration of spaces of beliefs, doxastic, epistemic, bouletic (Farkas 1992; Giannakidou 1994 et seq.; Villata 2008; Smirnova 2013, a.o.). Building on Giannakidou (1994 et seq.), we treat (non)veridicality as a property of subjective spaces. The subjective spaces are the based on the epistemic state of an individual as follows:

(37) Epistemic state of an individual anchor i (Giannakidou 1999: (45))
An epistemic state M(i) is a set of worlds associated with an individual i representing worlds compatible with what i knows or believes.
M(i) is the private space of i’s thought, belief and knowledge, and it plays a key role in truth assessment. Subjective veridicality is anchored to an individual’s M(i). In unembedded assertions, i is the speaker, hence M(i) is the default. In embedding, M(speaker) is still relevant, as is the Stalnakerian common ground C, i.e. the set of mutually known propositions or commitments.

(38) Subjective veridicality (Giannakidou and Mari 2017; (25)):
A function F that takes a proposition p as its argument is subjectively veridical with respect to an individual anchor i and an epistemic state M(i) iff: \( \forall w[w \in M(i) \rightarrow w \models p(w')] \)

(39) Subjunctive as an indicator of nonveridicality (Giannakidou 1999, et seq.):
(i) The subjunctive is an indicator of a nonveridical epistemic state or modal base, and is selected by expressions that are at least subjectively nonveridical.
(ii) Subjunctive sentences indicate epistemic weakening.

The subjunctive thus produces epistemic weakening, which means that it separates the monogeneity of M. Thus nonveridical domains are sets of worlds partitioned into p and non-p worlds, and the partition could be the result of ordering (e.g. ordering sources with modals). Commitment weakening is the creation of a nonveridical (i.e. non-homogeneous) epistemic space as below. In (40), given that M be a set of worlds, compatible with what the speaker/subject knows in w, M is partitioned between p and non-p worlds, then i is in a state of epistemic uncertainty:

(40) Epistemic non-homogeneity (Giannakidou and Mari 2017; (41)):

There is a semantic dichotomy in assigning different semantic values to ordinary Q-Comp (n)ci and SUBJQ-Comp (u)l-kka, where the latter is sensitive to nonveridical weakening. The licensing of (u)l-kka is revealed in that it indicates the subjective nonveridicality.

(41) Epistemic subjunctivity marked in subordinator C = subjective nonveridicality

Recall that subjective nonveridicality thus means that i is in a state of uncertainty with respect to p, M(i) as a whole does not support p. some worlds in M(i) support p and some other don’t.

(42) Subjective nonveridicality of (u)l-kka SUBJQ-Comp: A function F that takes a proposition p as its argument is subjectively nonveridical with respect to an individual anchor i and an epistemic state M(i) iff: \( \exists w' \in M(i); \neg p(w') \wedge \exists w'' \in M(i); p(w'') \)
(Note: An epistemic model M(i) is a set of worlds associated with an individual i representing worlds compatible with what i believes or knows.)

The proposed semantics shows how (u)l-kka expresses the speaker’s perspective towards p by achieving...
a partition in the modal base, characterized as a partitioned epistemic space.

In the sense of syntactic aspect, there is a cross-linguistic variation in the subjunctive mood incorporated in complementizers. As mentioned above, in French and the most Romance languages, the mood exponent appears on the verb. In contrast, mood can appear outside the verbal form in the subordinating C. If we are on the right track, Korean is a language which subcategorizes the interrogative complementizer into subjunctive and non-subjunctive. We suggest the following syntactic structure for (u)l-kka SUBJQ-Comp:

(43)  

\[
\begin{array}{c} 
C: (u)l-kka \\
\text{epistemic subjunctive (uncertainty/doubt)} 
\end{array}
\]

The above structure is built on the assumption that a propositional attitude verb encodes a complement that needs to appear in a particular mood. In the interrogative embedded clause, Korean selects (u)l-kka under epistemic subjunctive verbs such as uncertainty and doubt.

4. Conclusions and implications

In this paper, we identified (u)l-kka as a novel type of epistemic subjunctive complementizer. Based on the empirical data that we have concerned thus far, the observation of Korean subjunctive (u)l-kka with respect to the cross-linguistic mood selection is suggested as follows:

<table>
<thead>
<tr>
<th></th>
<th>Veridical</th>
<th></th>
<th>Non-veridical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reality</td>
<td>Non-reality</td>
<td></td>
</tr>
<tr>
<td>Non-epistemic</td>
<td>be good that P</td>
<td>know that P</td>
<td>want that P</td>
</tr>
<tr>
<td>Epistemic</td>
<td>imagine that P</td>
<td></td>
<td>conjecture that might P</td>
</tr>
<tr>
<td>Portuguese</td>
<td>INDICATIVE</td>
<td></td>
<td>SUBJUNCTIVE</td>
</tr>
<tr>
<td>Italian, Catalan, Spanish, French</td>
<td>SUBJUNCTIVE</td>
<td>INDICATIVE</td>
<td>SUBJUNCTIVE</td>
</tr>
<tr>
<td>Korean (u)l-kka</td>
<td>INDICATIVE</td>
<td></td>
<td>SUBJUNCTIVE</td>
</tr>
</tbody>
</table>

Table 7. modal contexts and selection of indicative or subjunctive in complement clauses

We showed that there are three distinct mechanisms for the occurrence of Korean and European subjunctive: First, Korean subjunctive can be formally marked at the level of interrogative subordinator C. Second, it exhibits flexible distributions on the selection of attitude predicates. Third, subjunctive marking produces semantic contribution of epistemic weakening more than reflecting modal properties of the context in which it occurs. In the sense of mood selection, we revealed the existence of tendency
in which the occurrence of (u)-kka depends on the higher verbs whose subject provides nonhomogeneous doxastic space. The judgments were empirically verified through the corpus analysis.

Theoretical implication of the current analysis is as follows: First, Korean reveals that subjunctive complement clause does not form the uniform class. Unlike the traditional way of classifying mood in the declarative complement, mood can occur in the “inquisitive” complement clause. Second, in Korean, there is a semantic dichotomy in assigning different semantic values to the ordinary Q-Comp ci and the SUBJ-Q-Comp (u)-kka. The parallel contrast between indicative and subjunctive in other languages can be found in (u)-kka and ci in Korean. Much more needs to be said to gain a full understanding of the precise nature of the relationship between inquisitiveness and nonveridical subjectivity.

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1. Introduction

This paper presents an account of internally headed relative clauses (IHRCs) that modifies Shimoyama’s (1999) E-type analysis by removing the maximalization operator to allow for non-maximal IHRC interpretations. Evidence comes from Yûn Shan (Southwestern Tai), where internally quantified heads have a non-maximal/non-definite interpretation available, in contrast to languages like Japanese (see, e.g., Hoshi 1995). The non-maximal interpretation described here is similar to the non-maximal interpretation available for anaphoric bare nouns in Inuttut (Gillon 2015), which is also found in Yûn Shan. Current IHRC analyses cannot capture this pattern. The data and analysis presented here add to the literature on patterns of internally headed relative clauses and anaphora that are found cross-linguistically.

2. Non-maximal IHRCs in Yûn Shan

Recently, there has been debate in the literature about how to analyze Japanese internally headed relative clauses (IHRCs) (Grosu and Landman 2012; Erlewine and Gould 2016; Grosu and Hoshi 2018; Kitagawa 2019; a.o.). There have been fewer analyses for IHRCs in other languages (see, e.g., Williamson (1987) for Lakhota; Hastings’s (2004) analysis of Quechua; Bogal-Allbritten and Moulton’s (2017) analysis of Navajo; and Kim’s (2009) analysis of Korean. There is still more to say about what types of IHRCs are available cross-linguistically and what analyses can account for IHRCs in other languages. This paper adds an analysis for a language typologically under-represented in the IHRC literature by focusing on Yûn Shan, an article-less SVO language with non-maximal IHRCs.

Moroney (2018) introduced data on Yûn Shan IHRCs, which are CNPC island sensitive, non-maximalizing IHRCs. While this previous paper proposed a head raising analysis for Yûn Shan IHRCs, it did not offer a complete semantic analysis of the phenomenon. The non-maximal interpretation for Yûn Shan IHRCs that is at issue is demonstrated by the contrast between Japanese and Yûn Shan, shown in (1)-(2):

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* Thanks to Aye Twei Soe who provided the Shan data. Thanks also to Molly Diesing, Carol-Rose Little, Sarah Murray, and John Whitman and the audiences of GLOW in Asia XII, the Chulalongkorn International Student Symposium on Southeast Asian Linguistics and BLS 44 for their feedback on an earlier version of this paper. Any errors are my own.
Interpreting quantification within internally headed relative clauses

Japanese:
    John-TOP Mary-NOM three-CL-GEN apple-ACC peeled NO-ACC ate
    ‘Mary peeled three apples and John ate them all.’
    (Shimoyama 1999: (12), citing Hoshi 1995)
    • Apples Mary peeled: 3
    • Apples John ate: 3

Yûn Shan: 1, 2
(2) Nan Lî cîn pên [ʔän Saj Kham pîk màmô sâam hwî nâj].
    Nan Li eat up COMP Saj Kham peel apple three CL.RND thi s
    ‘Nan Li ate up apples that Saj Kham peeled of which there are three.’
    (Moroney 2018: (18))
    • Apples S.K. peeled: 3
    • Apples N.L. ate: some of the peeled apples

In the Japanese sentence in (1), the numeral meaning ‘three’ describes both the number of apples peeled and eaten—i.e., the numeral describes the quantity that the IHRC and matrix clause predicates both apply to. However, in the corresponding Yûn Shan sentence in (2) the numeral ‘three’ only specifies the number of apples that were peeled—the IHRC clause predicate. In both examples, the numeral modifying the relative clause internal head indicates the number of apples that are peeled, showing that the numeral is construed inside the relative clause, where it appears. The difference lies in the fact that at the matrix clause level, the noun phrase denoted by the internally headed relative clause must be maximal for Japanese but need not necessarily be construed that way for Yûn Shan.

Section 3 will discuss previous analyses for Japanese internally headed relative clauses—the most broadly investigated case of IHRCs. Section 4 presents the Yûn Shan data in more detail. Section 5 discusses the problem of applying previous analyses to this data and argues for an E-type analysis of the data. Section 6 concludes.

3. Previous Analyses of Japanese IHRCs

This section describes three IHRC analyses for Japanese, one of the better analyzed IHRC languages. I focus on three types of accounts: Shimoyama’s (1999) E-type account, Grosu & Landman’s (2012) choose-role function with raising account, and Erlewine & Gould’s 2016 raising with trace conversion account. Previous analyses of IHRCs have focused on accounting for the RC head’s interpretation within both the main clause and the relative clause. Additionally, accounts of Japanese have focused on accounting for i. maximality of the relative clause, ii. relative clause-internal construal of quantifiers inside the relative clause, and iii. island sensitivity of IHRCs. According to previous accounts, including Shimoyama 1999 (S), Grosu & Landman 2012 (G&L), and Erlewine & Gould 2016 (E&G), which have all focused on Japanese IHRCs, this definite/maximal interpretation

1 The Shan data comes from my fieldwork with one Shan speaker in Ithaca, NY from January 2016 to September 2017. She is from Mei Wai village, near Papun in Kayin (Karen) State in Myanmar. She speaks the Yûn Shan dialect, which is very different from the Taunggyi dialect. She also speaks Karen, Burmese, and English. She had been in the United States for 7 years at the time I worked with her. Data was collected using a variety of elicitation methods: telling short stories, grammaticality judgments, and felicity judgments.

comes from a ‘THE’ or σ operation taking place at the top of the relative clause, though the source of this definiteness operation is not agreed upon. Examples (3a-3c) represent my interpretation of how each of these previous accounts would analyze the IHRC in (1), repeated below:

\[ (1) \text{John-wa} \ [\text{Mary-ga}\ \underline{\text{san-ko-no} \ ringo-o} \ \text{mui-te-kureta}] \ -no\]-o \ \text{tabeta}. \]

‘Mary peeled three apples and John ate them all.’

(Shimoyama 1999, citing Hoshi 1995)

- Apples Mary peeled: 3
- Apples John ate: 3

(3) a. the maximal individual a such that \([λ \ x ∈ D_{e} \ x \ \text{is apples m peeled}] (a) = 1\)  
   (S style: see her (37-38))

b. \(σ (λx.∃e[\text{PEEL}(e) ∧ \text{Ag}(e) = m ∧ \text{Th}(e) ∈ \text{*APPLE} ∧ |\text{Th}(e)| = 3 ∧ \text{Th}(e) = x])\)  
   (G&L style: see their (48))

c. \(\text{(THE)}[\lambda X. \ X \ \text{apple(s)}∧ m \ \text{peeled} 3[\text{apple parts of } X]]\)  
   (E&G style: see their (46c))

Shimoyama (1999) proposes an E-type analysis of Japanese IHRCs. In Shimoyama’s analysis, the IHRC starts in the specifier of the matrix DP and moves at LF to adjoin to IP. In the position of N is a null pro-form of type \(e, t\) which gets its denotation from the utterance context via an assignment function. In D is the morpheme -no, which Shimoyama says essentially functions like ‘the’. This D causes the maximal interpretation of the IHRC. This is demonstrated in (4). The assignment function comes to denote ‘the set of apples that Mary peeled’ and the morpheme -no generates something of type \(e\) including all the apples that Mary peeled. This is the denotation given in (3a).

(4) [Diagram of the structure of (1)]

Landman (2012), on the other hand, incorporate a projection, Choose Role, which has an operator ChR that abstracts over a salient theta role of the IHRC verb phrase. The specifier of ChRP has an
additional operator that moves to the specifier of CP and abstracts over the identified head at the CP level. The ChR operator functions to capture Kuroda’s (1992) Relevancy Condition that had been identified in Japanese. The operator that moves to SpecCP serves to both abstract over the variable of the head and to capture the CNPC sentitivity of Japanese IHRCs. The sigma operator generates the maximal interpretation. This results in the denotation in (3b).

Erlewine and Gould (2016) offer a very different analysis that aims to capture not only IHRCs, but also externally headed and doubly headed relative clauses. Their analysis uses the Copy Theory of movement and late-merger of relative clauses to copy the full DP head. The relative clause CP merges with the NP of the copied DP. Trace conversion (Fox 2002) and Inverse trace conversion (Erlewine, 2014)—both of which involve abstraction and determiner replacement—cause the two DP copies to be realized distinctly. Determiner replacement switches one quantifier for ‘the’. Trace conversion changes the quantifier for the lower copy and Inverse trace conversion changes the quantifier of the higher copy. This ‘the’ that replaces the quantifier, combined with maximal informativeness semantics, generates the maximal interpretation. A principle called Minimize Mismatch causes the quantifier to be pronounced in the position corresponding to where it appears at LF. Since we are focusing on IHRCs with internally quantified heads, this means that we are focusing on inverse trace conversion—which leaves the relative clause internal quantifier unchanged. Following this derivation for example (1), we get the derivation in (3c).

The subset relation in the denotation is meant to capture the “Salient set” interpretation Erlewine and Gould (2016) identify in Japanese IHRCs. They report that some speakers do not allow this reading. Presumably, for those speakers the subset relation in this denotation would be ‘equal to’ instead. The subset reading has not been found in Yûn Shan IHRCs, so I will not discuss this phenomenon further.

This maximal interpretation has been assumed or asserted for IHRCs in the majority of languages investigated, Lakhota being a notable exception (Williamson 1987). For Lakhota, the claim is that the presence of overt definite and indefinite articles is what allows for the non-maximal interpretations of some internally headed relative clauses (Watanabe 2004). Since Yûn Shan does not have overt definite and indefinite articles, this analysis cannot be extended to the Yûn Shan case. The next section explores Yûn Shan IHRCs in more detail and proposes an analysis that can account for the non-maximal interpretation of these IHRCs.

4. Yûn Shan Relative Clauses

Yûn Shan is an SVO, classifier language.3 This language has post-nominal relative clauses, as in (7). As (7) shows, quantifiers modifying the head at the matrix clause level are construed in the matrix clause. Thus, mâmɔ̂s sãam hwɪ ‘three apples’ in (7) specifies only the number of apples eaten, not the number of apples peeled.

\[
\text{(7) Nan Lî cîn pën [mâmɔ̂s sãam hwɪ] ?ån Saj Kham pûk nàj].}
\]

Nan Lî eat up apple three CL.RND COMP Saj Kham peel this ‘Nan Li ate up three apples that Saj Kham peeled of which there are three.’

While it is still an open question about whether other varieties of Shan, as are found in Shan state, have IHRCs (see Section 5 for discussion of this), other SVO languages do have IHRCs (such as, Gur languages (Hiraiwa 2005)). Additionally, IHRCs have been reported in at least some dialects of Karen (Tibeto-Burman)—another SVO language spoken in Karen State, Myanmar (Naw Hsar Shee 2008).
Internally headed relative clauses are also available. These and their externally headed counterparts are sensitive to CNPC islands. Unlike other definite article-less languages, the IHRCs are not obligatorily definite or maximalizing. This non-maximal interpretation is also available when the head is a bare noun, as in (8).

(8) Nan Li khaj cín [ʔān̥ Saj Kham tē lāan màm3 nāj]. Mān khaj cín hwí. ‘Nan Li wants to eat apples that Saj Kham will wash. She wants to eat one.’

(Moroney 2018: (17))

The internal head can be modified by quantifiers meaning ‘half’ or ‘all’ in addition to numerals, as shown in (9). These quantifiers are different from the numerals in that they do not ever appear with a classifier.

(9) Nan Li cín pēn [ʔān̥ Saj Kham pōk màm5 mymót/khuŋ nāj].
Nan Li eat up COMP Saj Kham peel apple all/half this
‘Nan Li ate up apples from the all/half of them that Saj Kham peeled.’

- Apples S.K. peeled: all/half the apples in the context
- Apples N.L. ate: some of the peeled apples

This section shows that post-head relatives are available in Yūn Shan in addition to internally headed relative clauses. Yūn Shan IHRCs display a non-maximal interpretation whether the noun is bare, modified by a numeral, or modified by a quantifier like ‘all’ or ‘half’. The following section will assess whether the IHRC analyses for Japanese can apply to the Yūn Shan case.

5. Analysis

Analyses that assume a definite IHRC interpretation cannot be applied directly to this new data since we want to allow for a possible non-definite/maximal interpretation. (10a-10c) are possible IHRC interpretations for (2) adapted from (3a-3c) to exclude the definiteness operation. The IHRC’s subject has also changed from m (Mary) to sk (Saj Kham). Note: (10a) is the adaptation of S style (3a), (10b) is the adaptation of G&L style (3b), and (10c) is the adaptation of E&G style (3c):

\[
\begin{align*}
&\text{(10) a. } \lambda x. x \in \text{De. } x \text{ is apples sk peeled} \\
&\text{b. } \lambda x. \exists e \text{[PEEL(e) } \land \text{ Ag(e) } = \text{ sk } \Land \text{ Th(e) } \in \text{ *APPLE } \land \text{ [Th(e)] } = 3 \Land \text{ Th(e) } = x] \\
&\text{c. } [\lambda X. X \text{ apple(s)} \Land \text{ sk peeled 3[apple parts of } X]]
\end{align*}
\]

With the definite operation removed, Grosu and Landman’s (2012) analysis would give the interpretation in (10b). The problem with this is that each x in the set must have the measure 3, but the matrix clause verb does not actually need to apply to all three peeled apples in Yūn Shan. We want it to be possible for only 1 or 2 apples to be eaten.4 Erlewine and Gould’s (2016) analysis has a similar

---

4 During the question period, the question was raised as to whether the non-maximal interpretation comes about
problem, shown in (10c). Each X described would have to contain at least 3 apples. The interpretation of Shimoyama’s (1999) with the definiteness operation removed, shown in (10a), does better since it would not make reference to the number of apples peeled at level of the E-type pronoun, but since the LF of the IHRC was interpreted separately, that information is not lost (i.e., we still know only three apples were peeled).

In Shimoyama’s (1999) analysis, the IHRC would adjoin at LF to the IP. In the base position of the IHRC is a free variable that receives its denotation from an assignment function in the utterance context. The IHRC supplies the salient property. Instead of having something like Japanese -no performing a definiteness operation at D, either there would be no D, or the null D itself would generate an existential or definite meaning. Then, the argument of the matrix clause would be something of type (e, t), that could be handled like any bare noun in the language. This is not a stretch since Shan, like Mandarin, can have bare nouns as arguments.

Another alternative is an unselective binding analysis, which has been proposed for nonmaximal IHRC languages like Lakhota (Watanabe 2004). The problem is that this analysis relies on the presence of overt determiners in the language, which Shan lacks, and predicts no IHRC island-sensitivity, which Shan has, so this type of analysis would require that there are covert definite and indefinite determiners that unselectively bind the internal head of IHRCs.

My proposal, building on Shimoyama’s (1999) analysis, is that the IHRC moves at LF to a higher projection. However, I claim that the higher position that it moves to is a topic/left dislocation position, which is independently found in the language. As (11) shows, this topic position can be used for a partitive structure where the topic is ‘her four children’ (from a story about a dog and her puppies), and subsequently two of those children are described one way and the other two another way.

\[
\text{\textbf{11) \{luk mán si tò náj\} seng tò náj\}} \text{\textbf{waarnaaj pñ funciones mán\}}}
\]

\[
\text{child 3 four CL.ANIM this two CL.ANIM this obedient like mother 3\}}
\]

\[
\text{\textbf{fàn seng tò náj\}} hajaj heighb mán khop pyn\}}
\]

\[
\text{COMP two CL.ANIM this bad and 3 bite others\}}
\]

‘(Of) her four children, two are obedient like their mother, (and) two are bad and they bite people.’

This position is usually filled by a noun or a dependent clause. As further evidence that relative clauses can move to this position, (12) shows an IHRC in the topic position. The structure in brackets looks the same as the IHRC in (2). The interpretation is similar to (2) in that the internal quantifier mambio sâam hwí ‘three’ indicates how many apples were peeled. The matrix clause quantifier mîmôt ‘all’ indicates how any apples were eaten. (13) is like (12) except the relative clause is missing the complementizer jên, which is sometimes optional, and there is no matrix clause quantifier, giving (13) the same interpretation as (2).

\[
\text{\textbf{12) \{\text{\textbf{[}\text{\textbf{ʔăn Saj Kham p\}} } mambio sâam hwí \}} náj\}} \text{\textbf{Na\}} \text{\textbf{i c\\}} \text{\textbf{p\}} mîmôt.\}}
\]

\[
\text{COMP Saj Kham peel apple three CL.RND this Nan Li eat up all\}}
\]

‘Nan Li ate up three apples that Saj Kham peeled.’

- Apples S.K. peeled: 3 apples
- Apples N.L. ate: all 3 peeled apples

from the verb \textit{eat}. This is not a problem since the non-maximal interpretation is available with other verbs.
Further support for this kind of analysis comes from the fact that for relatives that act as the subject of the matrix clause, there is often an overt realization of the pronominal form. This can be seen in (14).

(14) [ʔăn ħăw hăn lik năj] măn lĕŋ.  
COMP 1 see book this 3 red  
‘The book that I saw is red.’  

Interestingly, even in a dialect of Shan that does not have internally headed relative clauses, a structure like (12) and (13) is possible, as shown in (15). Like Yûn Shan, Southern Shan can have some quantificational material in the matrix clause that indicates how much of the topic noun serves as an argument of the matrix clause, as in (16).

Southern Shan:

(15) [ʔăn tsăaj Khám păk màak-monj si hõj năn] Năan ʔën kîn pĕt jawn.  
COMP Mr. Kham peel fruit-mango four CL.RND that Ms. Orn eat waste PERF  
‘Ms. Orn ate mangoes that Mr. Kham peeled of which there are four.’  
• Mangoes Mr. K. peeled: 4 mangoes  
• Mangoes Ms. O. ate: some peeled mangoes

(16) [ʔăn tsăaj Khám păk màak-monj si hõj năn] Năan ʔën sŏj jawn.  
COMP Mr. Kham peel fruit-mango four CL.RND that Ms. Orn kîn sŏng hõj jawn.  
eat two CL.RND PERF  
‘Ms. Orn ate two of the mangoes that Mr. Kham peeled of which there are four.’  
• Mangoes Mr. K. peeled: 4 mangoes  
• Mangoes Ms. O. ate: 2 peeled mangoes

(17) shows that the same non-maximal interpretation can be found in Southern Shan when verbs other than ‘eat’ are used.

(17) [ʔăn tsăaj Khám păk màak-monj si hõj năn] Năan ʔën sŏj jawn.  
COMP Mr. Kham peel fruit-mango four CL.RND that Ms. Orn cut PERF  
‘Ms. Orn cut mangoes that Mr. Kham peeled of which there are four.’  
• Mangoes Mr. K. peeled: 4 mangoes  
• Mangoes Ms. O. cut: some peeled mangoes

What I am calling “Southern Shan” is the dialect spoken in the southern part of Shan State. The speakers call themselves Tái or Tái Lǒng. This seems to be the best documented variety of Shan. Even within Southern Shan there is variation that has not been well described. This data comes from a speaker from Keng Tawng City in Southern Shan State, Myanmar, whom I have been working with since January 2018.
Both varieties of Shan have a topic/left dislocation position available. The difference here between Yûn Shan and Southern Shan seems to be that in Southern Shan internally headed relative clauses cannot raise from object position at LF, meaning that a structure like (2) is not possible.

I have proposed that Yûn Shan IHRCs are moved at LF to a higher topic position and that following Shimoyama (1999), the argument position in the matrix clause contains a pro-form which gets its interpretation from an assignment function and generates something of type \( e, t \). This structure can be seen in (18).

What has not yet been discussed is the internal structure of the internally headed relative clause. One piece of evidence suggesting that Yûn Shan IHRCs are relative clauses, is their island sensitivity, as shown in (19). This suggests that there is movement going on inside the relative clause.

\[
\begin{align*}
\text{(18)} & \quad & \text{Sarah peeled three apples.} \\
\text{DP} & \quad & \text{TopP} \\
\text{IHRC} & \quad & \text{this Nan Li} \\
\text{NP} & \quad & \text{ate} \\
\end{align*}
\]

As (20) shows, it is not merely the case that multiple embeddings are prohibited.

\[
\begin{align*}
\text{(19)} & \quad & \text{*[['ûn Nan Lî waa kân tân̄hen [ûn kôn ʔian lik näj]] mân lêŋ.} \\
& \quad & \text{COMP Nan Li spoke together with COMP person read book this 3 red} \\
& \quad & \text{Intended: ‘The book that Nan Li spoke with the people who read (it) is red.’} \\
\text{(Moroney 2018: 16)} & \quad & \text{3} \\
\end{align*}
\]

\[
\begin{align*}
\text{(20)} & \quad & \text{[ûn Nan Lî cîvk [ûn kôn sû li̊k näj] mân kêŋ.} \\
& \quad & \text{COMP Nan Li like COMP person buy book this 3 smart} \\
& \quad & \text{‘The person that Nan Li likes who bought the books is smart.’} \\
\end{align*}
\]

If there is no IHRC internal raising going on it is harder to predict why (19) is ungrammatical and (20) is grammatical. Perhaps, this issue is that for (19), it is not possible to identify the topic since there are two. Another possibility, which was raised during the question period of this talk, is that (19) is simply more difficult to process, and that by reducing the processing load by replacing arguments with indexical expressions it would be possible to show that this construction was more acceptable than originally thought. Unfortunately, I cannot collect new Yûn Shan data at the moment.
An alternative is to have—in addition to the IHRC being construed as a topic—something raising that causes the IHRC in the topic position to denote the noun phrase that serves as its head. Since the more deeply embedded IHRC in (19) has a different head than the less deeply embedded one, an island violation occurs.

Given that this analysis is relies on a kind of anaphora, it may seem peculiar that this anaphora generates an (e, t) type argument. While we generally think of anaphora as referring back to something maximally, bare nouns do not always have to refer anaphorically to the maximal entity, as Gillon (2015) shows for Inuttut, shown in (23). Here, when the bare noun is used anaphorically the default interpretation is maximal (23b), but that maximal interpretation is cancelable, as (23c) shows.

(23) a. Tallimat adlait amma śaksit tuttuit napättulinii.
   five bears and six caribou.PL forest.Loc
   ‘There were 5 bears and 6 caribou in the forest.’ (Gillon 2015: (42))

b. Tuttuit Kukijaka
caribou.PL shoot.1>3
   ‘I shot (and killed) the caribou.’ (all 6, not 5/6)”

c. Ilangit Kimajut
   some flee.3
   ‘Some escaped.’ (therefore less than 6)

Yūn Shan seems to allow non-maximal nominal anaphora, as demonstrated in (24). The noun mā ‘dog’ in the second sentence is referring to the five dogs described in the first sentence, yet the interpretation can be non-maximal. The nāj that appears here and with relative clauses might be functioning as a topic or focus marker rather than simply as a demonstrative.

(24) a. Māa haa tō tānhen mjáw sāam tō khóp kān.
   dog five CL.ANIM and cat three CL.ANIM fight together
   ‘Five dogs and three cats were fighting.’

b. Pejâwne māa nāj ṭen pēn
   then ‘dog this run off’
   ‘Then, dogs ran away.’ [Consultant comment: Could be all dogs or some that ran away.]

6. Conclusion

This paper offers an E-type analysis to account for the non-maximal interpretation available for IHRCs in Yūn Shan and discusses the connection this sort of analysis has with the types of anaphora found within a language. I have proposed that non-maximal Yūn Shan IHRCs cannot fully be accounted for using any of the previous analyses of Japanese IHRCs. An E-type analysis that allows for a non-maximal interpretation can capture the data, though we might still want to say that there is still movement within the relative clause. The Shan data given here show an overt realization of the pronoun left behind when the IHRC is moved to a higher position in the clause. The contrast between the Yūn Shan and Southern Shan data might show a language at different points in the development of internally headed relative clauses. For Southern Shan, what looks like an IHRC can only appear in the topic/left dislocation position. In Yūn Shan, the IHRC can appear in the original argument position.
Bibliography


The Hidden Syntax of Clausal Complementation in Japanese
Koji Shimamura
Ritsumeikan University

1 Introduction

Recent development in the theory of clausal complementation has been observing a radical shift from the traditional Hintikkan approach to attitude reports to the one where intensionality is not an attribute of attitude predicates (Kratzer 2006, Moulton 2009a,b, 2015, Elliot 2018). Under this new conception, the intentionality of attitude reports in e.g. English is introduced by the complementizer that. In this paper, I will push this new trend of severing intensionality from the attitude predicate in Japanese, and propose that what introduces an embedded clause is a hidden ‘say’ verb, given as SAY below. This said, attitude verbs like おもう- ‘think’ and 信じ- ‘believe’ do not select embedded clauses, and they are just monadic predicates only selecting an event argument (Elliot 2018; cf. Lohndal 2014). Then, I will propose that the matrix attitude verb and VP that is headed by SAY are semantically combined via Predicate Modification. The proposed analysis explains the distribution of the quotative complementation as well as the behavior of its pro-form. To be specific, I will explain why the quotative clause can only appear as an internal argument, why multiple instances of it can be stacked to modify the main verb, and why its pro-form そあ allows covert syntactic movement while banning its overt counterpart (Sakamoto 2016a,b).

This paper goes as follows. In Section 2, I will provide the gist of the recent discussion of dissociating intensionality from the attitude verb, especially focusing on Moulton (2009a,b, 2015) and Elliot (2018). In Section 3, we will consider whether such a new theoretical heading is plausible in Japanese quotative complementation, and I will show that it is not possible as it is due to the “stacking” problem, putting forth an alternative way to introduce the embedded clause in Section 4. Then, in Section 5, we will see that the proposed analysis can explain where the quotative clause can appear as well as where it cannot. Section 6 will be concerned with nature of the pro-form of the quotative clause regarding its extractability and the possibility of its cooccurrence with the associated quotative clause. Section 7 will conclude.

1More precisely, Kratzer (2006) and Moulton (2009a,b, 2015) argue that attitude verbs take a content individual (plus event and world arguments), whereas Elliot (2018) contends that they only take an event argument.
2 Severing Intensionality from the Attitude Predicate

A recent shift of the theory of attitude report is a departure from the traditional Hintikkaan perspective toward the one where intensionality is not the attribute of attitude predicates. That is, attitude predicates only take an event argument (Elliot 2018), or an event argument and an individual argument that has some content (Kratzer 2006, Moulton 2009a,b, 2015), and under this approach, the intentional semantics in the traditional sense is done by the complementizer such as *that* in English. Specifically, Moulton (2015) for example provides the following semantics for *that*:\(^2\)

\[
(1) \quad [\text{that}] = \lambda p \forall y . \lambda x . \lambda w . \text{cont}(x)(w) = p
\]
\[
\text{where cont} = \{w' : \text{w' is compatible with the intentional content determined by x, in w}\}
\]
\[
\text{(based on Moulton 2015, 312)}
\]

Therefore, the complement clause like *that Bob is fraud* will denote a set of individuals whose content is that Bob is a fraud as in (2). Then, since under Moulton’s analysis content nouns like *idea* also denote a set of content individuals as in (3a), appositive clauses like *idea that Bob is a fraud* will be semantically derived via (Intensional) Predicate Modification (PM) due to CP and the noun both being of type \(\langle e, wt \rangle\).

\[
(2) \quad [\text{that Bob is a fraud}] = \lambda x . \lambda w . \text{cont}(x)(w) = \lambda w' \text{ Bob is a fraud in w'}.
\]
\[
(3) \quad \text{a. } [\text{idea}] = \lambda x . \lambda w . \text{idea}(x)(w)
\]
\[
\text{b. } [\text{idea that Bob is a fraud}] = \lambda x . \lambda w . [\text{idea}(x)(w) \land [\text{cont}(x)(w) = \lambda w' \text{ Bob is a fraud in w'}]].
\]
\[
\text{(based on Moulton 2015, 312–313)}
\]

Given this, one question that will naturally arise is how to complement CP to the attitude predicate. In this connection, attitude predicates can also take various content nouns as well as clauses. For instance, the complement of *believe* can take a clause or a content noun as in (4).

\[
(4) \quad \begin{align*}
\quad \text{a. John believes the rumor.} \\
\quad \text{b. John believes that Bob is a fraud.}
\end{align*}
\]

Thus, we can assume that *believe* also selects an individual which has some content, so we have (5). In this denotation, *believe* is a function from entity to eventuality to proposition (a set of worlds), hence \(\langle e, (x, wt) \rangle\). Therefore, a type-mismatch problem arises, since the embedded clause in (2) is of type \(\langle e, wt \rangle\).

\[
(5) \quad [\text{believe}] = \lambda x . \lambda e . \lambda w . \text{believe}(x)(e)(w) \quad (\text{Moulton 2009a, 170})
\]

To combine (5) and (2), following Moulton (2009a), let us assume Chung and Ladusaw’s (2004)
Restrict, which restricts the internal argument of (5) via (2). Then, the internal argument is $\exists$-closed, which leads to (6).

$$\lambda x.\lambda w.\lambda w'[\text{believe}(x,r)(e)(w) \land [\text{cont}(x)(w) = \lambda w' \text{ Bob is a fraud in } w']]$$

(After $\exists$-closure) $\lambda e.\lambda w.\exists x[\text{believe}(x,r)(e)(w) \land [\text{cont}(x)(w) = \lambda w' \text{ Bob is a fraud in } w']]$.

An alternative picture is put forth by Elliot (2018), who assumes that the variables ranging over events (i.e. $e$) and those ranging over individuals (i.e. $x, y, \ldots$) are ontologically the same type, namely, both of them belonging to the domain of entities $D_e$. Then, just like abstract objects like idea can have a propositional content, events and states (e.g. belief-state or saying-event) can also have such a propositional content. If such contentual eventualities are possible, we can also combine the matrix attitude predicate and the complement CP via PM.$^3$

$$\lambda e.\text{say}(e) \lambda x.\text{cont}(x)(w^+) = \lambda w'.\text{Bob is a fraud in } w'$$

With either (6) or (7), we can integrate the embedded clause with the matrix verb, and the intensional semantics is now an attribute of the complementizer.

3 Stacking Problem and Quotative Complementation in Japanese

The new picture of attitude reports just shown has numerous consequences in the study of clausal complementation (mostly in English), but we will not discuss them, referring the reader to the references cited in the previous section. Rather, we will consider whether a similar analysis is possible in Japanese. Specifically, we will look into the domain of quotative complementation that is introduced by the reporting particle to (henceforth, Rep). Consider for example:

$$\text{Taro} \text{-top Hanako-nom cute.cop.pres-REP say-past}$$

‘Taro said that Hanako was cute.’

In this example, the embedded clause is suffixed by Rep, complemented to the matrix attitude

$^3$I ignore the world argument of the verb that will be evaluated in the actual world. Thus, the cop functor simply has the pronominal argument $w^+$ that corresponds to the actual world.
predicate. Then, we can imagine that Rep is endowed with the same semantics as *that in (1) as in (9)

$$[[to]] = \lambda p. \lambda x_c. \lambda w. \text{cont}(x_c)(w) = p$$

where cont = \{w' : w' is compatible with the intentional content determined by x_c in w\}

Then, the semantic mode of combining the embedded clause and the matrix verb is Restrict or PM. Either way, the former is a modifier to the latter. In this connection, there is one issue. That is, since embedded clauses are modifiers, they are expected to occur multiply like adjectives in the nominal domain, e.g. handsome young man. However, this is impossible for *that-clauses as in (10).

a. *The rumor that Fred was happy, that he was in Paris. (Moulton 2009b, 29)
b. *Abcd believes [[CP that Jeff is old] [[CP that Shirley is upset]]. (Elliot 2018, 182)

The ungrammaticality of (10), as Moulton (2009b) argues, should be reduced to the function status of cont. That is, if cont(x_c)(w) = p and cont(x_c)(w) = q, then p = q. Therefore, in case of e.g. (10a), the proposition that Fred was happy and the one that he was in Paris must be interpreted as identical, which cannot be true.\(^4\)

Turning to Japanese, this language exhibits an interesting fact. That is, it allows embedded clauses introduced by to be stacked as shown in (11).

(11) Taro-o-wa [Hanako-ga kawaii-to] [kanozyo-wa moteru-to]
    Taro-top Hanako-nom cute.top pres-rep
    li-ta
    say-fast.
    Lit. ‘Taro said [that Hanako was cute] [that she was popular (among guys)].’

Note that this is not a case of conjunction of the two embedded clauses, since an adverb that modifies the matrix verb can appear between them as in (12).

\(^4\)As Elliot (2018) observes, this explanation goes through to the extent that the propositional content of an individual (i.e. x_c) is equivalent to a set of worlds. Namely, if we assume that such an content individual is entailed by the proposition denoted by the embedded clause, we can come up with the following semantics.

(i) \[\lambda x_c. \lambda w. \text{cont}(x_c)(w) \subseteq \{w' : \text{Fred was happy in } w'\}\]

If (i) is the right option, two propositions in (10) do not have to be identical. However, there is a piece of evidence showing that (i) is not correct. Consider:

(ii) #Jeff explained a fact that Shirley is upset. (Elliot 2018, 183)

In (ii), the indefinite article invokes an anti-uniqueness presupposition for its domain of quantification. This should be compatible with the semantics of (i), but since (ii) is bad, the relevant assumption that the propositional content of an individual (i.e. x_c) is equivalent to a set of worlds is valid, and we need the definite article instead.
The status of sarani ‘furthermore’ being not a conjunctive but an adverb can be diagnosed. As in (13), sarari is optional, and what functions as a conjunctive is the verb form in the first conjunct. Also, as in (14), it can follow the subject in the second conjunct, which is optional.

Hanako-nom beautiful-person-conj furthermore she-top kind-conj
‘Hanko is beautiful, and furthermore she is kind.’

(14) Hanako-wa Bizin-dasi, Kanozuy-wa (sarani) sinsetu-da.
Hanako-nom beautiful-person-conj she-top furthermore kind-conj
‘Hanko is beautiful, and furthermore she is kind.’

(13) and (14) thus clearly show that sarani is an adverb rather than a conjunctive.

Given (12), we cannot simply carry over what Moulton proposes to the quotative complementation in Japanese. Then, I will next argue that what introduces an quotative embedded clause in Japanese is an invisible verb, which is a grammaticalized form of haver ‘say’, and its meaning is diluted due to grammaticalization, so it does not retain its original lexical meaning.

4 What is Hidden in the Quotative Complementation in Japanese?

Following H. Saito (2017, 2018a,b) and Shimamura (2018), I contend that there is an invisible verb involved in the quotative complementation for the cases like (8), repeated here in (15). Specifically, I propose the structure in (16), where the lexical verb takes the VP that is headed by SAY. Note that in this structure, SAY is phonologically null, hence invisible (or inaudible, more precisely).

(15) Taroo-wa Hanako-ga kawai-to it-ta.
Taro-nom Hanako-nom cute-conj-pres-say-past
‘Taro said that Hanako was cute.’

(16) \[
\begin{array}{c}
\text{VP} \\
\text{CP} \\
\text{say}_{\text{lexical}} \\
\text{SAY}
\end{array}
\]
For the semantics of SAY and lexical attitude predicates, I propose the following:

\[(17) \quad [\text{SAY}] = \lambda p. \lambda e. e \text{ in } w' \land \text{SAY}(e) \land \forall w \in \text{con}(e) : p(w)\]
where \(\text{con}(e) = \cap \varphi = \{p \mid p \text{ is a belief of the agent/experiencer of } e \text{ at } \tau(e)\}\)

\[\begin{align*}
\text{b. } & [\text{say}_{\text{lexical}}] = \lambda e. \text{say}(e)
\end{align*}\]

This semantics is due to Hacquard (2006), who argues that attitude predicates denote a belief state or event, whose content is an attitude holder’s belief, denoted via propositions. Although I do not follow her in assuming that attitude predicates have event-relativized intensionality, I adopt her semantics for SAY, so that SAY is a function of type \((w, st)\). I also assume that the meaning of SAY is abstract, only signifying an “expressing” event, so it may involve vocal sound as well as some mental representation. Therefore, it is compatible with a “saying” event and “thinking” state. Given this, the mode of semantic composition between SAY’s VP and the lexical verb is PM. Note that the lexical verb is just a monadic predicate that only selects an eventuality argument. In this connection, recent literature on the argument structure has been arguing for the total elimination of it. Namely, not only Agent but also Theme should be severed from the verb (see Lohndal 2014 and references therein). Elliot (2018) also maintains that the internal argument of attitude predicates should be severed, and it is introduced by a syntactic head independent of attitude predicates. If this line of reasoning is on the right track, postulating (17b) should be possible.

One advantage of disassociating the internal argument from attitude predicates is that some of them can select a nominal argument as well as a propositional argument, e.g. sinzi- ‘believe’.

\[(18) \quad \text{a. Taroo-wa [obake-ga i-ru-to] sinzi-tei-ru.} \quad \text{‘Taro believes that ghosts exist.’} \]
\text{Taro-top ghost-nom exist-fres-rep believe-asp-pres}

\[\text{b. Taroo-wa obake-o sinzi-tei-ru.} \quad \text{‘Taro believes in ghosts.’} \]
\text{Taro-top ghost-acc believe-asp-pres}

Indeed, we can imagine that sinzi- has two specifications in the lexicon with respect to its valency. However, under the proposed analysis, the verbs in (18a) and (18b) are the same. In (18b), the verb is combined with a functional projection F that introduces the relevant nominal argument as Lohndal (2014) proposes. That is, we have (19), where the internal argument is merged to Spec-FP. Recall that the verb is of type \((st)\). Therefore, the argument-introducer F

\[\text{\footnotesize{\textsuperscript{5}Let us abstract away from the world arguments of SAY and the matrix predicate for the brevity’s sake. They are just interpreted as the actual world.}}}
\]

\[\text{\footnotesize{\textsuperscript{6}Also, the semantics of (17a) works only for attitude verbs like sinzi- ‘believe’ and onow- ‘think’, and SAY for other attitude verbs like iw- ‘say’ should have a more relaxed semantics since they are compatible with a proposition whose truth the matrix subject does not commit herself to, e.g. telling a lie. Therefore, we need the intensionality in such cases to be defined by a set of possible worlds that is compatible with what the matrix subject utters/expresses in a given matrix context. I thank Elin McCready for raising this issue.}}}
\]

\[\text{\footnotesize{\textsuperscript{7}I assume that the attitude holder will be introduced by Voice (Kratzer 1996).}}\]
should be of type \( (e, st) \). Thus, the mode of semantic merger of \( F \) and \( VP \) should be Event Identification (EI) (Kratzer 1996).\(^7\)

\[ (19) \]

\[
\begin{array}{c}
\text{FP} \\
\text{ghost} \\
\text{believe} \\
\text{VP} \\
\text{F'} \\
\text{DP}
\end{array}
\]

Turning to the clausal stacking, the proposed analysis can straightforwardly explain why it is possible in Japanese. Under the current analysis, quotative clauses that are introduced via to involve SAY. Thus, we have two independent instances of SAY for the stacking cases like (11). This state of affairs is thus equivalent to having two independent verbs, each of which introduces a propositional argument. Specifically, I propose that the structure of (11) is (20).

\[ (20) \]

\[
\begin{array}{c}
\text{VP} \\
\text{AspP} \\
\text{VP1} \\
\text{[CP Hanako was cute] SAY} \\
\text{Asp} \\
\text{VP2} \\
\text{[CP she was popular] SAY} \\
\text{V} \\
\text{say}\text{\textsubscript{lexical}}
\end{array}
\]

Here, \( VP1 \) containing the first clause is adjoined to \( VP \) whose head is the lexical verb. Crucially, I assume that the adjunction of \( VP1 \) is mediated by a covert aspectual head Asp. This is because there is a temporal precedence relation between the first clause and the second clause (cf. Oshima 2017). Also, the utterance event of the first clause cannot be temporally distant from that of the second clause. Adjunct quotative clauses all obey this temporal constraint. For instance, observe:

\[ (21) \]

\[
\begin{array}{c}
\text{Taroo-wa [ ima isogasii-to ] #\( (i-t) \) yagate denwa-o kit-ta.} \\
\text{Taro-nom now busy,cof.pres-REP say-te in.short.while telephone-ACC cut-PAST} \\
\text{‘Taro hung up the phone, a while after saying that he was busy.’ (Oshima 2017, 7)}
\end{array}
\]

\(^7\)Lehndal (2014) does not concern himself with the semantic merger of \( F \) and \( VP \), since he proposes that \( VP \) independently undergoes Spell-Out when the object DP is merged, and that \( VP \) is semantically interpreted independently of \( FP \), constituting a conjunct of the Neo-Davidsonian event semantic denotation. Although I adopt such an event semantics, I will not follow Lehndal’s radical Spell-Out system.
In (21), the event of Taro’s saying that he was busy cannot be temporally distant from that of his hanging up the phone. When the lexical attitude verb is overt, such a temporal dislocation is possible. Then, I take (21) to mean that the relevant Asp head is involved. To be specific, I assume that -te has two possible structural spots, Asp and T. In this connection, Nakatani (2004) argues that -te appears as the past marker when T is not selected by C, whereas Kusumoto (2001) maintains that it can be a participial head (Part), which I assume corresponds to Asp. Then, I assume that they are both right. Consider:

(22) Taro-wa sono yoru moo gohan-o tabe-te-i-te, boku-to issyoni yuusyoku-ni
taro-top that night already meal-acc eat-te1-cop-te2 I-with  together dinner-dat
ika-nakat-ta.
go-NEG-PAST
‘Since Taro had already eaten dinner, he didn’t eat out with me that night.’

The -te glossed as te1 is Asp, and that glossed as te2 is T, to the extent that Kusumoto (2001) and Nakatani (2004) are on the right track.8 Then, under the current analysis, the invisible SAY, when it is an adjunct, is introduced with a covert Asp that corresponds to te1, not T. Why this state of affairs holds at all is, I admit, a fundamental question, but I leave this issue for my future research, presuming that postulating Asp for (invisible) SAY just suffices to explain (21). Also, having Asp prevents the event variable of VP1 and that of VP2 in (20) from being identified under PM, so that we have no propositional contradiction unlike the English clausal stacking; I assume that Asp 3-closes VP1’s event.

The proposed analysis can also explain why the pro-form of the embedded clause is soo ‘so’, which is adverbal, whereas the attitude predicate can select sore ‘that’, which is pronominal, when the antecedent is nominal. Witness:

taro-top ghost-nom exist-pres-rep believe-asp-pres Jiro-also so/that-acc
sinzi-tei-ru.
believe-asp-pres
‘Taro believes that ghosts exist. Jiro also believes so.’

taro-top ghost-acc believe-asp-pres Jiro-also that-acc/so believe-asp-pres
‘Taro believes in ghosts. Jiro also believes in them.’

In (23a), soo refers to SAY’s VP (cf. HH, Tanaka 2014). In contrast, sore in (23b) refers to the object DP. Therefore, this contrast is also naturally captured by severing the internal argument, be it clausal or nominal, from the attitude predicate.

---

8Note that I have glossed te1 and its combination with cop as Asp elsewhere. However, more precisely, glossing in (22) is more accurate, although I will keep using Asp for the other examples.
5 The Distribution of the Quotative Clause

Given the present analysis, the quotative clause that is introduced by to necessarily accompanies SAY covertly, and the VP headed by SAY and the matrix verb are semantically combined with each other under PM. This explains why the quotative clause only appears as an internal argument. Observe:

   Taro-TOP tomorrow Jiro-NOM come-PRES-REP hear-PAST
   ‘Taro heard that Jiro will come tomorrow.’

b. *[ Taroo-ga Ziroo-o sikat-ta-to ] watasi-o odorok-ase-ta.
   Taro-NOM Jiro-ACC scold-PAST-REP I-ACC surprise-CAUS-PAST
   Intended ‘That Jiro scolded me.’

   Taro-TOP Jiro-NOM leave-PAST-REP -from room-ACC clean-PAST
   Intended ‘Taro cleaned the room because Jiro left.’

d. [ Taroo-ga ku-ni-to ] omow-are-ru.
   Taro-NOM come-PRES-REP think-PASS-PRES
   ‘It seems that Taro will come.’

In fact, this paradigm is, as Baker (2011) shows, replicated in Sakha, where the embedded clause is mediated by the complementizer dien, which historically stems from die ‘say’.

   Sardaana today Aisen come-aor.3sg.s that hear-PAST.3sg.s
   ‘Sardaana heard that Aisen is coming today.’

   Saaska Baaska-ACC scold-PAST.3sg.s that US-ACC surprise-PTPL-3sg.s
   Intended ‘That Saaska scolded Baaska surprised us.’

   Masha Misha leave-PAST.3sg.s that with house-ACC clean-PAST.3sg.s
   Intended ‘Masha cleaned the house with (immediately after) Misha left.’

   Masha next.year Moscow-dar go-PUT.3sg.s that become.certain-PAST.3sg.s
   ‘It became clear that Masha will go to Moscow next year.’

(Baker 2011, 1169)

The parallelism between Japanese and Sakha in (24) and (25) lends further support to the proposed analysis.

The presence of SAY can also elucidate the quotative complementation without attitude predicates. For instance, su- ‘do’ can apparently take a quotative clause when it appears in the Control construction. Consider:
The Hidden Syntax of Clausal Complementation in Japanese

(26)  
Taroo-wa [ ratefu-o benkyoo-si-yoo-to ] si-ta.
Taroo-top EX-acc study-do-mod-rep do-past
‘Taro tried to learn how to use EX.’

In (26), the embedded clause has the volitional modal marker yoo, and Fujii (2006) contends that when a clause with this modal is embedded, it functions as a Subject (and Split) Control complement. We are not concerned with the specific details of Control in Japanese, but what is of importance here is the question of how su-, which is not an attitude verb, can select the sentential complement. Under the current analysis, this question is straightforwardly answered in terms of the hidden structure. That is, the embedded clause is mediated by SAY, which projects its own VP, and this VP and su- are combined via PM. Therefore, the structure is (28), where the SAYing (expressing) event modifies the doing event.

(27)  
\[
\text{VP} \\
\text{do} \\
\text{SAY}
\]

6 Referring Back to SAY’s VP

6.1 Extraction from Soo

Sakamoto (2016a,b) observes that the pro-form of the quotative clause, soo, allows the following extraction patterns with respect to A-movement:

(28)  
a.  Fugu-o1 Hanako-wa [CP Taroo-ga t1 tabe-ta-to ] omot-tei-ru kedo, blowfish-acc Hanako-top Taro-nom eat-past-rep think-asp-pres but
Lit. ‘Although blowfish1, Hanako thinks that Taro ate t1.’
Lit. ‘Destroying angels2, Sachiko thinks that Taro ate t2.’
Lit. ‘Destroying angels2, Sachiko thinks so.’

(Sakamoto 2016b, 112)

(29)  
a.  [PP OP1 [CP Taroo-ga t1 yon-da-to ] Kanako-ni iw-are-tei-ru yori(mo) ]
Taroo-nom read-past-rep Kanako-by say-pass-asp-pres than
Hanako-wa takusan ronbun-o yon-dei-ru.
Hanako-top many paper-acc read-asp-pres
Lit. ‘Hanako read more papers than [OP₁ it is said by Kanako that Taro read t₁].’

b. Sarani, \[PP \text{OP}_2 [\text{CP} \text{Taro-ga} \ t_2 \ \text{yon-da-to} \ ] \text{Ayaka-ni} \ \text{iw-are-tei-ru} \]
   furthermore \text{Taro-nom} \ \text{read-PAST-REP} \ \text{Ayaka-by say-PASS-ASP-PRES}
   yori(n(o)) \ \text{kanozyo-wa takusan ronbun-o yon-dei-ru,}
   than \ \text{she-top} \ \text{many paper-ACC read-ASP-PRES}
Lit. ‘She read more papers than [OP₂ it is said by Ayaka that Taro read t₂].’

c. Sarani, \[PP \text{OP}_2 [\text{CP} \text{soo} \ ] \text{Ayaka-ni} \ \text{iw-are-tei-ru} \ yori(n(o)) \]
   furthermore \ \text{so Ayaka-by say-PASS-ASP-PRES}
   kanozyo-wa takusan ronbun-o yon-dei-ru.
   \ \text{she-top} \ \text{many paper-ACC read-ASP-PRES}
Lit. ‘She read more papers than [OP₂ it is said by Ayaka so].’

(Sakamoto 2016b, 114)

As in (28c), overt Ā-movement (so-called long-distance scrambling discussed by M. Saito (1985) from the embedded clause is impossible when we have the soo anaphor. In contrast, overt Ā-movement (OP-movement) is possible as (29c) shows.⁹¹⁰

Turning to A-movement, Sakamoto (2016a,b) also shows that Raising-to-Object (RTO), which is assumed to be a case of cross-clausal A-movement, is implementable from soo.

(30) a. \text{Taro-o-wa Ayaka-o} \ t̄\text{orokanimo} \ [\text{CP} \ t_1 \ \text{tensa-da-to} \ ] \text{omot-tei-ru.}
   \text{Taro-sec top Ayaka-ACC stupidly genius-COP-PRES think-ASP-PRES}
   \text{Lit. ‘Taro, Ayaka, stupidly thinks that t₁ is a genius.’}

⁹See Kikuchi (1987) for the derivation of the comparative clause where a covert operator moves.

¹⁰Sakamoto also argues that another case of covert Ā-movement, namely Quantifier Raising, is possible. Specifically, he shows that the focused DP in (i) can take the embedded scope or the matrix scope, giving rise to the ambiguity in (ii), and this also holds for (ib).

(i) a. \text{John-wa [ Mary-ga oissi riuge-sae tabe-ta-to ] omot-tei-nai.}
   \text{John-top Mary-nom tasty apple-even eat-PAST-REP think-ASP-NEG-COP-PRES}
   \text{‘John does not think that Mary ate even a tasty apple.’}

b. \text{Bill-mo soo omot-tei-nai.}
   \text{Bill-also-so think-ASP-NEG-COP-PRES}
   \text{‘Bill also does not think so.’}

(Sakamoto 2016b, 114)

(ii) a. \text{Embedded Construal: John does not think that Mary ate a tasty apple in addition to some other things;}

b. \text{Matrix Construal: Even for a tasty apple, John does not have an idea that Mary ate it, in addition to some other ideas about some other things.}

(Sakamoto 2016b, 114)

However, in Shimamura (2018), I suggested another way to derive this ambiguity in terms of the reverse of scalar implicature of \text{-ne} ‘even’ under negation. That is, \text{-ne} ‘even’ is lexically ambiguous, so that it has its NPI counterpart as discussed by Rooth (1985). Details aside, I do not hold that (i) constitutes a convincing argument for covert extraction from soo.
   Jiro-sc top Kanako-acc stupidly genius-cop:pres-rep think-asp-pres
   Lit. ‘Jiro, Kanako2, stupidly thinks that t2 is a genius.’

   Jiro-sc top Kanako-acc stupidly soo think-asp-pres
   Lit. ‘Jiro, Kanako2, stupidly thinks soo.’

(Sakamoto 2016b, 113)

However, I would like to hold a skeptical attitude to (30), since the status of RTO as long-distance A-movement has been controversial, and a number of researchers put forth different ideas to derive RTO (Hiraiwa 2005, Hoji 1991, Takahashi 2011, Takano 2003, HK. Tanaka 2002, Yoon 2007, to name some). For instance, HK. Tanaka (2002) argues that it is a case of A-movement out of CP while Hiraiwa (2005) contends that such A-movement is optional, and that the embedded subject marked with the accusative case can stay in situ. In contrast, Hoji (1991) and Takano (2003) argue for a base-generation analysis of RTO. What’s more, a careful semantic treatment of RTO data divulges various semantic factors (Horn 2008), which may be bad news for those who want to study RTO only with the syntactic perspective. In any case, I refrain, in this paper, from deciding which approach is correct, only suggesting that both movement and base-generation may be possible (cf. Goto 2014).

Probably, we can assume that soo targets a smaller syntactic unit. To consider this possibility, let us see another instance of clausal embedding, where the embedded copula is in the infinitival form. Incidentally, the continuation from the finite complement to the nonfinite complement is just fine as (32) shows.

(31) Taro-wa Ayaka-o1 orokanimō [t1 tensai-ni] omot-tei-ru.
    Taro-sc top Ayaka-acc stupidly genius-cop:inf think-asp-pres
    Lit. ‘Taro, Ayaka1, stupidly considers t1 to be a genius.’

(32) Yuuta-wa Minami-o itiban-da-to omot-tei-ru-ga, Koozi-wa Haru-o
    itiban-ni omot-tei-ru.
    best-cop:inf think-asp-pres
    ‘Yuta thinks that Minami is the best, but Koji considers Haru to be the best.’

There are a couple of proposals for the pertinent infinitival complement on the market: the structure of it can be full-fledged CP (Takahashi 2017) or more reduced structures like TP/IP (Takezawa 1987) or even Small Clause (Kikuchi and Takahashi 1991). Whatever it is, (31) is propositionally identical to (30a). However, since the embedded infinitival clause in (31) is not quotative, SAY cannot be used under the current analysis. In addition, as discussed above, the attitude predicate does not select a propositional complement. Therefore, I assume, following Lohndal (2014), that the complement clause in (31) is introduced by the argument introducer F,
so I argue that (33) is the structure of the infinitival complementation.\textsuperscript{11,12} Then, if we assume that (30c) is derived by having soo refer to the embedded predicate, we have (34).

(33)  
\[
\begin{array}{c}
\text{FP} \\
\hline
\text{DP}_1 \\
\text{Ayaka} \\
\hline
\text{Adv.} \\
\text{stupidly} \\
\hline
\text{PredP} \\
\text{t}_1 \\
\text{Pred'} \\
\text{NP} \\
\text{a genius} \\
\hline
\text{VP} \\
\text{think} \\
\end{array}
\]

(34)  
\[
\begin{array}{c}
\text{FP} \\
\hline
\text{DP}_1 \\
\text{Ayaka} \\
\hline
\text{Adv.} \\
\text{stupidly} \\
\hline
\text{PredP} \\
\text{t}_1 \\
\text{Pred'} \\
\text{NP} \\
\text{soo} \\
\text{be} \\
\hline
\text{VP} \\
\text{think} \\
\end{array}
\]

In (34), the NP predicate is replaced by soo. Since I assume that soo replaces (st), a set of eventualities (covering events and states), it should be that NP also denotes such a semantic type. Relevant to this, soo and the copula can cooccur in the matrix context as in (35).

\textsuperscript{11}The intensionality should be brought into the structure by F.

\textsuperscript{12}In (33)/(34), I assume with Nishiyama (1999) that the pertinent infinitival clause is bare PredP, which is the minimal structure, so it may project up to TP or CP as other authors say, but I will not concern myself with it.
      Taro-TOP student-COP PRES Ji-ro also SO-COP PRES
    Lit. ‘Taro is a student. Jiro is also so.’

However, soo and the infinitival copula cannot cooccur as (36) shows.

      Taro-TOP student-COP INF see-CAN-PRES Ji-ro also SO-COP PRES see-CAN-PRES
    Lit. ‘Taro looks like a student. Jiro also looks like so.’

Presumably, this is a matter of morphology, although further detailed scrutiny is needed. However, insofar as the contrast between (35) and (36) is real, it is plausible to assume that the infinitival copula exists covertly in (34).

Given the above discussion, the emerging picture regarding extractability from soo is that only covert extraction (OP-movement in (29c)) is possible.

### 6.2 LF-replacement of soo

Since the predicate replacement for (st) is what soo does, I argue, departing from Sakamoto (2016a,b) but following the insight of Sakamoto (2019), that the antecedent of soo is LF-copied. That is, in cases like (37), VP headed by SAY is copied where soo appears.

(37)  Taroo-wa [obake-ga i-ru-to] sinzi-tei-ru. Ziroo-mo soo
      Taro-TOP ghost-NOM exist-PRES-REP believe-ASP-PRES Ji-ro also SO
      sinzi-tei-ru.
      believe-ASP-PRES
    ‘Taro believes that ghosts exist. Jiro also believes so.’

Therefore, OP-movement in (29c) applies after LF-copying SAY’s VP from the antecedent. Assuming that OP-movement is covert, we have the following derivation.

(38)  a.  \[\text{\ldots VP} [\text{VP [CP \ldots OP \ldots C] SAY}] \ldots\] \[\text{\ldots VP soo say}] \ldots\]

    \hspace{1cm} LF-COPYING

    \hspace{1cm} \text{COVERT OP-MOVEMENT}

In (38a). SAY’s VP is LF-copied from the antecedent sentence to the one where soo is employed. Then, from the copied VP, OP-movement is launched covertly.

Now, what is of interest here is that the embedded quotative complement and soo can cooccur as (39) illustrates (Funakoshi 2014, Sakamoto 2016a,b, HK. Tanaka 2008).
(39)  Taro-wa [obake-ga i-ru-to] soo sinzi-tei-ru.
    Taro-top ghost-nom exist-pres-rep so believe-asf-pres
    Lit. "Taro believes so: that ghosts exist."

Structurally, I argue that (39) has (40), where the quotative clause is an adjunct to the lexical
verb, so it has an additional structure of Asp as discussed above. Then, soo is merged to the
lexical verb as its complement, but the semantic mode of concatenating soo and the lexical verb
is PM. Crucially, the referent of soo is VP in the adjunct clause. Therefore, soo and SAY's VP
have the same index, and the latter is copied to replace soo at LF.

(40)  

\[
\text{SAY} \quad \text{Asp} \quad \text{VP}
\]

\[
\text{Adv}_v \quad \text{soo} \quad \text{believe}
\]

\[
| \text{I} \quad \text{g} \text{h} \text{o} \text{s} \text{t} \text{s \ e} \text{x} \text{i} \text{s} \text{t} \text{i} \text{r} \text{u} \text{.}
\]

In contrast, although the sequence of the quotative clause and soo is possible, the reversed order
is ungrammatical (Sakamoto 2016a,b).

    Taro-top soo ghost-nom exist-pres-rep believe-asf-pres
    Lit. "Taro believes so: that ghosts exist."

This is explained by (42), where soo c-commands SAY's VP with the same index. That is, I
maintain that this is a case of Condition C violation like *He$_i$ likes John$_j$.*

\[\text{(Schlenker 2005, 391)}\]

13 Since the Binding Theory is considered to concern the coinextraction of DPs, one may wonder whether it is
plausible to apply Condition C to the relevant case. Maybe, we can understand Condition C as a pragmatic/sematic
constraint as Schlenker (2005) proposes. Specifically, he proposes (i).

(i)  MINIMIZE RESTRICTORS!
    A definite description the A B [where order of A and B is irrelevant] is deviant if A is redundant, i.e. if:
    a. the B is grammatical and has the same denotation as the A, and
    b. A does not serve another purpose.

This is also intended to deal with DPs. However, we can assume that the semantic restriction is the factor at
stake, and semantic types do not matter. Then, soo and VP headed by SAY in (42) are also modifiers and hence
the restrictors of the main verb event. Assuming that the eventualities of them are contextually closed at TP,
we can say that "the soo-believe$_{a-v}$-[ghosts exists SAY]-believe$_{a}$" event and "the [[ghosts exists SAY]-believe$_{a}$]$_{b}$
event are referentially the same. However, (40) is fine since the adjunct clause involves more structure which is
semantically meaningful, i.e. Asp, and soo is more minimally restricted.
Note that LF-copying SAY’s VP to soo cannot involve AspP since there is, to begin with, no AspP to be copied in (42). That being so, we cannot eschew the configuration where the copied VP c-commands the original VP.

Then, there is one prediction. That is, if the index of soo and that of VP headed by SAY are different, the order of soo and the quotative clause becomes possible. This prediction is indeed borne out as (43) shows. Since the antecedent of soo in (43b) is the first quotative clause and hence its VP headed SAY plus Asp in (43a), what we copy from (43a) is AspP as in (44).

(43) a. Taroo-wa [Hanako-ga kawaii-to ][kanozyo-wa mote-ru-to ]
   Taro-top Hanako-nom cute,cop,pres-rep she-top be,liked,pres-rep
   it-ta
   say-past.
   Lit. ‘Taro said [that Hanako was cute] [that she was popular (among guys)].’

b. Ziroo-mo soo [ kanozyo-wa mote-ru-to ] it-ta
   Jiro-top soo she-top be,liked,pres-rep say-past.
   Lit. ‘Jiro also said so (= that Hanako was cute) that she was popular (among
   guys).’

(44) (43a): ...[VP [AspP [VP [CP ... C ] SAY ] AspP]] [VP [CP ... ] SAY ] say ] ...

(43b): ...[VP soo [VP [CP ... ] SAY ] say ] ...

--- LF COPYING ---

Before we conclude, let us discuss the impossibility of forming an interrogative question with the cooccurrence of the quotative clause and soo (Sakamoto 2016a). Observe:

(45) *Taroo-wa [ dare-ga kawaii-to ] soo it-ta-no.
   Taro-top who-nom cute,cop,pres-rep soo say-past-q.
   Lit. ‘Who said that Taro was cute?’

One may say that since the quotative clause in (45) is an adjunct involving covert AspP, it is

\[\text{In passing, considering AspP in light of the Binding Theory may be problematic because it can be regarded as a functional head. However, if we assume that the relevant Asp is low/lexical in the sense of Travis (2010), it should be possible to see it as a lexical part of the verbal projection.}\]
simply an adjunct island effect. However, the argument interrogative is not sensitive to the adjunct island as in (46); see Watanabe (2003) for the properties of WH-questions in Japanese.

      Taro-top who-nom come-pres-before go.home-past-q
Lit. ‘Who did Taro go home before t₁ came?’

Therefore, we cannot simply attribute the impossibility of (45) to the adjunct island. However, notice that the quotative clause is the antecedent of anaphoric soo, which means that it is informationally given. That is, it can be said that it is semantically subordinate in the sense of Erteschik-Shir (1973), who argues that extraction is possible only from the semantically dominant domain (roughly speaking, the asserted domain, hence neither presupposed nor referential in a given discourse). Then, if the quotative clause is not the antecedent of soo, it is predicted to allow a WH-question. This prediction is indeed borne out: observe (47).

(47)  a.  Taro-o [wain-o nomi-sugi-ta-to] [kino-o-zibun-ga
      Taro-top wine-acc drink-exceed-past-rep yesterday-gen self-nom
      baka-dat-ta-to] omot-tei-ru xl
      stupid-cop-past-rep think-asp-pres
Lit. ‘Taro thinks that yesterday’s self was stupid, with the thought that he drank too much wine.’

      Jiro-top what-acc drink-exceed-past-rep so think-asp-pres-q
Lit. ‘What did Jiro also thinks so (= that he was stupid) that he drank t₁ too much?’

7 Conclusion

It has been argued throughout this paper that the quotative complementation in Japanese involves a covert verb SAY, which is a grammaticalized verb stemming from *ive- ‘say’. This analysis explains why clausal stacking is possible in Japanese unlike English while complying with the idea of severing intensionality from the attitude predicate. Furthermore, it explains the distribution of the quotative clause and the distribution of its pro-form plus the syntactic behavior of it regarding the patterns of syntactic extraction from it.

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1. Introduction

Japanese has a rich morphology for coding predication relations: -ku, -de, and -ni, as shown in (1), where the adjective *aka/makka* ‘red’ is followed by overt morphology.

(1) a. **Adjectival Primary Predicates (APP)**  
   Kabe-ga *aka-ku/makka-de* mo ar-u.  
   wall-Nom red-KU/red-DE even be-Pres  
   ‘The wall is even red.’

b. **Resultative Secondary Predicates (RSP)**  
   John-Nom wall-Acc red-KU/red-NI paint-PAST  
   ‘John painted the wall red.’

In APP (1a), *aka* ‘red’ is followed by -ku and *makka* is by -de. Following Nishiyama (1999), I refer to adjectives associated with -ku, such as *aka*, asCanonical Adjectives (CAs) and ones with -de like *makka* as Nominal Adjectives (NAs). The CA root is consistently followed by -ku but the NA root is not. As shown in (1b), NA root *makka* is followed by -ni when it is used as an RSP.

In the framework of Distributed Morphology (Halle & Marantz 1993), Nishiyama (1999) argues that -ku, -de and -ni, which he calls predicative copulas, realizes Pred in the sense of Bowers (1993) as allomorphs. The predicates exemplified in (1) are roughly derived as follows in Nishiyama’s mechanism (T is omitted):

(2) \[
\begin{array}{c}
\text{VP} \\
\text{Pred} \\
\text{wall’} \\
\text{AP} \\
\text{akaCA} \\
\text{makkaNA} \\
\end{array}
\]

In (2), Pred is realized as -ku after the CA root like *aka* ‘red’, as -ni when it is followed by lexical verbs like *nur* ‘paint’, and as -de everywhere else. These realization patterns are formally given in
vocabulary insertion rules as in (3):

(3) a. Pred $\leftrightarrow$ -ku / CA_

b. Pred $\leftrightarrow$ -ni / [+lexical] verb

c. Pred $\leftrightarrow$ -de

I totally agree with Nishiyama’s analysis that -ku is not a part of the stem of CA, but is the predicative copula on par with -de and -ni (contra Namai 2002). Nevertheless, I contend that -ku, -de and -ni are not allomorphs of Pred. Rather, it is argued in this paper that -ku and -ni are allomorphs of the same head, but -de is a morphological manifestation of another functional head.

The rest of the paper is organized as follows. In section 2, I introduce the present proposal, where the realization of Japanese predicative copulas is related to two syntactic heads. Section 3 presents three pieces of evidence in favor of the present proposal. In section 4, I extend the proposal to further phenomena, and section 5 concludes.

2. Proposal

In this paper, I argue for a layered analysis of Japanese predication, where Pred used in Nishiyama (1999) falls into two heads: Pred and relator. Pred is a head that turns AP into a predicate. r(elator), which is advocated by den Dikken (2006), is a head responsible for establishing a predication relation between PredP (its complement) and DP (its specifier). As such, that adjectives in Japanese can be analyzed to have the following configuration. With this layered analysis, I propose that APP and RSP exemplified in (1) have the phrase structure as illustrated in (4a) and (4b), respectively (heads above VP like v and T are omitted):

\[
\begin{align*}
\text{(4a) APP} & \quad \text{b. RSP} \\
\text{VP} & \quad \text{VP} \\
\text{R} & \quad \text{kabe} \\
\text{'wall'} & \quad \text{V} \\
\text{PredP} & \quad \text{Pred} \\
\text{AP} & \quad \text{makka} \\
\text{akaCA} & \quad \text{NA} \\
\text{makka} & \quad \text{ni} \\
\text{akaCA} & \quad \text{ni} \\
\text{ku} & \quad \text{ku} \\
\text{ar} & \quad \text{ar} \\
\text{'be'} & \quad \text{'be'} \\
\text{Ø} & \quad \text{Ø} \\
\text{Ø} & \quad \text{Ø}
\end{align*}
\]

The point in our analysis is that an adjective with a predicative copula in APP is projected up to RP, whereas one in RSP is only to PredP, i.e., it does not have RP. I contend the actual morphological realization of Pred and that of R are obtained by the following insertion rules:

(5) a. Pred $\leftrightarrow$ -ku / CA_

b. Pred $\leftrightarrow$ -Ø / __R

c. Pred $\leftrightarrow$ -ni
(6) a. $R \leftrightarrow -\emptyset / ku$ 
   b. $R \leftrightarrow -de$

According to (5), $Pred$ is realized as -$ku$ after a CA root, as -$\emptyset$ when it is followed by R, and as -$ni$ everywhere else. On the other hand, (6) says $R$ is realized as -$\emptyset$ after -$ku$ and as -$de$ everywhere else. The layered analysis straightforwardly captures the fact that CA roots are consistently followed by -$ku$ both in APP and in RSP, while NA roots are marked with -$de$ in APP but with -$ni$ in RSP. In what follows, I present a set of evidence that empirically supports the present proposal.

3. Data and Analysis

3.1 Diachronic/Formal Speech

A first evidence in favor of our layered analysis comes from the fact that, in diachronic or formal speech, NA roots are followed by -$ni$-$te$ in a context where they are marked with -$de$ in synchronic and colloquial speech. Relevant examples are given below:

(7) a. Diachronic Speech  

   nagare-yuku mizu sizuka-ni-te … (cf. sizuka-de)  
   flow-go water quiet-NI-TE  
   ‘The way water is flowing is quiet …’ (Wakanasyu, 1897)

b. Formal Speech  

   otomotino kamer-o kooka-ni-te kaitori-itamimasu. (cf. kooka-de)  
   in.hand-Gen camera-Acc expensive-NI-TE buying.out-be.Pres  
   ‘We’ll buy your camera at a high price.’  
   (http://blog.kitamura.jp/13/8351/2018/03/10880783.html)

Of importance here is that -$ni$, which is analyzed to realize $Pred$ in our analysis, is also included in the diachronic/formal speech form of -$de$. Given this fact, it is safe to claim that $Pred$ is realized as -$ni$ and $R$ is as -$te$ in diachronic/formal speech, as shown in (8):

(8) $\begin{array}{|l|} 
\hline 
\text{Pred} & \text{NA} & \text{Pred} & \text{R} \\
\hline 
\text{Diachronic/Formal Speech:} & \text{-ni} & \text{-te} \\
\text{Synchronic/Colloquial Speech:} & \text{-\emptyset} & \text{-de} \\
\hline 
\end{array}$

As such, the fact that two overt morphemes -$ni$ and -$te$ appear to the right of an NA root naturally follows if two independent syntactic heads are involved in Japanese predication. If the present analysis is on the right track, different vocabulary insertion rules are exploited between in diachronic/formal speech and in synchronic/colloquial speech. Vocabulary insertion rules relevant to $Pred$ and R in these two speeches are as follows:

(9) $\begin{array}{l} 
\text{Pred in synchronic/colloquial speech} \\
\text{a. } Pred \leftrightarrow -ku / CA__ \\
\text{b. } Pred \leftrightarrow -\emptyset / _R \\
\text{c. } Pred \leftrightarrow -ni \\
\end{array}$

(10) $\begin{array}{l} 
\text{Pred in diachronic/formal speech} \\
\text{a. } Pred \leftrightarrow -ku / CA__ \\
\text{b. } Pred \leftrightarrow -ni \\
\end{array}$
(11)  R in synchronic/colloquial speech  (12)  Pred in diachronic/formal speech
  a.  R     ↔ -Ø / ku  a.  R     ↔ -Ø / ku
        __  __                 __  __
  b.  R     ↔ -de                                b.  R     ↔ -te

Pred in diachronic/formal speech is realized either as -ku or -ni, depending on whether it is followed by a CA root or by an NA root, and not as -Ø unlike in synchronic/colloquial speech. In addition, R is realized as -de in synchronic/colloquial speech but as -te in diachronic/formal speech.

3.2 Coordination

A second evidence has to do with the availability of a coordination marker. Japanese has some kinds of coordination markers, and as shown in (13), adjectives in AAP can be coordinated by sosite, katu, or -te.

(13) Suupu-ga    kara-ku sosite/katu/te makka-de at-ta.
       Soup-Nom    spicy-KU       &       red-DE    be-Past
    ‘The soup was spicy and red.’

When it comes to RSP, however, the situation differs. As exemplified in (14), sosite and katu are capable of coordinating two adjectival conjuncts, but -te is not.

(14)  Suupu-ga    kara-ku sosite/katu/*te makka-ni nat-ta.
       Soup-Nom    spicy-KU       &       red-NI      become-Past
    ‘The soup became spicy and red.’

Why is this the case? Although the present study will not delve into the property of -te, we have at least two possible analyses. A first possible analysis is that -te appears only when two TPs are coordinated and that the combination of the first conjunct’s T and & gets pronounced as -te (see Yoda (2013) for a detailed analysis of the realization of -te):

(15) [&P  [TP Suupu-ga    kara-ku [I] & [TP Suupu-ga makka-de at-ta]]
           -te

If so, the unavailability of -te in (14) is attributable to the lack of TP in each conjunct. This analysis seems convincing since, as shown in (4b), an adjective in RSPs is projected only to PredP, which is embedded by a lexical V. On the other hand, in AAP, an adjective can be projected up to TP, though a non-lexical, copula verb -ar ‘be’ intervenes between RP and TP. I suppose that due to its semantic vacuity, this copula verb can be somehow omitted before -te.

Alternatively, it might be possible to say that -te coordinates two full-fledged predicates like [XP DP [X YP]], where a DP is predicated of YP by the way of X. As argued in section 2, RP has such a structure in which a DP is predicated of PredP: hence adjectives in AAP, which are projected up to RP, can be coordinated by -te, while ones in RSP, which are projected to PredP, cannot. In either case, the contrast between (15) and (16) follows from the deference in phrase structure between APP and RSP.
3.3 Soo-replacement

A third evidence is concerned with soo-replacement. In Japanese, a predicate can be replaced by the pro-form soo(-su), when it is repeated. In (16), for instance, the verb *tabe* ‘eat’ is replaced by the proform *soo* (in tandem with the light verb *su*).

    Taro-Nom susi-Acc eat-Past    Hanako-even so-did.
    ‘Taro ate sushi. Hanako did too.’

Soo-replacement is possible even when the predicate is an adjective. But, when an adjective is replaced by the proform *soo*, -*ku* and -*ni* cannot be to the right of *soo*, but -*de* is (Namai 2002; Nishiyama 2005a). Observe (18):

(18)a.   aka-ku    nar-u    =>    soo(*-ku)    nar-u
b.   makka-ni    nar-u    =>    soo(*-ni)    nar-u
c.   makka-de    ar-u    =>    soo*(-de)    ar-u

This fact calls into the question the validity of Nishiyama’s (1999) analysis, which is given in (19), that -*ku*, -*ni*, and -*de* are allomorphs of *Pred*. (19c) indicates that AP is replaced by *soo* since -*de* follows *soo*. But if it is correct, it is predicted that -*ku* and -*ni* can also follow -*de* contra the fact.

(19) a.   [VP    [PredP    [AP aka]    -ku]    nar]
    b.   [VP    [PredP    [AP makka]    -ni]    nar]
    c.   [VP    [PredP    [AP makka]    -de]    ar]
             =>    soo

By contrast, the contrast shown in (18) naturally follows from our layered analysis of Japanese predication, if we assume that the target of the proform *soo* replacement is *PredP*. If this is on the right track, we get the following picture:

(20) a.   [VP    [PredP    [AP aka]    -ku]    nar]
    b.   [VP    [PredP    [AP makka]    -ni]    nar]
             =>    soo

As shown, only -*de*, i.e., the realization of R, is out of the scope of the proform replacement. On the other hand, -*ku* and -*ni*, both of which are morphological manifestations of *Pred*, is inside the scope of *soo*. Therefore, the layered analysis predicts the contrast in (18).

4. Extension

4.1 Secondary Predicates

In addition to RSP, Japanese has what is termed as Depictive Secondary Predicates (DSP). As Takezawa (1993) correctly points out, a DSP is marked with -*de*, but an RSP is with -*ni*, as illustrated in (21).
(21) a. *Depictive Secondary Predicates (DSP)*

John-ga gyuuniku-o nama-DE/NI  tabe-ta.
John-Nom beef-Acc  raw-DE/NI  eat-Past
‘John ate the beef raw.’

b. *Resultative Secondary Predicates (RSP)*

John-Nom wall-Acc  red-NI/DE  paint-Past
‘John painted the wall red.’

In (21a), the NA root *nama* ‘raw’ describes the state of the accusative-marked object *gyuuniku* ‘beef’ and must be morphologically associated with -DE, not with -NI. In (21b), on the other hand, the NA root *makka* ‘red’ describes the resultant state of *kabe* ‘wall’ and must be followed by -NI, not by -DE. In the layered analysis, DSP and RSP are analyzed to have the phrase structures in (22a) and (22b), respectively.

(22) a. DSP

\[
\text{V} \quad \text{P} \\
\text{R} \quad \text{PredP} \\
\text{R} \\
\text{AP} \\
\text{namaNA} \\
\text{Ø} \quad \text{de} \quad \text{tabe} \quad \text{‘eat’}
\]

b. RSP

\[
\text{V} \\
\text{PredP} \\
\text{V} \\
\text{AP} \\
\text{makkaNA} \\
\text{ni} \\
\text{nur} \quad \text{‘paint’}
\]

In our analysis, an accusative object is predicated of an adjective in DSPs due to the presence of R, but such a predication relation does not hold in RSP. The presence/absence of predication relation between an object and an adjective allows us to account for the difference in semantic interpretation between DSP and RSP. Observe:

(23) a. *#Taroo-ga yaita-gyuuniku-o nama-de  tabe-ta.*  [DSP]

Taroo-Nom grilled-beef-Acc  raw-DE  eat-Past
‘Lit. Taro ate the grilled beef raw.’

b. *Taroo-ga kiiroi-kabe-o makka-ni  nur-ta.*  [RSP]

Taroo-Nom yellow-wall-Acc  red-NI  paint-Past
‘John painted the yellow wall red.’

(23a) is semantically unacceptable since *the grilled beef* is no longer *raw*. On the other hand, (23b) is acceptable even if *the yellow wall* is not *red*. This contrast follows from the present analysis in which the predication relation between an accusative object and *de*-marked adjectival predicate must be established, but such relation does not hold between an accusative object and *ni*-marked adjectival predicate.
4.2 Locative PP in Japanese

In Japanese, -ni and -de are also used as locative postpositions, as shown in (24).

(24) a. Taroo-ga (kooen-de/*ni) asob-u.
   Taro-Nom park-DE/NI play-Pres
   ‘Taro plays in the park.’

b. Taroo-ga *(kooen-ni/*de) i-ru/ik-u.
   Taro-Nom park-NI/DE be-Pred/go-Pres
   ‘Taro is in/goes to the park.’

As argued in Nishiyama (2005b) and Nagano (2014), a locative PP that adjoins to a(n active) verb must be marked with -de, but a PP that functions as a complement of a stative/direction verb is associated with -ni.

In this connection, Nishiyama (2005b) proposes an insightful hypothesis that Pred and P is the same category: Pre(d/p) on the ground that the same de/ni alternation holds in predicative contexts (i.e. DSP vs. RSP) and in locative contexts. In this subsection, I argue that the present layered analysis complies with Nishiyama’s (2005b) Pre(d/p) hypothesis in more reasonable fashion.

In current studies on locative PP, Svenonius (2003, 2007, 2010) advocates a layered PP structure:

(25) [pP Figure p [PP P Ground]]

where p is a functional head taking a Figure argument as its specifier and PP as its complement. P takes a Ground argument as its complement. According to Svenonius (2003), the Figure is defined as “the entity in motion or at rest which is located with respect to the Ground”, while the Ground is as “location with respect to which the figure is located” (cf. Talmy 1985). In line with Svenonius, I argue that the layered PP structure holds in Japanese, but Figure can be introduced not only by p but also by V in Japanese. Bringing the Pre(d/p) hypothesis and the layered PP structure, I propose that a sentence with PP-de and one with PP-ni are taken to have the following phrase structures:

(26) a. PP-de

   \[\text{Figure} \quad \text{R'} \quad \text{Pre(d/p)} \quad \text{R} (= p) \quad \text{Ground} \]

   \[\_ \quad \_ \quad -\text{de} \]

b. PP-ni

   \[\text{Figure} \quad \text{V'} \quad \text{Pre(d/p)} \quad \text{V (stative/directional)} \quad \text{Ground} \]

   \[\_ \quad \_ \quad -\text{ni} \]

In our layered analysis, Pre(d/p) corresponds to Pred, and p corresponds to R. Thus, the difference between PP-de and PP-ni lies in the difference of PP structure: PP-de has RP structure, where Figure is introduced by R, which gets pronounced as -de. PP-ni has Pre(d/p)P structure, where Pre(d/p) is realized as -ni, and Figure is introduced by a stative/directional verb.
That the locative postposition -de realizes R and Ø realizes Pred(d/p) is the same as the situation of predicative contexts, i.e., a NA root + -de. This is supported by the fact that locative postposition -de also falls into -ni and -te in diachronic/formal speech:

(27) a. sioumi-no horoti-ni-te azare-aheri
    ocean-Gen near-NI-TE act.funny-with
    ‘(two persons) are acting up near the sea.’ (Tosa Nikki, 10C)
b. Mensetu-wa honsya-ni-te okonaimasu.
    interview-Top head.quarters-NI-TE perform.Pres
    ‘The interview will be held in the headquarters.’

It is thus safe to conclude that in diachronic/formal speech, -ni realizes Pred(d/p) and -te realizes R. To summarize, Nishiyama’s (2005b) Pre(d/P) hypothesis complies with our layered analysis given the Svenonius’s (2003, 2007, 2010) layered PP structure.

5. Conclusion

In this paper, I proposed that Japanese predication is best analyzed with the layered structure, where Pred takes AP as its complement, turning it into a predicate, and R established the predication relation between its specifier DP and its complement Pred/P. I presented some sets of evidence in favor for the present proposal, for instance, the diachronic/formal speech form, coordination, and replacement by the proform soo. I argued that -ku and -ni realize Pred depending on whether an adjectival root is CA or NA, and that -de is a morphological manifestation of R. In this sense, it is safe to conclude that -ku and -ni are allomorphs of Pred but -de is not. This conclusion is in accordance with Baker (2003), who seems to accept only -de as a predicative copula in Japanese—Baker (2003) does not mention why -ku and -ni are not copulas, though.

References


A prosodic restriction affecting stress patterns and word order

Kenyon Branan
National University of Singapore

1 Introduction

In this paper, I propose and defend a general restriction on prosodic structure, shown in (1). (1) rules out certain constituents whose members are mismatched in prominence from appearing at the left edge of larger constituents.

(1) The Left Edge Ban:  
* (w S ...  
where w means “weak”  
and S means “strong”

We will see that the ban in (1) — the LEB — has effects on prosodic constituents of various sizes. At the word level, the LEB will account for a crosslinguistic skew in the distribution of main stress in weight-insensitive stress systems. At the phrase level, the ban in (1) will account for certain restrictions on disharmonic word order that have previously received a purely syntactic explanation. The driving idea behind the analyses presented in this paper is that languages manipulate the prosodic structure, either directly or indirectly, so that the LEB might be respected.

2 The LEB at the word level

In this section we will see the effects of the LEB at the word level, where the ban governs the distribution of main stress. We will restrict our attention primarily to languages with weight-insensitive stress systems. There are five attested systems crosslinguistically, but with a skewed distribution, as shown in a variety of surveys of stress systems: peninitial and antepenultimate stress systems are much rarer than the other three, as shown in the chart reproduced from Gordon (2016) below.

(2) Relative frequency of stress

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Initial</td>
<td>40</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>Peninitial</td>
<td>30</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Antepenfinal</td>
<td>25</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Penult</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Final</td>
<td>10</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>
Setting aside the antepenultimate pattern for now — which we will return to shortly — a simple mechanism can be defined which captures the other four stress systems. Such a mechanism is given in (3). The mechanism lies on the assumption that stressable elements are grouped into larger constituents — feet — which are then grouped together to form a word. The stress assignment mechanism either assigns stress to the left or rightmost stress-bearing unit in a foot, or chooses the left or rightmost foot in a word as a locus for stress assignment.

(3) Stress assignment mechanism
   a. If a constituent immediately dominates a stress-bearing unit, assign stress to the {left, right} most stress-bearing unit and terminate.
   b. If a constituent does not immediately dominate a stress-bearing unit, apply the stress assignment mechanism to the {left, right} most element dominated by that constituent.

Each of the two options in (3) is independently parameterized, leading to four possible stress systems. If both (3a-b) favor the leftmost element, an initial stress pattern is generated, (4). If both (3a-b) favor the rightmost element, a final stress pattern is generated, (5). If both (3a) favors the leftmost element but (3b) favors the rightmost element, a penultimate stress pattern is generated, (6). Finally, if (3a) favors the rightmost element but (3b) favors the leftmost element, a peninitial stress pattern is generated (7).

(4) Initial: $(\omega_{l}f_{l}w)_{l}$
(5) Final: $(w_{l}S)_{l}$
(6) Penultimate: $(S_{l}w)_{l}$
(7) Peninitial: $(\omega_{l}f_{l}w_{l})_{l}$

Recall now the LEB, repeated in (8). The LEB rules out constituents mismatched in prominence from appearing at the left edge of some larger prosodic constituent. (7) is in violation of (8), if stressed syllables are considered more prominent than unstressed syllables: it contains a foot containing a w S sequence, and that foot appears at the left edge of a larger prosodic constituent, namely the word.

(8) The Left Edge Ban:
   * $(w_{l}S_{l})$
   where w means “weak”
   and S means “strong”

The set of parametric choices which would lead to the peninitial stress system will consistently lead to a violation of the LEB. The peninitial system is ruled out as a result.

2.1 Accounting for exceptions

Peninal systems and antepenultimate systems are attested, but rare. Neither is straightforwardly generated by the system discussed previously in this section: it cannot generate the antepenultimate system, and the peninal system runs afoul of the LEB. In this subsection I will suggest that these systems underlyingly involve one of the parametric choices in (8), plus some sort of additional process that obscures this underlying choice. I will limit my discussion to two processes of this sort — extrametricality of a peripheral syllable and edge targeting phonological processes. The hope will be that the the relative rarity of peninal systems and antepenultimate systems reflects the fact that they require some additional process to be generated, outside of the core system of stress assignment discussed before.

If we admit extrametricality of no more than one stress-bearing unit into our system, it becomes possible to generate an antepenultimate stress system. Antepenultimate stress could arise from the parametric choices that lead penultimate stress with the addition of final syllable extrametricality, as schematized in (9).

(9) Antepenultimate stress as penultimate stress + extrametricality:
   $... (S_{l}w)_{l}$

It also becomes possible to generate a peninal stress system which respects the LEB: at least some peninal stress systems could arise from the set of parametric choices leading to initial stress, with the addition of initial syllable extrametricality, as schematized in (10).

---

1 The V-apex is the percentage of languages displaying the pattern in a survey. N = 396 (Hyman, 1977); 186 (Gordon, 2002); 211 (Goedemans & van der Hulst, 2009).
A prosodic restriction affecting stress patterns and word order

(10) **Peninitial stress is initial stress + extrametricality:**
    \[ w (\sigma_f, S \sigma) \ldots \]

Such a proposal has been made for certain dialects of Basque with peninitial stress in Hualde (1991) by Melinger (2002) for Seneca.\(^2\) Recall now that the frequency of peninitial and antepenultimate stress systems is roughly equivalent — we have seen here that edge syllable extrametricality allows both to be generated. We can understand the relative rarity and parity of occurrence of these systems as a result: both are reliant on the same mechanism. There are a number of imaginable reasons why stress systems involving extrametricality are less preferred than those that lack extrametricality. One possibility is that systems with extrametricality are not diachronically stable; systems with extrametricality tend over time to become systems lacking extrametricality.

Another way a language with peninitial stress might skirt the LEB is by increasing the prominence of the initial syllable, along with the second. Osage, as discussed in Altschuler (2009), is an example of such a language. Altschuler notes that the default stress pattern in Osage is on even syllables counting from left to right, as in (11).

(11) a. pa:ˈxo
b. nāːˈlɔxa
   'mountain'
c. xoːˈsoːbːi, bráb
   'smoke cedar'

This pattern, on its face, appears to be problematic for the LEB. However, Altschuler goes on to provide an analysis of the phonetics of Osage stress, under which one of the primary correlates of stress is increased F₀. Here he makes an interesting discovery. Unstressed syllables always have a lower F₀ than the stressed syllables which precede and follow them. However, putatively unstressed initial syllables in words which follow the default stress pattern have an F₀ which is roughly equivalent to the syllable which follows them.

Altschuler concludes from this analysis that Osage is a language which has both stress and tone at the word level. In addition to the peninitial stress pattern, Osage has word-initial high tone. Given this analysis of Osage, we are in a position to understand how it is able to circumvent the LEB. As schematized in (12), both syllables in the initial foot in the Osage word are targeted by a prominence-boosting process.

(12)

At the word level, the LEB generally rules out peninitial stress because the second syllable is strong in comparison to the first — i.e. they are mismatched in prominence. In the case of Osage, placing stress on the peninitial syllable does not have this effect, because the initial syllable is at least as prominent as the second, as a result of high tone assignment. Since the peninitial syllable in Osage is not stronger than the initial as a result of initial high tone assignment, the LEB does not rule out initial stress.

\(^2\) It is here worth noting that the possibility of initial extrametricality has been argued against, notably by Kager (1995); Hyde (2002), among others. If extrametricality ends up being asymmetric, then some other explanation will be needed for peninitial stress systems more generally.
The LEB at the phrase level

Much work on comparative syntax (Greenberg, 1963; Dryer, 1992; Sheehan et al., 2017, a.m.o.) has revealed a particular preference: languages prefer harmonic syntactic structures (13-14) over disharmonic syntactic structures (15-16).

\[
\begin{align*}
(13) & & \text{XP} & \quad (14) & & \text{XP} & \quad (15) & & \text{XP} & \quad (16) & & \text{XP} \\
& & \text{X} & \quad & \text{YP} & \quad & \text{X} & \quad & \text{YP} & \quad & \text{Y} & \quad & \text{X} \\
& & \text{Y} & \quad & \text{ZP} & \quad & \text{ZP} & \quad & \text{Y} & \quad & \text{ZP} & \quad & \text{Y} \\
\end{align*}
\]

In particular, (16) has been shown to be particularly dispreferred. Holmberg (2000); Biberauer, Holmberg & Roberts (2014); Sheehan, Biberauer, Roberts & Holmberg (2017) propose and refine a general ban — the FOFC, (17) — that rules out this structure entirely.

\[
(17) \quad \text{FOFC:} \quad *_{\text{XP}} [\text{VP Y ZP} \, \text{X}] 
\]

The FOFC is meant to account for a number of restrictions on word order. For instance: Finnish is known to display remarkably free word order in question contexts. However, as shown below, one particular word order is ruled out.

\[
(18) \quad \text{Object order in Finnish} \\
\begin{align*}
& \text{a. milloin Jussi [ olisi } \quad [ \text{kirjoittanut } \text{romaamin } ] \\
& \text{when Jussi would-have written novel-def} \\
& \text{b. milloin Jussi [ olisi } \quad [ \text{romaamin kirjoittanut } ] \\
& \text{when Jussi would-have novel-def written} \\
& \text{c. milloin Jussi [ [ \text{rolaanin kirjoittanut } ] olisi ]} \\
& \text{when Jussi novel-def written would-have} \\
& \text{\quad \
(20) Match Theory
   a. For each XP, there is a phonological phrase $\phi$ dominating the exponents of the terminals XP dominates.
   b. For each X0 there is a phonological word $\omega$ dominating the exponent of X0.
   c. If X0 is null, X/XP are ignored by Match.

Consider for instance the problematic syntactic structure for (18d). (20) will translate it into the prosodic representation in (21).

\[
\begin{array}{c}
\text{AuxP} \\
\Downarrow \\
\text{VP} \\
\Downarrow \\
\text{V} \\
\Downarrow \\
\text{DP} \\
\Downarrow \\
\end{array}
\quad \rightarrow \rightarrow \quad \phi(\text{kirjoittanut}_\omega (\phi \text{romaanin}_\omega ) \text{olisi}_\omega )
\]

We are in a position to understand why the LEB would rule out the prosodic representation in (21) if $\phi$ are stronger than $\omega$. Provided there is a prominence-related process which generally applies to $\phi$ but not to $\omega$, a $\phi$ will always be stronger than its $\omega$ sister as the two will always be mismatched in prominence. For expository purposes, I give the following definition for determining the relative strength and weakness of constituents at the phrasal level.

(22) Informal heuristic for determining strength and weakness:
   a. For a structure like ($\omega \phi$) or ($\phi \omega$), $\phi$ is strong and $\omega$ is weak.
   b. If an element that would otherwise be weak has been targeted by a prominence boosting process, it will not be weak.

Given this, we can understand the unacceptability of (21): the prosodic representation in (21) is in violation of the LEB. The $\phi$ corresponding to VP consists of an $\omega$ followed by a $\phi$—here $\omega$ is weak and $\phi$ is strong. That $\phi$ is at the left edge of a larger prosodic constituent, which is the configuration the LEB rules out.

The theory of disharmonic word order developed here appears to cover more or less the same empirical ground as the FOFC. I will show now that the two theories can be teased apart, and that the approach suggested here has a number of empirical advantages. On the LEB theory, we should expect manipulation of the prosody of the clause to allow disharmonic word orders to exceptionally surface. We should furthermore expect the LEB to govern the distribution of constituents that the FOFC would not.

3.1 Manipulation of the prosodic representation

As reported in Sheehan (2017), the FOFC in Finnish may be violated when the object or adverb between a verb and auxiliary is phonologically light, as shown in (23). The sentences in (23) should have the same syntactic structure as the problematic Finnish sentence discussed earlier in this section. The difference here is the object or adjunct in the putatively problematic configuration in (23) are both phonologically light pronouns.

(23) Phonologically light elements violate the FOFC
   a. *Milloin minä (\(\phi\) laudara tääldä ) oisin
      \quad \text{when I sung here aux}
      \quad \text{When would I have sung here?}*
   b. *Kyllä minä (\(\phi\) lukuen sen ) olen
      \quad \text{priet I read it aux}
      \quad \text{I have indeed read it.}*

Sheehan (2017)
This is unexpected for the classical FOFC. The syntactic structures for (23) should be ruled out, independent of the phonological weight of the elements involved. For the LEB, in contrast, we should expect this sort of sensitivity. Provided the smaller φ in (23)—corresponding to VP—does not itself contain a φ, the structure will not run afoul of the LEB. There are at least two non-mutually-exclusive possible explanations for the LEB-based theory of disharmonic word order for the acceptability of (23).

One possibility is that pronominal elements—like sen, it' and tāvālā, 'there'—don't map to φ, but to ω (or perhaps something smaller). As has been long noted that functional words—in particular pronominal objects—do not behave in the same way as lexical words in terms of their prosodic structure [see Selkirk (1996); Tyler (2019), a.o.]. This could be accounted for straightforwardly if we follow a version of Match Theory proposed in Selkirk (2017) for Xitsonga. On this view, Match is sensitive to whether a syntactic phrase is headed by a ‘lexical’ or ‘functional’ element: only lexically headed phrases need to map to φ. Pronominal elements like sen, it' and tāvālā, 'there' need not map to φ, since they are not lexically headed. The upshot of this is that the verb in (23) will be an ω, and therefore at least as strong as its sister, which will also be an ω (or perhaps smaller). No violation of the LEB will arise.

Another possible manipulation of the φ corresponding to the VP would be to target the verb with some sort of prominence-boosting process. It is noted in Sheehan, Biberauer, Roberts & Helmberg (2017) that the sentences in (23) are most acceptable when the verb additionally bears contrastive stress.

We could account for this if—as suggested in the heuristic earlier—narrow focus on the verb causes it to no longer count as a weak element in comparison to its object complement. This would be analogous to the case of Osage discussed in §2. On this view, prominence-related manipulation of sisters in the prosodic tree can alter their relative strength. An ω bearing contrastive stress, for instance, would be neither strong or weak in comparison to its φ sister, since there would be a prominence-related process—the application of focal stress—which applied to the ω but not its φ sister. The upshot: the verb in (23) will be at least as strong as its sister. No violation of the LEB should arise.

3.2 VPs at the left edge

Another difference between the LEB and the FOFC: the LEB bars a constituent with a mismatch in prominence of its subconstituents from appearing at the left edge of larger prosodic constituents, independent of the status of elements which follow the constituent at the left edge. The FOFC, in contrast, holds only over certain types of head-complement structures. We should expect, on the LEB approach, to be able to identify cases where the LEB has an effect that do not involve the head-complement structure relevant for the FOFC.

Van Urk (2019) discusses a consistent pattern in languages that display a particular sort of word order alternation in predicate-initial languages, given in (24).

(24) Van Urk’s generalization

In a language that allows [VO]X or [V]XO word order, [VO]X word order requires the object to be prosodically reduced.

In the discussion which follows, we will use Fijian as an example, but similar facts are reported by Van Urk to hold in many other languages, including Inreer, Niucan (Massam, 2001), Samoan (Collins, 2017), Hawaiian (Medeiros, 2013) [all Oceanic], Giksan [Tsimshianic] (Forbes, 2018), Tenetehara [Tupi-Guarani] (Duarte, 2012), Ch’ol [Mayan] (Coon, 2010), and Santiago Lacop Zapotec [Zapotecan] (Adler et al., 2018). For simplicity’s sake, I will assume that languages exhibiting this alternation in word order are all languages in which verb-initial word order is derived through VP fronting. It is of course conceivable that that this is not the case; the analysis proposed here should be compatible with a number of imaginable alternatives, provided there is some other motivation for the object to form a prosodic constituent with the verb.

Certain particles mark the right edge of the Fijian VP. Internal arguments, either with determiners, (25a), or PPs, (25b), must appear to the right of these particles.

(25) Heavy elements appear outside of VP in Fijian

a. e a [VP kau-ta ___ mai ] [VP na i lokokeko ] ko Eroni.

b. “Eroni brought the pillows.”
In contrast, prosodically light arguments may appear to the left of these particles, inside the VP, pronominal arguments, (26a), or DPs lacking determiners, (26b), may appear in this position.

(26) Light elements appear inside VP in Fijian

\begin{align}
\text{a.} & \quad e \quad a \quad [\text{VP} \  \text{kau-ta} \ \text{ma} \  ] \ \text{ma} \  ] \ \text{ko} \ \ Eroni. \\
& \quad 3sg \ \text{pst} \ \ \text{bring-tr} \ \text{lg} \ \text{dir} \ \det.\text{n} \ \text{Eroni} \\
& \quad \text{"Eroni brought me."} \\

\text{b.} & \quad e \quad \text{dau} \quad [\text{VP} \  \text{kau} \ \text{laki-laki} \  ] \ \text{ma} \  ] \ \text{ko} \ \ Eroni. \\
& \quad 3sg \ \text{lab} \ \ \text{bring pillow} \ \text{always dir} \ \det.\text{pr} \ \text{Eroni} \\
& \quad \text{"Eroni always brings pillows."} \\
\end{align}

Given what we have said so far, we can see this as a consequence of the LEB. The LEB does will out a heavy object appearing in this left-edge $\phi$. If the DP in the fronted VP is pronounced in the expected position — as in (27) — then a LEB-violating prosodic structure will be generated, as in (28). If the DP is not pronounced in this position — as in (29), either as a result of it evacuating the VP (Massam, 2001, for Niuean), or as a result of scattered deletion (Van Uck, 2019) — the phrase corresponding to the VP will respect the LEB, as in (30).

(27) $\ldots$ (28) $*$ (29) $\ldots$ (30) $\ldots$

$$
\begin{array}{c}
\text{VP} \\
\hline
\text{V} \ \text{DP} \\
\end{array}
\begin{array}{c}
\omega \\
\phi \\
\end{array}
\begin{array}{c}
\phi \\
\end{array}
\begin{array}{c}
\phi \\
\end{array}
\begin{array}{c}
\omega \\
\end{array}
$$

When the object is light, this does not occur: neither of the elements in the $\phi$ corresponding to VP is stronger than the other, so no violation of the LEB could occur. In the structure in (31), the complement to V is either a bare determiner or a bare noun. Match Theory will not require such an element to map to a $\phi$; these elements are heads/$X^0$, and may therefore map to $\omega$, as in (32). The structure in (32) respects the LEB, since it consists of constituents which are balanced in prominence.

(31) $\ldots$ (32) $\ldots$

$$
\begin{array}{c}
\text{VP} \\
\hline
\text{V} \ \text{N/D} \\
\end{array}
\begin{array}{c}
\phi \\
\end{array}
\begin{array}{c}
\omega \\
\end{array}
\begin{array}{c}
\phi \\
\end{array}
$$

The pattern we see here is analogous to what we saw earlier in this section for Finnish. There and here we see that the LEB allows a certain type of structure only when the initial element in the structure is at least as prominent as the penultimate element in the structure. Under the LEB, classical FOFC effects appear when a $\phi$ corresponding to VP appears at the left edge of some larger domain, when the second element — an internal argument — in that $\phi$ is stronger than the first. However, when the second element is not stronger than the first, the effect vanishes — which is not expected under the classic FOFC. Prosodically light elements are thus consistently exempt from the ban. In the cases investigated in this subsection, it is furthermore unclear why the FOFC should govern these configurations: the disharmonic head configuration which gives rise to FOFC effects is not clearly present in the cases examined.

3.3 Incorporation of weak initial material

The LEB has another potential advantage over the classical FOFC. A problem for the classical FOFC arises when we consider constituents like the German VP in (33): the DP is head initial, but the VP is head final. The FOFC should rule such structures out. Given the widely assumed DP hypothesis (Abney, 1987),
(33) **German VP looks like a FOFC violating structure**

... daß Johann [VP [XP das Buch ] gelesen ] hat
that John the book read has

"...that John has read the book"

The move made by Biberauer, Holmberg & Roberts (2014); Shoehan, Biberauer, Roberts & Holmberg (2017, a.o.) to account for (33) is to relativize the evaluation of the FOFC to certain domains. Rather than evaluating the FOFC over the entire structure, the FOFC is evaluated only within the extended projection of a lexical head. On this view, (33) is acceptable since the higher head in the propositive structure, V, is not in the extended projection of N.

The structure in (33) is potentially similarly problematic for the LEB. It should have a prosodic structure like (34) — given the strict definition of Match Theory assumed in §3 — which is not LEB compliant.

(34) **German VP maps to a LEB violating structure**

\[
\begin{array}{c}
\phi_{VP} \\
\phi_{XP} \quad \omega \\
\quad \downarrow \\
\omega \\
\downarrow \\
das \\
\omega \\
\downarrow \\
\omega \\
\downarrow \\
gesehen \\
\omega \\
\downarrow \\
buch
\end{array}
\] 

\[\ast((wS...\right)

Of course, if (34) is not the correct representation, then there is hope that the correct representation is LEB compliant. Recall our previous discussion of the peculiar prosodic status of functional words — in particular, determiners. We saw there that such elements consistently fail to map to independent phonological words, but instead appear to be prosodic clitics, which tend to elide onto a lexical word following them. Following Hall (1969); Kabak & Schlieter (2006); Ito & Mester (2009), I suggest that German determiners do not map to independent phonological words, but rather to some smaller element which adjoins in some way to the lexical noun, schematized below.

(35) \[
\begin{array}{c}
\psi_{VP} \\
\psi_{XP} \\
\phi \\
\omega \\
\downarrow \\
gesehen \\
\omega \\
\downarrow \\
das \\
\omega \\
\end{array}
\] 

\[\ast((S...\right)

This is suggestive of the analysis of penultimate stress in Basque noted in §2: there, rendering a weak element in the initial position of a left edge constituent extrametrical in some way allows what looks like an LEB violation. It is also suggestive of part of the analysis of Finnish in §3.1: there, we saw that ‘weak’, functional, determiner like elements behaved differently from lexical nominals with respect to the ban. If the proposed amendment to Match Theory is adopted there, then it could extend here as well — DP need not map to \(\phi\), since it is not headed by a lexical element.

This potential problem for the LEB — and hopefully, the suggested solution — is more general. Subjects in English, for instance, look on the surface to pose a similar sort of problem: if the determiner in a subject were to map to \(\omega\), as in (36), then we should expect the LEB to rule the sentence out. However, it has been argued — see Selkirk (1996); Ito & Mester (2009) for more details — that determiners in English behave similarly [but not identically] to determiners in German, in that they seem to be prosodically dependent on the lexical word that follows them.
(36) Subject violates the LEB

(37) Subject respects the LEB

If the LEB is on the right track, we should generally expect phrase-initial functional words to be prosodically dependent, in order to avoid creating a violation of the LEB, particularly in languages where these words generally appear at the left edge of some larger prosodic constituent. However, we should not necessarily expect this to be true of functional words which fail to appear in an initial position. The tendency of functional words — in particular, phrase-initial functional words — to prosodically depend on some way could potentially be seen as a consequence of the LEB: prosodically dependent elements will never create the embedding of prosodic structure which could give rise to an LEB violation.

3.4 Conclusion

In this paper, I proposed and defended a general ban on certain types of prosodic constituent whose elements are mismatched in prominence, given below. This ban was argued to hold at a variety of levels of representation, and accounted for a number of broad cross-linguistic trends.

(38) The Left Edge Ban:

\[
* \{ (w S \ldots)
\]

where \( w \) means “weak”
and \( S \) means “strong”

We first saw that the LEB accounted for the fact that preinitial stress is crosslinguistically rare, and, when it appears, seems to require something ‘extra’ to happen to the first syllable. We then saw that this accounted for a number of word order requirements, including harmonic word order effects that the FOFC was posited to capture. In a number of the cases investigated, something ‘extra’ happening to an element in the configuration seems to rescue a structure that might otherwise be LEB violating.

References


Graded Possibility: Distinguishing Epistemic Modals in Atayal

Sihwei Chen
Academia Sinica

1. Introduction

Under possible worlds semantics, modals encode existential or universal quantification over a set of worlds accessed from the actual worlds. Kratzer’s (1977, 1981, 1991, 2012) theory derives the truth values of modal sentences via two sets of propositions in the context in which the modals are uttered, a modal base and an ordering source. The former determines a set of accessible worlds for an evaluation world, and the latter ranks the worlds by comparing them according to how many propositions in the ordering source are true in those worlds. This picture however is insufficient to capture so-called graded modals, such as probably, more likely than, a good/slight possibility, etc. in English (Yalcin 2007; Portner 2009; Kratzer 2012; Lassiter 2017) and a typology of modals without duals (Rullmann et al. 2008; Peterson 2010; Deal 2011; Cable 2017).

This paper addresses intermediate quantificational strength of possibility modals, drawing evidence from Atayal, an Austronesian spoken in northern parts of Taiwan. I show that the modals ki’a and hazi’ in Atayal are unambiguous epistemic possibility modals that do not encode a difference in the source of evidence. I argue that the epistemic modals lexically encode degrees of possibility. I present a proposal utilizing the notion of ordering source in the Kratzer’s theory together with reasoning of pragmatic competition. Unlike gradable modality with overt degree modifiers or comparatives, the Atayal epistemic modals reveal a case of lexical gradability.

2. Epistemic possibility modals in Atayal

Atayal has at least seven modal elements, ki’a, hazi’, siki, blaq, mway, baq and thneyay, syntactically realized as preverbal auxiliaries or main verbs. Each of the modals is lexically restricted for a certain flavor and for either existential or universal quantification. This section focuses on the modal ki’a and hazi’, showing that they are both specified for epistemic modality and possibility strength (Section 2.1) and do not encode a particular type of information source, unlike what is sporadically claimed in the literature (Section 2.2).

2.1 Lexical specification

The modal ki’a is an auxiliary restricted to the sentence-initial position, and the modal hazi’ is an adverb freely distributed in the sentence. While they belong to different grammatical categories, both modals are usually translated or glossed using unambiguous modals of epistemic
possibility in English or Mandarin. The translations provide the first hint that the two modals encode both modal strength and modal flavor in their lexical semantics. Below I provide evidence other than translations for the lexical specification of the two modals.

In contexts that target epistemic modality, ki’a and hazi’ are both felicitous. The dialog in (1) is extracted from a storyboard, in which Tali’ and Rimuy were chased by the police and ran to hide in a cabin, and the police are discussing where Tali’ and Rimuy hid, based on what they observe inside the cabin. Each of their utterances contains one of the modals. (1) is also a context targeting possibility strength: The policeman has no idea of where Tali’ and Rimuy hid, and since the storyboard specifies that there are several possible hiding places in the cabin, the policewoman’s reply conveys that their hiding in the box is simply one possibility.

(1) Context: Tali’ and Rimuy run to an old abandoned cabin and hide there. Then the police find the cabin, where there are several places to hide, and wonder where Tali’ and Rimuy could be. (Elicited based on ‘On the Lam’, TsF Working Group 2011)

a. Policeman: ki’a wal t’iqing inu’ la.
   EPIST.POS PEV,PRF hide,AV where PRT ‘Where might they have hidden?’

b. Policewoman: hazi’ wal t’iqing kuru’ la.
   EPIST.POS PEV,PRF hide,AV box PRT ‘They might have hidden in the box.’

Similarly in (2), where there are many other possible reasons why a kid was crying on the street alone, either ki a or hazi’ is accepted.

(2) Context: A kid is crying on the street without an adult beside him. You think:

a. nyux hazi’ m-tkari laqi’ qani la.
   PROG.DIST EPIST.POS AV-get,lost child this PRT ‘This kid might have got lost.’

b. ki’a nyux m-tkari laqi’ qani la.
   EPIST.POS PROG.DIST AV-get,lost child this PRT ‘This kid might have got lost.’

Moreover, both modals are incompatible with any type of circumstantial modality. (3) and (4) illustrate a teleological and deontic flavor respectively, where neither ki’a nor hazi’ is judged felicitous.

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1 For instance, Egerod’s (1999) dictionary uses ‘maybe, I wonder’ for the modal ki’a, and Hsiao (2004) glosses it as ‘probably’; the modal hazi’ is translated or glossed as ‘perhaps’ (Egerod 1999:64; Rau 1992:127; Hsiao 2004:78) or ‘probably’ (Yeh and Huang 2009:95). Similarly, Mandarin translations of these modals, for instance, provided in the official dictionary published by Taiwan’s Council of Aboriginal People (Huang and Wu 2016), and offered by my consultants, often use epistemic possibility modals (e.g., kěnèng, yěxū, dāgài, dànyù, etc.). Sometimes a weak necessity modal (e.g., yīnggěi) or an expression with evidential flavor (e.g., hàoxiǎng) is attested in translations, but both of these analytical possibilities will be falsified below.

2 Abbreviations not included in the Leipzig Glossing Rules: AV = actor voice; CIRC = circumstantial modality; DEP = dependent voice; E = existential; EPST = epistemic modality; LV = locative voice; POS = possibility modality; PV = patient voice; REP = reportative.
Teleological context: Someone stops you and asks you about the direction to the tribe in the mountain. You answer:

a. musa’ **blaq** pwha’ sa tuqi qani.
   FUT CIRC.POS pass.AV LOC road this
   ‘You can take this road.’

b. # {**ki’a** / **hazi**} pwha’ sa tuqi qani.
   EPST.POS pass.AV LOC road this
   ‘You might take this road.’

(4) Deontic context: Your child asks your permission to go out. You say:

a. **nway**=su’ m-usa’ g<–m>–naw.
   DEON.POS=2SG.ABS AV–go play<AV>
   ‘You can go to play.’

b. # {**ki’a**=su’ / **hazi**} m-usa’ m-usa’=su’
   EPST.POS=2SG.ABS AV–go EPST.POS AV–go=2SG.ABS play<AV>
   ‘You might go to play.’

Note that (1) and (2) above merely show that they can have existential quantification; a remaining possibility is that the modals are felicitous in both necessity and possibility contexts. The context for (5) is extracted from the storyboard ‘On the Lam’, in which the policeman’s inference entails the truth of the proposition, given that behind the curtain is the only possible hiding place in the cabin. Against this context, one speaker firmly rejected the modal ki’a, as in (5)a; the other speaker first offered the modal hazi’ when he told the story, but upon reviewing the story, he suggested retracting hazi’, and hence hazi’ is marked as infelicitous in (5)b. I take these as evidence that ki’a and hazi’ do not encode certainty as a necessity modal or a flexible-force modal does.

(5) Context: The police follow Tali’ and Rimuy to the cottage. There are only three possible hiding places in the cabin. The policeman says, ‘They can’t be hiding in the box because it’s too small. And they can’t be hiding under the bed because it’s too low. They must be behind that curtain.’ (Elicited based on ‘On the Lam’, TFS Working Group 2011)

a. (# **ki’a**) cyux tlqng suwu na pala qniway tubung. [Speaker A]
   EPST.POS PROG.DIST hide.AV back GEN cloth cover window
   ‘They are hiding behind the curtain.’

b. (# **hazi’**) cyux tlqng suwu na katen. [Speaker B]
   EPST.POS PROG.PROX hide.AV back GEN curtain
   ‘They are hiding behind the curtain.’

Likewise, the context in (6) is set for epistemic necessity, and the presence of ki’a and hazi’ results in direct rejection as well as a comment that they are equivalent to a weak modal. I conclude that ki’a and hazi’ are unambiguous possibility modals.

(6) Context: Rimuy told you that she was very sleepy and would go upstairs to sleep. After a
while, you couldn’t hear any sound from upstairs. You think, “She must be asleep.”

a. cyux mk-sngya’ m-’abi’ la.
   PROG.DIST want-ventilate AV AV-sleep PRT
   “She is deeply asleep.”

b. # {kí’a / hazi} cyux mk-sngya’ m-’abi’ la.
   EPIST.POS PROG.DIST want-ventilate AV AV-sleep PRT
   “She might be deeply asleep.”
   Consultant’s comment: “You said yíding ‘must’; kí’a and hazi are kénéng
   ‘maybe’.”

2.2 No encoding of evidential distinctions

An obvious question is how the two modals differ. An initial plausible option is that kí’a and hazi are each restricted to a certain source of evidence, as evidential markers do.

Indeed epistemic modals in some languages encode the source of evidence the speaker has for the prejacent, i.e., they are evidential modals (Izvorski 1997, Matthewson et al. 2007, Faller 2011, Peterson 2010, among many others). A common distinction in languages with an evidentiality system is between inference from mental reasoning and inference from results of causing events (Willett 1988). The Atayal kí’a and hazi however are compatible with both evidence types. Consider first the context of (7), which describes how the speaker infers the reason why the fish is gone on the basis of his past experience and/or mental reasoning in the absence of any sensory evidence (e.g., the cat likes to wander in the house and if he sees the fish, he might eat it). Either kí’a or hazi is accepted for this context.

(7) Context: You find the fish you put on the desk is gone, but no one came to your house.
   You do have a cat, who likes to wander in the house, so you wonder:
   { kí’a / hazi } val niq-un na ngyaw la.
   EPIST.POS PFV.PRS eat-PV ERO cat PRT
   “It might have been eaten by the cat.”

Indirect inference via sensory evidence for the result of the described event is exemplified by (8), in which the speaker infers that it has rained from seeing the wet ground (caused by the raining event). Again, each modal alone (or their co-occurrence) is accepted.

(8) Context: You have been staying indoors this morning and you can’t see outside from your office. You go out at noon and see the ground is wet.
   a. (kí’a) m<-in>qwalax hazi’ ssawni’.
      EPIST.POS AV<- prep PST rain EPIST.POS earlier.today
      “It might have rained.”

b. kí’a m<-in>qwalax (hazi’) ssawni’.
   EPIST.POS AV<- prep PST rain EPIST.POS earlier.today
   “It might have rained.”

3 Pitay (2014:21-22) makes such a claim—A kí’a claim is based on pure speculation, while a hazi’ claim is inferred via reasoning—but does not provide any conclusive evidence.
The last note is that neither of the two modals indicates that the source of evidence for the proposition is by report, which is encoded by the final particle mhai/ma ‘hearsay, it is said, reportedly’, as exemplified in (9).  

(9) wal m-huqil qu’ b País qasa mha.  

\[ \text{FV.PRF AV-die ABS old.man that REP} \]  

‘It is said that the old man died.’ (Huang 2008: 33)  

Note that it could be the case that the epistemic modals disallow reportative uses (i.e., they have a certain restriction on evidence). This is not true for hazi’ as it can co-occur with the reportative particle, as in (10); further work is required for ki’a.

(10) p-huqil hazi’ na in-nbu’=nya’ i Suyan ma wahi.  

\[ \text{FUT.AV-die EPST.POS OBL EPST-be.iH=3SG.GEN ABS Suyan REP PRT} \]  

‘It is said that Suyan will die from his illness.’ (Huang and Wu 2016)

3. Evidence for the strength of ki’a and hazi’

I suggest that the two modals differ in quantificational strength: hazi’ is stronger than ki’a. We have seen that in contexts that call for epistemic possibility modals, either ki’a or hazi’ is volunteered. (Both modals can also co-occur, as in (8)). However, minimal pairs of ki’a and hazi’ sentences are often commented by the consultants that ki’a expresses a weaker claim; witness (11):

(11) Context: You ask grandpa, “How many houses are there in the tribe?” He replies:  

\[ \text{hazi’ kbul msyaw kwara’ cin-ngasal=nya’ EPST.POS hundred rest all POSS-house=3SG.GEN} \]  

‘There might be more than a hundred houses.’  

Consultant’s comment when ki’a is used instead: “You are less sure.”

Furthermore, hazi’ but not ki’a is given in contexts with finer evidence (or those describing better knowledge of the speaker). This can be demonstrated by (12), where the context makes it clear that it’s unlikely that Tali’ and Rimuy are hiding inside a box given the size of the box, and only hazi’ is felicitous. Note that given the targeted sentence (‘They can’t be hiding inside the box’), hazi’ may be interpreted as a necessity modal, but this will contradict what (5)-(6) show, where hazi’ is not felicitous in contexts of epistemic necessity. I argue that the speaker uses a weaker claim here (indicated by the evidential-like topicalized phrase ‘it looks like that . . . , by looking’), which in fact conveys epistemic possibility rather than necessity.

(12) Context: The police are guessing where Tali’ and Rimuy hide. They figure out that they can’t be hiding inside the box because the box is too small. (elicited based on ‘On the Lam’, TFS Working Group 2011)

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4 According to Huang (2008), mhai/ma is an evidential marker grammaticalized from the saying verb mhai/mha ‘say’, through a stage of being a complementizer.
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kt-an ga, \{hazi\} / \{ki'a\} ini’ tlaq’ing zik na kulu’.  
see-LV TOP EPIST.POS NEG hide.AV.DEP inside GEN box  
“It looks like they probably didn’t hide inside the box.”

(13)a and (13)b, rejected in the necessity context (6), are offered with a different context, which I suggest indicates different quantificational strength: directly observing the way a person is sleeping provides a higher likelihood that she is in a deep sleep.

b. ki’a cyux mk-sngya’ m-’abi’ la.  
EPIST.POS PROG.DIST want-ventilate.AV AV-sleep PRT  
“She might be deeply asleep.”

Context offered: It’s your conjecture. You might hear her snoring or maybe she makes no sound anymore.

Lastly, in future contexts involving an anticipated event, ki’a is judged felicitous; compare (14) and (15). Intuitively speaking, anticipation of events reflects a higher possibility of its realization.  \footnote{5 It should be noted that the infelicity of ki’a cannot be attributed to a temporal restriction, since ki’a can be used for a future situation:}

(14) Context: After the dinner, mother tells you to not clean the dishes:  
\{# ki’a / hazi\} p-qaniq na’ yaba’=su’ kira’.  
EPIS.PPOS FUT.AV-eat still father=2SG.GEN later.today  
“You father will probably still eat later.”

(15) Context: Your family is having dinner except for your father. Your mother says:  
\{hazi\} / \{ki’a\} p-qaniq na’ yaba’=su’ kira’.  
EPIS.PPOS FUT.AV-eat still father=2SG.GEN later.today  
“He might eat later.”

4. Analysis

I showed that the modals ki’a and hazi in Atayal are both epistemic possibility modals but used for a different strength. In contexts in which a modal claim is more grounded, which involve a smaller domain of accessible worlds, hazi is appropriate but ki’a is not, the speakers’ intuitions also suggest that using ki’a is associated with a tone of comparatively

\footnote{5 It should be noted that the infelicity of ki’a cannot be attributed to a temporal restriction, since ki’a can be used for a future situation:}

(i) ki’a p-qwalax kira’.  
EPIS.POS FUT.AV-rain later.today  
“It might rain later.”

(ii) Context: On Father’s Day, your brother is out shopping. Father asks you what he is gonna buy. You reply:  
\{musa’ m-bazi hazi\} / \{ki’a m-bazi\} m’al sana’ wavy-an=st maniq.  
FUT AV-buy EPIS.POS FUT AV-buy LOC even what like-LV=2SG.ERG eat.AV  
“He will buy whatever you like to eat.”
less commitment or confidence than *hazi*. I offer a proposal for the strength gradability, modeling the notion of ‘Human Possibility’ and ‘Simple Possibility’ in Kratzer (1981, 1991, 2012), with the aid of pragmatic competition between the modals.

### 4.1 Kratzer’s doubly relative model

In modal logic, modal expressions denote quantifiers over possible worlds. Possibility and necessity modals correspond to existential and universal quantification, respectively. Modals acquire different flavor depending on which subset of possible worlds is quantified over. Kratzer (1977, 1981, 1991, 2012) develops a theory of modals and conditionals, in which the truth values of modal sentences depend on the context in which they are uttered, termed *conversational backgrounds*. A conversational background consists of two sets of propositions, the former of which is dubbed *modal base* (MB), $f(w)$, and the latter *ordering source* (OS), $g(w)$. A MB maps each world onto a set of accessible worlds that the modal quantifiers over, and an OS serves to further restrict the domain of quantification of the modal by ranking the set of accessible worlds. It provides a set of propositions that can generate a partial ordering of worlds. The accessible worlds in a MB are compared according to how many propositions in the OS are true in those worlds. For instance, $w \preceq_{f,g} z$ says that $w$ ranks better than or the same as $z$ with respect to the OS $g(w)$ iff all propositions in $g(w)$ that are true in $z$ are also true in $w$. In epistemically accessible worlds, an OS represents a notion of normalcy or stereotypicality: given a normal course of events, some worlds are better than others.

An ordering source can condition the strength difference of modals. Kratzer (2012:49) suggests that the interpretations of possibility modals, as defined in (16), generally “depend on both a modal base and an ordering source, but either parameter can be filled by empty conversational background.” When OS is empty (i.e., no ranking is imposed on the accessible worlds), all the worlds compatible with the modal base are equally good. In this case, a proposition is possible iff it is true in one world among all the accessible worlds, which is termed ‘Simple Possibility’. Simple Possibility is thus a special case of (16) where the domain of quantification is the largest; a proposition not involving Simple Possibility is termed ‘Human Possibility’, which is stronger than Simple Possibility.

(16) A proposition $p$ is a possibility in a world $w$ with respect to a modal base $f$ and an ordering source $g$ iff $\neg p$ is not a necessity in $w$ with respect to $f$ and $g$. (Kratzer 1991:644)

### 4.2 The lexical entry of the Atayal epistemic modals

Against this background, I propose that while both modals denote an existential quantifier and presuppose an epistemic modal base, *ki’u* minimally differs from *hazi* in specifying an empty ordering source, as given in (17). Notice that I assume that the lexical restriction is a presupposition on the modal base and/or ordering source, whose value is assigned by a variable assignment function (cf. Rullmann et al. 2008). I also assume that an OS always gives a best set of worlds; the operator *BEST* that produces such a best set of worlds is defined as in (18).

(17) Let $p$ be a proposition, $f$ a modal base, $g$ an ordering source, $c$ an utterance context and
w a possible world.

a. $[[k'i'a]]^g$ is only defined if c(f) is an epistemic MB and c(g) is an empty OS.
   If defined, $[[k'i'a]]^g = \lambda f. \lambda g. \lambda P. \lambda w. \exists w' (w' \in \text{best}_{g,w}(\cap f(w)) \cap P(w')) = 1$

b. $[[hazi]]^g$ is only defined if c(f) is an epistemic MB.
   If defined, $[[hazi]]^g = \lambda f. \lambda g. \lambda P. \lambda w. \exists w' (w' \in \text{best}_{g,w}(\cap f(w)) \cap P(w')) = 1$

(18) For a given ordering A on a set of worlds X:
   \begin{align*}
   \text{best}_A(X) &= \{w' \in X \text{ and there is no } w' \in X \text{ such that } w' \leq_{g,w} w \} 
   \end{align*}
   (adapted from Portner 2009:67)

(17)a says that $p$ is true in some of the accessible worlds; the worlds compatible with the
modal base are equivalently good, given no identification of an ideal and hence no
ranking is imposed on the accessible worlds. This gives the widest domain of quantification
(akin to Kratzer’s Simple Possibility). In (17)b, $hazi$’ does not presuppose that its ordering
source is empty or non-empty, simply leaving it open to be determined by what is salient in
the context.

The fact that $hazi$’ is stronger than $k'i'a$ can be attributed to pragmatic competition
between the modal without involving an extra specification in the lexical meaning of $hazi$’.
Although the semantics of $hazi$’ is compatible with both the weakest and slightly stronger
possibility strength, the weakest reading is predicted to be blocked by $k'i'a$ based on
Maximize Presupposition (cf. Heim 1991), because $k'i'a$ has a presupposition of an empty OS
and will be chosen whenever the presupposition is met. Moreover, since the strength of $hazi$’
entails that of $k'i'a$ (but not vice versa), Grice’s Maxim of Quantity predicts that the choice of
$k'i'a$ over $hazi$’ incurs an implicature that the speaker is not in a position to make a stronger
commitment to the truth of $p$. This explains why in contexts in which a modal claim is
supplied by more evidence, $hazi$’ is appropriate whereas $k'i'a$ is not.

An immediate issue for this analysis is why in some contexts both modals are equally
acceptable (e.g., (2), (7), and (8)); it could also be that the contexts are not clear enough to
differentiate the degree of possibility. Crucial for this analysis, further work is required to
determine whether $hazi$’ is always used for a non-empty ordering source.

5. Concluding remarks

Overall, the Atayal epistemic modals present a typologically unique case: while they are
comparable to modals with variable strength, argued to depend on the role of ordering source
(as in Peterson 2009), the gradability of Atayal modals is lower bound within the domain of
possibility. This raises an interesting question what conditions that a (stronger) possibility
modal can be used in necessity contexts in one language but not in another.

The Atayal epistemic modals are also unique in that they do not appear to accept
degree modifiers or take part in comparatives and equatives. However, it is empirically
unclear whether the language makes use of degrees. If the inferential connection between
the modal elements and gradable adjectives turns out to be positive, it will prefer an analysis
such as Lassiter (2017), which is directly couched with different probabilistic strengths for
each of the epistemic modals in Atayal.

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Measurement and Optional Classifiers in Taiwan Mandarin

Yi-Hsin Chen
Nanjing University

1. Introduction

It is well-known that in contrast to English, numerals cannot directly combine with nouns in Mandarin; instead, a classifier (henceforth CL) has to be used. The relevant facts are illustrated in (1).

(1) a. san 3(ke) pingguo
    Mandarin
    three   CL   apple

b. three apples
    English

In the literature, there have been two different views on the above contrast between Mandarin and English. One view considers that the variation lies in the denotation of nouns and proposes that all Mandarin nouns are registered as kind terms. Therefore, CLs are required for Mandarin nouns to obtain their predicative meanings, as suggested in Chiengia (1998, 2010). Under Chiengia’s view, classifiers are for nouns. In contrast, Krifka (1995) considers that the variation lies in the denotation of numerals and proposes that Mandarin numerals (in contrast to English ones) do not encode the cardinality function while CLs denote the cardinality function. Therefore, Mandarin numerals require CLs to complete their meanings. Under Krifka’s view, classifiers are for numerals (i.e., not for nouns).

However, this paper argues that neither claim is completely correct and offers two observations. First, Chinese classifiers are systematically optional in certain degree constructions (cf. Cheng et al. 2012), as shown in the positive (2), the comparative (3) and the superlative (4).

(2) Liubei mai-le hen-duo (ke) pingguo.
    Liubei buy-ASP POS-many/much CL apple
    ‘Liubei bought a lot of apple(s).’

(3) Liubei bi Caocao mai-le geng-duo (ke) pingguo.
    Liubei than Caocao buy-ASP COMP-many/much CL apple

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1 I am very grateful to Pei-Yi Hsiao, Wei-Fang Hsieh, Wei-Wen Roger Liao, Jo-Wang Lin, BeiBei Xu, Chin-Yu Helen Yang, and the audiences at TripleA6 and TEAL12 for discussion and comments. Particular thanks go to Chen-sheng Luther Liu and Roger Schwarzschild for constructive suggestions. All errors are of course mine. This work is supported by the Fundamental Research Funds for the Central Universities, P.R.C.
2 Abbreviations in this paper are listed below. ASP: aspect; CL: classifiers; POS: pos-morpheme; COMP: comparative morpheme; SUP: superlative morpheme.
3 Cheng et al. (2012) observes that CLs may be optional with the presence of hen duo ‘a lot’. However, they do not discuss the comparative and the superlative; neither do they discuss the variation in the dimension of measurement w.r.t. the presence/absence of CLs.
Yi-Hsun Chen

‘Liubei bought more apple(s) than Caocao.’

(4) Zhe-xie-ren zhizhong, Liubei mai-le, zui-duo (ke) pingguo
These-CL-people among Liubei buy-ASP SUP-many/much CL apple
‘Among these people, Liubei bought the most apple(s).’

Second, the optionality of Mandarin CLs is not a free variation. We observe that the presence/absence of CLs lead to a variation in the dimension of measurement. For instance, in (2) — (4), without CLs, the relevant dimension of measurement can be either cardinality or others obeying monotonicity such as weight or volume; in contrast, with CLs, the dimension has to be cardinality and other dimensions such as weight or volume are impossible. Below, (5) illustrates the same point.

(5) a. Liubei bi Caocao mai-le geng-duo li mi. \textsuperscript{\textit{\^}cardinality; \textit{\^}weight}
Liubei than Caocao buy-ASP COMP-many/much CL rice
‘Liubei bought more gains of rice than Caocao.’

b. Liubei bi Caocao mai-le geng-duo li mi. \textsuperscript{\textit{\^}cardinality; \textit{\^}weight}
Liubei than Caocao buy-ASP COMP-many/much rice
‘Liubei bought more rice than Caocao.’

Mandarin nouns participating in the pattern include conceptually count nouns, flexible nouns and conceptually mass nouns, as shown below.

(6) a. Conceptually count nouns: yingtao ‘cherry’ and shu ‘book’

b. Flexible nouns: shitou ‘stone’ and giaokeyi ‘chocolate’

c. Conceptually mass nouns: rou ‘meat’ and mi ‘rice’

The linguistics facts in (2) — (6) raise several important questions concerning the relation between measurement and classifiers: (i) what is the role of classifiers in the measurement constructions? (ii) How is measurement connected with classifiers? (iii) How and why does the variation in the dimension of measurement show up? By consider bare numerals as degree terms, this paper takes a mixed approach incorporating both Krifka (1995)’s and Chierricia (1998)’s insights while account for the optionality of CLs and its connection to the variation in the dimension of measurement. The central proposal of this paper is that sortal/individuating classifiers encode a cardinality function and imposes restrictions on the denotation of nouns.

The rest of this paper proceeds as follows. Section 2 briefly reviews Krifka (1995) and Chierricia (1998). Section 3 spells out our theoretical assumptions and presents a formal analysis of the case with numerals and the case with optional classifiers. Section 4 concludes the paper.

2. Two views on why classifiers are necessary

As mentioned in the introduction, Chierricia (1998, 2010) proposes that all Mandarin nouns (like English mass nouns) are registered as kind terms and CLs are required for Mandarin nouns to obtain their predicative meanings. Below, the illustrations are taken from Bale and Coon (2014: 696–697): First, (7) shows that the Mandarin noun gou ‘dog’ is a kind term, just like English mass noun furniture, but in contrast to English count noun dog; Second, (8) presents the semantics of CLs and numerals; Finally, (9) illustrates the equivalence between the denotation of English count nouns and that of the combination of Mandarin CLs and nouns.
(7) a. [gou] ‘dog’ = "DOG (i.e., the dog-kind)
    b. [furniture] = "FURNITURE (i.e., the furniture-kind)
    c. [dog] = \{x: \text{atom}(x) \land \text{dog}(x)\} (i.e., a set of individual dogs)

(8) a. [liang] ‘two’ = \lambda P. \text{Atomic}(P). \{x: \#P(x) \land \mu_{\text{card}}(x) = 2\}
    b. [zhi] ‘CL’ = \gamma (i.e., the function from kinds to sets of atoms.)

(9) Equivalences: [zhi gou] = \{x: \text{atom}(x) \land \text{dog}(x)\} = [\text{dog}]\quad \text{singular count noun}

In contrast, Krifka (1995) proposes that the locus of variation does not lie in the semantics of nouns, but in the semantics of numerals. In particular, Mandarin CLs encode the cardinality function and Mandarin numerals do not (in contrast to English numerals). Thus, CLs are required for Mandarin numerals. The following illustrations are again taken from Bale and Coon (2014: 698): First, (10) presents the equivalence between the denotation of Mandarin noun gou ‘dog’ and English count noun dog; Second, (11) shows that Mandarin numerals (in contrast to English numerals) do not encode the cardinality function, which is crucially provided by CLs; Finally, (12) illustrates the semantic equivalence between English numerals and the combination of Mandarin CLs and numerals.

(10) [gou] ‘dog’ = \{x: \text{atom}(x) \land \text{dog}(x)\} = [\text{dog}]

(11) a. [two] = \lambda P. \text{Atomic}(P). \{x: \#P(x) \land \mu_{\text{card}}(x) = 2\}
    b. [liang] ‘two’ = \lambda mP. \text{Atomic}(P). \{x: \#P(x) \land m(x) = 2\}
    c. [zhi] ‘CL’ = \mu_{\text{card}}

(12) Equivalences: [liang zhi] = \lambda P. \text{Atomic}(P). \{x: \#P(x) \land \mu_{\text{card}}(x) = 2\} = [\text{two}]

Several remarks are in order. First, Chierchia (1998, 2010)’s proposal, though highly influential, is not free from challenges. For example, Cheng et al. (2008) argues that not all Mandarin nouns behave like English mass nouns (see also Chierchia 2015 on this point). Second, Krifka (1995)’s analysis is similarly subject to some challenges. Under Krifka’s analysis, numerals have to first combine with CLs; this necessarily predicts a left-branching structure [[\text{NUM}+\text{CL}]+\text{NP}], independently of the type of CLs. However, recent studies show that sortal/ individuating CLs involve a right-branching structure [\text{NUM }+[CL]+\text{NP}], in contrast to other types of CLs (Huang et al. 2009, Li and Rothstein 2012, Li 2013, Niina Zhang 2011, 2013, Rothstein 2016).

This paper takes a mixed approach incorporating Chierchia’s insights that Mandarin nouns are kind terms and Krifka’s insights that numerals do not encode the cardinality function, with a primary focus on sortal/ individuating CLs in degree constructions. The next section spells out the analysis.

3. A formal analysis

In this section, we first introduces our theoretical assumptions; then, section 3.1 presents the analysis of the case of numerals and section 3.2 spell out the analysis of optional CL in degree constructions. Before we proceed, (13) summarizes the empirical facts to be captured in this paper.

(13) The optionality of Mandarin sortal/ individuating CLs in degree constructions
    With CL: only cardinality is available
Without CL: either cardinality or other monotonic dimensions (weight/volume) are available

First of all, we assume with Chierchia (1998) that Mandarin nouns are kind terms and can be shifted into their predicative meanings (i.e., an atomic join semi-lattice, like English plural nouns) via the type-shifting \( \triangleright \) operator. Second, we assume with Krifka (1995) that Mandarin numerals do not encode the cardinality function; instead, bare numerals are denote degrees (see also Hackl 2000). Below, (14) presents the semantics of Mandarin nouns and (15) the semantics of bare numerals.

\[
\begin{align*}
(14) & \quad [\text{pingguo}] \text{‘apple’} = \lambda x \! \downarrow_{\text{e}} \! \triangleright \! \downarrow_{\text{t}} \cdot \text{‘apple}(x) \\
(15) & \quad [\text{san}] \text{‘three’} = 3 \! \downarrow_{\text{e}} = [\text{three}]
\end{align*}
\]

Crucially, without any further ado, it naturally follows that numerals cannot directly combine with nouns due to type-mismatch, unless something appears in-between, as schematized in (16).

\[
(16) \quad \text{a. Numerical + NP} \\
& \quad <\triangleright, e, t> \quad \text{type-mismatch!} \\
& \quad \text{b. Numerical + ?? + NP} \\
& \quad <\triangleright, e, t>
\]

The idea here is that CLs are one natural candidate mediating between numerals and nouns to avoid the type-mismatch in natural language. As we will see shortly, besides CLs, a measurement operator, which may be covert in one language but overt in another, may also serve to avoid the type-mismatch. Specifically, we propose that Mandarin sortal CLs encode the cardinality function (Krifka 1995). Moreover, sortal CLs imposes a partition on the denotation of nouns and picks out those (plural) individuals for which there is a cover S, whose cardinal value is provided by the numeral. Finally, sortal CLs require the individuals in the cover to be atomic relative to the denotation of nouns. Concretely, (17) presents the semantics of sortal/ individuating CLs, and (18) provides the formal definition of partition and cover (e.g., Schwarzschild 1994, Ionin & Matushansky 2006).

\[
(17) \quad [\text{ke}] = \lambda P \! \downarrow_{\text{e}} \! \triangleright d \! \downarrow_{\text{e}} \! \triangleright x \! \downarrow_{\text{e}} \! \triangleright \exists S [\Pi(S)(x) \land |S| = d \land \forall a \in S \rightarrow \text{Atom}(a)(P)]
\]

\[
(18) \quad \text{a. S is a partition } \Pi \text{ of an entity } x \text{ if it is a cover of } x \text{ and its cells do not overlap} \\
\Pi(S)(x) = 1 \text{ iff } S \text{ is a cover of } x, \text{ and } \forall z, y \in S [z = y \lor \neg \exists a [a \leq z \land a \leq y]] \\
\text{b. A set of individuals } S \text{ is a cover of a plural individual } X \text{ if } X \text{ is the sum of all members of } S: \cup S = X
\]

In other words, under the current analysis, sortal/ individuating CLs not only encodes the cardinality function (Krifka 1995) but also provides the level of individuation (Chierchia 1998) by requiring the individuals in the cover to be atomic relative to the denotation of nouns. The next section illustrates how the current analysis applies to the case of numerals.

### 3.1 The ease of numerals

With the above theoretical background, (19) illustrates the compositional process of the Mandarin phrase \text{liang-ke-pingguo} ‘two apples’.
(19) liang ‘two’ + CL + pingguo ‘apple’

a. $[[\text{liang}]] = 2_{\text{cl}}$

b. $[[\text{ke}]] = \lambda P_{\text{cl}}. \lambda d_{\text{cl}}. \lambda x_{\text{cl}}. \exists S. \left( \Pi (S)(x) \land |S| = d \land \forall s \in S \rightarrow \text{Atom}(s)(P) \right)$

c. $[[\text{pingguo}]] = \lambda x_{\text{cl}}. \text{apple}(x)$

d. $[[\text{liang-ke-pingguo}]] = \lambda x_{\text{cl}}. \exists S. \left( \Pi (S)(x) \land |S| = 2 \land \forall s \in S \rightarrow \text{Atom}(s)(\text{apple}) \right)$

According to (19), the Mandarin noun pingguo ‘apple’ is a kind term and shifted into a set of instances of the kind (i.e., an atomic join semi-lattice); the sortal CL ke then imposes a partition over the set of individuals relative to the cardinal value provided by the numeral liang ‘two’; moreover, it is required that the individuals in the cover are atomic relative to the denotation of the noun. Below, (20) further illustrates the point.

(20) a. Suppose there are three apples $a$, $b$, $c$ in the discourse:

\[
\begin{array}{c}
\text{a+b=c} \\
\text{a+c} \\
\text{b+c} \\
\end{array}
\]

b. $[[\text{liang-ke-pingguo}]] = \{a+b, b+c, a+c\}$

c. Covers:

\[
\begin{array}{c}
\{a, b\} \\
\{b, c\} \\
\{a, c\} \\
\end{array}
\]

Now, let’s turn to English, a non-CL language. In the literature on comparative constructions, it is not uncommon to assume that a covert measurement operator exists in English, though it has many different names by different authors (e.g., many in Hackl 2000; M-OP in Rett 2014, 2018; Meas in Solt 2015; Kennedy 2015; Buccola & Spector 2016; among many others). For concreteness, in this paper, we assume with Rett (2014, 2018) that the covert measurement operator in English is M-OP, with its semantics in (21). The composition of the English phrase three apples is illustrated in (22).

(21) $[[\text{M-OP}]] = \lambda P_{\text{cl}}. \lambda d_{\text{cl}}. \lambda z_{\text{cl}}. [P(z) \land \mu(z) = d]$

(22) three apples

a. LF: [three [M-OP [apples]]]

b. $[[\text{three}]] = 3_{\text{cl}}$

c. $[[\text{apples}]] = \lambda x_{\text{cl}}. \text{apple}(x)$

d. $[[\text{M-OP}]] = \lambda P_{\text{cl}}. \lambda d_{\text{cl}}. \lambda z_{\text{cl}}. [P(z) \land \mu(z) = d]$

e. $[[\text{M-OP apples}]] = \lambda d_{\text{cl}}. \lambda x_{\text{cl}}. \text{apple}(z) \land \mu(z) = d$

In other words, under a degree-theoretic perspective, bare numerals do not directly combine with nouns (even in English). Specifically, the apparent direct combination between numerals and nouns results from the existence of a covert measurement operator M-OP. Semantically, the numerical value names the number of atoms in the measurement along the dimension cardinality.

At this point, it is worth noting that the current analysis does not claim that there is no mass-count distinction in English concerning the (in)compatibility between numerals and the type of nouns. Instead, the analysis presented here offers a new perspective on the traditional observation that numerals cannot directly combine with mass nouns in English; under the current terms, numerals cannot combine with mass nouns even with the presence of M-OP. What is at stake underlying the nature of incompatibility is the fact that the dimension of cardinality cannot apply to mass nouns.
Depending on your particular view on the semantics of mass nouns, the reason could be that mass nouns lack atoms (Link 1983) or that mass nouns do not have stable atoms (Chierchia 1998, 2010), the number of (stable) atoms thus cannot be counted grammatically on the dimension of cardinality.  

So far, we have completed our discussion on the case of numerals. The next section presents our formal analysis of optional Mandarin CLs in degree constructions.

### 3.2 The optionality of Mandarin classifiers

Rett (2014, 2018) proposes that English quantity adjective much always induces a higher-order measurement on degree property.

\[(\text{much}) = \lambda d. \lambda D. \lambda z. \mu_D(z) = d\]

For Mandarin quantity adjective duo ‘many/much’, I propose that duo ‘many/much’ can be either the overt realization M-OP (see 24a) or the counterpart of English much inducing a higher-order measurement (see 24b).

\[(\text{duo}) = \lambda d. \lambda D. \lambda z. \mu_D(z) = d\]

With this background in mind, let’s first consider the case where sortal/ individuating CLs are present in degree constructions. The relevant Mandarin example is repeated in (25). The LF and the semantic computation are illustrated in (26).

\[(\text{25) The case with CL: } \text{henduo ‘many’ } + \text{CL} + \text{pingguo ‘apple’})\]

\[
\begin{align*}
\text{Liubei} & \quad \text{mai-le} \quad \text{hen-duo} \quad \text{ke} \quad \text{pingguo}. \\
\text{Liubei} & \quad \text{buy-ASP} \quad \text{POS-many/much} \quad \text{CL} \quad \text{apple}
\end{align*}
\]

\‘Liubei bought a lot of apple(s).’

\[(\text{26) a. LF: } [\text{POS}[\lambda.2 \quad [d_\text{2-duo} \quad [\lambda.1][\text{Liubei} \quad \text{bought} \quad [\exists \quad [d_\text{1-CL-apple}]]]]]]\]

---

4 There are many different views on how and where the mass-count distinction is encoded in the grammar (e.g., see Roehslein 2016: chapter 4 for an overview and discussion). It is not our intention to claim that Link (1983) or Chierchia (1998, 2010) is the correct approach to the mass-count distinction, nor is it the purpose of this paper to evaluate different views on the mass-count distinction. The point here is simply to point out that under the current analysis, the core issue underlying the traditional observation on the (in)compatibility between numerals and the type of nouns is the fact that the dimension of cardinality does not (intuitively) apply to mass nouns, rather than the surface (in)compatibility with numerals. Any theory of mass-count distinction in natural language should be able to explain why the dimension of cardinality does not apply to mass nouns (while it applies to count nouns). Crucially, with this shift of perspective, the surface (in)compatibility with numerals will no longer be a reliable diagnostic for the type of nouns; it would then depend on (i) whether a language has a covert M-OP; (ii) what the semantics of M-OP is. Specifically, these two parameters will together determine whether numerals can directly combine with mass nouns on the surface in a given language and what interpretations will arise with those combinations.

5 Given that the dimension of M-OP is contextually specified, two questions immediately arise: (i) why wouldn’t other monotonic dimensions (e.g., weight) apply to plural count nouns (e.g., in the case like three apples)? (ii) why wouldn’t other monotonic dimensions (e.g., weight) apply to mass nouns (e.g., in the case like three water)? It seems to me that maybe the dimension of M-OP in English is not contextually specified after all (though see Wellwood 2018 for an alternative view); instead, it only specifies for cardinality, as the role of covert many suggested in Hackl (2000).
The bolded part in (26f) indicates the contribution of the sortal/individuating CL *ke*. In (26), the sortal CL *ke* imposes a partition over the set of apples relative to the cardinal value $d$ and requires the apples in the partition to be atomic; then the quantity adjective *duo* ‘many/ much’ induces a higher-order measurement where the degree interval (i.e., the number of apples that *Liubei* bought) holds of a degree $d'$. Finally, the pos-morpheme requires the relevant degree $d'$ to exceed a contextually-given standard $d_0$. Taken together, (25) is judged true if and only if the number of apples that *Liubei* bought exceed a certain contextual standard. More specifically, the dimension of comparison must be cardinality because the sortal/individuating CL *ke* encodes the cardinality function.

Now, let’s consider the case where sortal/individuating CLs are absent in degree constructions. The relevant Mandarin example is repeated in (27). The LF and the semantic computation are illustrated in (28).

(27) The case without CL: *hen duo* `many’ + *ping guo* `apple’

\[
\text{Liubei bought many apples.}
\]

\[
\text{Liubei bought a lot of apples.}
\]

In (28), no sortal/individuating CL is present; the quantity adjective *duo* ‘many/ much’ is the overt realization of M-OP and introduces measurement, while leaving open the relevant dimension. According to (28), (27) is judged true if and only if the number of apples that *Liubei* bought exceeds a certain contextual standard (i.e., cardinality) or the amount of apples that *Liubei* bought has a measure value which exceeds the contextual standard along a contextually-given dimension (e.g., weight). More specifically, in (27), the amount of apples that *Liubei* bought can be measured in terms of cardinality or other monotonic dimensions like weight, as long as the relevant measure value exceeds a certain contextual threshold.

4. Concluding remarks

This paper takes a mixed approach with the the attempt to incorporate Chierchia (1998, 2010, 2015)”s insights that Mandarin nouns are kind terms and Krifka (1995)”s insights that numerals do not encode the cardinality function, by considering bare numerals as degree terms (Hackl 2000, Kennedy 2015). In contrast to the two previous views where the locus of variation is placed in either the semantics of nouns or that of numerals; this mixed approach embraces the hypothesis that the locus of variation is situated in the measurement operators, namely, those linguistic elements encode measure function and
thus introduces measurement. These measure operators (including sortal CLs) are necessary to mediate between numerals and nouns to avoid the semantic type-mismatch. When the measure operator is covert in a non-CL language like English, it leads to the apparently direct combination of numerals and nouns (see Deoêtjes 2012 on the direct combination of numerals and nouns from a cross-linguistic perspective; cf. Lima 2014 on Yudja). When the measure operator is covert in a CL language, it leads to the fact that the use of CLs is apparently optional (i.e., not obligatory). In this line, Mandarin, a CL language, does not have a covert measure operator; thus the use of CLs is obligatory. The current research not only explains the role of CL in degree constructions (its syntactic optionality and semantic contributions), but also connects with Bale and Barner (2009)’s idea about quantity judgment where comparative constructions can be used as a reliable diagnostic of the mass-count distinction in languages beyond English. More studies are needed to further explore (i) the relation between the dimension of measurement and the structure of individuals in natural language; (ii) the role of CLs in the shift of the dimension of measurement in other languages; (iii) the semantics of the covert measure operator and its sensitivity to the mass-count distinction in languages beyond English.

References


1. Introduction

Chinese exhibits its typological property, analyticity, at all levels and provides a good perspective to the syntactic-semantic correspondence under the cartographic approach (Rizzi 1997; Cinque 1999; Rizzi & Cinque 2010). This comparative study is on the postverbal modal construals, Mandarin de and Hakka tet, and presents a syntactic account for the modality sources and the potential verbal base, investigating the selectional relationship as well as (a)symmetries among those alternatives both associated with core syntactic-semantic requirements.

(1) a. Zhangsan he-de-wan na-guan piju.  
   Zhangsan drink-DE-RES that-CL beer  
   ‘Zhangsan can [will manage to] drink off that bottle of beer.’

   b. Amin lim-tet-lit ge-gon bitu.  
   Amin drink-TET-RES that-CL beer  
   ‘Amin can [will manage to] drink off that bottle of beer.’

Mandarin: single-layered modality and one verbal base

Mandarin de parallel to neng carrying a single-layered modality, dynamic modality, sits between a verb and a resultative marker in a frozen [V-Mod-Res] alignment, due to its morphological boundedness.

(2) a. Zhangsan neng he-wan na-guan piju.  
   Zhangsan can drink-RES that-CL beer  
   (Dynamic: Mod V-Res)

   b. Zhangsan he-de-wan na-guan piju.  
   Zhangsan drink-RES that-CL beer  
   ‘Zhangsan can [will manage to] drink off that bottle of beer.’

(3) a. * Zhangsan de he-wan na-guan piju.  
   Zhangsan DE drink-RES that-CL beer  
   (Mod-V-Res)

   b. * Zhangsan de he na-guan piju.  
   Zhangsan DE drink-RES that-CL beer  
   (Mod-V)

Intended ‘Zhangsan can [will manage to] drink off that bottle of beer.’

Hakka: two-layered modality and two types of verbal bases

In Hakka, the modal tet illustrates a two-layered modality, namely dynamic modality in (4a) [V-Mod-Res] and deontic modality in (4b) [V-tet] (Palmer 1986; Portner 2009), which are located at the lexical layer and the inflectional layer, respectively (cf. Mandarin (Tsai 2010). Interestingly, deontic tet has another alternative as [v-Mod V] that tet appears after a light verb if such light verb is overtly realized as zo ‘do’.
A system of light verbs in Mandarin and its dialects has overt counterparts as in (5), due to the analyticity of Chinese, therefore raises more interesting issues about the potential verbal bases of this postverbal modal, tet. A straightforward prediction is that other overt light verbs in Hakka are qualified as candidates. Fortunately, this possibility is attested by (6):

(5) a. 作 zo:  ng zo ng hong (寫作紅) ‘just walk (your part)’ [Lit: ‘do your walking’]
    b. 使 sii: sii ngin fonhi (使人歡喜) ‘cause someone pleasure’
    c. 動 tung: ng tung ng-ge (動動個) ‘just focus on (your part)’ [Lit: ‘move your motion.’

(6) a. Amin sii-tet siid ng-von fan. (Deontic: CAUSE' -Mod V)
    Amin CAUSE-TET eat five-CL rice
    ‘Amin can [is permitted to] eat five bowls of rice.’
    b. Amin tung-tet siid ng-von fan. (Deontic: MOVE'-Mod V)
    Amin MOVE-TET eat five-CL rice
    ‘Amin can [is permitted to] eat five bowls of rice.’

This paper examines the comparative study of Mandarin Chinese and Hakka dialect, and is organized as follows: section 2 briefly reviews previous approaches to two central factors, the postverbal modals and the (lexical) light verbs, as the background for our discussion. In section 3, a topography of modals is articulated under the cartographic approach to capture the notable relationship between postverbal modals and their verbal bases, further leading to not only the modality sources distinctions but an array of (a)symmetries among those alternatives. Section 4 concludes this paper.

2. Two Central Factors: postverbal modal constructions & lexical light verbs

2.1 Postverbal Modal constructions

Mandarin

Wu(2004) compares de-sentence with the neng-sentence, and proposes that de projects differently from the neng between the VP and the resultative phrase licensed by the Modal through LF movement. The resultative element firstly moves and merges with de in the overt syntax, and follows the de-to-Modal LF-movement, as demonstrated below:

(7) a. Lisi kan-de dao zhe-ke shu.
    Lisi chop-DE-fall this-CL tree
    ‘Lisi can chop this tree down.’
    b. Lisi neng kan-dao zhe-ke shu.
    Lisi can chop-fall this-CL tree
    ‘Lisi can chop this tree down.’

(8) (i) [Modp LS [Mod [DE] Modp [VP [chop-DE-fall] ]] [dp [de t] [sp t] [sp this tree]]]] (Overt-mvt)
    (ii) [Modp LS [Modp [DE] Modp [VP [chop-DE-fall] ]] [dp [de t] [sp t] [sp this tree]]]] (LF-vmt)
2.2 Light Verb Constructions

It is well-known that a flexible argument structure is accepted in Mandarin. The arguments typically selected by the predicates can be replaced by many options and even appear either in subject or object positions (Lin 2001, Huang et al 2009, among others).

Furthermore, light verbs in Mandarin typically without a morphological realization occur covertly, while overt counterparts are accepted in some cases as (14) and (15), owing to Chinese analyticity. (16) and (17) show that such implicit-explicit contrast pairs not only could be observed in Hakka, but also have more couples of correlation exemplified by (18):

(14) a. ta-de laoshi dang de hao.  
     his teacher serve DE well ‘He serves as a good teacher.’

b. [NomP his [NomP do'-NOM [vikipedia do'] teacher…]] do well

(15) a. ta zuo ta-de laoshi.  
     he do his teacher ‘He must be a teacher.’ [Lit: ‘He is his teaching.’]

b. [he zuo'-do' [NomP his [NomP zuo'-do'->NOM [vikipedia zuo'-do'] teacher]]]
(16) a. ng hang ng-ge
    you walk your ‘You just walk (your part)’ [Lit: ‘You do your walking.’]
    [you [vp walk-do'] [nomp your [vp <walk>]]]]

b. [you [vp zo-do’] [nomp your [vp walk]]]

(18) {do- zo’}(Agent); {cause- si’}(Cause(r)); {move- tung’}(Perf(rner), {at- di’}(Location); {use- jing’} (Instrument); {at- di’}(Temporal)

A natural question along this line should concern whether all light verbs could be qualified as candidates as the verbal bases of postverbal modals. If the answer is no, what properties are responsible for the selectional restrictions? In fact, once we look deeper into the grammatical patterns, it becomes clear that a verbal element qualified as a proper base not only should fulfill the syntactic feature, [+V], but must concern the semantic requirement, the modality source.

3. Modals and its Verbal Bases

Syntactic feature [+V]: morphonological boundedness

Given the analyticity, a system of lexical light verb exists in Mandarin and its dialects. Those light verbs in (18) are predicted as potential verbal bases for this postverbal modal, tet, to satisfy the syntactic feature, [+V]. Fortunately, this possibility is attested by (19):

(19) a. Amin sii-tet siid ng-von fan. (Deontic: cause’-mod V)
    Amin cause- tet eat five-cl rice
    ‘Amin can [is permitted to] eat five bowls of rice.’

b. Amin tung-tet siid ng-von fan. (Deontic: move’-mod V)
    Amin move- tet eat five-cl rice
    ‘A cart is permitted on that road.’

However, a puzzle has to do with the fact that there are explicit-implicit pairs in Locative, Instrumental, and Temporal lv, whereas there is no one qualified as a potential verbal base in the v-tet-V, [v-mod-V], or V-tet, [V-mod] as in (20)-(22). It is unclear why they are ruled out, since those light verbs all bear the [+V] feature akin to other grammatical sentences.

(20) a. * ge-e-tiao lü hang-tet ngiu-ca. (Locative: *v-at-mod deo)
    that-cl road walk-tet cart

b. * ge-e-tiao lü di-tet hang giu-ca. (Locative: *at’-mod deo V)
    that-cl road at-tet walk cart

Intended: ‘A cart is permitted on that road.’

(21) a. * ge-zag vog-ge zu-tet gie-tong. (Instrumental: *v-use-mod deo)
    that-cl wok cook-tet chicken soup

b. * ge-zag vog-ge iung-tet zu gie-tong. (Instrumental: *use’-mod deo V)
    that-cl wok use-tet cook chicken soup

Intended: ‘That wok is permitted to use to cook chicken soup.’

(22) a. * gim-ambu zu-tet gie-tong. (Temporal: *v-temp-mod deo)
    tonight cook-tet chicken soup

b. * gim-ambu di-tet zu gie-tong. (Temporal: *at’-mod deo V)
    tonight at-tet cool chicken soup

Intended: ‘Chicken soup is permitted to be cooked tonight.’
Semantic requirement: the modality source—Agentivity and Authority

Though a system of lexical light verbs exist in Hakka, a proper verbal base of the modal *tet* ought to be considered both syntactically and semantically. Drawing the interaction between the modality source and the subject restrictions, *tung* ‘move’ stands as the introducer of a Performer and an Agent relies on *zo* ‘do’, leading to the subject agentivity requirement. The contrast in (23) further illustrates that an authority could be introduced by *sii* ‘cause’ as the permissive modality source. Moreover, the counterpart involved an implicit light verb, *V-tet*, shows respect to constraints on what detected in those taking explicit ones.

(23)  
\begin{align*}
&\text{a. } \text{fablid guitin siibbad se } \text{sii-tet } \text{siid jiu. (CAUSE}\text{-}^{\text{e}}\text{-Mod}^{\text{Doo}} \text{ V)} \\
&\text{law stipulate eighteen years old } \text{CAUSE-TET } \text{eat alcohol} \\
&\text{‘It is permitted to drink alcohol over eighteen years old by law.’} \\
&\text{b. } * \text{fablid guitin siibbad se } \text{zo-/tung-tet } \text{siid jiu.} \\
&\text{law stipulate eighteen years old } \text{DO-/MOVE-TET } \text{eat alcohol} \\
&\text{(DO}^{\text{t}}/\text{MOVE}^{\text{t}}\text{-Mod}^{\text{Doo}} \text{ V)}
\end{align*}

Proposed Syntactic Topography

For Hakka postverbal modal, *tet*, and its potential verbal bases, the proposed syntactic topography is sketched as in (24) to illustrate their selection by twofold conditions: syntactically, in addition to verbs, three overt light verbs, *zo* ‘do’, *tung* ‘move’ and *sii* ‘cause’, are accepted to serve as the potential verbal bases of *tet*, based on the [+V] feature. Semantically, the subject agentivity requirement is fulfilled to complete the permission, either by a Performer in *tung-tet V* ‘MOVE’-Mod V’, or an Agent in ‘DO’-Mod V’, realized as *zo-tet V* or *V-tet*, depending on whether the light verb, *‘do’*, appears explicitly or implicitly.

(24) \textbf{The proposed syntactic topography}

\begin{itemize}
\item \text{Inflectional layer}
\item \text{Lexical layer}
\end{itemize}
As for the third alternative, *sii-tet V ‘cause²-Mod V’, is allowed to take an authority as the permissive modality source, which is banned in *zo-tet V ‘do²-Mod V’ and *tung-tet V ‘move²-Mod V’, as the contrast in (23). The argument introduced by *sii ‘cause’ has two interpretations as exemplified by (25), based on its syntactic positions. It remains as a Cause(r) if it sits at [Spec, IP], and further receives an authority interpretation if it raises to [Spec, EvidP] (Evidentiality Projection, Uriagereka 1995; Rizzi 1997; Tenny 2006). Hence, the verbal bases have discrete syntactic positions and the arguments introduced by them are not the same, giving the modality source distinctions. This syntactic-semantic correspondence provides another argument to the main concerns of the cartographic approach.

(25) a. go cun-jied sii-tet siid jiu. (Cause(r))

celebrate Chinese New Year cause-TET eat alcohol
‘It is permitted to drink alcohol because of celebrating Chinese New Year.’

b. sii-tet siid jiu. (Authority)

eighteen years old cause-TET eat alcohol

‘It is permitted to drink alcohol because of being old by eighteen years old by law.’

c. fablid guitin sii-tet siid jiu. (Authority)

law stipulate eighteen years old cause-TET eat alcohol

‘It is permitted to drink alcohol over eighteen years old by law.’

By contrast, locative, instrumental, and temporal light verbs, even though the syntactic feature [+V] gets satisfied, there is no way for them to establish the modality source of *tet, since no agentivity or authority could serve as the permissive source.

(26) a. *ge-tiao lu di-tet hang ngiu-ca. (*at³-Mod V)

that-CL road AT-TET walk cart

b. [IP Location [MFD³ [AT³]-TET] [vp <Location>¹-Arg] [vp t₁ [vp ...]]]

(27) a. *ge-zag vog-ge tung-tet zu gie-tong. (*use³-Mod V)

that-CL wok use-TET cook chicken soup

b. [IP Instrument [MFD³ [USE³]-TET] [vp <Instrument>¹-Arg] [vp t₁ [vp ...]]]

(28) a. *gim-ambu di-tet zu gie-tong. (*at⁴-Mod V)

tonight AT-TET cook chicken soup

b. [IP Temporal [MFD³ [AT⁴]-TET] [vp <Temporal>¹-Arg] [vp t₁ [vp ...]]]

Further Evidence
Other differences within those alternatives of postverbal modals, deontic *tet, clearly exhibit the syntactic as well as the semantic properties on their selected verbal bases.

1. The interaction with rigid-hierarchically merged adverbs
The syntactic-semantic constraints on the selectional relation tied a proper (light) verbal bases are exemplified by their interaction with adverbials, also merged in the rigidly ordered hierarchy under the cartographic approach and the Functional Specifier analysis (Cinque 1999, 2006; Rizzi 2004). Evaluative adverbs exemplified as CP-layer modifiers are accepted in three alternatives of [v-Mod V] and [V-Mod] and consistently precede the deontic modals.

(29) a. lo-ninga ginien sii-tet / zo-tet / tung-tet (v-Mod V)

old people unexpectedly cause-TET do-TET move-TET

liau mien-fi-ge.

visit without pay-GEN
b. lo-ninga ginien liau-tet mien-fi-ge. (V-Mod)
old people unexpectedly visit-TET without pay-GEN
‘The elders usually can come to visit for free.’

(30) a. v-Mod V: \( v = \) sii ‘CAUSE’, zo ‘DO’, tung ‘MOVE’
    \[ \text{[CP Agent}_{j} \text{ [Mod}_{j} \text{ Adv}_{j} \text{ [MPD}_{0} \text{ V-}TET \text{ [VP } t_{j} \text{ [v } <v> \text{ [VP V}]]]]} \]

b. V-Mod
    \[ \text{[CP Agent}_{k} \text{ [Mod}_{k} \text{ Adv}_{k} \text{ [MPD}_{0} \text{ [V-V]}-TET \text{ [VP } t_{k} \text{ [v } <v-v> \text{ [VP V}]]]]} \]

Conversely, the VP-layer modifiers, manner adverbials, are restricted to [v-Mod V], sitting after the modals. Under the economic consideration (Relativized Minimality, Rizzi 1990, 2002; Minimal Link Condition, Chomsky 1995), (32) shows that the V-to-v-into-Mod movement in [V-Mod] is blocked by the adverbial as a closer \( X^0 \) to Mod\(^0\), i.e., but unfortunately without a proper feature to achieve the syntactic [+V] feature, resulting in the ungrammaticality:

(31) a. lo-ninga sii-tet / zo-tet / tung-tet (v-Mod V)
    old people CAUSE-TET DO-TET MOVE-TET
tintin-e hang lusunheu.
    slowly walk roadside ‘The elder can walk at the roadside slowly.’
cf. *lo-ninga tintin-e sii-tet / zo-tet / tung-tet

b. *lo-ninga tintin-e hang-tet tintin-e lusunheu. (V-Mod)
    old people slowly walk-TET slowly roadside

(32) a. v-Mod V: \( v = \) sii ‘CAUSE’, zo ‘DO’, tung ‘MOVE’
    \[ \text{[CP Agent}_{j} \text{ [Mod}_{j} \text{ V-}TET \text{ [VP } t_{j} \text{ [v } <v> \text{ [Mod}_{k} \text{ Adv}_{k} \text{ [VP V}]]] \]

b. V-Mod
    \[ \text{[CP Agent}_{k} \text{ [Mod}_{k} \text{ Adv}_{k} \text{ [MPD}_{0} \text{ -TET \text{ [VP } t_{k} \text{ [v } <v-v> \text{ [VP V}]]] \]

II. The prohibitive force and the rhetorical questions

The deontic tet has its negative counterparts via inserting a negative marker between tet and its verbal bases, light verbs in three alternatives of [v-Mod V], or verbs in [V-Mod]. (33) displays a preference for sii-tet V ‘CAUSE-Mod V’, denoting a stronger prohibitive force than others. So is the case in rhetorical questions that (34) tends to be expressed by the sii-tet V ‘CAUSE-Mod V’, carrying an authority as its permissive source.

(33) The prohibitive force

a. Amin sii-m-tet siid ng-von fan. (CAUSE\(^{v}\)-Neg-Mod V)
    Amin cause-NEG-TET eat five-CL rice

b. Amin zo-m-tet / tung-m-tet siid ng-von fan. (DO\(^{v}\)-Neg-Mod V;
    Amin DO-NEG-TET / move-NEG-TET eat five-CL rice MOVE\(^{v}\)-Neg-Mod V)

c. Amin siid-m-tet ng-von fan. (V-Neg-Mod)
    Amin eat-NEG-TET five-CL rice
    ‘Amin can not [is not permitted to] eat five bowls of rice.’

\( \text{\( \Rightarrow \)} \) CAUSE\(^{v}\)-Neg-Mod V \( \Rightarrow \) DO\(^{v}\)-Neg-Mod V / MOVE\(^{v}\)-Neg-Mod V / V-Neg-Mod

(34) The rhetorical questions

a. Amin nglong sii-tet siid jiu? (CAUSE\(^{v}\)-Mod V)
    Amin how come CAUSE-TET eat alcohol
b. Amin *ngiong* zo-tet / tung-tet siid jiu? (DO*-Mod V);
   Amin how come DO-TET MOVE-TET eat alcohol MOVE*-Mod V)

c. Amin *ngiong* siid-tet jiu?
   Amin how come eat-TET alcohol
   ‘Why can [is permitted to] Amin drink alcohol?’

\[ *ngiong* ‘how come’ + CAUSE*-Mod V >>
   ngiong* ‘how come’ + DO*-Mod V/ MOVE*-Mod V/ V-Mod

III. The formulation of A-not-A questions

Hakka postverbal modal, *tet*, patterns with other modals in constructing A-not-A questions by reduplication (Luo 1985), but differ in the reduplicated scope, which is again determined by its verbal base. In *sii-tet V ‘CAUSE-Mod V’, sii ‘cause’ and *tet* behave as a frozen constituent, so that the reduplication is operated on the whole [v-Mod] in (35). By contrast, (36) shows that a narrow scope, its verbal base only, is allowed in other cases. Thus, what would be reduplicated in A-not-A questions is the lexical light verb as *zo’dou*, *tung* ‘cause’ or the main verb.

\[ \text{(35)} \]
a. Amin sii-m-sii-tet siid jiu? (CAUSE*-Mod V)  
   Amin CAUSE-NEG-CAUSE-TET eat alcohol

b. Amin [sii-tet]-m-[sii-tet] siid jiu?
   Amin CAUSE-TET-NEG-CAUSE-TET eat alcohol
   ‘Is Amin permitted to drink alcohol?’

\[ \text{(36)} \]
a. Amin *zo-m-zo-tet / tung-m-tung-tet* siid jiu? (DO*-Mod V;  
   Amin DO-NEG-DO-TET MOVE-NEG-MOVE-TET eat alcohol MOVE*-Mod V)

b. Amin siid-m-siid-tet jiu?
   Amin eat-NEG-eat-TET alcohol
   ‘Is Amin permitted to drink alcohol?’

IV. Modal Licensing

* Tet as a deontic modal is proposed to have a licensing ability for indefinite subjects under the Subject Specificity (Tsai 2001; Tsai & Chung 2014). Whether this licensing ability could successfully function is also found associated with its selected verbal base. Indefinite subjects could rely on the modal licensing of *zo-tet V DO-Mod V* and *tung-tet V MOVE-Mod V* in (37a), while they must be rescued by *in* in other cases:

\[ \text{(37)} \]
a. sam-me ngn *zo-tet / tung-tet* siid ge-vog fan. (DO*-Mod V  
   three-CL person DO-TET MOVE-TET eat that-CL rice MOVE*-Mod V)  
   ‘Three people can [are permitted to] eat that wok of rice.’

b. *(iu)* sam-me ngn *sii-tet* siid ge-vog fan. (CAUSE*-Mod V  
   exist three-CL person CAUSE-TET eat that-CL rice

c. *(iu)* sam-me ngn *siid-tet* ge-vog fan. (V-Mod  
   exist three-CL person eat-TET that-CL rice

Above distinctions are summarized as Table 1. Despite sharing similar permissive modality, each alternative of deontic *tet* has its idiosyncratic properties. In *sii-tet V CAUSE-Mod V*, its modality source of permission could be expended from a cause(r) to an authority, giving a stronger prohibitive force. *Zo-tet V DO-Mod V* and *tung-tet V*
‘MOVE-Mod V’ as more neutral ones in their modality gain the grammatical functions—Modal licensing ability (for Subj\textsuperscript{indef}). The most restricted distribution is V-let ‘V-Mod’ derived from long-distance cyclic verb movements of the main verb, which must strictly respect to the locality constraint (Relativized Minimality, Rizzi 1990, 2002; Minimal Link Condition, Chomsky 1995). In other words, the syntax-semantics properties of their verbal bases could be regarded as the core factors to the modality source distinctions and the (a)symmetries within those postverbal modal alternatives.

<table>
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<th>V-let ‘V-Mod’</th>
<th>zo\textsuperscript{t}-let V ‘DO-Mod V’</th>
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4. Conclusion
Through a comparative study of Mandarin Chinese and Hakka dialect, the fine-grained topographies under the cartographic approach is proposed as (24) in Section 3, simplified as (38) below (for referential convenience). They aim to empirically capture the restrictions on postverbal modals differing in their verbal bases, and to theoretically elaborate the modality sources denoted by those construals, which are crucially affected by the robust system of light verbs, well demonstrated Chinese analyticity.

(38) a. V-Mod\textsuperscript{Det}
[IP Subject \text{[MPDeco]} [Vi-V]\text{–let} [vP t\text{[vP t\text{[vP t]}]]}]

b. DO\textsuperscript{t}-Mod\textsuperscript{Det} V
[IP Agent \text{[MPDeco]} zo\textsuperscript{t} ‘DO’ i–let [vP t \text{[vP t}} [vP V]]]]]

c. MOVE\textsuperscript{t}-Mod\textsuperscript{Det} V
[IP Performer \text{[MPDeco]} tung\textsuperscript{t} ‘MOVE’ i–let [vP t \text{[vP t}} [vP V]]]]]

d. CAUSE\textsuperscript{t}-Mod\textsuperscript{Det} V
[Ev\text{IP Authority} \text{[IP Cause(r)\text{[MPDeco]} sii\textsuperscript{t} ‘CAUSE’ i–let [vP t \text{[vP t}} [vP V]]]]]}

This comparative study shows novel arguments to the modality sources based on the selectional relationship between the postverbal modals and their verbal bases. This proposed analysis, if on the right track, not only empirically captures the contrasts in the permissive modality sources and the subject-argument selections, but also is advantageous in: (i) the
interactions with rigid-hierarchically merged adverbs under the cartographic approach, giving another piece of empirical evidence for such notable syntactic-semantic restrictions tied a proper (light) verbal bases to postverbal modals. (ii) Other (a)symmetries within those alternatives of postverbal modals, as the formulation of A-not-A questions and the prohibitive force implicated in the rhetorical questions, are also closely related to which verbal base token. (iii) Cross-linguistically, the alternatives of postverbal modals and the correlated distinction of modality sources in (38) could be attested by the selective relationship observed in other subdialects of Hakka. (iv) The most desirable consequence is that theoretically, this study of the modality sources and the potential verbal bases, a serial of lexical light verbs, may provide insights into the high analyticity of Modern Chinese (Chao 1968; Huang 2005, 2015), from the perspective of language typology.

Selected references
1. Introduction
This paper investigates argument ellipsis (AE), attested in languages like Japanese and Korean (Oku 1998; Kim 1999; Saito 2007; Takahashi 2008; Sakamoto 2017). AE can be applied to arguments like objects, subjects, and clausal complements, but not to adjuncts, as exemplified in (1) (Oku 1998; Shinohara 2006). Following the antecedent clause in (1a), the missing object in (1b) can be contained in interpretation, whereas the missing adjunct in (1c) cannot.

(1) a. Mary-wa yakkurito zibun-no booru-o nageta noni,  [Antecedent]
   Mary-top slowly self-gen ball-acc threw but
   ‘Mary threw her ball slowly, but...’
   b. Bill-wa yakkurito [_______] nagenakatta.  [AE of object]
      Bill-top slowly not.threw
      lit. ‘Bill didn’t throw ___ slowly.’ (Sloppy: ‘Bill didn’t throw his ball slowly.’)
   c. Bill-wa [_______] zibun-no booru-o nagenakatta.  [*AE of adjunct]
      Bill-top self-gen ball-acc not.threw
      lit. ‘Bill didn’t throw his ball ___,’ (*‘Bill didn’t throw a ball slowly’.)

Importantly, the elided reflexive zibun ‘self’ creates a new binding relation with the subject ‘Bill.’ Such interpretation is called sloppy interpretation and taken as evidence for ellipsis. Although Japanese allows a null pronoun to occur in an empty position (Kuroda 1965), it is known that sloppy readings cannot be obtained by a pronoun (see Saito 2007).

AE has been analyzed as involving LF-copy, not PF-deletion, since it was first proposed by Oku (1998). The LF-copy analysis of AE is based on Boškovic and Takahashi’s (1998) idea on Japanese-type scrambling (i.e. long-distance scrambling). They consider theta-roles to be formal features, and argue that theta-features need not to be checked in syntax in Japanese, and thus theta-positions can be empty as long as their features are checked at LF. Theta-features can be checked by a base-generated “scrambled” element at LF (Boškovic and Takahashi 1998) or LF-copy from the antecedent clause as in (2) (Oku 1998).

(2) Antecedent clause: [CP [TP Subj Obj V]]
   a. syntax: [CP [TP Subj ___ V]]
   b. LF: [CP [TP Subj Obj V]] : LF-copy

In short, the LF-copy analysis assumes that a missing argument is not present in overt syntax, and it is copied onto a relevant theta-position at LF from a linguistic context without its phonological feature.
In contrast to the standard analysis, I argue that AE is derived by PF-deletion in this paper. In particular, this paper pursues Fujiwara’s (to appear) proposal for AE, that is, an elided element gets deleted at PF after it has undergone movement to the matrix SpecCP (cf. Zagora 1982; Johnson 2001; Aelbrecht and Harwood 2015). The proposed PF-deletion approach to AE is illustrated in (3), where an object moves to the matrix SpecCP, and gets deleted at PF.

(3) a. syntax: \[CP \text{ Obj} [\text{Subj to} \text{V}] \]  b. PF: \[CP \text{ Obj} [\text{Subj to} \text{V}] \]

Note that this approach also captures the intuition behind Oku’s analysis of AE. Namely, both Oku’s and my approaches suggest the correlation between AE and long-distance scrambling. In fact, the (un)availability of AE depends on the (im)possibility of long-distance scrambling, as shown in (4). \(^1\)

(4) a. \text{Booru-o John-ga } [\text{Mary-ga} \text{ yukkurito t nageta to}] \text{ itta.}  
ball-acc John-nom Mary-nom slowly threw C said.
\text{lit.} \text{‘a ball, John said [that Mary threw t} \text{slowly].} \)  
b. *\text{Yukkurito John-ga } [\text{Mary-ga t booru-o nageta to}] \text{ itta.}  
slowly John-nom Mary-nom ball-acc threw C said.
\text{intended.} \text{‘Slowly, John said [that Mary threw a ball \text{tadv}.].} \)  
(Sugisaki 2000, 387)

The goal of this paper is to provide several arguments that favor the proposed PF-deletion approach in (3) to the LF-copy approach in (2).

2. Extraction out of an ellipsis site

The empirical argument for the LF-copy analysis is originally observed by Shinohara (2006) and developed by Saito (2007) and Sakamoto (2017). Their argument is based on the observation that overt extraction out of an ellipsis site is not possible. First, consider Japanese ECM constructions, where an embedded subject gets accusative, as in (5a). It has been argued that this subject can undergo A-movement out of the embedded CP (Kuno 1976; Hiraïwa 2001; Tanaka 2002). A matrix adverb preceded by the embedded subject confirms that the embedded subject is located in the matrix clause. In this case, the embedded CP cannot be elided (Tanaka 2008). According to Tanaka (2008) and Sakamoto (2017), the ungrammaticality of (5b) can be straightforwardly captured by the LF-copy analysis: the elided CP is not present in overt syntax.

\(^1\) The ungrammaticality of (4b) is not uncontroversial. Saito (1985) reports, with different data, that long-distance scrambling of manner adverbs is possible. On the other hand, Sugisaki (2000), Takita (2011) and Yamashita (2013) judge (4b) to be ungrammatical. I will not discuss the speaker variation here, but what is important is that the adjunct-argument asymmetry in scrambling becomes even stronger when we use interrogative as an embedded clause. In (i), the embedded clause is a \text{wh}-interrogative and scrambling of the adjunct out of it is ungrammatical, as shown in (ia). Note that scrambling of the object is still grammatical, as in (ib).

(i) a. \text{Booru-o John-wa } [\text{dare-ga} \text{ yukkurito t nageta ka}] \text{ itta.}  
ball-acc John-Top who-nom slowly threw Q said
\text{lit.} \text{‘a ball, John said (to us) who threw t} \text{slowly.’}  
b. *\text{Yukkurito, John-wa } [\text{dare-ga t booru-o nageta ka}] \text{ itta.}  
slowly John-Top who-nom ball-acc threw Q said
\text{int.} \text{‘Slowly, John said (to us) who threw a ball t.’}  
I take this contrast as evidence that long-distance scrambling of adjuncts is banned.
so that no elements can be extracted out of it.

   Taro-nom Hanako-acc stupidly genius cop C thought
   ‘Taro stupidly thought that Hanako is a genius.’
   b. *Sachiko-wa Ziro-o orokanimo _______ omotta.
      Sachiko-top Ziro-acc stupidly thought
      ‘Sachiko stupidly thought that Ziro is a genius.’ (Tanaka 2008, 21: slightly modified)

Next, let’s consider (6), where the embedded object is scrambled out of the embedded clause. (6b) shows that the ellipsis of the remnant CP is not possible.

(6) a. Hon-o Taroo-wa [CP Hanako-ga ti kat-ta to] it-ta ga,
    book-acc Taroo-top Hanako-nom buy-past C say-past but
    ‘Taro said that Hanako bought a book, but…’
   b. *Zassi-o Ziro-wa _______ it-ta.
      magazine-acc Ziro-top say-past
      ‘Ziro said that she bought a magazine.’ (Saito 2007, 210)

The representations of the antecedent clause and the ellipsis clause under the LF-copy analysis are given in (7) and (8), respectively. In (7b), the scrambled object undergoes reconstruction at LF (Saito 1989). The LF-representation of the ellipsis clause in (8b) is clearly illegible because it has two instances of the embedded object.

(7) Antecedent clause
   b. LF: [Taro [CP Hanako book bought C] said] (LF reconstruction)

(8) Ellipsis clause
   a. Syntax: magazine, [Ziro _______ said]
   b. LF: magazine, Ziro [CP Hanako book bought C] said (*LF reconstruction)

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Note that even when the extracted object is identical, the sentence is still ungrammatical as shown in (i).

(i) a. Sono-bon-o Taroo-wa [CP Hanako-ga ti kat-ta to] it-ta si,
    this-book-acc Taroo-top Hanako-NOM buy-past C say-past and
    ‘Taro said that Hanako bought this book’
   b. *Sono-bon-o Ziro-o mo _______ it-ta.
      this-book-acc Ziro-also say-past
      ‘Ziro also said that she bought this book.’ (Saito 2007, 210)

The LF-representation of (ib) is illustrated in (ii). In order to explain its ungrammaticality, one has to stipulate that the object copied from the antecedent clause cannot be considered as related (under the copy theory) to the scrambled object in the ellipsis sentence.

(ii) LF: this book, Ziro [CP Hanako this book, bought C] said

Sakamoto (2017) avoids making this stipulation by adopting a regular (i.e., bottom-up) approach to scrambling, which is a departure from Oku’s (1998) original motivation on the LF-copy analysis based on Bošković and Takahashi’s (1998) mechanism on theta-checking in Japanese. Under Sakamoto’s explanation, (ib) is deviant because there is no internal structure to the elided clause in syntax (argument ellipsis being LF-copying) so that no element can be extracted out of it. Although this explains the ungrammaticality of (ib) without the stipulation, the original motivation for LF-copying disappears, which makes the distinction between arguments and adjuncts in argument ellipsis unclear. Thus, I do not discuss Sakamoto’s (2017) version of the LF-copy account here, but the arguments against LF-copy in Sect. 3 would also hold for this version of the LF-copy account.
Although these data can be captured by the LF-copy approach, the proposed PF-deletion approach can also account for them. Under the PF-deletion account, the ungrammaticalities of (5b) and (6b) are attributed to the ungrammaticalities of their movement counterparts in (9), where the embedded CP undergoes movement to the matrix SpecCP (Tanaka 2008).

(9) a. *[\text{CP} t_i \text{ tensai da to} \text{ Sachiko-wa Ziroo-o, orokanimo t}\_\text{CP} \text{ omotta.} \text{(cf. 5b)}] \\
    \text{genius cop C Sachiko-top Ziroo-Acc stupidly thought} \\
    \text{lit. ‘[CP That } t_i \text{ is a genius] Sachiko stupidly thought Ziroo, t}\_\text{CP}.\]

b. *[\text{CP Hanako-ga t_i kat-ta to} \text{ zassi-o Ziroo-wa t}\_\text{CP} \text{ it-ta.} \text{(cf. 6b)}] \\
   \text{Hanako-Nom buy-Past C magazine-Acc Ziroo-Top say-Past} \\
   \text{lit. ‘[CP That Hanako bought } t_i], \text{ a magazine, Ziroo said t}\_\text{CP}.\]

Thus, the impossibility of overt extraction out of an ellipsis site does not conclusively show that AE involves LF-copy.

In fact, Sakamoto (2016a; cf. Tanaka 2008) has reported that overt extraction out of an ellipsis site is indeed possible in certain environment.\footnote{Goto (2011) reports that (6b) becomes grammatical when the extracted object is contrastively focused with a topic marker -wa, as shown in (i).} In Japanese, an adverbial pronoun soo ‘this/so’ optionally appears after a complement clause behaving like an expletive like Hindi yah ‘this’ (Mahajan 1990). In (10a), this element occurs in the ECM construction. Interestingly, as shown in (10b), the embedded CP can get elided when soo appears. As expected under the proposed PF-deletion approach, it can also undergo movement, as in (11).

\begin{itemize}
  \item[(i)] a. \text{Hon-wa Taro-ga [cp Hanako-ga t_i kat-ta to]it-ta ga,} \\
         \text{book-top Taro-nom Hanako-nom buy-past C say-past but} \\
         \text{lit. ‘A book, Taro said that Hanako bought } t_i, \text{ but…’} \text{\footnote{Goto (2011) reports that (6b) becomes grammatical when the extracted object is contrastively focused with a topic marker -wa, as shown in (i).}}

  \item[(ii)] b. \text{Zassi-wa Ziroo-ga \_\_\_ it-ta.} \\
            \text{magazine-acc Ziroo-top say-past} \\
            \text{lit. ‘A magazine, Ziroo said \_\_\_\_\_\_\_\_’ (Goto 2011, 245).} \\

\end{itemize}

Note that the movement counterpart of (ib) is also grammatical, as shown in (ii).

\begin{itemize}
  \item[(i)] a. \text{Hanako-ga t_i kat-ta to} zassi-wa, \text{Ziroo-ga t}\_\text{CP} \text{ it-ta.} \\
         \text{Hanako-Nom buy-past C magazine-top Ziroo-nom say-past} \\
         \text{lit. ‘[that Hanako bought } t_i], \text{ a magazine, Ziroo said t}\_\text{CP}.\]

\end{itemize}

Nevertheless, (Salto 1985) finds that topicalization of a DP argument in a relative clause is slightly more acceptable than its scrambling counterpart, and argues that topicalization of a DP does not involve movement but base-generation. However, to my ears at least, topicalization of an argument out of an adjunct clause sounds worse than its scrambling counterpart, as in (iii).

\begin{itemize}
  \item[(i)] a. \text{Zassi{-wa [wa] o] Mary-ga [cp otoesan-ga t_i ara-\_u toki] sigoto-o tetu-\_u.} \\
         \text{car-top/acc Mary-nom father-nom wash-pres when job-acc help-pres} \\
         \text{lit. ‘Cars, Mary helps his father with his work [when he washes } t_i].’} \\

\end{itemize}

In addition, a resumptive pronoun cannot appear in the thematic position in the overt counterpart of (ib) and (ii).

\begin{itemize}
  \item[(i)] a. \text{*[Zassi{-wa [wa] o] Ziroo-ga [cp Hanako-ga sore-o kat-ta to] it-ta.} \\
         \text{magazine-top/acc Ziroo-nom Hanako-nom it-ace buy-past C say-past} \\
         \text{lit. ‘A magazine, Ziroo said that Hanako bought } t_i, \text{ it-ta.} \text{\footnote{Goto (2011) reports that (6b) becomes grammatical when the extracted object is contrastively focused with a topic marker -wa, as shown in (i).}}}

  \item[(i)] b. \text{*[cp Hanako-ga sore-o kat-ta to] zassi{-wa [wa] o] Ziroo-ga t}\_\text{CP} \text{ it-ta.} \\
         \text{Hanako-nom it-ace buy-past C magazine-top/acc Ziroo-nom say-past} \\
         \text{lit. ‘[that Hanako bought } t_i], \text{ a magazine, Ziroo said t}\_\text{CP}.\]

\end{itemize}

This also suggests that topicalization does not involve base-generation. I leave the issue of whether (ib) actually involves extraction out of an ellipsis site or not for future research.
   Taro-nom Hanako-acc stupidly genius cop C this thought
   ‘Taro stupidly thought that Hanako is a genius.’

b. Sachiko-wa Zirō-ō orokanimo ____ soo omotta.
   Sachiko-top Ziro-acc stupidly this thought
   ‘Sachiko stupidly thought that Ziro is a genius.’ (Sakamoto 2016, 113)

(11) [CP tō tensai da to] Tare-ga Hanako-ō orokanimo t_C soo omotta.
   genius cop C Taro-Nom Hanako-Acc stupidly this thought
   ‘Taro stupidly thought that Hanako is a genius.’

The possibility of overt extraction out of the ellipsis site in (10b) indicates that the elided CP
indeed has internal syntax, which supports the PF-deletion analysis.⁴

3. Empirical arguments for the PF-deletion approach

There are three additional kinds of empirical arguments that favors the PF-deletion analysis to
the LF-copy analysis. The first argument comes from ellipsis of a local anaphor. As shown in
(12), movement changes the binding relation of Japanese local anaphors. In (12a), ‘herself’ is
located in the embedded object position and cannot refer to the matrix subject ‘Mary’, which
shows that ‘herself’ is a local anaphor. However, as can be seen in (12b), when this reflexive
undergoes long-distance scrambling, it can refer to the matrix subject ‘Mary’ (cf. Saito 2003).
This suggests that the binding relation here is established in the intermediate position $\iota$.

(12) a. *Mary-wa [CP John-ga kanojozin-no keiken-o hanasi-tagaranai to]
   Mary-NOM John-NOM herself-GEN experience-ACC tell-want-not C
   omotta.
   thought
   lit. ‘Mary thought that John does not want to tell herself’s experience.’

b. [Kanojozin-nokeiken-o]. Mary-wa [CP tō] [CP John-ga tó hanasi-tagaranai
   to] omotta.
   ‘Herself’s experience, Mary thought that John does not want to tell tō.’

(13) Nancy-mo [CP Bill-wa ____ hanasi-tagara-nai to] omotta.
   Nancy-also Bill-top tell-want-NEG C thought
   lit. ‘Nancy also thought that [Bill does not want to tell ____ ].’ (CR Sloppy)

Taking (12b) as an antecedent, the local reflexive gets deleted in (13). Importantly, (13) is
grammatical and moreover it yields a sloppy reading. This suggests that the elided anaphor in
(13) has moved as in (12b).⁵ In other words, the elided element establishes the binding relation
with the matrix subject ‘Nancy’ in the intermediate position. The derivation of (13) under the
proposed PF-deletion approach is given in (14). The PF-deletion approach is consistent with
the existence of such intermediate positions in a derivation of ellipsis because it assumes that
an elided element undergoes movement, in particular, in syntax.

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⁴ In addition, Sakamoto (2017) shows that covert extraction out of the elided clause with soo in the ECM
constructions is also possible.

⁵ Here, I crucially assume that the reflexive herself does not undergo vehicle change (Fiengo and May 1994) into
a pronoun her in order to derive a sloppy reading (see Fujiwara to appear for the relevant discussion).
(14) a. \( \text{[TP Nancy] [CP [TP Bill herself ...]]} \)
    b. \( \text{[TP Nancy] [CP herself [TP Bill t ...]]} \)
    c. \( \text{[CP herself [TP Nancy] [CP t [TP Bill t ...]]]} \)

In contrast, under the LF-copy approach, it is difficult to capture this binding relation since it assumes that the antecedent is copied onto its theta-position, not an intermediate position.

The second piece of evidence that argument ellipsis involves PF-deletion is that an elided element is interpreted in its case-position. In Japanese, the conjunction -mo-mo ‘and’ is a positive polarity item (PPI), and it must take scope over negation (Goro 2007). (15) illustrates this point with an object and a subject.

    \( \text{John-top cabbage-also radish-also eat-neg-past} \)
    lit. ‘John did not eat the cabbage and the radish.’
    \( (\text{and} > \text{not}) \)
    ‘It is both the cabbage and the radish that John did not eat.’
    *\( (\text{not} > \text{and}) \)
    ‘It is not the case that John ate both the cabbage and the radish.’

    \( \text{John-also Bill-also cabbage-acc eat-neg-past} \)
    lit. ‘[John and Bill] did not eat cabbages.’
    \( (\text{and} > \text{not}) \)
    ‘It is both John and Bill that did not eat the cabbage.’
    *\( (\text{not} > \text{and}) \)
    ‘It is not the case that John ate both the cabbage and the radish.’

It is known that ellipsis cancels polarity sensitivities of the polarity items such as anyone and someone (Sag 1976; Johnson 2001; Merchant 2013). In (16a), the elided NPI anyone is not licensed by negation, and in (17a), the elided PPI someone does not take scope over negation.

(16) a. John-didn’t see anyone, but Mary did [see anyone].
    b. *\( \text{John-didn’t see anyone, but Mary saw anyone.} \)

(17) a. John saw someone, but Mary didn’t [see someone]. \( (\text{not} > \text{some} / *\text{some} > \text{not}) \)
    b. John saw someone, but Mary didn’t see someone. \( *\text{(not} > \text{some} / \text{some} > \text{not}) \)

The polarity sensitivity of -mo-mo also disappears when it is elided (Funakoshi 2013). As in (18b), the elided conjunction can take scope under negation. Crucially, the elided conjunction does not take scope under negation when it is placed in the subject position, as shown in (19).

(18) a. John-wa [kyabetsu-mo daikon-mo] tabe-ta kedo,
    \( \text{John-top cabbage-also radish-also eat-past but} \)
    ‘John ate the cabbage and the radish, but...’
    \( (\text{and} > \text{not}) \)
    ‘\( \text{Bill did not eat } \_\text{.} \)’
    \( (\text{and} > \text{not}) \)
    ‘\( \text{Bill did not eat } \_\text{.} \)
    \( / (\text{not} > \text{and}) \)

b. Bill-wa ______ tabe-anak-atta.
    \( \text{Bill-top eat-neg-past} \)
    lit. ‘\( \text{Bill did not eat } \_\text{.} \)’
    \( / (\text{not} > \text{and}) \)

    \( \text{John-also Bill-also cabbage-acc eat-past} \)
    ‘\( \text{John and Bill ate cabbages} \)’

b. Demo ______ daikon-wa tabe-nak-atta.
    but ______ radish-top eat-neg-past
    \( \text{But } \_\text{ did not eat radishes.} \) (\( \text{and} > \text{not} \)) \( / (\text{not} > \text{and}) \)
This indicates that an elided subject is interpreted not in its theta-position (i.e. SpecvP), but in its case-position (i.e. SpecTP). The PF-deletion account can naturally capture this subject-object asymmetry. The subject undergoes movement to SpecCP through its case-position in syntax and gets deleted at PF (see Chomsky 1995 and Lasnik 1998 for the lack of reconstruction effects under A-movement, which is also assumed here). On the other hand, this is unexpected under the LF-copy analysis, in which an elided element would have to be copied onto its theta-position at LF.\(^6\)

The third piece of evidence that the relevant elements are elided by PF-deletion comes from comparison between Japanese and Korean double accusative constructions. As exemplified in (20), multiple occurrences of accusative particles are not allowed in Japanese (i.e. double-\(\theta\) constraint), where Korean does not have such a constraint (Shibatani 1977).

(20) a. John-wa [kankokugo-no tango]-no/*\(\theta\) anki-\(\theta\) sita. [Japanese]
   John-top Korean-gen word-gen/ace memorization-acc did
   'John did memorization of Korean words.'

   John-top Korean word-ace memorization-acc did-decl
   'John did memorization of Korean words.'

Interestingly, the internal object of the verbal noun cannot be elided in Japanese, while it can in Korean, as in (21). Japanese example in (21a) only means that Sue did not do memorization at all, while the one in Korean (21b) can contain the internal argument in its interpretation.

(21) a. *Demo Sue-wa ___ anki-\(\theta\) si-nak-atta. [antecedent: 20a]
   but Sue-top memory-acc do-neg-past
   int. 'But Sue did not do memorization of Korean words.'

   b. Kulena Sue-nun ___ kick-ul haci anh-ass-ta. [antecedent: 20b]
   But Sue-top memory-acc do neg-past-decl
   int. 'But Sue didn't do memorization Korean words.'

Both of the approaches can capture the possibility of AE in Korean (21b) since the internal argument can undergo long-distance movement, as illustrated in (22).

(22) Hankwuke tane-lul, Bill-un [CP Sue-ka t kick-ul hayssta-ko]
    Korean word-acc Bill-top Sue-nom memorize-acc did-C
    sayngkakhayss-ta. [Korean]
    thought-decl
    lit. 'Korean words, Bill thought [that Sue did memorization of t].'\(^\star\)

The question here is why ellipsis of the internal argument in (21a) is not allowed. Intuitively, the unavailability of AE in (21a) can be attributed to the impossibility of long-distance movement of the genitive-marked argument, as in (23).

(23) *[Kankokugo-no tango]-no Bill-wa[CP Sue-ga t anki-\(\theta\) sita to]
Nevertheless, given that double accusatives are in principle possible as in Korean (20b) and (22), we should also address why the structure used in Korean (21b) cannot be used in Japanese (21a). The PF-deletion approach can attribute the unavailability of the double-accusative structure in (21a) to the double $\alpha$-constraint. Note that if the accusative particle attached to the verbal noun is dropped as in (24), AE of the internal argument becomes possible. This ensures that the unavailability of AE in (21a) is due to the double $\alpha$-constraint at least partially.

In contrast, it is unclear under the LF-copy approach why the internal argument cannot be copied onto the ellipsis site in Japanese but can be in Korean. Note that the only difference between (21a) and (21b) is the case-particle of the antecedents in (20a) and (20b). The antecedent in (21a) has genitive case, whereas the one in (21b) accusative case. Under the assumption of the LF-copy approach that a copied element is an LF object, it is difficult to address the difference in case.

4. Theoretical implications

So far, I have argued that AE involves PF-deletion, not LF-copy. This section discusses why it is so. I first point out two conceptual issues on LF-copy. LF-copy is regarded as Merge of an LF-object (Saito 2007). However, they are crucially different in a way they establish a relation between the original item and its copies. In regular movement, each copy is related through c-command, but the original element (i.e. antecedent) and the elided material are not under the LF-copy analysis. This means that something like coindexiation may then be needed to establish the relation between the antecedent and the copy, but this would violate Inclusiveness Condition (Chomsky 1995).7

Second, LF-copy is counter-cyclic. It is often assumed that an LF-object (i.e. an element transferred to semantics) in the antecedent clause is copied into the LF representation of the ellipsis sentence that is fully constructed, as in (24).

\[
\text{(24) a. Antecedent clause} \\
\text{LF: } \left[\text{TP Subj } v_1 \left[\text{VP Obj } V \right] v_2 \right] T \\
\text{b. Ellipsis clause} \\
\text{Syntax: } \left[\text{TP Subj } v_1 \left[\text{VP } \_ \_ \_ \_ \_ \_ \_ V \right] v_2 \right] T \\
\text{LF: } \left[\text{TP Subj } v_1 \left[\text{VP Obj } V \right] v_2 \right] T \text{ (LF-copy)}
\]

The derivation in (24b) is counter-cyclic because the object position enters into a computational process at LF after the relevant position has already computed in the syntax. One way to avoid this problem would be to assume to copy an LF element (i.e. an element transferred to

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7 See also Nunes (2004) for arguments against Chomsky’s (1995) idea on ellipsis, which is similar to the LF-copy approach in the sense that an elided element and its antecedent are chain-connected.
semantics) in the antecedent clause onto the relevant position in the ellipsis clause in overt syntax (cf. Saito 2007; Sakamoto 2016b), as in (25). In (25b), when the phase \( vP \) is computed, an LF object in the antecedent clause is copied onto the complement of \( V \).

\[
\begin{align*}
\text{(25) a. Antecedent clause} & \quad \text{(25b. Ellipsis clause)} \\
\text{LF: } [TP \text{ Subj } [\_ [VP \text{ Obj } V] \_] T] & \quad \text{Syntax: } [TP \text{ Subj } [\_ [VP \text{ Obj } V] \_]]
\end{align*}
\]

Note, however, that this is similar to PF-deletion in the sense that there is internal syntax to the elided element. Moreover, it is in effect equivalent to the late lexical insertion view of PF-deletion (Aelbrecht 2009), that is, an element affected by ellipsis does not undergo vocabulary insertion. Therefore, LF-copy is conceptually undesirable.

On the other hand, the proposed PF-deletion approach to AE can be naturally captured under the copy theory of movement (Fujiwara to appear; cf. Chomsky 1995; Johnson 2001). Under the copy theory of movement, movement follow from Internal Merge and Deletion of lower copies. I argue that ellipsis is the case where all copies are deleted. Obviously, deletion of all the copies creates a recoverability problem: elided elements must be recoverable. I assume that the highest copy is recoverable only when it occupies the matrix SpecCP, where it can find a linguistic antecedent from discourse.\(^8\) The copy theory of ellipsis is conceptually desirable since we do not need to posit special operations for ellipsis phenomena. In other words, ellipsis is an instance of movement under this approach. This naturally explains why ellipsis applies PF-deletion, not LF-copy: copies undergo ‘deletion’ under the copy theory of movement.

5. Conclusion

This study has investigated argument ellipsis attested in Japanese and Korean focusing on the nature of the ellipsis site. Following Fujiwara (to appear), I have claimed that argument ellipsis involves PF-deletion, which is applied to a moved element in the matrix SpecCP. In this paper, it has been shown that the apparent empirical argument for the LF-copy approach discussed by Saito (2007) and Sakamoto (2017) can also be accounted for under the proposed PF-deletion approach. Moreover, I have provided several pieces of empirical evidence that supports the PF-deletion approach, and pointed out conceptual issues regarding the LF-copy approach. I have suggested that the PF-deletion analysis of argument ellipsis can be naturally accounted for under the copy theory. Under the copy theory, a regular movement deletes lower copies and pronounce the highest copy, whereas all the copies are deleted in ellipsis. This copy theory approach to ellipsis provides a principled account for why the operation used in argument ellipsis is not LF-copy but PF-deletion.

\[^8\] The idea that a null element is identified in the matrix CP is not new; the relation between the highest position in the root clause and the discourse context has also been investigated in other phenomena, especially topic drop in other languages (Tsao 1977; Huang 1984; Haegeman 2000; Rizzi 1995; Cardinaletti 1995; Sigurdsson and Maling 2010; Møresjö 2002; Nygard 2018; Bošković 2011; a.o.). For example, Rizzi (1994) defines this position in terms of the identification requirement of the Empty Category Principle (ECP). According to him, empty categories except pro and PRO must be identified by being chain-connected to an antecedent unless they occupy the specifier of the root clause, where they can be identified from discourse context. In Sigurdsson and Maling’s (2010) term, null elements are licensed by a context-linking element such as topic, logophoric agent/speaker and logophoric patient/hearer, which is placed higher than regular CPs.
Selected references


1. Introduction

This paper examines a previously unobserved type of case connectivity effect in copular constructions, based on Japanese data. *Connectivity effect* is a descriptive term for a phenomenon where “an element is present or interpreted in a way that [it] is normally associated with a certain syntactic configuration seemingly without that configuration obtaining” (Mikkelsen 2011, 14). The term *case connectivity effect* then refers to a phenomenon where some morphological case is available, contrary to how the sentence looks superficially in terms of the satisfaction of the case licensing condition. (1) provides an example of German case connectivity sentences, where XP1 and XP2 indicate the grammatical subject and its predicate, respectively.

(1) [XP1 was Hans ___ essen wollte] war [XP2 einen Apfel]  
     ___ eat wanted was ___ apple

     ‘[XP1 What Hans wanted to eat] was [XP2 an apple].’

(Iatridou and Varlokosta 1998, 6)

In (1), the nominal in XP2 is associated with the gap position in XP1 (i.e., “___”); semantically, the object of *essen ‘eat’* in XP1 is *einen Apfel ‘an apple’* in XP2. Also, the case associated with the nominal in XP2 corresponds to the case that would be assigned to the element in the gap position in XP1. But it is not obvious how to formalize the mechanism of the predicate accusative case assignment. In a standard case theory based on Chomsky’s (1995) Agree relation, which this paper adopts, roughly speaking, a transitive verb assigns accusative case to a nominal. However, *einen Apfel* does not appear in the local domain of *essen*. Note that even if one assumes copula is able to assign accusative case, there remains a question as to how to explain the relation between XP2 and the gap position in XP1.

There are two common approaches to connectivity puzzles. One of them, which I call the *semantic approach*, tries to solve connectivity puzzles by proposing that the supposedly syntactic phenomena in standard theories are indeed governed by semantic rules (e.g., Jacobson 1994; Sharvit 1999; Heller 2005). On the other hand, the other approach, which I call the *ellipsis approach*, tries to solve the puzzles by proposing that the relevant syntactic configuration (e.g., the one for accusative case assignment in (1)) is simply obscured by clausal ellipsis in XP2 (e.g. Ross 1972, den Dikken et al. 2000, Schlenker 2005).

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While some phenomena that are standardly assumed to be syntactic might be easier to explain as a by-product of the semantic composition, the case assignment seems more difficult to do so; it is shown that the attempts of attributing structural case assignment mechanism to the meanings of structural cases have fallen short (e.g., Pesetsky and Torrego 2011; Weir 2014; Baker 2015). Thus, the semantic approach is unlikely to explain the case connectivity sentences. On the other hand, the ellipsis approach can provide a solution. According to the ellipsis approach, XP1 in (1) denotes a question *what did Hans want to eat?* and XP2 is a propositional answer to the question, where some expressions are elided. Given that (1) means *einen Apfel* is the entity Hans wanted to eat, XP2 in (1) is considered to have the structure in (2), where the focused expression (i.e., expression with a new information) bears a focus feature $F$.

$$\text{(2) } \begin{array}{c} \text{Hans} \quad \text{wollte} \quad \text{einen} \quad \text{Apfel} \quad \text{essen} \\ \text{H wanted an} \text{apple to eat} \end{array}$$

It can be assumed that in (2), XP2 is a projection such as FocusP, whose head bears an $[E]$-feature to license ellipsis; that is, the feature instructs the PF component not to overtly realize the materials in the clausal complement of Focus$^E$ except for the F-marked expression (e.g., Weir 2014). But if (2) involves a phonologically null materials, their meaning must be recoverable by the hearer (e.g., Fiengo and Lasnik 1972). So this paper assumes following Weir (2014) that the meaning of an elided clause can be recovered from the meaning of a wh-question which the elided clause answers. Then, the ellipsis in (2) satisfies the recoverability condition because XP1 in (1), which denotes a wh-question, can recover the meaning of XP2.

Given a Hamblin/Kartunen semantics of questions, Dayal’s (1996) answer operator, and the idea that copula equates XP1 and XP2 (e.g., Sharvit 1999), (1) approximately means: *the strongest answer to the question “what did Hans want to eat?” is “Hans wanted to eat an apple”*. Note that in (2) *essen* assigns accusative case to the remnant phrase *einen Apfel*.

While the ellipsis approach can explain the availability of the predicate accusative case in (1), this paper investigates a typologically unobserved type of case connectivity sentences which the ellipsis approach cannot straightforwardly explain, let alone the semantic approach. Those sentences have the general schema in (3).

$$\text{(3) } [X_P1 \quad \text{[XP2 NP-Acc]} \quad \text{Cop}]$$

The case connectivity sentences with the schema in (3) have two unique properties. First, XP1 does not host any overt expression. The lack overt expression in XP1 challenges the ellipsis hypothesis; although clausal ellipsis requires a linguistic antecedent in general (e.g., Hankamer and Sag 1975), connectivity sentences with the schema in (3) do not seem to have a linguistic antecedent for the ellipsis of an accusative case assigner, unlike in (1). Second, the non-linguistic utterance context affects whether the predicate accusative case is available. Contextual variability in case is surprising because case assignment is generally considered to

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2 For the exact ellipsis licensing condition, see p. 322 in Weir 2014.

3 Although this paper discusses only the predicate accusative case, there exist connectivity sentences with a predicate nominative or dative case, and the proposal in this paper can apply to those cases as well.
be a morpho-syntactic phenomenon. In light of the second property, I call connectivity
sentences with the schema in (3) context-dependent case connectivity sentences.

The goal of this paper is twofold. First, the paper proposes a descriptive generalization of
when the predicate accusative case is available (Section 2). Second, I demonstrate that the
ellipsis approach can indeed explain the context-dependent case connectivity effect (Section
3). In so doing, I propose that XP1 in context-dependent case connectivity sentences contains
a covert free variable pronoun *pro* as a linguistic antecedent for the ellipsis in XP2.

2. Context-dependent case connectivity sentences

This section introduces an example of context-dependent case connectivity sentences, and
puts forward a descriptive generalization as to when the predicate accusative case is available.
First, (4) provides an example.

(4) [Context: Ken is the father of Ai, and always cooks lunch for her. It is 6am now. Ai has
just come to kitchen, and Ken says to Ai:]

\[
\text{kyoo-wa \hspace{1cm} [XP1 \hspace{1cm} \_ \hspace{1cm} ] \hspace{1cm} [XP2 \hspace{1cm} onigiri-(6) \hspace{1cm} \_ \hspace{1cm} ] \hspace{1cm} \text{mit-tu}-dayo}
\]

today-Top \hspace{1cm} rice-balls-Acc \hspace{1cm} 3-CL-Cop

"Today is three rice balls."

XP2 in (4) can optionally show accusative case. The availability of the case is not trivial
because superficially identical sentences sometimes cannot show the case, depending on
the context where those sentences happen. For example, sentence (4) with an accusative case
sounds degraded in context (5).

(5) [Context: Ken and Ai have long been examining when different kinds of food they put in
a showcase goes bad. Ken always checks which food and how many of them have gone
bad. It is 10am. Ai has just come to the showcase. Looking at the food, Ken says to Ai:]

The difference in grammaticality between the superficially identical sentences uttered in the
different contexts in (4-5) raise questions such as:

(6) a. What kind of contexts allow the predicate accusative case?
   b. How can the predicate accusative case be licensed?
   c. How do contexts affect the availability of the predicate accusative case?

The rest of this section focuses on question (6a), and Section 3 will address the rest.
As an answer to the question in (6a), this paper submits (7).

7. Distribution of the predicate accusative case

The predicate accusative case in a context-dependent case connectivity sentence is
available only when the context supports accommodation of a question:
   a. which contains an accusative case-marked wh-item, and
   b. which clarifies the meaning of the context-dependent case connectivity sentence.

I call wh-questions satisfying the conditions in (7) \(\text{wh}_{\text{acc}}\)-question.

I demonstrate that whereas the context in (4) accommodates a \(\text{wh}_{\text{acc}}\)-question, the one in
(5) does not, and thus only the context in (4) allows the predicate accusative case. First,
consider a \(\text{wh}_{\text{acc}}\)-question accommodated in (4) below.
The question with an accusative case-marked wh-item in (8) is contextually salient because Ken always cooks lunch for Ai every morning and (4) is uttered in the morning. Also, the question clarifies the meaning of (4); although the meaning of (4) is unclear without any utterance context, the accommodated question clarifies its meaning as (9).

In contrast to (4), it is difficult to envision a what_AG-question in context (5); the most natural wh-question to accommodate in (5) that clarifies its meaning would be (10). But the question does not contain an accusative case-marked wh-item. Thus, (10) is not a what_AG-question.

To sum up, the availability of the predicate accusative case depends on the utterance context, and is governed by the conditions in (7).

3. Ellipsis approach and the case connectivity puzzle

This section demonstrates that the ellipsis approach can answer the questions in (9b-c).

Following the ellipsis approach, I assume that XP2 in context dependent case connectivity sentences is also a full clause obscured by a clausal ellipsis. Then, in (4) (i.e., Japanese counterpart of today is three rice balls), given that three rice balls is interpreted as entities Ken is making, XP2 is assumed to have the structure in (11).

Given (11), the question in (6b) is solved; tukuteiru assigns accusative case to the remnant.

The problem of extending the ellipsis approach to (4) is that clausal ellipsis in (11) does not seem to have a linguistic antecedent, with which the meaning of an elided materials in XP2 is recovered. However, I propose that XP1 in (4) contains a covert free pronoun pro as a linguistic antecedent, as shown in (12).

As for today, the strongest true answer to the question “what is Ken making?” is the proposition “I am making three rice balls”.

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4 The clausal ellipsis in XP2 is obligatory as in other elliptical phenomena such as comparative deletion and fragment answers (e.g., Napoli 1983; Merchant 2004).
kyoo-wa is an aboutness topic; it is "what the sentence is about" (Reinhart 1982). XP1 is a covert free pronoun of type <st> whose interpretation is determined by the contextual variable assignment; in the context in (4), pro in (12) is assumed to bear an index such as I at LF, and the utterance context serves as fixing a partial function which maps the index I into the whAc-question in (8) (i.e., Japanese counterpart of what is Ken making?). Then, adopting the idea that the meaning of an elided clause can be recovered from the meaning of a wh-question it answers (e.g., Weir 2014), I assume that the question-denoting pro can recover the meaning of elided materials in XP2. Note that for the ellipsis licensing, it can be assumed that XP2 is a FocusP, whose head bears an [E]-feature to license the ellipsis.

Given a Hamblin/Karttunen semantics of questions, Dayal’s (1996) answer operator, and the idea that copula equates XP1 and XP2 (e.g., Sharvit 1999), (12) has an approximate meaning as shown in the translation. Note that the implementation of pro, together with the ellipsis approach, provides a solution to the question in (6c); the context supports accommodation of a whAc-question, pro may take that question as its value, and the pro enables the ellipsis in XP2 that involves an accusative case assigner. In this way, assuming the covert structure in XP2 and pro in XP1 has theoretical motivations in it that enables to explain the predicate accusative case assignment and its contextual variability.

The rest of this section provides further supports for the covert structure of XP2 and the presence of pro in XP1 in turn, and demonstrates that the proposed analysis can, as a byproduct, provide a solution to a puzzle about Japanese fragment utterances.

First, the presence of the covert structure in XP2 can be supported by the distribution of postpositional phrases (hence, PP).⁵ The profile of the support is as follows; some PPs in Japanese can co-occur with an NP in XP2 of context-dependent case connectivity sentences. But those PPs adjoin on a clausal spine, and not on an NP. Thus, context-dependent case connectivity sentences with an PP + NP in XP2 suggest that XP2 is underlingly a clause. This section employs the postposition madeni ‘by’ to show this point. Consider first the sentence with madeni in (13).

(13) watashi-wa ([PP 11-zi-madeni]) [[Np kuruma-o 50-dai] tuku-ru]
we-Top 11-o’clock-by car-Acc 50-CL make-NPst
"We will make fifty cars by eleven o’clock."

The sentence in (13) involves an optional PP 11-zi-madeni, and it is parsed as adjoining on [[Np kuruma-o 50-dai] tuku-ru] and not on [Np kuruma-o 50-dai]. The fact that the PP is associated with [[Np kuruma-o 50-dai] tuku-ru] can be supported by (14) as well.

(14) watashi-wa ([PP 11-zi-madeni]) [[Np kuruma-o 50-dai] tuku-ttei-ru]
we-Top 11-o’clock-by car-Acc 50-CL make-Prog-NPst
"We are making fifty cars by eleven o’clock."

The sentence in (14) differs from (13) only in that the verb bears the progressive suffix ttei. Note that this difference makes (14) ungrammatical only when the PP is pronounced.⁷ Hence,

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⁵ Note that pronouns, unlike ellipsis, do not require linguistic antecedents (e.g., Hankamer and Sag 1976).

⁶ This support is based on Hirsch’s (2017) supporting argument for the claim that XP2 in English pseudoelefs is underlingly a clause.

⁷ ttei is ambiguous between progressive and perfective suffixes. When ttei is interpreted as a perfective suffix, the sentence is grammatical with the meaning: I will have made fifty cars by eleven o’clock.
the difference in grammaticality between (13) and (14) suggests that the PP in (13) is associated with \[I_{NP} \text{kuruma-}0 \text{50-dai} \text{tukuru}].

In light of the distribution of the PP 11-zi-madeni, consider next the context-dependent case connectivity sentence in (15), whose XP2 appears to involve the PP and an NP.

\[(15) \text{[Context: Ken is working at a factory which makes several kinds of vehicles. The factory has a meeting every morning, and at the beginning, Ken is supposed to report by what time what needs to be made on that day.]}\]

\[\text{mazu [XP1 pro] [XP2 PP 11-zi-madeni] [NP kuruma-}0 \text{50-dai]}-desu first of all 11-o’clock-by car-Acc 50-CL-Cop}\]

First of all, fifty cars by 11 o’clock.

In (15), the PP cannot be parsed as XP1 as suggested by the fact that it cannot be nominative case-marked (although some PP can be nominative case-marked in Japanese). Nor can it be parsed as adjoining on kuruma-0 50-dai-desu because reasonable meaning cannot be made if we assume that the PP modifies the state of being fifty cars. So the remaining structural possibility is that the PP is located in XP2 with the NP. But as illustrated in (13-14), the PP does not adjoin on an NP but on a clausal spine. Hence, if XP2 does not involve a covert structure, we cannot explain the grammaticality of (15).

On the other hand, the grammaticality of (15) is compatible with the assumption that XP2 in the sentence is underlyingly a clause such as (13); in (13), the PP adjoins on kuruma-0 50-dai tukuru, and XP2 in (15) derives after ellipsis applies to the clause except the F-marked phrases (i.e., the PP and NP in (15)). In this way, the covert clausal structure in XP2 is supported by context-dependent case connectivity sentences whose XP2 involves a PP that adjoins on a clausal spine as well as the availability of the predicate accusative case.

Next, we turn to the supporting arguments for the presence of question-denoting pro in XP1. First, Japanese has a covert free pronoun in general, as shown in (16).

\[(16) \text{[Context: Ken found Ai eating cookie, and Ai says to Ken:]}\]

\[\text{pro kukkii taberu?}\]

\[\text{cookie eat}\]

\[\text{‘Do pro (= you) eat cookies?’}\]

Pro in (16) is a covert free variable pronoun whose value is determined by the contextual variable assignment. The only difference between the pro in (16) and context-dependent case connectivity sentences is whether it denotes an individual or question, and appears in a position for an individual-denoting expression or in a position for a question-denoting expression.

In fact, pro in Japanese can be of question type and have its value determined by a contextually salient wh-question in general. The pro in (17) provides an illustration.\(^8\)

\[\text{8 The context in (17) is designed such that pro does not have a linguistic antecedent; thus, the complement of wakaranai is not an elided phrase although Japanese is proposed to allow argument ellipsis (e.g., Oku 1998).}\]
(17) [Context: Ken told Ryo and Ai that one of their friends is playing a masked wrestler without telling who that is. Today, Ken took them to a wrestling match. Looking at a masked wrestler whose face is mostly hidden, Ryo cannot recognize the wrestler, and turns to Ai. Seeing Ryo’s inquisitive look, Ai says:]

watasî-mo {pro*/kare/*kanozoyo/ kono resuraa-ga dare-da-ka} wakaranaiyo
I also this him/her/it this wrestler-Nom who-Cop-Q don’t recognize ‘I don’t recognize pro/who this wrestler is.’

The complement of wakaranai can be either pro or an overt wh-question, but not kare or kanozoyo, which are overt individual-denoting pronouns that are intended to refer to the wrestler. Note that the overt wh-question is contextually salient. So the value for pro can be assumed to be set as the question who is this wrestler? by the contextual variable assignment.

Given that Japanese has a question-denoting pro in general, it is important to note that the copula in connectivity sentences is a two-place predicate (e.g., Sharvit 1999). In other words, the context-dependent case connectivity sentence as in (12) requires an argument besides XP2. But the argument should not be kyoo-wa, for one thing, the unstressed -wa of kyoo-wa makes the phrase look like an aboutness topic, which uniformly occur in TopP projection (e.g., Miyagawa 2017). For another, the assumption of kyoo-wa being an argument predicts that (12) is a predicational copular sentence at best; the propositional XP2 Ken is making three rice balls describes a property of today in the sense that the event of Ken making three rice balls is one of the events that happens today (e.g., Declerck 1988). But there are two problems with assuming (12) to be predicational sentence: first, the predicted meaning mentioned above seems to differ from the intended meaning of the sentence which is assumed to be the translation in (12). Second, predicational sentences are known not to show connectivity effects cross-linguistically (e.g., Higgins 1979). Thus, kyoo-wa is unlikely to be XP1. Then, since the lack of linguistic antecedent eliminates the possibility of XP1 being an elided phrase, it is reasonable to assume a question-denoting pro in XP1.

Moreover, the question-denoting pro in XP1 can sometimes be overtly realized (18).

(18) [Ken-ga nani-o yuumonsita-ka] zutto kininneiteita-ga, [XP1 sore-ga/pro]
K-Nom what-Acc ordered-Q long was wondering-but it-Nom
[XP2 onigiri-o mitu-da-to] wakatta
rice.ball-Acc 3-CL-Cop-C found.out
‘I’ve long been wondering what Ken ordered, but I found out it was three rice balls.’

In (18), pro in XP1 can be overtly realized as sore-ga ‘it-Nom’, and it can be assumed to takes as its antecedent the wh-question in the first clause (i.e., what Ken ordered). Hence, the example in (18) further supports the presence of a question-denoting pro in XP1.9,10

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9 Schlenker (2003) discusses French reflexive connectivity sentences whose XP1 involves c ‘it’ which takes an overt wh-question as its antecedent.
10 Interestingly, pro in (12) and (17) cannot be realized as sore-ga. At this moment, it is not exactly clear when question-denoting pro can be realized as sore, but one tendency is that the question-denoting pro cannot be substituted by sore when it does not have an overt antecedent.

Also, it should be noted that an overt wh-question cannot appear in XP1 in context-dependent case connectivity sentences. At this moment, it is not clear why, given that XP1 denotes a wh-question. But it is worth mentioning that some overt R-expressions can substitute the pro in XP1; in (15), an NP such as gozen-no haisonbutu ‘morning-Gen delivery’ or CP as in (1) can appear between mazu and 11-ci-makenu.
Next, we turn to an English example which suggest English has a question-denoting it that corresponds to the question-denoting pro in Japanese. Thus, the construction may also support the presence of pro in context-dependent case connectivity sentences. The construction in question is given in (19).

(19) [Context: John and Mary are watching a drama where two police officers are running after a suspect. Running into a dead-end, the suspect turns around, and gets his gun out of his pocket. Then, the episode ended with a sound of gunshot. John and Mary do not know who the suspect shot. But since Mary is a police officer, she is worried if the suspect shot a police officer. Looking at Mary being worried, John says:]

Maybe *(XP1 it was) [XP2 himself/#him] (intended: Maybe the suspect shot himself.)

The example in (19) is a reflexive connectivity sentence; himself does not appear to be bound by its antecedent the suspect, and yet the sentence does not show the effect of violating Principle A of the Binding Theory. Given the availability of himself and unavailability of him, it is assumed that XP2 involves ellipsis of suspect that binding himself/him. Although there seems to be no linguistic antecedent for such an ellipsis, it can be assumed that it in XP1 serves as an antecedent; the value of it is set to be a contextually salient question who did the suspect shoot? and it enables the ellipsis in XP2: the suspect shot [himself/#him]. Notably, this analysis is compatible with the fact that it was is obligatory in (19); since English does not have pro, it (was) is necessary to license the clausal ellipsis.

Finally, this section ends with the following puzzle in (20). The puzzle is difficult to explain without assuming the existence of the proposed pro, but the implementation of the proposed pro and the ellipsis approach provide a solution.

(20) [Context: Ken and Ai’s parents are holding a party and they are looking forward to the things their relatives bring. One of the relatives Ryo has just come with a thing in a plastic bag. Ken nods at it, and Ai raises her eyebrows at Ken. Ken says:]

a. *zyuuu-o
   juice-Acc
   ‘juice.’

b. zyuusu-o
   1-CL
   ‘one bottle of juice.’

In both (20a) and (20b), it is easy to imagine that Ken is intended to mean Ryo brought (one bottle of) juice, and yet only (20b) is grammatical.

It should be noted that expressions as in (i) are proposed to be CPs when they appear in the position of pro in (15) although their sequences of words themselves can be used as NPs in some constructions (e.g., Hiraiz and Ishihara 2012). Although it is not obvious that CP such as gozen-ni hainawata ‘morning-Gen delivery’ or CP as in (i) denote a question as pro does, it is a possibility.

The grammaticality of (19) is based on the interview with five monolingual English speakers, while one of them reported that the sentence does not sound natural whether it was is pronounced or not, four of them agreed with the judgment. It should be noted that the judgment of the sentence showed more individual difference among multilingual speakers, and they tend to dislike the sentence. At this moment it is not clear why.

In (19), if Mary uttered an overt question who did the suspect shoot?, the utterance maybe himself that is said as a response to the question, is grammatical. This is also expected because the overt wh-question can serve as a linguistic antecedent to license the clausal ellipsis: Maybe the suspect shot [himself/#him].
If context-dependent case connectivity sentences involve a question-denoting pro as proposed in this paper, the difference between in grammaticality (20a) and (20b) can be reduced to the fact that whereas (20b) can be parsed as a grammatical context-dependent case connectivity sentence (21b), (20a) cannot (21a).

(21) Underlying structures of (20a-b)

\[
\begin{align*}
\text{a.} & \quad [\text{\textit{pro}}]\ [\text{\textit{zyussu}}-\text{\textit{o}}]-\text{\textit{da}} \\
& \quad \text{juice-Acc-Cop} \\
& \quad \text{\textit{juice}}' \\
\text{b.} & \quad [\text{\textit{pro}}]\ [\text{\textit{zyussu}}-\text{\textit{o}}]\text{-\textit{da}} \\
& \quad \text{juice-Acc-Cop} \\
& \quad \text{\textit{ip-pon}}-\text{\textit{da}} \\
& \quad \text{1-CL-Cop} \\
& \quad \text{\textit{one bottle of juice}}' 
\end{align*}
\]

In Japanese, copula can often drop especially in casual conversations. Thus, it is possible that (20b) involves copula underlingly as in (21b). Then, on the assumption that copula is a two-place predicate, (21b) has an argument in addition to XP2. Since the argument is unlikely to be an elided phrase due to the lack of a linguistic antecedent for such an ellipsis, it is reasonable to assume the argument to be pro. In the context in (20), there is a \textit{wh}-question \textit{what did Ryo bring?}. So it is assumed that pro takes that question as its value, and enables the ellipsis in XP2: \textit{Ryo brought \textit{one bottle of juice}}.'

Unlike in (20b), (20a) cannot be parsed to involve a copula underlingly, as the ungrammaticality of (21a) suggests. Thus, (20a) cannot be parsed to involve pro or any linguistic antecedent for the ellipsis of an accusative case licensor. Hence, (20a) is ungrammatical due to the lack of an accusative case licensor.\(^13\)

To sum up, this section demonstrated that the ellipsis approach can solve the puzzles in context-dependent case connectivity sentences by proposing that XPI in the construction involves a question-denoting pro that mediates between the non-linguistic utterance context and the ellipsis site in XP2.

4. Conclusion

This paper discussed a previously unobserved type of case connectivity sentences, where the availability of the predicate accusative case depends on the non-linguistic utterance context. I first proposed a descriptive generalization as to what type of contexts allow the predicate accusative case. Then I demonstrated how the predicate accusative case is licensed and the utterance context can affect its case licensing. Specifically, I argued that a line of analysis on connectivity effects, which I called the ellipsis approach, can solve the case licensing mechanism and its contextual variability even though it does not appear to at first glance. The key proposal that enables the ellipsis approach to solve the issues was that the case connectivity sentences discussed in this paper involve a covert free pronoun \textit{pro} that mediates between the utterance context and the ellipsis site. Essentially, the implementation of such a pronoun enables ellipsis that does not seem to have a linguistic antecedent in general. Therefore, this paper not only supports the ellipsis approach of connectivity sentences but also yields insights into the study of so-called \textit{anteecedentless ellipsis}.

\(^13\) This analysis on the grammaticality of (20a-b) is compatible with the fact that the utterance \textit{zyussu} (i.e., (20a) without an accusative case) is grammatical; given that the utterance does not involve accusative case, it may not require an accusative case licensor or an elided clausal structure, and the utterance may pragmatically receive its intended meaning such as \textit{Ryo brought juice}.  

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Tense-aspect particles or not: The lesson from the comparison between
tensed and tensed languages

Yuyin He
Harvard University

1. Introduction

Mandarin perfective aspect marker le is related to two phenomena: past relevance and non-culminating interpretation of accomplishments. Past relevance means that predicates in a root clause modified by le denote past interpretations (Smith 1997, Lin 2003, 2006 etc.). In contrast to English perfective (simple past) that entails culmination in general (Smith 1997), some accomplishments with le allow non-culminating readings (Soh & Kuo 2005, Zhang 2018). For example, the English sentence in (1a) is odd to cancel the culmination of letter writing while the Mandarin counterpart in (1b) is natural. Other than Mandarin, generically unrelated languages such as Salish (Bar-el 2005, 2015), Hindi (Singh 1998) and Thai (Koenig & Muansuwan 2000) etc. also show similar phenomenon.

(1) a. # Mrs Ramsey wrote a letter, but she didn’t finish writing it. (Smith 1997: 67-68)
   b. Mali xie-le yi-feng xin, keshi meiyou xie-wan.
      Mary write-PERF one-CL letter but NEG.PERF write-finish
      ‘Mary wrote a letter, but didn’t finish.’

One widespread proposal to account for the past relevance property of le is to suggest that the perfective marker is a tense-aspect particle in Mandarin (Smith 1997, Lin 2006). Namely, the semantics of the perfective aspect contains not only a temporal relation between topic time and eventuality time like canonical grammatical aspect does but also a temporal relation between topic time and evaluation time that is usually denoted by tense in tensed languages. For instance, in the following template of perfective aspect from Lin (2006), on the one hand, ‘t $\subseteq t_{Top}$’ requires the runtime of an event to be included in the topic time, which is the denotation of canonical perfective aspect. On the other hand, ‘$t_{Top} < t_{0}$’ constraints the temporal relation between reference time and evaluation time, which is the denotation of relative past tense in tensed languages.

(2) \[\|\text{PERF}\| = \lambda P: S.T. \lambda t_{Top} \lambda t_{0} \exists t [t \subseteq t_{Top} \land P(t) \land t_{Top} < t_{0}]\] (Lin 2006:6)

In this paper, we question the necessity of building a temporal precedence relation into the semantics of perfective aspect because the lack of present perfective is observed in generically unrelated languages: tenseless languages such as Mandarin and Blackfoot and tensed languages such as English. After demonstrating the compatibility between event culmination reading (a reading that is widely observed for the perfective aspect) and present/past ‘tense’\(^1\), we suggest a unified analysis

\(^1\) We do not commit ourselves to a tensed/tenseless analysis to Mandarin. Thus ‘tense’ throughout this paper refers to present and past interpretations, used in quotation marks. Future is claimed to involve modalities,
following the instantaneous present proposal argued by Bennett & Partee (1978) and Reis Silva & Matthewson (2007). We argue that we do not necessarily treat perfective aspect as tense-aspect particles, the past relevance property in root clauses is nicely born out given the instantaneous present proposal. Moreover, we provide a partial analysis to le to account for the non-culminating interpretations of accomplishments.

The discussion is organized as follows. In Section 2, we explain the guiding framework and methodology of conducting the comparison between English and Mandarin. In Section 3, we present the results of comparison and summarize our discoveries. Section 4 provides a general explanation to the results presented in Section 3 and discusses the implications of the instantaneous present proposal. Section 5 focuses on a partial analysis to le to account for the non-culminating interpretation of accomplishments. Section 6 concludes the paper.

2. The Setup

Before we dive into the data, let’s briefly review the basic temporal pattern of Mandarin root clauses: (i) a root clause requires aspect marking on eventives to denote episodic readings, otherwise the clause with bare eventives can only denote generic interpretations (Klein, Li & Hendriks 2000, Sun 2014). Statives are not marked by aspect markers in general. (ii) Stative and derived statives (bare eventives denoting generic readings or progressive verb phrases denoting episodic readings) allow either past or present interpretations. (iii) Future time reference requires obligatory overt marking. (iv) Eventive sentences marked with perfective aspect markers are obligatorily interpreted with past reference time (Smith 1991, Lin 2006, Sun 2014 a.o.).

In the next section, we investigate the compatibility between event culmination reading and the four Vendler classes of predicates in present and past contexts under the guidance of the neo-Reichenbachian framework. In this framework, the temporal and aspectual reference of clauses can be described in terms of temporal relations between three time intervals: the evaluation time, the topic time (also called “reference time”) and the eventuality time. The evaluation time is the time relative to which a clause is evaluated. For a root clause, usually the utterance time (s*) at which a root clause is uttered is the evaluation time. The topic time (tTop) is the interval that the uttered clause is about. The topic time can be specified by temporal adverbials, when-clauses or be a salient time in the context. Eventuality time of a clause is the time at which the eventuality it describes is temporally located (represented by the temporal trace of the event, t(e)). Klein (1994) suggests that tense constrains the temporal relation between the evaluation time and the topic time of a clause while grammatical aspect constrains the temporal relation between the topic time and the eventuality time of the clause.

For Mandarin sentences that lack tense morphology, we specify the past context by temporal adverbials such as zuotian ‘yesterday’ or yiqian ‘in the past’. Zuotian ‘yesterday’ aims to constrain the past ‘tense’ in an episodic context while yiqian ‘in the past’ constrains the past ‘tense’ in a generic context. The present context is specified by temporal adverbial xianzai ‘now’. The meaning of now can be a relatively long period of time including the utterance time, or a short interval that the utterance time occupies. We adopt the meaning that denotes a relatively long period of time for xianzai in a context aiming at a present generic reading. When we take xianzai ‘now’ to specify

which is different from present ‘tense’ and past ‘tense’, leaving future interpretations for later work.
present episodic readings, we adopt the meaning that denotes a very short interval. Furthermore, we use the ‘telephone context’ that forces an episodic present ‘tense’ interpretation to help detect the temporal effects with different aspect markers in Mandarin, following the methodology of Reis Silva & Matthewson (2007) for Blackfoot (an Algonquian language). In the telephone context illustrated in (3), (3a) with progressive marker zai is natural while (3b) with perfective aspect marker le aiming for a reading that the runtime of the event overlaps with the utterance time is odd. This indicates that perfective aspect with activities like chi-fan ‘eat-rice’ is incompatible with present ‘tense’.

(3) **Context:** Your friend calls you on the phone and asks you to meet with her right now. You respond by saying ‘I can’t meet with you right now because…’

a. wo xianzai zai chi-fan.
   1SG now PROG eat-rice
   ‘I am eating now.’

b. # wo xianzai chi-le fan.
   1SG now eat-PERF rice.
   ‘Lit: I ate now.’

The four categories of aspectual classes proposed by Vendler (1967), namely states, activities, achievements and accomplishments are commonly assumed to be universal (Van Valin 2006, Chelliah & Willem 2011 etc.). But it is difficult to categorize aspectual classes across languages (Bar-el 2015). Providing a detailed picture of Mandarin aspectual classes goes far beyond our current goal. Hence we take the less controversial predicates for comparison. For instance, accomplishments are typically described as dynamic telic events that have a natural endpoint. It is controversial about what counts as accomplishments in Mandarin since some predicates that allow non-culminating interpretations are claimed to be activities (Zhang 2018). We thus choose derived accomplishments that take a quantized object for comparison since they are the least controversial subcategory of accomplishments between the two languages (Zhang 2018). Some examples we used for comparison are presented below in (4). For presentation purpose, we only present one example for each case. The illustrated pattern holds for other predicates in the same category unless otherwise specified.

(4) a. activities: *chouyan* ‘smoke’, *da lanqiu* ‘play basketball’, *youyong* ‘swim’

   b. accomplishments: *du yi-benshu* ‘read a book’, *xie yi-fengxin* ‘write a letter’, *chi yi-ge pingguo* ‘eat an apple’

   c. achievements: *dao* ‘arrive’, *xing* ‘wakeup’, *ying* ‘win’

   d. stage-level statives: *jinzhang* ‘nervous’, *mang* ‘busy’, *lei* ‘tired’

   e. individual-level statives: *gao* ‘tall’, *congming* ‘smart’, *zhidao* ‘know’

3. **The results of comparison**

English does not bear perfective morphology that is distinct from tense morphology. Therefore English perfective aspect is often treated as a functional category that bundles with tense morphology. English present tense on eventives neither denotes an event-in-progress reading\(^2\) nor an event culmination reading. For example, the sentences in (5a-c) fail to denote episodic interpretations. That is, ‘John smokes’ cannot mean ‘John is smoking’ or ‘John finishes smoking right within the utterance

---

\(^2\) French and German present tense can denote an event-in-progress reading.
time’. Sentences with statives in (5d-e) means the state holds at the utterance time and continues. Namely, they describe continuous states rather than a culminating reading, either.

(5) a. * John smokes. (episodic reading) (activity)
b. * John reads a book. (episodic reading) (accomplishment)
c. * John wakes up. (episodic reading) (achievement)
d. John is busy. (stage-level stative)
e. John is tall. (individual-level stative)

As we mentioned in the previous section, Mandarin root clauses with eventives have to be aspectually marked when denoting episodic readings. In the telephone context, the sentences in (6a-c)
with perfective aspect marker *le* indicate that the event has culminated or is partially realized before the utterance time. We cannot obtain a reading that the runtime of the event overlaps with the
utterance time. Rather, it is the result of the culmination or termination of the event instead of the
event itself that is relevant to the conversation. This reading is captured by the present perfect in the
English translations in (6a-c). In other words, *le* on eventives denotes a past reading in which the topic
time precedes the utterance time (Lin 2003, 2006).

(6) a. Xianzai wo chou-le yan.
     now 1SG smoke-PERF tobacco
     ‘I have smoked.’ (activity)
b. Xianzai wo du-le yi-ben shu.
     now 1SG read-PERF one-CL book
     ‘Now I have read a book.’ (accomplishment)
c. Xianzai wo xing-LE.
     now 1SG wake-up-PERF
     ‘Now I have woken up.’ (achievement)
d. Xianzai wo hen mang.
     now 1SG very busy
     ‘Now I am very busy.’ (stage-level stative)

Many statives (adjectives and mental verbs) are compatible with perfective marker *le* to obtain an
inchoative reading, as shown in (7) below. Lin (2006) treats statives with *le* denoting an inchoative
reading to be coerced to achievements. Therefore we only focus on their stative interpretations
without perfective aspect. For the sentence with bare stative *mang* ‘busy’ in (6d), the most natural
interpretation is that the state holds at the utterance time and continues. Individual-level predicates are
argued to be generic in nature (Chierchia 1995), hence is odd in the telephone context which targets at
an episodic reading but is felicitous for a present generic interpretation. Like the sentence with
stage-level predicate in (6d), the generic interpretation of individual-level statives describes
continuous states at the utterance time.

(7) a. Yuehan zhidao le zhe-jian shi.
    John know PERF this-CL matter
    ‘John got to know this matter.’
b. Hua’r hong le.
    flower red PERF
    ‘The flowers became red.’
On the contrary, the predicates under discussion are perfectly fine in the past context denoting a culmination reading in both languages. The two languages differ in their culmination patterns of eventives in perfective aspect, as we suggest in introduction section. English accomplishments in simple past entail culmination in general while Mandarin derived accomplishments marked by le implicate culmination. The results of comparison is summarized Table 1. We thus conclude that both English and Mandarin lack present perfective.

<table>
<thead>
<tr>
<th>English Present</th>
<th>perf: Is ‘event culminated in s*’ possible?</th>
<th>Mandarin Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Mandarin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*</td>
<td>1SG smoke-PERF</td>
</tr>
<tr>
<td></td>
<td>*</td>
<td>1SG read-PERF one-CL book</td>
</tr>
<tr>
<td>John wakes up.</td>
<td>*</td>
<td>Wo xing-le.</td>
</tr>
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<td></td>
<td>*</td>
<td>1SG wake-up-PERF</td>
</tr>
<tr>
<td>John is busy.</td>
<td>*</td>
<td>Wo hen mang.</td>
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<td></td>
<td>*</td>
<td>1SG very busy</td>
</tr>
<tr>
<td>John is tall.</td>
<td>*</td>
<td>Wo hen gao.</td>
</tr>
<tr>
<td></td>
<td>*</td>
<td>1SG very tall</td>
</tr>
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</table>

Table 1: Perfective readings in present and past ‘tense’

Other than English and Mandarin, Blackfoot, a tenseless Algonquian language also shares the same property. Reis Silva & Matthewson (2007) shows that in the phone-call context that forces a present tense interpretation, the Blackfoot sentence with a perfective eventive in (8b) is odd. In the next section, we suggest that the similar patterns among the three languages share the same reason.

(8) **Context:** Your friend calls you on the phone and asks you to meet with her right now.
You respond by saying ‘I can’t meet with you now because…’

a. nit-ik-sttsokini
1SG-INT-hungry
“I am really hungry.”

b. # nit-ii-okstoo-’p-wa om-yi sinaaki-a’tsis
1SG-IC-read-LOC>0-3 that-0 write-tool
“I read that book.”
4. The instantaneous present

We suggest that the instantaneous present approach proposed by Bennett & Partee (1978) for English, adopted by Reis Silva & Matthewson (2007) for Blackfoot can be extended to Mandarin. Bennett & Partee (1978) proposes that English present tense locates the situation at the moment of utterance (\(s^*\)). This is the Utterance Indexicality (Anand & Toosarvandani 2017) property. Perfective aspect requires the runtime of an event to be included within the topic time, as indicated in the following template of perfective aspect in neo-Davidsonian semantics. Therefore, present perfective requires the runtime of eventualities to locate within \(s^*\), illustrated in (9b).

\[
\begin{align*}
\text{(9)} & \quad \text{a. } ||\text{PERF}|| = \lambda P. \langle \nu e. P(e) \land \tau(e) \subseteq t_{\text{top}} \rangle \\
& \quad \text{b. } ||\text{PRES PERF(P)}|| = \exists e \in w [P(e) \land \tau(e) \subseteq s^*]
\end{align*}
\]

However, the runtimes of events are longer than a single moment, so that eventives cannot satisfy ‘\(\tau(e) \subseteq s^*\)’. Specifically, accomplishments and achievements involve a change of state process, which at least take up two moments for the original state and the result state after the change. Hence they are not as instantaneous as \(s^*\) does. Activities are homogeneous down to some minimal extent that is recognizable as the right type of activities. Hence activities are not instantaneous as well. Therefore eventives with perfective aspect in present tense are infelicitous.

Statives are homogeneous. They possess sub-interval property defined in (10) so that the runtime of statives can be a single moment small enough to satisfy the requirement of present perfective. But we usually have a continuous reading of statives in present ‘tense’. We capture this intuition by assuming a maximality constraint as defined in (11). It claims that for any state that the max operator applies to, it returns the state that satisfies the property of eventualities \(P_{\langle \nu t \rangle} \) and bears the longest runtime in a given context. A state generally lasts longer than a single moment, thus the continuous reading is available and preferred when statives are in present tense.

\[
\begin{align*}
\text{(10)} & \quad \text{A predicate } p \text{ of times has the subinterval property iff for all times } t, \text{ for all subintervals } t' \text{ of } t, \text{ the truth of } p(t) \text{ entails the truth of } p(t'). \quad \text{ (Dowty 1979)} \\
\text{(11)} & \quad ||\text{max(P)}||^c = \lambda s. [P(s) \land \forall t. \tau(s) = t \land \forall t' \forall s'[P(s') \land \tau(s') = t' \rightarrow t' \leq t]]
\end{align*}
\]

By assuming the instantaneous present tense, the unavailability of present perfective observed in Blackfoot, English and Mandarin obtain a unified account. The current proposal suggests that to account for the past interpretation property of \(le\) in root clauses, the temporal precedence relation can be removed from the semantics. Namely, the perfective aspect marker is not necessarily treated as tense-aspect particles. We suspect that the two semantic building blocks, past ‘tense’ and perfective aspect, is morphologically realized differently in languages. Namely, the bond between the past ‘tense’ and perfective aspect exists, yet some languages like Blackfoot and Mandarin only morphologically realize the perfective aspect while languages like English morphologically realize the tense. There are also languages like Russian and Hindi in which past tense and perfective aspect are both morphologically overt.

5. Le as a partitive operator

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In this section, we will talk about another phenomenon related to le: non-culminating interpretation of accomplishments\(^3\), repeated below. Many genetically unrelated languages allow non-culminating accomplishments in perfective aspect. The majority of the proposals in the literature to account for the non-culminating accomplishments belong to the camp of partitive theories (Koenig and Muansuwan 2000, Bar-el, Davis and Matthewson 2005, Altshuler 2014, Chen 2017 among others). The basic idea of a partitive approach is that events denoted by non-culminating accomplishments are parts of events from the denotation of culminating ones. For instance, derived accomplishment predicates such as *xie yi-feng xin* ‘write a letter’, the theme does not undergo sufficient changes to count as a complete one. A partitive operator is built into either the grammatical aspect/other morphemes (Bar-el et al 2005, Altshuler 2014 a.o.) or the accomplishment stems (Koenig & Muansuwan 2001). Given the fact that Mandarin non-statives are obligatorily marked by aspect when denoting episodic readings (Sun 2014), there is no direct evidence to confirm the source of non-culmination due to the problem of indirect access (Zucchi 1999). Namely, we only have indirect evidence of how base sentences are interpreted by native speakers, since they do not occur as independent clauses.

(12)  
\(a. \) Mrs Ramsey wrote a letter, but she didn’t finish writing it. (Smith 1997: 67)
\(b. \) Mali xie-le yi-feng xin, keshi meiyou xie-wan.
Mary write-PERF one-CL letter but NEG.PERF write-finish
‘Mary wrote a letter, but didn’t finish.’

In (13), we follow Altshuler’s proposal (2014) and build the partitive operator into the Mandarin perfective aspect marker. The event \(e\) being evaluated in the actual world is a stage of a complete event \(e’\) (\(e \leq_{\text{stage}} e’\)) that satisfy an intensional property of eventualities \(P\) on the continuation branch (Landman 1992) in which the stage continues and culminates.

(13)  
\(a. \) \([|le|= \lambda P_{semb} \lambda t_{\text{Top}} \exists e \in w_0 [\tau(e) \subseteq t_{\text{Top}} \& \exists e’ \exists w::<e’,w> \in \text{CON}(e,w_0)[P(w)(e’)]])\)
\(b. \) \(\text{CON}(e,w_0)\) is the continuation branch of \(e\) in \(w_0\) iff \(\text{CON}(e, w_0)\) is the smallest set of pairs of events and worlds \(<e’,w>\) such that:
\(i.\) the history of \(w\) is the same as the history of \(w_0\) up to and including \(\tau(e)\)
\(ii.\) \(w\) is a reasonable option for \(e\) in \(w_0\)
\(iii.\) \(e\) is a stage of \(e’\) (\(e \leq_{\text{stage}} e’\))

---

\(^3\) In this paper we only focus on derived accomplishments that take a quantized object, which show a subtype of non-culminating readings: the partial success reading. Another type of non-culminating readings is the failed attempt reading (Tatevosov & Ivanov 2009), which is observed for inherent accomplishments that the natural end point is inherently associated with the predicate (such as *kai* ‘open’, *guan* ‘close’), though whether Mandarin has inherent accomplishments is controversial (Zhang 2018). To fully understand the non-culmination phenomenon, we need to explore the following questions: (a) Why some languages do not allow non-culminating readings? (b) Why some languages allow one of the non-culminating readings but not the other? (c) What do the class of predicates that allow non-culminating readings share in common? (d) How do languages that allow non-culminating readings vary in the class of predicates that allow such readings? For a detailed discussion about the subtypes of accomplishments in Mandarin and different culmination patterns from a cross-linguistics perspective, see He (2019, in preparation) for details.
The similarity between the semantics of the perfective aspect and the modal account for English progressive (Dowty 1979, Landman 1992) is obvious. Let’s explain the notion of ‘stage’, ‘continuation branch’ and ‘reasonable option’. To be a stage, a part has to be big enough and share enough with an event so that it is recognized as a less developed version (Landman 1992) or the stage is a complete event itself (Rothstein 2008, Tatevosov & Ivanov 2009, Altshuler 2014). The continuation branch (Landman 1992) of an event e in a world w is constructed according to these instructions. Follow the development of e in w and put every event of which e is a stage in the continuation branch. Take the maximal event of which e is a stage in w and go to the closest world w’ in which this event continues, namely, this event is a stage of a larger event, if there is one. If w’ is not a reasonable option for e in w, then stop; otherwise we follow the development of this event in w’ until we reach the maximal event of which this event is a stage in w’. Again, we go to the closest world in which this event continues, if there is one, until there is a world the event culminates or we reach a world that is not a reasonable option for e in the base world w. To explain what a reasonable option for e in w means, let’s take the following sentence in (14) as an example.

(14) Mary was wiping out the Roman army.

Suppose that Mary, a person of moderate physical capacities, was battling the Roman army. She managed to kill a couple of soldiers before she got killed, but the sentence in (14) is clearly false in our scenario. The reason is that the world in which Mary succeeds in wiping out the Roman army is not a reasonable option of the actual world. To decide whether a world is a reasonable option, we pay attention to what is internal to e in w and determine if there is a reasonable chance that e could continue as far as it does in w’. In the case of (14), what is internal to the event of Mary’s killing a couple of Roman soldiers is Mary’s physical capacities, but we will not reach a world in which Mary succeeds in wiping the Roman army. A continuation branch of e in w₀ is the smallest set of pairs of reasonable worlds of w₀ and continuing events of e in these worlds. The partitive approach in (13) captures the non-culminating reading when the stage e is a proper part of e’ and the culminating reading when the stage equals to e’.

Though le allows a non-culminating reading and a completive reading, the culminating reading seems to be the default reading without extra context. This is due to the aspectual alternatives of le in the Mandarin aspectual system. Altshuler (2014) suggests that English progressive evaluates a proper subpart of the complete event (e’). This proposal can also extend to Mandarin progressive zai, demonstrated below. The semantics in (15) shows that the only difference between progressive and the perfective aspect with a partial operator is that the former requires a proper part of a complete event in the actual world while the latter does not. In other words, if e’ is partially realized, in fact using the perfective marker will mean the same as using the imperfective maker. Since e < e’ entails e ≤ e’ but not the other way around, a sentence with the accomplishment and imperfective aspect marker zai makes a stronger claim than a sentence with the perfective aspect marker does. According to the Maxim of Quantity, if the speaker knows that the event is partially realized, they would use the more restricted imperfective marker zai available in the system rather than using the weaker form with perfective marker. Given that the speaker uses the perfective marker, we infer that it is not true that the event is partially realized but culminated. This explains why without subsequent contexts, we obtain a culminating interpretation with le rather than a non-culminating reading.
(15) \( a. \ |\text{zai}\rangle = \lambda P_{\text{OP}} \forall e \in w_0 [\text{Top}_{\text{OP}} \tau (e) \land \exists e' w _{\langle e', w \rangle} \in \text{CON}(e, w_0)[P(w)(e')]] \)

\( b. \text{CON}(e, w_0) \) is the continuation branch of \( e \) in \( w_0 \) iff \( \text{CON}(e, w_0) \) is the smallest set of pairs of events and worlds \( \langle e', w \rangle \) such that:

(i) the history of \( w \) is the same as the history of \( w_0 \) up to and including \( \tau (e) \)
(ii) \( w \) is a reasonable option for \( e \) in \( w_0 \)
(iii) \( e \) is a stage of \( e' \)
(iv) \( e \) is a proper part of \( e' \) (\( e <_{\text{stage}} e' \))

The proper-part-of relation is not the only difference between progressive and perfective in Mandarin. Altshuler (2014) observes the termination difference between Hindi perfective and Russian imperfective aspect, which both are claimed to be neutral aspect\(^4\). The Hindi perfective sentence in (16b) is odd with the continuation of the event while the Russian imperfective sentence in (16a) is natural with the continuation. The same phenomenon is observed in Mandarin. In the context illustrated in (17), progressive sentence in (17a) is fine while perfective sentence in (17b) is odd. These data indicate that Mandarin perfective aspect entails termination of an event (either the event culminates or the event ceases to develop in the actual world at the topic time of the clause).

(16) \( a. \text{Ja e l ort, I sejcas prodolzaju ego est'}. \)
\( \text{I eat.IPF-PST.1S cake and how continue it eat.INF} \)
\( \text{‘I was eating cake and now I am still eating it.’} \) (Russian)

\( b. \# \text{maayaa-ne biskuT-ko khaa-yaa aur use ab tak khaa rahii hai}. \)
\( \text{Maya-ERG cookie-ACC eat-PFV and it still eat PROG be.PRS} \)
\( \text{Intended: Maya was eating the cookie, and is still eating it.} \) (Hindi)

Altshuler (2014: 759-760)

(17) **Context:** John kept reading a book from the morning till the time when the speaker utters the sentence.

\( a. \text{Yuehan shangwu zai du yi-ben shu, xianzai hai zai du}. \)
\( \text{John morning prog read one-cl book now still PROG read} \)
\( \text{‘John was reading a book in the morning and now he is still reading.’} \)

\( b. \text{Yuehan shangwu du-le yi-ben shu, #meiyou jianduan, xianzai hai zai du}. \)
\( \text{John morning read-PERF one-CL book NEG.PERF  break now still PROG read} \)
\( \text{‘John read a book in the morning, # without a break now he is still reading it.’} \)

6. Conclusions

In this paper, we demonstrate the lack of present perfective in three generically unrelated languages: Blackfoot, English and Mandarin. We argue that an instantaneous present ‘tense’ account unifies the cross-linguistic data, indicating that the past relevance property of perfective aspect does not necessarily require treating the perfective aspect as tense-aspect particles. Moreover, we propose a partial approach to *le* by suggesting that *le* requires a stage of a complete event to terminate in the actual world, yielding the non-culminating interpretation when the stage is a proper part of the

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\(^4\) Neutral aspect refers to a aspectual form on telic verbs that are compatible with both a ‘processual’ (the non-culminating reading) and a ‘complete’ reading (Smith 1997). Perfective aspect in Mandarin, Hindi etc. are examples of neutral aspect.
complete event and culminating event when the stage itself is a complete event.

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1. Introduction

The Left-Node-Raising (LNR) construction has been often regarded as a mirror image of English Right-Node-Raising (RNR) construction (Yatabe 2001). LNR seems to exist in Japanese and Korean (Nakao 2009, 2010; Abe & Nakao 2009; Park & Lee 2009; Chung 2010; Lee 2018; Kim 2019). The following exemplifies English RNR and Japanese/Korean LNR, respectively:

(1) John made, and Mary ate the cake.
    cake-ACC John-NOM make & Mary-NOM ate
     ‘The cake, John made, and Mary ate.’ [Japanese; Nakao 2010: (1a)]
    [Korean; Chung 2010: (2b)]

In English RNR (1), two clauses are coordinated, and the pivot (i.e., a shared argument) the cake can be interpreted as the argument of each verb in conjuncts. Similar to English RNR, in Japanese/Korean LNR (2), two clauses are conjoined, and the pivot (i.e., keeki-o and kheyikhu-lul) in the leftmost position can be interpreted across all the conjuncts.

With regard to the syntax of LNR, at least two analyses have been explored: Scrambling + pro and Across-the-Board (ATB) Scrambling. Korean and Japanese are pro-drop languages, so the so-called LNR construction can be a variant of Null Object Constructions (NOCs). Given this, LNR can be derived by Scrambling + pro. To be specific, it is possible that the pivot is scrambled out of the first conjunct, and the gap in the second conjunct is a phonologically null argument pro (we call it the NOC analysis, hereafter):

(3) cake-ACC John-NOM t₁ make-& Mary-NOM pro₁ ate
    [Nakao 2010: (2)]

According to the ATB Scrambling analysis, on the other hand, the pivot moves to the leftmost position in an ATB way—it moves out of all the conjuncts, which is schematized in (4):

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1. We thank the audiences at GLOW in Asia XII and SICOGG XXI for their valuable comments and feedback. Any remaining misconceptions are ours. This research has been approved by the IRB at Korea University (KUIRB-2018-0038-01).
In the previous studies, however, the NOC analysis of LNR has been discarded (Yatabe 2001; Nakao 2009, 2010; Abe & Nakao 2009; Chung 2010). In particular, Nakao, Abe & Nakao, and Chung point out the Case-matching requirement on the pivot as the evidence against the NOC analysis. They observe that the pivot in LNR must be assigned the same Case from each predicate across all the conjuncts. For example, in (5), the first conjunct predicate *okuri* ‘send’ assigns DAT(ive) Case to its indirect object, and the second conjunct predicate *nagusameta* ‘comforted’ ACC(usative) Case to its direct object. According to them, such Case-mismatches degrade LNR.

(5) Mary-ni John-ga hana-o okuri, Tom-ga nagusameta.

\[
\begin{array}{cccc}
\text{M-DAT} & \text{J-NOM} & \text{flower-ACC} & \text{sent}_{\text{DAT}} \text{T-NOM} \text{comforted}_{\text{ACC}} \\
\end{array}
\]

‘To Mary, John sent a flower, and Tom comforted (her).’

[Japanese; Nakao 2010: (7a)]

Pro in NOCs, on the other hand, need not have the same Case as its antecedent. In (6), for instance, the indirect object in the first sentence Mary-ni ‘to Mary’ is assigned DAT Case, and *pro* in the second sentence ACC Case. These Case-mismatches in NOCs do not lead to degradation.

(6) John-ga Mary-ni hana-o okutta. Tom-wa pro nagusameta.

\[
\begin{array}{cccc}
\text{J-NOM} & \text{M-DAT} & \text{flower-ACC} & \text{sent}_{\text{DAT}} \text{T-TOP} \text{comforted}_{\text{ACC}} \\
\end{array}
\]

‘John gave a flower to Mary. Tom comforted (her).’

[Japanese; Nakao 2010: (8a)]

However, Kim (2019) observes, through an online survey, that Korean LNR may allow Case-mismatches. In (7), the first conjunct predicate *sasst* ‘bought’ assigns DAT Case to its indirect object, and the second conjunct predicate *wilohayssta* ‘comforted’ ACC Case to its direct object. Such Case-mismatches are judged acceptable.

(7) Chelswu-eykey chinkwu-nun swul-ul sasst-ko, pwumonim-un wilohayssta.

\[
\begin{array}{cc}
\text{C-DAT} & \text{friend-TOP} \text{ alcohol-ACC bought}_{\text{DAT}} \text{&} \\
\text{parents-TOP} & \text{comforted}_{\text{ACC}} \\
\end{array}
\]

‘For Chelswu, a friend bought a drink, and parents comforted (him).’

In short, regarding the Case-(mis)matches of LNR, especially in Korean, there exist conflicting observations. If the LNR construction is a type of NOCs, Case-mismatches of the pivot will not lead to degradation; otherwise, they will lead to ill-formedness. Given this, the Case-(mis)matching property of Korean LNR and NOCs have a good reason to be examined via experimental methodologies. In this regard, this paper conducted two acceptability judgment experiments. This paper is organized as follows: in section 2, the detail of experiments, including results, will be introduced. Section 3 discusses the results of experiments. Section 4 draws a conclusion.

2. Experiments

The two possible analyses of LNR—the NOC analysis and the ATB Scrambling analysis—make different predictions. The NOC analysis predicts that Case-mismatches of the pivot in LNR will not lead to deviance. The ATB Scrambling analysis predicts that Case-mismatches will lead to deviance.
Given the NOC analysis, in which Scrambling of the pivot only occur in the first conjunct, it is predicted that Case-mismatches of Korean LNR are influenced by conjunct locus where the pivot is Case-marked. More precisely, the sentence will be more acceptable when the pivot is Case-marked by the first conjunct predicate. Taking difference between inherent Case (IC) and structural Case (SC) into account, it can also be predicted that Case types of the pivot affect acceptability. In particular, the IC-assigned pivot—the DAT-marked pivot—will be more acceptable than the SC-assigned pivot—the ACC-assigned pivot. In addition, we predict that LNR constructions and NOCs will show the same pattern in both conjunct locus and Case types, which suggests that the two constructions are quite similar.

To test these predictions, we conducted two acceptability judgment experiments on LNR constructions and NOCs. We formulated a $2 \times 2$ factorial design to investigate the effect of each factor. The first factor with 2 levels was conjunct LOCUS where the pivot is Case-marked: 1ST (conjunct) and 2ND (conjunct). The second factor with 2 levels was CASE types of the pivot: DAT(-marked pivot) and ACC(-marked pivot). Thus, there were 4 conditions for each experiment. 12 sets of target stimuli were created for 4 conditions. 48 target items were divided into 4 lists using the Latin Square design along with fillers. 76 filler items were added to each list: 12 good fillers, 12 mid fillers, 12 bad fillers, and 40 unrelated fillers. As a result, each participant rated 88 experimental stimuli. The order of the experimental items was fully randomized for each participant.

For each experiment, there were 40 respondents after outliers were excluded. They were recruited from Korea University, and they all were native speakers of Korean, aged from 18 to 30 ($\text{MEAN} = 22.7$, $\text{SD} = 2.9$). The toolkit used in the lab experiments was a web-based experiment platform IBEX. Participants were asked to rate the acceptability of each sentence on a 1-to-7 scale (from 1 ‘completely unacceptable’ to 7 ‘perfectly acceptable’). Each experiment started with 6 practice items to familiarize participants with experimental tasks. After the practice, participants rated the acceptability of the main experimental items presented one by one on the screen in a random order. All the logs were automatically stored in the IBEX server.

### 2.1 Experiment 1

Experiment 1 examined whether Korean LNR may allow Case-mismatched pivots in terms of LOCUS and CASE. The following shows the sample stimuli:

(a) **Condition (a) [1ST | DAT]**

<table>
<thead>
<tr>
<th>Yenghuy-eykey</th>
<th>oppa-ka</th>
<th>kkochtapal-ul</th>
<th>cwu-ko,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y - DAT</td>
<td>brother-NOM</td>
<td>bouquet-ACC</td>
<td>give- &amp;</td>
</tr>
<tr>
<td>emma-ka</td>
<td>ttattushakey</td>
<td>macihayssta.</td>
<td></td>
</tr>
<tr>
<td>mom-NOM</td>
<td>warmly</td>
<td>welcomed</td>
<td></td>
</tr>
</tbody>
</table>

‘To YenghuyDAT, her brother gave a bouquet, and her mom welcomed (her) warmly.’

(b) **Condition (b) [2ND | DAT]**

<table>
<thead>
<tr>
<th>Yenghuy-eykey</th>
<th>emma-ka</th>
<th>ttattushakey</th>
<th>maciha-ko,</th>
</tr>
</thead>
<tbody>
<tr>
<td>oppa-ka</td>
<td>kkochtapal-ul</td>
<td>cwessta.</td>
<td></td>
</tr>
</tbody>
</table>

---

2 To identify outliers, we used gold-standard questions. In our experiments, good fillers and bad fillers, acceptability of which had been tested through a series of experiments, served as the gold-standard questions. We calculated how far from the known judgments each participant’s judgments are. We removed the data of any participants whose judgments are more than 2 standard deviations away from the known judgments. Consequently, we excluded 2 outliers from the results of each experiment.
To Yenghuy\textsubscript{DAT}, her mom welcomed warmly, and her brother gave a bouquet (to her).

\textbf{c. Condition (c) [1ST | ACC]}

Yenghuy-lul \textsubscript{ACC} emma-\textsubscript{NOM} ttattushakey \textsubscript{ACC} maciha-\textsubscript{ko},
Y-\textsubscript{ACC} mom-\textsubscript{NOM} warmly welcome-&
oppa-\textsubscript{NOM} kkochtapal-ul \textsubscript{ACC} cwessta.
brother-\textsubscript{NOM} bouquet-\textsubscript{ACC} gave

\textquote{Yenghuy\textsubscript{ACC}, her mom welcomed warmly, and her brother gave (her) a bouquet.}

\textbf{d. Condition (d) [2ND | ACC]}

Yenghuy-lul oppa-\textsubscript{ka} kkochtapal-ul cwu-\textsubscript{ko},
emma-\textsubscript{ka} ttattushakey macihayssta.

\textquote{Yenghuy\textsubscript{ACC}, her brother gave a bouquet, and her mom welcomed (her) warmly.}

Before statistical analyses, the raw judgment ratings were transformed to z-scores, which convert discrete variables into continuous variables and may neutralize potential scale bias. Figure 1 shows Mean z-score acceptability ratings and standard errors (SEs) in Experiment 1. For statistical analyses, we used the lmerTest package in R (Kuznetsova et al. 2017; R Core Team 2017). Linear Mixed-Effects Regression (LMER) models revealed that there were main effects of LOCUS ($p < .001$) and CASE ($p < .01$), but there was no significant interaction ($p = .667$) between the two.

The result of Experiment 1 confirmed our hypotheses. As expected, the 1ST conjunct Case-licensing was more acceptable than the 2ND conjunct Case-licensing. This suggests that Case-mismatches of the pivot are allowed when the pivot is Case-marked by the 1ST conjunct predicate. In addition, the DAT-marked pivot was more acceptable than the ACC-marked pivot. This indicates that there may be difference between DAT Case-licensing and ACC Case-licensing.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{Means and SEs in Experiment 1}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2.png}
\caption{Means and SEs in Experiment 2}
\end{figure}

\subsection*{2.2 Experiment 2}

Experiment 2 examined whether Korean NOCs show the same acceptability pattern concerning LOCUS and CASE as Korean LNR constructions when there are Case-mismatches of the pivot. Target items were exactly the same as those of Experiment 1 except that the pivot remains in-situ, as follows:

\textbf{(9) a. Condition (a) [1ST | DAT]}

Oppa-\textsubscript{ka} Yenghuy-eykey kkochtapal-ul cwu-\textsubscript{ko},
brother-\textsubscript{NOM} Y-\textsubscript{DAT} bouquet-\textsubscript{ACC} give-&
Figure 2 shows Mean z-score acceptability ratings and SEs in Experiment 2. LMER models indicated that there was a main effect of LOCUS ($p < .001$) but no main effect of CASE ($p = .44$). However, planned pairwise comparisons showed that the 2ND conjunct groups (i.e., (9b), and (9d)) differed significantly in CASE ($p < .05$) although the 1ST conjunct groups (i.e. (9a), and (9c)) were not ($p = .419$). There was no significant interaction ($p = .667$) between LOCUS and CASE.

Overall, the result of Experiment 2 confirmed our hypotheses. As in Experiment 1, the 1ST conjunct Case-licensing was more acceptable than the 2ND conjunct Case-licensing. This points out that Case-mismatches of the pivot are allowed when the pivot is Case-marked by the 1ST conjunct predicate. The DAT-marked pivot generally showed higher acceptability than the ACC-marked pivot. This suggests that there is difference between DAT Case-licensing and ACC Case-licensing. However, (9a) and (9c), unlike (8a) and (8c), did not show significant difference. More precisely, the ratings of Condition (a) and (c) were not statistically different without Scrambling. This will be explored in section 3.2.

2.3 Discussion

The results of both experiments showed that the 1ST conjunct Case-licensing was more acceptable than the 2ND conjunct Case-licensing. This indicates that both LNR and NOCs may permit Case-mismatches of the pivot when it is Case-marked by the 1ST conjunct predicate. The results also showed that the DAT-marked pivot is generally more acceptable than the ACC-marked pivot. This still indicates that the culprit of acceptability difference can be difference between DAT Case and ACC Case. However, the ratings of DAT-marked vs. ACC-marked pivots in NOCs, unlike their LNR counterpart, are not significantly different when they are Case-marked in the 1ST conjunct.

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3 An abstract reviewer has inquired how we can explain the relatively low acceptability of target items in LNR. We suggest that it can be ascribed to the effect of the Case hierarchy on sentence processing. According to Kim et al. (2009), the Case hierarchical order of [Nom(inative) > NonNom] may be easier to process than the non-hierarchical order of [NonNom > Nom]. In LNR, the acceptability is relatively low since a NonNom NP precedes a Nom NP.
3. General Discussion

3.1 Conjunct Locus

The results of two experiments indicated that LNR and NOCs showed the same pattern with respect to Case-matching properties. Both of them seem to approve of Case-mismatches of the pivot when the pivot is Case-marked by the 1st conjunct predicate. This indicates that LNR may be a variant of NOCs. This conclusion challenges Nakao’s (2009, 2010) and Chung’s (2010) analyses of LNR. Both of them argued that LNR cannot be a type of NOCs based on their observation that while Case-mismatches are allowable in NOCs, the pivot in LNR should have identical Case across all the conjuncts.\(^4\)\(^5\) They proposed symmetric approaches to LNR: ATB Scrambling analysis and Multiple Dominance analysis, respectively, which are schematized as follows:

\[\text{(10) Nakao’s ATB Scrambling analysis}\]

\[\text{cake-ACC John-NOM tACC makeACC-\& Mary-NOM tACC ateACC}\]

\[\text{[Nakao 2010: (5)]}\]

\[\text{(11) Chung’s Multiple Dominance analysis}\]

\[\text{cake-ACC [TP1 John-NOM \ldots makeACC] tACC & [TP2 Mary-NOM \ldots ateACC]}\]

\[\text{[Based on Chung 2010: (4)]}\]

According to the ATB Scrambling analysis, the pivot is scrambled to the leftmost position in an ATB way.\(^6\) Given Multiple Dominance, the pivot is multi-dominated by predicates in all the conjuncts and moves to the left edge. These symmetric analyses cannot account for Case-mismatches.

The experiment results make us argue that LNR is a variant of NOCs. Following Moon (1989, 1998),\(^7\) if the morphological forms of wh-pivots are identical, Case-mismatches seems to be permitted, as in (ii), however. See Franks (2003, 2005) for more discussion.

\[\text{(i)}\]

\[\text{a. Co Jan lubi t i Maria uwielbia t?} \]

\[\text{whatACC Jan likeACC and Maria adoreACC}\]

\[\text{‘What does Jan like and Maria adore?’}\]

\[\text{b. *Co Jan lubi t i Maria nienawidzi t?} \]

\[\text{whatACC Jan likeACC and Maria hatesGEN}\]

\[\text{‘What does Jan like and Maria hate?’}\]

\[\text{[Citko 2003: (8)]}\]

\[\text{(ii) Kogo Janek lubi t a Jerzy nienawidzi t?} \]

\[\text{whoACC/GEN John likeACC and George hatesGEN}\]

\[\text{‘Who does John like and George hate?’}\]

\[\text{[Dyła 1984: (2)]}\]

\(^4\) Nakao (2009, 2010) argues that LNR can be a variant of NOCs when the second conjunct of LNR has an island. See Nakao (2009, 2010) for more details.

\(^5\) In addition to Case-(mis)matches, sloppy reading of honorific expressions, distributive scoping, and interrogative complements are discussed as different properties of LNR and NOCs (Nakao 2009, 2010; cf. Abe & Nakao 2009; Chung 2010). See Nakao (2009, 2010) for more details.

\(^6\) ATB-movement of wh-phrases shows (morphological) Case-matching properties (Dyła 1984; Franks 1993, 1995; Citko 2003, 2005). The sentence (ia) is grammatical when both predicates assign the same Case to their wh-argument while the sentence (ib) is not when each predicate assigns different Case.
In our proposal, Scrambling occurs only in the 1ST conjunct, and the gap in the 2ND conjunct is pro. Given the proposal, the pivot is Case-assigned by the first conjunct predicate. Thus, it can explain why the 1ST conjunct Case-licensing is more acceptable than the 2ND conjunct Case-licensing.

3.2 Case Types

The results showed that the DAT-marked pivot is generally more acceptable than the ACC-marked pivot. This may be due to the difference between IC and SC. In Generative tradition, it has been argued that IC and SC differ in their behavior and licensing condition (Chomsky 1981, 1986). In particular, according to Chomsky (1986), IC assigners must assign θ-role as well as Case to Case-assignees. To link Case theory and θ-theory, the Visibility Condition is thus proposed (Chomsky 1986: 94); for an element to receive θ-role, it should be Case-marked when it comes to inherent Case. This may explain why the DAT-marked pivot is more acceptable than the ACC-marked pivot, adopting Bošković’s (2008) Inverse Inherent Case Filter:

(13) The Inverse Inherent Case Filter (Bošković 2008: fn. 8): An inherent Case-assigning verb must assign its Case [to an argument].

Given the Inverse Inherent Case Filter, an IC-assigning predicate, unlike a SC-assigning predicate, must assign its Case in order to discharge its θ-role. In this light, see the following schemas of (8) and (9):

(14) a. \[\text{NP}_{\text{DAT}} \text{ give}_\text{IC} \]
    \[\text{pro} \text{ welcomed}_\text{SC} \]
    \[+C, +\theta \]
    \[-C, -\theta \]

b. \[\text{NP}_{\text{DAT}} \text{ welcome}_\text{SC} \]
    \[\text{pro} \text{ gave}_\text{IC} \]
    \[+C, +\theta \]
    \[-C, -\theta \]

c. \[\text{NP}_{\text{ACC}} \text{ welcome}_\text{SC} \]
    \[\text{pro} \text{ gave}_\text{IC} \]
    \[+C, +\theta \]
    \[-C, -\theta \]

d. \[\text{NP}_{\text{ACC}} \text{ give}_\text{IC} \]
    \[\text{pro} \text{ welcomed}_\text{SC} \]
    \[-C, -\theta \]
    \[+C, +\theta \]

In (14), pro as an empty category is not subject to the Case Filter (Chomsky 1981), but it needs to be θ-marked as an argument.

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7 Moon (1989, 1991, 2010), Ahn & Cho (2011, 2012), and Park (2014) have argued that a phonologically unrealized argument in Korean, Japanese, and Chinese is identified as pro. The properties of pro which they argue are different. Moon (2010) argues that the property of pro is determined by the property of its antecedent. If the antecedent is a referring pronoun, it is characterized as referential; if the antecedent has quantificational property, it is a bound pro. According to Ahn & Cho (2012), pro behaves like the indefinite pronouns in English when it has sloppy interpretations. Park (2014) argues that the property of pro is determined by the semantics of a verb. Pro can be defined as either [+anaphoric] or [+pronominal]. See Huang (1984, 1991), Takahashi (2008), and Abe (2009) for different approaches to null arguments in Korean, Japanese, and Chinese.
In general, the acceptability of (14a) was higher than that of (14c). The 1ST conjunct verb (i.e. *give* and *welcome*) in (14a) and (14c) successfully discharge their Case and θ-role to the pivot. According to the Visibility Condition, *pro* in (14c) violates the θ-criterion since the IC-assigner cannot discharge its θ-role without Case-assignment. Because *pro* is Caseless, the verb cannot check off its Case against it. Thus, the IC-assigner gave in the 2ND conjunct cannot discharge its Case, violating the Inverse Inherent Case Filter. However, *pro* in (14a) satisfies the θ-criterion. Given Chomsky’s (1986) Case system, SC is not associated with θ-role assignment; thus, the SC-assigner welcomed in the 2ND conjunct can discharge its θ-role although it does not discharge its Case. To be brief, *pro* in (14a) receives a θ-role, but *pro* in (14c) does not. In this way, the difference between (14a) and (14c) can be explained.

Turning now to (14b) and (14d), note that their acceptability was significantly lower than those of (14a) and (14c) because the 1ST conjunct Case-licensing requirement is not satisfied. Concerning the 1ST conjunct of (14b) and (14d), the Case-assigners do not successfully discharge their Case; the morphological Case of the pivots differs from the Case of the verbs, violating the Case Filter. Then, why is (14d) significantly worse than (14b)? In (14b), the SC-assigner in the 1ST conjunct can discharge its θ-role even if it does not check off its Case. Consequently, the pivot can be θ-marked, conforming with the θ-criterion. In (14d), on the other hand, the IC-assigner in the 1ST conjunct cannot discharge its θ-role because it fails to Case-mark its argument. This leads to the violation of both the θ-criterion and the Inverse Inherent Case Filter. All in all, the Visibility Condition and the Inverse Inherent Case Filter can account for the different acceptability of DAT-marked pivots and ACC-marked pivots.

We still need to explain why there is a significant difference between Condition (a) and (c) in LNR constructions but not in NOCs. Specifically, the acceptability of the ACC-marked pivot was far lower than that of the DAT-marked pivot when the pivot is scrambled. We speculate that this difference is attributed to the processing nature of Scrambling. It has been reported that the canonical word order is easier to process than the non-canonical word order (Rösler et al 1998; Schlesewsky et al. 2003; Bornkessel et al. 2005; Kim et al. 2009). This might explain the relatively lower acceptability of the scrambled pivot in LNR. Regarding the question of why Scrambling of ACC-marked pivots is far less acceptable than that of DAT-marked pivots, we might resort to the processing effect of the thematic hierarchy (Agent > Experiencer > Goal/Source/Location > Theme) or the processing effect of the Case hierarchy (NOM > ACC > DAT) (Bornkessel et al. 2005; Kim et al. 2009; Grimshaw 1990 for the thematic hierarchy; Vogel 2001 for Case hierarchy). To explicate this more clearly, further research is in order.

4. Conclusion

The Scrambling + *pro* approach to LNR has not been explored as an analysis of Korean/Japanese LNR. This was because Case-mismatches of a pivot, the shared argument, were reported to be deviant. However, Kim’s (2019) online survey showed that in certain environments, Case-mismatches of the pivot in Korean LNR do not lead to any degradation. We conducted experiments to collect native speakers’ intuition on whether Korean LNR allows Case-mismatches of the pivot and whether Korean LNR and Korean NOCs show the same acceptability pattern with respect to Case-mismatches. The present study has its own significance by providing the empirical data through the formal experimental method.

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8 According to Schlesewsky et al. (2003), the increased processing load of the scrambled argument is a reflection of a local syntactic violation rather than that of an increased working-memory load.
The results of experiment revealed that Case-mismatches of LNR and NOCs are permitted when the pivot is Case-assigned by the first conjunct predicate. This observation may confirm that LNR is a variant of NOCs because the previous symmetric analyses, ATB Scrambling and Multiple Dominance, cannot explain Case-mismatching properties of the pivot. We proposed that NOCs contain pro (cf. Moon 1989, 1991, 2010; Ahn & Cho 2011, 2012; Park 2014). We further proposed that LNR is a variant of NOCs; in other words, the pivot in LNR is fronted out of the first conjunct, and the gap in the second conjunct is pro.

The results showed that the dative-marked pivot generally was more acceptable than the accusative-marked pivot. This indicates that there are differences between inherent Case and structural Case, as argued in Chomsky (1981, 1986). The difference can be explicable through the Visibility Condition (Chomsky 1986) and the Inverse Inherent Case Filter (Bošković 2008).

References


1 Introduction

Colloquial Singaporean English (henceforth Singlish) is a contact language spoken in Singapore. Due to Singapore’s history both as a major regional trading hub, as well as a one-time British crown colony, the linguistic ecosystem of Singapore was, and indeed, continues to be exceedingly diverse, with influence from a wide variety of different languages from distinct language families having had a discernible impact in the development of Singlish.

While the primary lexifier of Singlish is the superstrate, English, lexical items have been adopted from the various substrate languages over the years, with key contributors including Hokkien, Cantonese, Mandarin, and Malay, amongst others. Consequently, a characteristic of Singlish which sets it apart from more standard Engishes is its rich inventory of discourse particles.

In this paper, I will focus on a particular discourse particle drawn from Malay, namely sekali\(^1\), and attempt to sketch a uniform formal semantics account of said particle.

Historically, the lexical item sekali was decomposable into se ‘one’ and kali ‘time’ in Malay, though this decompositionality was not imported into Singlish. Chen (2010) notes that sekali in Singlish has two distinct uses, with the more prevalent sense often approximated as being equivalent to the standard English hypothetical ‘what if’, as in (1).

\begin{enumerate}
\item A: Why don’t you buy a lottery ticket? Sekali you win the top prize.
\item ‘What if you win the top prize?’
\end{enumerate}

The second sense of sekali appears to mark counter-expectational developments, as demonstrated in (2).

\begin{enumerate}
\item They were saying that the new boss is very short. Sekali he walk/walked/#walks in he is taller than all of them.
\item ‘They were saying that the new boss is very short. When he walked in he was taller than all of them.’ (Chen 2010: 47)
\end{enumerate}

Chen further reports that this secondary use of sekali appears to be restricted to older Singaporeans and is next to non-existent amongst younger Singaporeans, hypothesising that the lexical item has undergone semantic change over time such that the first sense has become the dominant one in Singlish today. I set aside what the semantics of this sekali might be, instead restricting my analysis to the more contemporarily prominent ‘what if’-like use.

I begin with a comparison of sekali to what if, as well as the German discourse particle doch, and ultimately argue that Chen’s (2010) characterisation of sekali as expressing unexpectedness and plausibility is essentially correct, and propose a semantic formalisation for sekali which accounts for its distribution.

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\(^1\)Often rendered ‘scarly’ in written Singlish especially by Chinese-speaking Singaporeans.
2 Properties of Sekali

Chen (2010) characterises the function of sekali as expressing unexpectedness so long as the unexpected event is plausible given the speech context, noting that the sekali-constructions in (3) and (4) are acceptable only when the respective propositions within the scope of sekali are considered unexpected by the interlocutors.

(3) A: John secretly took some money from his dad’s wallet last night.
   B: Sekali his dad finds out when he checks later.
   $\approx$ ‘What if his dad finds out when he checks later?’ (Chen 2010: 19)

(4) A: Mary sang very well at the concert today.
   B: Sekali she has been doing this since she was ten.
   $\approx$ ‘What if she’s been doing this since she was ten?’ (Chen 2010: 20)

However, this appears to be too weak, as it fails to account for contrasts in examples such as (5).

(5) Context: A is rolling a six-sided die; only if A rolls a one does A receive a penalty; only if A rolls a six does A receive a prize.
   B: Sekali you roll a one/#two/six. $\approx$ ‘What if you roll a one/#two/six?’

In the context of a (fair) dice roll, all outcomes are equally likely. According to the characterisation provided by Chen, sekali would be predicted to be unfelicitous with any individual outcome of the dice roll, given that each of the six possible outcomes are equally (un)expected whilst also being completely plausible. Yet, (5) demonstrates that sekali is licensed in conjunction with ‘one’ and ‘six’, but not ‘two’. What sets these constructions apart appears to be the consequentiality of the outcome as determined by the context - any attempt at a formal treatment of the semantics of sekali must therefore reflect this sensitivity to consequentiality.

Chen further claims that sekali “requires the time of evaluation to be after the point of the utterance” (p. 26), thereby precluding the possibility of having the sekali-marked proposition be in the past tense, observing the following contrast between (6) and (7).

(6) A: John didn’t buy any insurance when he went for holiday.
   B: Wah, sekali something happen to him when he’s there.
   $\approx$ ‘Oh, what if something happens to him while he’s there?’ (Chen 2010: 25)

(7) A: John didn’t buy any insurance when he went for holiday.
   B: *Wah, sekali something happen to him when he was there.
   $\approx$ ‘What if he fell down and had to go to the hospital?’ (Chen 2010: 27a)

Given that (6) and (7) are a minimal pair, differing only in that (7) has an overtly-marked past tense proposition within the scope of sekali, Chen asserts that sekali requires that the associated proposition be non-past.

However, this is not an accurate generalisation, as past tense can be licensed within the scope of sekali in certain contexts, as demonstrated by the felicity of (8).

(8) Context: John is late for an appointment with A and B.
   A: Where is John?
   B: Sekali he fell down and had to go to the hospital.
   $\approx$ ‘What if he fell down and had to go to the hospital?’
The contrast between (6) and (7) cannot be attributed to the presence/absence of past tense within the scope of *sekali* then, *pace* Chen (2010). It is therefore evident that Chen’s (2010) generalisation that *sekali* expresses unexpectedness and plausibility requires further refinement to adequately address these empirical issues.

2.1 What if *sekali* is ‘what if’?

As noted previously, an oft-given translation for *sekali* constructions into standard English involves the use of hypothetical ‘what if’, and indeed, in each of the examples thus far, the approximate translations have utilised ‘what if’.

Rawlins (2010, 2016, 2017) establishes four distinct functions of the English ‘what if’, namely: (i) consequential ‘what if’, used to ask about the consequences of some ordinary possibility (9); (ii) challenging ‘what if’, used to double check the addressee’s commitment to some claim (10); (iii) hypothetical ‘what if’, used to ask about the consequences of some outlandish possibility (11); and finally (iv) suggestive ‘what if’, used to suggest the resolution for some issue (12).

(9) Consequential
   A: Henry is going to the party.
   B: What if Isabella is there?

(10) Challenging
   A: I’m not going to the party.
   B: What if Isabella is there?

(11) Hypothetical
   What if cats could text?  (Rawlins 2017: 2)

(12) Suggestive
   A: Who should we invite to give a talk?
   B: What if we invite Isabella?

Under the hypothesis that *sekali* is the Singlish analogue for standard English ‘what if’, we might expect that simple substitution of *sekali* for ‘what if’ in the above examples would yield equally acceptable, or indeed, equivalent, constructions.

This is proven to be false, however, with the substitution holding for consequential (9’) and challenging (10’), but not for hypothetical (11’) and suggestive (12’).

(9’)? Consequential
   A: Henry is going to the party.
   B: *Sekali* Isabella is there. \( \approx \) ‘What if Isabella is there?’

(10’) Challenging
   A: I’m not going to the party.
   B: *Sekali* Isabella is there. \( \approx \) ‘What if Isabella is there?’

(11’) Hypothetical
   #*Sekali* cats could text. [Intended: ‘What if cats could text?’]

(12’) Suggestive
   A: Who should we invite to give a talk?
   B: *#Sekali* we invite Isabella. [Intended: ‘What if we invite Isabella?’]
A caveat regarding the interchangeability of sekali and hypothetical ‘what if’, however; it has been pointed out to me that the hypothetical use of ‘what if’ may be infelicitous when produced completely out of the blue, pace the claim made in Rawlins (2010), though this observation appears to be alluded to in Rawlins (2017), which notes the requisite antecedent for hypothetical ‘what if’ construction as being ‘none?’ (p. 12), hedging the earlier claim with the use of the question mark. In other words, for some speakers of (standard American) English, the ‘what if’ construction in (11) is unacceptable without additional context. When the appropriate contextual cues are provided, however, the equivalent sekali construction also improves drastically, albeit without the subjunctive or x-marking (cf. von Fintel and Iatrídou 2017) on the modal, as shown in (13).

(13) A: Why do you keep looking at your phone and your cat like that?
   B: What if cats could text?
   A: ?Sekali they can/ *could] text.

Setting hypothetical ‘what if’ aside, however, it remains evident that sekali cannot be considered equivalent to ‘what if’, on the basis of the non-substitutability between sekali and suggestive ‘what if’, as shown in (12’), which cannot be reconciled in a fashion similar to the above case.

Sekali constructions cannot therefore be “consequent-less conditional questions”, as Rawlins (2017) claims ‘what if’ constructions to be. Indeed, a further distinction between ‘what if’ and sekali which is often obscured due to the availability of rhetorical ‘what if’ can be drawn here. Unlike ‘what if’ questions, which can optionally be interpreted rhetorically (with the appropriate context), sekali constructions crucially must be interpreted akin to rhetorical ‘what if’ questions – meaning that they are not inherently interrogative.

That is not to say that sekali-constructions cannot be interrogative, however. An associated interrogative construction involves the use of sekali string-initially, followed by a string-final ‘how’, to generate an interrogative sekali construction, as shown in (14).

(14) A: My five-year-old son went to school by himself today.
   B: Sekali he get lost how? ≈ What if he gets lost?
   A: He has a hand phone, so he will be able to call me.

(Chen 2010: 44a)

While it is possible to have the same dialogue with a sekali construction as well (15), Chen (2010) notes that the use of sekali in (15) “is somewhat rhetorical in nature and does not expect a reply” (p. 36), unlike in (14), where a reply is explicitly warranted.

(15) A: My five-year-old son went to school by himself today.
   B: Sekali he get lost. ≈ What if he gets lost?
   A: He has a hand phone, so he will be able to call me.

(Chen 2010: 44b)

Since sekali is not inherently interrogative, it differs from (non-rhetorical) ‘what if’ in that where the utterance of a ‘what if q’ question does not commit the speaker to any specific position on the epistemic state of q, the utterance of sekali q does commit the speaker to v q. This notion is reflected in Chen’s (2010) characterisation of sekali as expressing unexpectedness so long as the unexpected event is plausible given the speech context.

This is demonstrated by the contrast between (16) and (17), where the first clause denies the possibility of the complement q.

(16) I know it’s not possible, but what if he’s not your son?
2.2 *Sekali* ‘sekali’ is like ‘doch’

In some ways, the properties of *sekali* are reminiscent of those of the German discourse particle *doch*, which is often analysed as expressing unawareness of a conflicting proposition that should be known (Karagozova 2004, Zimmermann 2011), as in (18).

(18) *Du kannst doch zum Arzt gehen.*
    you can DOCH to.the doctor go

\[ \approx \text{‘[Why do you behave as if there was no obvious solution: ] You can go to the doctor.’} \]

(Kaufmann and Kaufmann 2012: 6)

In particular, the property of expressing unexpectedness seems to parallel the notion of unawareness expressed by *doch*, though *sekali* differs from *doch* in that it does not require that the “conflicting proposition” in question be something which should have been known to the addressee; rather, it expresses that the addressee should acknowledge the possibility of the “conflicting proposition”.

(19) *Sekali you can go to the doctor.*
    \[ \approx \text{‘[You’re acting like you believe you cannot go to the doctor, but:] What if you actually can go to the doctor?’} \]

Another distinction between *sekali* and *doch* lies in the fact that in producing a *sekali* \( \varphi \), the speaker does not commit to \( \varphi \), unlike in the production of *doch* \( \varphi \). Instead, the speaker commits only to \( \Diamond \varphi \).

In some sense, *sekali* resembles a dual of *doch*, then, with both particles apparently working at two distinct levels, and *sekali* differing from *doch* on both levels.

3 Analysis

*Sekali* therefore cannot simply be an analogue to the standard English “what if”, and its semantic contribution appears to be twofold, much like the German *doch*. I propose that the two distinct components are an epistemic possibility component and an inferential component respectively.

These two components appear to function at different levels, with the epistemic possibility component being situated at the level of assertion, such that *sekali* \( \varphi \) is truth-conditionally equivalent to \( \Diamond \varphi \). This is demonstrated by the long form negative response to the *sekali* construction in (20).

(20) A: *Sekali* he never do his homework.
    \[ \approx \text{‘What if he didn’t do his homework?’} \]

B: No, (that’s not possible.) I saw him doing it yesterday.

Some further evidence for *sekali* having an incorporated epistemic possibility component comes from the (in)ability of *sekali* to take other epistemic modals within its scope, as demonstrated by (22) and (23), cf. (21).

(21) *Sekali* he’s sleeping.
(22)  ?Sekali he might/may be sleeping.
(23)  *Sekali he must be sleeping.

Though sekali does not readily take epistemic modals in its scope, the insertion of an epistemic
necessity modal (23) results in more violent unacceptability than the insertion of an epistemic
possibility modal (22). In fact, in (21), an alternate approximate translation which may be provided
is ’maybe he’s sleeping’, though this approximation completely loses the flavour of unexpectedness
provided by sekali.

The unexpectedness must therefore be expressed via the inferential component, which is situ-
ated at the level of presupposition (cf. Kaufmann and Kaufmann 2012). This inferential component
essentially expresses that the speaker, in uttering sekali $\phi$, commits to the belief that it is possible
that the addressee believes $\neg \phi$; the flavour of unexpectedness thus arises because the possibility of
$\phi$ expressed by the sekali-construction is contrary to the addressee’s belief in $\neg \phi$.

3.1 On belief

Since sekali appears to be concerned with the beliefs of the respective interlocutors, a model for beliefs, both of the explicit and implicit varieties, is necessary for a comprehensive formal treatment
of the meaning of sekali. In particular, I model beliefs as conversational backgrounds in the sense
of Kratzer (1981, 2012), i.e. functions which assign to every possible world a set of propositions
which an individual $x$ believes to be true in it, as in (24) and (25) for explicit and implicit beliefs
respectively.

\begin{align}
(24) \quad f^{
EE}_x(w) &= \{p \mid p \text{ is explicitly believed by } x \text{ in } w\} \\
(25) \quad f^{
IB}_x(w) &= \{p \mid p \text{ is implicitly believed by } x \text{ in } w\} \\
(26) \quad \text{(IN)EXPRESSIBILITY: } \forall x \forall w \ldots f^{
EE}_x(w) \cap f^{
IB}_x(w) = \emptyset \\
(27) \quad \square^{
EE}_x \phi \downarrow^w = 1 \text{ iff } f^{
EE}_x(w) \subseteq p \\
(28) \quad \square^{
IB}_x \phi \downarrow^w = 1 \text{ iff } \text{BEST}(w, f^{
EE}_x, f^{
IB}_x) \subseteq p
\end{align}

The condition (IN)EXPRESSIBILITY in (26) reflects the fact that an individual can express held
explicit beliefs, but not implicit beliefs, and essentially ensures that the two sets of propositions are
disjunct.

If an individual to $x$ explicitly believes a proposition $p$ in $w$, $p$ is a simple $f^{
EE}_x$-necessity in $w$, i.e. $p$ follows from the generalised intersection of $f^{
EE}_x(w)$ (27).

While (IN)EXPRESSIBILITY ensures that there is no overlap between the two sets of propositions,
an implicit belief should in principle be allowed to be inconsistent with the set of explicit
beliefs, or indeed, even with the other implicit beliefs held, an intuition which is captured by this
model, given that the generalised intersection of implicit beliefs is never accessed. Thus, even if
none of an individual’s implicit beliefs are consistent with the other (explicit) beliefs held by said
individual, both explicit and regular beliefs can still be expressed insofar as the explicit beliefs are
consistent.

In essence, I take an individual’s explicit beliefs to be the modal base which informs an individ-
ual’s belief worlds, and her implicit beliefs to be an ordering source which imposes a ranking on the
accessible worlds according to the modal base. Taking a simplistic view of the implicit beliefs such
that they are not ranked relative to each other, an individual $x$ can be said to believe a proposition
3.2 The inferential component of *sekali*

With the machinery of belief, we can now outline the semantics of the inferential component of *sekali*. Namely, we want to express that in producing *sekali* \( \varphi \), the speaker commits to the belief that it is possible that the addressee necessarily believes (implicitly or otherwise) that \( \varphi \) is false.

Since the speaker is committing to a belief, I take this to be an explicit belief, which ultimately yields the formalisation in (29). The formalisation for explicit belief that a proposition \( p \) is possible is provided in (30) and the denotation of (29) is given in (31).

\[
\begin{align*}
(29) & \quad \diamond^{EB} \square^{B} \neg p \\
(30) & \quad \llcorner \diamond^{EB} \llcorner p, \llcorner^{B} = 1 \text{ iff } \cap f^{EB}_x(w) \not\subseteq \neg p \\
(31) & \quad \llcorner \diamond^{EB}, \square^{B} \neg p, \llcorner^{B} = 1 \text{ iff } \cap f^{EB}_x(w) \not\subseteq \neg [\text{BEST}(w, f^{EB}_x, f^{IB}_x) \subseteq \neg p]
\end{align*}
\]

Evidence that the use of *sekali* depends upon the addressee’s general beliefs rather than implicit beliefs, as might be inferred from the dice scenario (5), repeated as (32), comes from the illicit use of *sekali* in (33), where \( p \) is the proposition that it rains; given that A asserts \( p \), \( p \) must be held as an explicit belief. Since *sekali* \( \neg p \) is felicitous, *sekali* can be licensed even with explicit beliefs.

\[
\begin{align*}
(32) & \quad \text{Context: A is rolling a six-sided die; only if A rolls a one does A receive a penalty; only if A rolls a six does A receive a prize.} \\
& \quad \text{B: Sekali you roll a one/two/six. } \approx \text{ ‘What if you roll a one/two/six?’} \\
(33) & \quad \text{A: It will rain later.} \\
& \quad \text{B: Sekali it doesn’t. } \approx \text{ ‘What if it doesn’t?’}
\end{align*}
\]

With (29), we now have a complete semantic account of *sekali*, with (29) reflecting the unexpectedness which *sekali* encodes, and \( \diamond \varphi \) encoding the plausibility component identified by Chen (2010). However, recall that Chen’s generalisation was unable to account for a number of empirical details, including the problematic example of the dice roll (32).

Consider what this semantic account predicts of the acceptability of the *sekali* constructions in (32). First, the associated proposition must be epistemically possible. This is satisfied without issue. However, the inferential component requires that the speaker, B, commit to the belief that it is possible that the addressee, A, believes, implicitly or explicitly, that the complement of the proposition is true.

In other words, B must commit to the belief that it is possible that A believes that he will not roll a one, two, or six respectively in the three constructions. Since there are no grounds for A to believe that he will not roll specifically a two in the given context, but there are some grounds for A to believe that he will not roll either a one or a six given that they are uniquely consequential, (29) is met only in those cases.

Indeed, the *sekali* constructions can be further improved with additional context, as in (34) and (35).

\[
\begin{align*}
(34) & \quad \text{Context: A is rolling a six-sided die; only if A rolls a one does A receive a penalty; only if A rolls a six does A receive a prize. } \textbf{B knows A to be a pessimistic individual.} \\
& \quad \text{B: Sekali you roll a #one/#two/six.}
\end{align*}
\]
(35) Context: A is rolling a six-sided die; only if A rolls a one does A receive a penalty; only if A rolls a six does A receive a prize. **B knows A to be an optimistic individual.**

**B:** *Sekali* you roll a one/two/six.

In (34), B has grounds upon which to commit to the belief that it is possible that A believes that he will not roll a six, namely, that A is a pessimistic individual who (implicitly) believes that he cannot win. However, since a dice roll is essentially random, it is epistemically possible for him to roll a six. Both conditions for the felicitous use of *sekalı* are thus met, so B is able to say to A: “*Sekali* you roll a six.”

Conversely, the additional context also prevents the felicitous utterance of the ‘one’ construction here, since B no longer has any grounds (without any further context) to believe that A believes that he will not roll a one, for the same reason that he is a pessimistic individual.

The converse holds in (35), where the context now skews B’s beliefs about what is possible in the opposite direction.

Consider the following variations of this scenario, however:

(36) Context: A is rolling a six-sided die; only if A rolls a one does A receive a penalty; only if A rolls a six does A receive a prize. **B is good friends with A and wants him to win; B generally has an optimistic outlook.**

**B** (to herself): *Sekali* he rolls a one/two/six.

(37) Context: A is rolling a six-sided die; only if A rolls a one does A receive a penalty; only if A rolls a six does A receive a prize. **B is good friends with A and wants him to win; however, B generally has a pessimistic outlook.**

**B** (to herself): *Sekali* he rolls a #one/#two/#six.

Interestingly, (36) demonstrates two things: first, that *sekalı* can be self-directed, in which case the speaker and the addressee converge, and second, that B’s attitude towards A, in conjunction with B’s general outlook, is able to license the use of *sekalı*.

The semantics of *sekalı* which I have proposed handles self-directed speech without any issue, since the speaker has direct insight to the beliefs of the addressee, given that they are the same individual; the possibility-necessity sequence then essentially collapses into simple possibility.

The fact that B’s attitude towards A can inform the inferential component of *sekalı* is a result of how belief was set up; B’s attitude towards A, along with their general outlook on life, can in conjunction induce the requisite implicit belief required to license *sekalı*.

Indeed, the unacceptability of *sekalı* in (37) demonstrates that it is those two contextual elements which come together to generate the correct implicit belief.

As I have previously noted, the individual propositions within the set of implicit beliefs are not ranked respective to each other. Consequently, when two inconsistent implicit beliefs are simultaneously held, as in (37), *sekalı* simply cannot be licensed, since the best accessible worlds do not support either proposition.

This may yet prove to be a shortcoming, however; consider a context such as in (38).

(38) Context: A is rolling a six-sided die; only if A rolls a one does A receive a penalty; only if A rolls a six does A receive a prize. **B is good friends with A and wants him to win; however, B is extremely pessimistic.**

**B** (to herself): *Sekali* he rolls a #one/#two/#six.
In this case, the felicity of the *sekali* construction with the proposition that A rolls a six is much improved relative to (37). This suggests that there may be some ranking of the relevant implicit beliefs required for a complete picture.

I now turn to the other outstanding problem involving the acceptability of past tense in the scope of *sekali*: consider again the relevant examples (7) and (8), repeated as (39) and (40) respectively.

(39) A: John didn’t buy any insurance when he went for holiday.
B: *Wah, sekali* something happened to him when he was there.  

(40) Context: John is late for an appointment with A and B.
A: Where is John?
B: Sekali he fell down and had to go to the hospital.
≈ ‘What if he fell down and had to go to the hospital?’  

(Chen 2010: 27a)

The pertinent question is why the *sekali* construction is illicit in (39) but perfectly felicitous in (40). One difference that immediately presents itself is that in (39), A is ostensibly the expert with regards to John’s situation, given that A is the one who provides the initial update to which B is responding.

Conversely, neither A nor B may be considered an expert on John’s whereabouts in (40). More specifically, B can be certain that A is not an expert relative to himself, given that A has just uttered an unbiased question about the subject.

One possible solution would then be to suggest that the modality expressed by *sekali* is performative in that the use of *sekali* issues a recommendation for belief-revision on the part of the addressee. If *sekali* is indeed performative, then it would be subject to the conditions on the use of performative modals, namely the authority condition (AC), the epistemic uncertainty condition (EUC), and the ordering source restriction (OSR), as laid out in Kaufmann (2012).

Setting aside the technical implementation of the various conditions, the authority condition requires that the speaker be an expert of what is essentially the topic under discussion, the epistemic uncertainty condition stipulates that the speaker must hold the proposition within the scope of the performative modal to be epistemically uncertain, and the ordering source restriction requires that the proposition answers a salient decision problem for the hearer.

As previously noted, in (39), the addressee, A, is an expert relative to the speaker, B; the AC is therefore not met.

Though the EUC may appear to conflict with the past tense, it can conceivably be met in both cases due to the speaker being uncertain of the proposition’s truth or falsity at the point of utterance.

Finally, the OSR is partially met, in that the possibility of the proposition may lead to an answer downstream in the logical reasoning process; this is clearer in the case of (40) where the relevant decision problem is if A should wait for John to show up - if John had fallen down and been admitted to the hospital then A should no longer waste his time waiting for John. This may be implementable in (39) as well given sufficient context, but since the AC is already unmet, (39) is infelicitous.

Admittedly, the specifics may require tweaking for *sekali* to meet the conditions exactly, especially since *sekali* appears to be a weak performative at best, in that it merely enforces the admission of an unexpected possibility, and may not fully align with more traditional performative modals.
4 Conclusion

In this paper I have proposed an analysis of the Singlish discourse particle *sekali* which seeks to capture its distribution, through comparison with English ‘what if’ and German *doch*. I suggest that *sekali* \( q \) has the truth-conditional semantics \( \diamond q \) while also carrying the presupposition \( \Box^B_B q \). This formalisation reflects Chen’s (2010) generalisation of *sekali*, whilst also dealing with some empirical points which appeared to fall outside of the generalisation. I have also suggested that *sekali* is a performative modal, and is consequently subject to the relevant conditions, though further scrutiny may be warranted.

This analysis highlights the (dis)similarities which hold between Singlish *sekali*, English ‘what if’, and German *doch*: *sekali*’s epistemic possibility component patterns with ‘what if’, while its inferential component draws closer parallels with *doch*. Further study of other discourse particles (including the other sense of *sekali* reported by Chen (2010), as well as the use of *sekali* in Malay) may prove to be insightful about the internal composition of discourse particles cross-linguistically, and in turn, make typological predictions about the possible kinds of discourse particles.

References


1. Introduction

Chomsky (1981) introduces the principle \( P \), which comes to be called “the Extended Projection Principle” (EPP) in Chomsky (1982), the requirement that clauses have subjects. Ever since its introduction, the EPP has played an important role in propelling research in generative syntax; however, at the same time, as Lasnik (2003) correctly points out, it has been a pervasive mystery (i.e., a stipulation) and attempts have been made in the literature to wipe out the EPP and derive it from somewhere else (see, e.g., Bošković 2002, Epstein and Seely 2006, Epstein, Firas and Seely 2005 and references cited therein). In pursuing a minimalist approach to language, Chomsky (2015) argues that the EPP can reduce to labeling (i.e., Full Interpretation), proposing that in languages like English, T is subject to label weakness, which is a property of a head regarding its labelability:

\[ (1) \textbf{Label Weakness}: T by its nature is too weak to serve as a label on its own; in order to work as a label, T must have overt or visible Spec,TP. \]  
(Chomsky 2015:9-10)

To see how the EPP follows from (1), consider a sentence in (2), where the object raises to Spec,TP for the EPP on T:

\[ (2) \text{The book was written by the professor.} \]

Given (1), failure to raise to Spec,TP will incur a labeling problem: the \( \lambda \)-marked set in (3) will not be labeled in the absence of Spec,TP when the labeling algorithm called Label, which is nothing other than minimal search, applies to \( \lambda \) and finds T as the label:

\[ (3) \begin{align*}
& a. [\lambda_1 \text{ T [be written the book by the professor]}] \quad (\lambda = ?) \\
& b. [\lambda_2 \text{ The book [be written t by the professor]})] \quad (\lambda = \text{T})
\end{align*} \]

Syntactic objects (SOs) must be labeled at the Conceptual-Intentional (CI) interface and for externalization at the Sensory-Motor (SM) level. CI and externalization processes must know what kind of objects derived SOs are (Chomsky 2013). Given this interpretability requirement, if SOs are without labels, they will not be interpreted at the interfaces and the

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derivation will be ruled out in violation of Full Interpretation.

With this as our background, in this paper, I consider the deduction of the EPP from labeling. Although label weakness may eliminate the stipulative EPP, the attempt also raises problems that do not arise under the assumption of the EPP. I argue that the problems that are faced with label weakness can be overcome by Merge, claiming that the successful deduction of the EPP from labeling includes the operation as an important ingredient.

The organization of this paper is as follows: section 2 points out problems that arise under the attempt to deduce the EPP from labeling. Section 3 spells out a main claim in this paper. Section 4 considers consequences of the proposed analysis. Section 5 summarizes and concludes the paper.

2. Problems

The EPP and label weakness both require that Spec,TP be created, making the same prediction for examples such as (2). In (2), the EPP will not be satisfied or λ will be left unlabeled if the Spec is not produced. As regards examples like (2), the deduction of the EPP from labeling is successful. There are, however, cases where the two make distinct predictions or where the labeling approach, unlike the EPP, makes wrong predictions. The first case is where the subject moves out of Spec,TP. Consider the following examples:

(4) a. [Which professor [C [t [λ, will win the Nobel Prize]]]]?
b. [Which professor do you think [C [t [λ, will win the Nobel Prize]]]]?
(5) a. The student seems [t [λ, to [be in the library]]].
b. Which student do you believe [t [λ, to [be the most intelligent]]]?

In these examples, the subject moves to Spec,TP but moves out in the derivational process, which yields a copy in the relevant Spec. The movement is unproblematic under the assumption of the EPP: the EPP is satisfied in (4) and (5), whether or not the subject moves out (i.e., regardless of whether it turns into a copy), and the examples are correctly predicted to be grammatical.

On the other hand, the labeling approach to the EPP will predict that the examples are ill-formed. For labeling purposes, as stated in (1), Spec must be overt or visible and overt/visible Spec must be generated. Suppose, following Chomsky (2013), that overtness or visibility of SOs or occurrences is defined by (6) (Chomsky 2013:44):

(6) α is taken to be in the domain D if and only if every occurrence of α is a term of D.

(6) says that to be syntactically visible is to be in a relevant domain (see also Epstein, Kitahara and Seely 2016). Given the definition, copies are invisible to operations since they are part of a discontinuous element and are lower occurrences of a moved element; only the head of a chain or the whole chain, the discontinuous element as a whole, is taken to be syntactically visible. Spec,TP in (4) and (5) is thus invisible to labeling when it applies at the phase level (Chomsky 2013, 2015) and T, as it is without overt Spec, cannot work as a label. Consequently, λ will be left unlabeled and will violate Full Interpretation at the interfaces. Label weakness cannot be overcome by copies and unlike the EPP, it predicts that (4) and (5) are ill-formed for labeling failure. This argument is endorsed by the fact that (7) is ill-formed. In (7), the movement of the subject incurs labeling failure with λ for lack of overt/visible
Spec, TP, causing the *that-trace effect (Chomsky 2015):

(7) *[Which professor do you think [that [t [λ will win the Nobel Prize]]]]? (λ = ?)

The second case where the EPP cannot be explained by label weakness is found in the verbal domain. Chomsky (2015) argues that label weakness also applies to the root R, which is realized or interpreted as V when selected by v/v* in the derivation. R, like T, is weak as a label and cannot label on its own without overt/visible Spec. Given this, the object will always raise from its externally merged position to Spec,RP for labeling purposes; otherwise, labeling failure will result with β and Full Interpretation will be violated. Consider (8):

(8) a. The student will [read-v* [the book [β R t]]]. (β = R)
    b. The student will [read-v* [β R the book]]. (β = ?)

Notice, however, that this is not what the EPP predicts. It has been observed in the literature that unlike the subject EPP, the object EPP is not forced in languages like English and that the object can stay in its externally merged position. The absence of the object EPP is evidenced, for instance, by grammatical extraction from the object. Consider (9):

(9) Who did Mary see [a picture of t]? It has been argued that movement is not possible out of a moved element (see, e.g., Bošković 2018 and references cited therein). Assuming this, well-formed extraction from the object in (9) suggests that [a picture of t] stays put in its externally merged position and does not move out to Spec,RP as shown in (8a). As illustrated in (10), where the object moves to Spec,TP from its first-merged position, the extraction of the wh-phrase out of it is indeed impossible, which supports the argument that the object does not move at all in (9):

(10) *Who was [a picture of t] taken by Bill?

This argument is further supported by (11), where extraction takes place out of specific objects:

(11) a. *Who did Mary steal [[that picture of t]l [tsteal t]]?  
    b. *Who did Mary make [[most movies about t]l [tmake t]]? (Mahajan1992)

Mahajan (1992) argues that specific objects move from their externally merged position to Spec,AgroP, which can be considered Spec,RP in the current framework. When the object does move, extraction out of it is ungrammatical.1

Another case in which label weakness, unlike the EPP, cannot make a correct empirical prediction is (12), where the object undergoes v/h-movement to Spec,CP:

(12) Which book did the professor recommend?

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1 The argument that the object EPP is not forced is also supported by optional raising in ECM. See, e.g., Mizuguchi (2017) and references cited therein.
In the derivation of (12), though the object may move to Spec,RP, it will not halt there but move on to Spec,CP. As in (4) and (5), overt/visible Spec,RP is not created in (12) and labeling failure will result. This argument also applies to (2), where the object is passivized. On the other hand, the EPP can correctly explain examples like (9) and (12) as the object EPP is not forced but it is optional. When R optionally has the EPP, movement to Spec,RP can satisfy the EPP even if the object moves out of the Spec, just as in (4) and (5). Unlike the EPP, labeling cannot explain the absence of overt/visible Spec for R.

In sum, while label weakness may deduce the EPP in examples such as (2), it also makes wrong predictions that the EPP does not make.

3. Overcoming Labeling Failure

In this section, I propose that Merge plays a key role in the deduction of the EPP from labeling. It has been assumed that the basic operation Merge, which is irreducible and forms a principled part of Universal Grammar (UG), is subject to the Strong Minimalist Thesis (SM1), which says that principles of UG, including Merge, operate in accord with general principles of computational efficiency (or what are often called 3rd factor principles) (Chomsky 2017). Merge, constrained only by 3rd factor principles, is formulated as simplest Merge and applies freely. Given simplest Merge, any two SOs (say, α and β) can be merged both symmetrically as in (13a) and asymmetrically as in (13b); the former creates set-theoretic objects while the latter produces adjunction structures:

\[ (13) \quad a. \{\alpha, \beta\} \quad b. <\alpha, \beta> \]

Chomsky (2015) calls the Merge that produces (13a) “set-Merge” and the Merge that generates (13b) “pair-Merge.” Keeping in mind that set-Merge and pair-Merge are both instantiations of simplest Merge and especially that (13b) can be generated by set-Merge (footnote 2), these terms are used in this paper only for the purpose of distinction.

I claim that external pair-merge of heads solves label weakness, hence labeling failure. In the examples where labeling failure does not arise even though overt/visible Spec is not created, T and R, both of which are subject to label weakness, are not set-merged; set-merge of T and R generates (14a,b):

\[ (14) \quad a. [\epsilon C [\epsilon, T [\epsilon, \ldots]]] \quad b. [\epsilon, v \ [\epsilon, R [\epsilon, \ldots]]] \]

Instead, pair-Merge applies to T and R are externally pair-merged to C and v, respectively, which yields head-head amalgams or composite heads (15a), (16a); then, the composite heads are set-merged with complements of T and R, generating (15b) and (16b):

\[ (15) \quad a. <C, T> \quad b. <C, T [\epsilon, \ldots]] \]

\[ (16) \quad a. <v, R> \quad b. [\epsilon, v \ [\epsilon, R [\epsilon, \ldots]]] \]

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Fukui (2017) notes that the ordered pair \(<\alpha, \beta>\) is mathematically equivalent to the set \(\{\alpha, \{\alpha, \beta\}\}\) (a variant of \(\{\alpha, \{\alpha, \beta\}\}\) in the Kuratowski definition — see also Tourlakis 2003 for relevant discussion). Then \(<\alpha, \beta>\) can be produced by set-Merge, with Merge applying only symmetrically.
Notice that pair-Merge, just like set-Merge, can apply externally as well as internally since it is one instantiation of Merge. Under the assumption of simplest Merge, set-Merge and pair-Merge can apply in any order in syntactic workspace to yield (15b) and (16b), which can only be blocked by stipulation. In (15b) and (16b), unlike in (14a,b), thanks to pair-Merge, $\lambda$ (i.e., a T-headed set) and $\beta$ (i.e., an R-headed set) are not produced in the derivation, with the result that overt/visible Spec is not required to strengthen T and R for labeling purposes. Moreover, (15a) and (16a) are labelable heads and can label on their own. $\alpha$ with $\beta$ adjoined to it is syntactically on a par with $\alpha$ (Chomsky 2004, 2015). SOs, when pair-merged to others, become de-activated, being syntactically invisible. Pair-Merge adjoins one SO to the other; when $\beta$ is adjoined to $\alpha$ by pair-Merge, $\alpha$ and $\beta$ are asymmetric in structure and they are not put on the same plane but on separate planes in the derivation. $\alpha$, a host of adjunction, retains all its properties on the primary plane while $\beta$ behaves as if it were not there (see also footnote 2 for this conclusion). (15a) is syntactically on a par with C and (16b) on a par with $v$. Unlike T and R, C and $v$ are not subject to label weakness, able to label without overt/visible Spec. Hence, the composite heads can label alone. In examples such as (4), (5), (9) and (12), labeling failure does not arise in the absence of overt/visible Spec.3

I have argued that the problems that arise under label weakness are solved by Merge or external pair-merge of heads, claiming that label weakness, together with Merge, explains the EPP.

4. Consequences

I have argued that the EPP is deduced from label weakness $\vdash$ Merge. The proposed analysis brings three consequences. In this section, I discuss them one by one, showing that they are theoretically and empirically favorable.

One consequence of the proposal is that it can remove the assumption that there are two types of T in language: that is, “strong” T and “weak” T. Chomsky (2015) argues that T in languages like Italian and Spanish, unlike the one in English, is strong enough and can serve as a label, with no overt/visible Spec required for labeling purposes. One argument for this claim is that a null subject (i.e., the absence of Spec,TP) is possible for such languages. Consider the following examples:

(17) Ha parlato. [Italian]
    has spoken
    ‘He spoke.’ (Burzio 1986)

(18) Hemos trabajado todo el día. [Spanish]
    have worked all the day
    ‘We have worked all day.’ (Perlmutter 1971)

Following Rizzi (1982), Chomsky attributes the parametric variation to richness of agreement: T, with rich agreement, can label while T, with poor agreement, cannot. But this

3 The proposal in this paper suggests that the pair-merge in question does not occur with (7), where T cannot label in the absence of overt/visible Spec. See Mizuguchi (2018) for the discussion of how the contrast between (4b)/(5) and (7) is explained under the proposal in this paper.
raises the following question: why can richness of agreement make T labelable?

I argue that T, just like R, is universally too weak to label alone and that the labelability of the head is not at all lexically parameterized: label weakness is a universal property of T. Strong or labelable T is attributable to the derivation: that is, it depends on Merge or how it applies to C and T. Null subjects are possible when (15b), instead of (14a), is generated in the derivation by external pair-merge of T to C. Thanks to the pair-merge, unlike in (14a), a T-headed set or “λ” is not produced and overt/visible Spec is not required to strengthen T for labeling. Besides, as I have discussed, the composite head \(<C, T>\), which is syntactically on a par with C, can label without overt Spec. External pair-merge of T to C explains strong T in null-subject languages; under the proposal, parametric variation regarding strong/weak T is explained as one consequence of 3rd factor compliant applications of Merge.\(^4\)

Another consequence is that labeling is one side of the EPP. Recall that Merge is an important ingredient in the deduction of the EPP from labeling in that it can solve labeling failure. Under the assumption of simplest Merge, however, external pair-Merge can also apply to yield (15b) in such examples as (2), which can only be blocked by stipulation as Merge is free. Since \(<C, T>\), as I have argued, is a labelable head and (15b), in terms of labeling, is well-formed without overt/visible Spec, a null subject will be predicted even for non-null-subject languages such as English for the pair-merge, which is contrary to the empirical fact. To the extent that the proposed deduction of the EPP is on track, it is suggested that the EPP cannot completely be reduced to label weakness.

I claim that externalization is the other side of the EPP. Mizuguchi (2017) argues that Spec,T (or that, the \{Spec\}, \{TP\}) configuration works as a syntactic instruction to the externalization component that agreement is spelled out canonically at T, proposing (19):\(^5\)

(19) \[ _\alpha C [_\beta NP [_T \_\eta \_\tau \_\sigma ... (i) ... ]] ] \ (\phi on T \rightarrow canonically externalized) \\

(19) is a condition imposed on externalization at the SM level, which spells out SOs created by syntax so that requirements of the SM system can be satisfied. If the Spec,T position is not created in (19), \(\phi\)-features on T cannot be canonically externalized, with the result that the derived expression cannot satisfy the SM requirement that \(\phi\) be morpho-phonologically realized. Suppose that in languages such as English, only canonical agreement is morphologically available and that non-canonical agreement cannot be realized as the language is not equipped with the relevant morphology. Mizuguchi argues that (19) explains the EPP on T even when it turns into a labelable head.

Developing Mizuguchi’s argument, in this paper, I propose (20), which subsumes (19):

(20) \[ NP [X \_\alpha [ ... (i) ... ]] ] \ (\phi on X \rightarrow canonically externalized) \\

(20) says that syntactically valued \(\phi\)-features of a head X are morpho-phonologically externalized canonically by Spec,XP: that is, (19) is not restricted to T, but is generalized to

\(^4\) See also Obata, Epstein and Baptista (2015) for relevant discussion. They argue that parameters of UG follow from the way operations apply with the confines of 3rd factor principles.

\(^5\) For other attempts to eliminate the strong/weak distinction on T, see Goto (2017) and Mizuguchi (2017) among others.

(19) is in line with McFadden and Sundaresan (2018) and Richards (2016) among others, who argue that phonological properties of languages are relevant to the EPP.
any head with φ-features (i.e., $X_\phi$). This generalization is reasonable considering that what matters in (19) is not a specific category or head but φ-features.

With (20) in place, φ-features on C or $<C, T>$, which are under-inherited as T is part of C through pair-Merge and does not stand as an independent head in the derivation, will not be externalized or spelled out and the SM interface condition cannot be met, which violates Full Interpretation at the interface, unless the NP is externally or internally merged as the Spec of $<C, T>$ as in (21). (20) will rule out (22) even though T is externally pair-merged to C and there is no problem with labeling (cf. (3a)):

(21) [Spec $<C_\phi, T>$ $[\alpha \ldots (t) \ldots ]]$

(22) *[δ $<C_\phi, T>$ [be written the book by the professor]] ($\delta = <C, T>$)

Given (20), the EPP is forced by externalization as well as by labeling. To the extent that the discussion here is correct, it suggests that an XP-YP structure plays an important role not only in interpretation at the CI interface as discussed in Epstein, Kitahara and Seely (2015) but also in morpho-phonological interpretation or externalization at the SM level.

Notice that null subjects in languages like Italian and Spanish can correctly be captured under (20). It has been argued in the literature that rich verbal agreement in such languages has exactly the same status as pronouns (see, e.g., Alexiadou and Anagnostopoulou 1998). This suggests that such verbal agreement, unlike the one in English, is not a morphological spell out of φ on $<C, T>$ but is lexically determined, just like pronominal forms. Considering that verbal agreement is not stacked in the relevant languages, it can be concluded that valued φ on $<C, T>$ is not externalized. If so, the Spec of $<C, T>$ is not required for externalization of its φ; that is, (20) is irrelevant to null-subject languages such as Italian and Spanish.

The final consequence is that the intermediate EPP or successive cyclic A-movement is explained. Recall that in (5), $<C, T>$ is created, which overcomes label weakness of T and explains the absence of overt/visible Spec.TP. As I have discussed, C with T pair-merged to it is on a par with C; $<C_\phi, T>$ keeps all the properties of C. Considering that C is a phase head, the composite head, having phasehood as one of its properties, functions as a phase head, with its complement (marked as α) cyclically transferred at the phase level. Consider (23):

(23) [δ $<C, T>$ $[\ldots \text{Transfer}\ldots ]$]

Given (23), in long-distance A-movement such as (5), the subject cannot move in one fell swoop into the higher clause for phase impenetrability: transferred domains are sent to the interfaces and kicked out of syntactic workspace; SOs embedded in such domains will turn inaccessible to syntax, unable to be manipulated (e.g., Chomsky 2000). Then in the derivation of (5), unless the subject moves to the Spec of $<C, T>$, it cannot move out; the subject has to move through the Spec of $<C, T>$ in order to move into the higher clause. It follows from the proposed analysis that A-movement is necessarily successive cyclic.

This consequence is empirically well supported. It has been argued in the literature that A-movement, just as A-movement, is successive cyclic. For instance, examples such as (24) and (25) have been discussed as evidence for successive-cyclic A-movement:

(24) a. Mary seems to John [__ to appear to herself to be in the room].
b. *Mary seems to John [ _ _ to appear to himself to be in the room].

\[ (25) \text{[His; mother’s; bread] seems to every man; [ _ _ to be known by her; to be the best there is].} \]

(Bošković 2002:179)

(24) demonstrates that the surface subject can bind the reflexive in the embedded clause while the experiencer cannot. In (25), as indicated by co-indexation, the experiencer every man can bind the pronoun his in the surface subject and at the same time, the pronoun her can refer to his mother. These examples will only be explained if the surface subject moves successive cyclically via the underlined position in the embedded clause, which is the Spec of \( <C, T> \) under the proposed analysis. In (24), the copy of the subject created in that position can bind the reflexive in the embedded clause in (24a); in (24b), on the other hand, the copy in that position will be a specified subject, blocking binding of the reflexive by the experiencer. As regards (25), the co-indexed reading will be possible if and only if the surface subject reconstructs to the underlined position, which indicates that its copy is created in that position through successive cyclic movement. In the externally merged position of the subject, every man can bind his while a Condition C violation will be incurred as her binds his mother; \(^6\) on the other hand, in the surface position, although her does not bind his mother, every man cannot bind his. The examples above or intended interpretations will be explained only if the surface subject moves successive cyclically via the underlined position or the Spec of \( <C, T> \) in the embedded clause.

Notice that the intermediate EPP will not be forced unless cyclic Transfer applies in the embedded clause. As I have argued, Merge applies freely and one-fell-swoop movement and successive-cyclic movement will both be possible for A-movement under the assumption of simplest Merge (see also Epstein, Kitahara and Seely 2014 for this argument). Given that labeling failure in intermediate TP is solved by external pair-merge of T to C as I have proposed, A-movement will be necessarily successive cyclic for cyclic Transfer, which explains the intermediate EPP effect, hence empirical examples such as (24) and (25).

It should be noted that the intermediate EPP or successive-cyclic A-movement will not follow from the labeling approach to the EPP. It may be true that movement to the Spec of intermediate T creates overt/visible Spec, which allows the T to become a labelable head. Notice, however, that unlike in (2), the NP does not halt in the Spec but moves on into the higher clause. The movement will turn the NP into a copy, making it invisible by the time labeling applies to identify \( \lambda \).

\[ (26) \text{[NP [ ... [t [\lambda, T [\lambda, t ...]]]]] (\lambda = ?)} \]

Consequently, \( \lambda \) will not be labeled in the absence of overt/visible Spec. The labeling approach cannot give an answer to the intermediate EPP.

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6 The NP can e-command out of the experiencer phrase and the by-phrase. To see this, consider (i) and (ii):

(i) Pictures of himself seem to John to be cheap. \hspace{2cm} (Bošković 2002:179)
(ii) [His mother’s bread] seems to John to be known by every man, to be the best there is.

In (i), John can bind the reflexive and in (ii), a bound-variable reading is possible. This shows that the NP embedded in the experiencer phrase and the by-phrase can e-command out into the surface subject in its reconstructed positions.
Labeling is also helpless in deducing the intermediate EPP under the analysis proposed in this paper. Recall that \(<C, T>\) is a labelable head and that it can label without overt/visible Spec. This means that even when the NP moves in a single leap, labeling will be successful. What deduces the intermediate EPP in A-movement is not labeling but the phase status of an intermediate head, which is straightforwardly explained by external pair-merge of T to C. Under simplest Merge, successive-cyclic A-movement will not be forced unless cyclic Transfer applies. Given the proposal in this paper, the successive cyclicity can be deduced from solving label weakness by external pair-Merge.

5. Conclusion

In this paper, I have discussed the deduction of the EPP from labeling (i.e., Full Interpretation at the interfaces). I have shown that labeling or label weakness does not suffice to erase or deduce the stipulative EPP as it raises its own problems. I have argued that such problems can be solved by Merge, claiming that Merge is an integral part of the successful deduction of the EPP from labeling; labeling failure can be overcome by external pair-merge of T/R to C/v, which does not produce a T/R-headed set, and yields \(<C, T>\) and \(<v, R>\), which are labelable.

In conclusion, the present paper demonstrates that Merge plays a key role in language and supports the basic hypothesis in the Minimalist Program that language is explained by Merge and the properties of the interfaces.

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1. Introduction

In this study, we consider markedness in loanwords, focusing especially on compound truncation in Japanese. The term markedness has been used in the literature on linguistics in different ways (Rice 2007; Hume 2011). We use it here to refer to a structure that is blocked by the Obligatory Contour Principle (OCP, hereafter), a principle that prohibits adjacent identical elements. Avoidance of similar sounds, or dissimilation, is observed at segmental and suprasegmental levels in a variety of languages (see, e.g., Alderete and Frisch 2007; Bye 2011; Leben 1973; McCarthy 1986; Suzuki 1998; Yip 1988). One of the most cited OCP effects observed in Japanese is a phenomenon in which a voiced obstruent does not occur with another in a certain domain. This is generally known as Lyman’s Law, which is defined as a prohibition preventing two voiced obstruents from occurring in a single morpheme or in the second member of compounds (e.g., McCawley 1968; Nishimura 2006; Vance 2016), also expressed as OCP (-son. voice) (Alderete 1997; Ito and Mester 1996, 2003). Another OCP effect that has been discussed in recent years is Identity Avoidance. There are two main constraints on Identity Avoidance effects, as shown in (1): OCP-Consonant (OCP-C) bans two identical consonants in the onset position (e.g., t-), and OCP-Consonant-and-vowel (OCP-CV), or OCP (mora) (Saro 2013), bans two identical moraic CV (e.g., ta-ta).

1. OCP-C
   Two identical consonants are prohibited from occurring in a sequence in the onset position.
2. OCP-CV
   Two identical morae are prohibited from occurring in a sequence.

In Japanese, we find monomorphemic words in which two identical consonants co-occur (e.g., /momo/ ‘peach’; /hana/ ‘seven’; /haha/ ‘mother’; /sasa/ ‘bamboo’). On the other hand, several experimental studies have shown that OCP-C and OCP-CV effects apply to native or Sino-Japanese words in word formation, or derived environments such as rendaku formation (Kawahara and Sano 2016), group naming formation (Kumagai and Kawahara 2018), and the nicknaming process (Kumagai 2019) (see Section 2 for details). A puzzle that arises here is that such OCP effects hold for word formation involving loanwords as well. The Japanese lexicon consists of four substrata: Yamato; Sino-Japanese; Foreign; Mimetic (Ito and Mester 1995). Words belonging to the Foreign stratum (i.e., loanwords) are known to be less susceptible to phonological constraints than are native words. For instance, geminates of voiced obstruents and initial [p] are allowed to occur in loanwords but not in native words (see Section 6 for discussion). Therefore, the fact that OCP effects work in native and Sino-Japanese words as demonstrated by the abovementioned experimental studies does not necessarily mean that they will work in loanwords as well. The aim of the current study is to conduct an
experiment using novel compound truncation in order to examine whether OCP-C and OCP-CV effects hold for loanwords as well. The results show that compound forms with identical consonants and morae are eschewed in loanwords, just as they are in the Yamato and Sino-Japanese substrata.

2. OCP Effects in Japanese Word Formation

The OCP was originally proposed as tonal dissimilation to avoid the same tone sequence (Leben 1973). After that, the OCP was extended not only to the tonal-features level but also to the segmental-features level (McCarthy 1986). Japanese rendaku is one morphophonological phenomenon in which OCP effects are observed (McCawley 1968; Ito and Mester 1986; see also Vance and Irwin 2016). In Japanese compound formation, the initial voiceless obstruent of the second member of the compound becomes a voiced obstruent.

(2) a. /sibu/ ‘sour’ + /kaki/ ‘persimmon’ \( \rightarrow /sibu-gaki/ \)
   b. /ai/ ‘to duplicate’ + /kagi/ ‘key’ \( \rightarrow /ai-kagi/, */ai-gagi/ \)

As in (2a), the second member of the compound /kaki/ ‘persimmon’ undergoes rendaku to be /gaki/. However, if the second member of the compound already has a voiced obstruent (as in (2b) /kagi/ ‘key’), rendaku is blocked (e.g., */ai-gagi/) because two voiced obstruents in onset position are marked in native words. This form would violate OCP (-son, voice).

We look below at recent experimental studies that examined OCP-C and OCP-CV effects in Japanese word formation. Kawahara and Sano (2016) examined the phonological conditions that prevent or cause OCP-C and OCP-CV effects through experiments using nonce compounds as in (3). The experiment was verified by controlling the phonological conditions of the morpheme boundary in compounds.

(3) a. /iga/ + /kaniro/ \( \rightarrow /iga-kaniro/ \) or /iga-ganiro/
   b. /iga/ + /keniro/ \( \rightarrow /iga-keniro/ \) or /iga-geniro/ 

For example, if rendaku occurred in (3a), it would cause identical CV-sequences at the morpheme boundary (e.g., /iga/ + /kaniro/ \( \rightarrow /iga-ganiro/ \)). On the other hand, in the case of (3b) rendaku would cause identical consonants at the morpheme boundary (e.g., /iga/ + /keniro/ \( \rightarrow /iga-keniro/ \)). Participants were presented with nonce compounds (e.g., /iga/ + /kaniro/), and asked to choose which of the rendaku and non-rendaku forms sounds more natural (e.g., /iga-kaniro/ or /iga-ganiro/). The results showed that rendaku is less likely to apply to the case in (3a) than to the case in (3b). This result clearly shows that the OCP-CV effect is stronger than the OCP-C effect.

Kumagai and Kawahara (2018) is another experimental study that tested the OCP-C and OCP-CV effects through the word formation of group naming. This previous study started with questions about why a group formed by two members, *mama and *kama, would be called *ma-mama, rather than *kaa-mama. Group names in (4) are examples of the stimuli used in the experiment, and each condition has a different sequence of consonants at a morpheme boundary.

(4) a. C-C \((n-m)\)   b. C-C \((n-m)\)   c. CV-CV \((na-na)\)
   hana-moka    hana-niko    hana-natu
   ‘Hana and Moka’ ‘Hana and Niko’ ‘Hana and Natsu’
The experiment was conducted using native words of the Yamato substratum and Sino-Japanese words. (4a) is an example examining whether different kinds of nasal sequences in the morpheme boundary (e.g., *n-m*) are disfavored (i.e., OCP (nasal)), (4b) is an example to test identical consonants with nasal sequences (e.g., *n-n*) (i.e., the OCP-C effect), and (4c) is an example to test identical mora sequences (e.g., *na-n* (i.e., the OCP-CV effect). The participants of the experiment were shown two types of group naming in each condition (e.g., *natsu-haru* or *haku-natsu*) and were asked to choose which sounded more natural. The results showed that forms that violate OCP constraints are selected at significantly lower rates, in the order of (4c) > (4b) > (4a). Output forms which have a sequence of identical consonants (C) at the morpheme boundary (e.g., *hana-niko*) tend to be avoided, as are output forms with a sequence of identical morae (CV) (e.g., *hana-natu*). The results suggest that the higher the phonological similarity, the stronger the OCP effect.

3. OCP Effects in Compound Truncation in Japanese

The target of word formation in this study, compound truncation in loanwords, is another example that involves OCP effects. Japanese loanwords are often truncated to form new words (Ito 1990; Kubozono and Ogawa 2005; Labrune 2002). Japanese compound loanwords tend to be abbreviated by clipping the initial two morae from each component of the base word (e.g., *dezita-ru + kamera* → *dezi-kame* ‘digital camera’). However, in case of a first component with a long vowel, there are two types of variation that occur as shown in (5).

(5) Two types of compound truncation with long vowels in the first component

a. syapu pensiru → syaa-pen *syapu-pen ‘mechanical pencil’

b. paasonaru konpyuuta → paso-kon *paas-kon ‘personal computer’

(5a) syapu pensiru ‘mechanical pencil’ is not abbreviated as syapu-pen, nor is (5b) paasonaru konpyuuta ‘personal computer’ abbreviated as paas-kon, although the first components in the base word of (5a) and (5b) both have a long vowel. In the first type (Pattern-A, hereafter), the initial long vowel tends to be maintained. On the other hand, the second type (Pattern-B, hereafter) does not maintain the long vowel, replacing it with the next independent mora.

Why do the two patterns arise in compound truncation in Japanese? Truncated forms must leave some of their original forms; otherwise, language users are unable to recognize meanings of the truncated forms. This is why forms of truncation that are too short are unacceptable. In order for language users to recognize what original forms are, there are two principles of compound truncation, which we propose below.

(6) a. The initiality principle: Initial elements are psychologically prominent.

b. The restoration principle: Independent elements are restorable.

The initiality principle (6a) is related to the fact that initial parts of a word are more likely to help language users to recall it than non-initial parts; the initial part of the word is in a phonologically privileged position (Beckman 1998; Hayes 2009). Therefore, the output word of compounds is formed by clipping the initial two morae from each component. The restoration principle (6b) pre-

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1 There is no clear reason why pattern-A (e.g., *paas-kon*) is not chosen.

2 There are a few examples of compound truncation which consist of two morae in all (e.g., *modan ‘modern’ + booi ‘boy* → *mo-bo ‘modern boy’).
supposes that independent elements, or independent morae, are more likely to help language users to recall original forms than dependent elements (e.g., a nasal coda; the second part of geminates; the second part of a long vowel). These two principles are involved in compound truncation, and the output form depends on which principle takes precedence. That is, if the initiality principle is given priority, the output form would be Pattern-A (*swampu + pensiru → swampu*), and if the restoration principle is given priority, the output form would be Pattern-B (*pensiru + konpyuta → pensi-*). Moon (2018b) found, based on her survey (“Truncation Database of Compound Words”3), that Pattern-A is more dominant than Pattern-B in Japanese compound truncations with a long vowel in the first component. In other words, the initiality principle is basically preferred to the restoration principle in Japanese. However, another reason why Pattern-B is not chosen in the case of the truncated forms in (5a) is that identical consonants are repeated at the morpheme boundary (*swampu-*), triggering an OCP-C effect observed in compound truncation (Moon 2016, 2018a).4 To investigate whether OCP-C and OCP-CV effects block Pattern-B as an output form, we conducted a word formation experiment, presented in the next section.5

4. Experiment

4.1 Purpose and Stimuli

To examine whether OCP-C and OCP-CV effects manifest themselves in compound truncation with loanwords, we conducted a forced-choice test. As stimuli, we used a combination of a nonce word as the first component and a real word as the second component, because we expected that participants would have an easier time imagining the meaning of the compound word, since the head of compounds is right-handed in Japanese (e.g., *hachi ‘bee’ + mitsu ‘nectar’ → hachi-mitsu ‘honey’; mitsu ‘nectar’ + hachi ‘bee’ → mitsu-bachi ‘honey bee’).6 We fixed the number of syllables and morae of the first component of the compound word (4 syllables and 5 morae). In addition, we gave the nonce words a fictitious meaning (e.g., *kanayirisu was given the meaning “customized”).

The current experiment prepared three conditions as shown in Table 1. Condition I is a control group in which Pattern-B (e.g., *kaya-taki*) does not violate any constraints. In Condition II, Pattern-B (e.g., *sitto-tapi*) violates the OCP-C constraint, because it produces identical consonants (-t-) in the morpheme boundary. In Condition III, Pattern-B (e.g., *tota-tahi*) violates the OCP-CV constraint as well as the OCP-C constraint, because it contains identical consonants and vowels (*ta-ta*). It is expected that if the OCP-CV effect is stronger than the OCP-C effect (e.g., Kawahara and Sano 2016; Kunagai and Kawahara 2018; cf. Kunagai 2019), Pattern-B will be less likely to be chosen in Condition III than in Condition II. Table 2 gives the set of stimuli that was used in the experiment.

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3 The ‘Truncation Database of Compound Words’ (Moon 2018b) has a total of 1,101 types, and 122 compound loanwords with a long vowel in the second mora of the first components.
4 There is also an example of compound truncation whose Pattern-B is not chosen, due to OCP-CV effects (e.g., *aota ‘art’ + toraku ‘truck’ → aota orora ‘decorated trucks’; *aota-fura*).
5 In this paper, we focus on the influence of the first element of compounds on output forms. For the influence of the second element on output forms, see Moon (2018b) and Tanaka (to appear) for details.
6 In some languages the head of morphologically complex words is the righthand member of that word (Williams 1981: 248). This rule applies to Japanese compound words.
<table>
<thead>
<tr>
<th>Condition</th>
<th>N1</th>
<th>N2</th>
<th>OCP-C</th>
<th>OCP-CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition I</td>
<td>kaayarisu</td>
<td>takisiido</td>
<td>(kaya-taki)</td>
<td></td>
</tr>
<tr>
<td>Condition II</td>
<td>siitoresu</td>
<td>tapioka</td>
<td><strong>Violated</strong> (sito-tapi)</td>
<td></td>
</tr>
<tr>
<td>Condition III</td>
<td>tectaruto</td>
<td>taburetto</td>
<td><strong>Violated</strong> (teta-tabu)</td>
<td><strong>Violated</strong> (teta-tabu)</td>
</tr>
</tbody>
</table>

| Condition I     | kaayarisu| takisiido| ‘tuxedo’            | kaa-taki            |
| Condition II    | teyaremnu| darumesian| ‘Dalmatian’         | tee-daru            |
| Condition III   | teesarudo| naporitan| ‘naporitan’         | tee-napo            |
| Condition I     | koonarimu| satenito| ‘satellite’         | koo-sate            |
| Condition II    | kiisaroni| yakuruto| ‘Yakult’³³³ | kii-yaku            |
| Condition III   | seerarisu| panorama| ‘panorama’         | see-pano            |
| Condition I     | keeramesu| barikeedo| ‘barricade’        | kee-bari            |
| Condition II    | koofarudo| magunetto| ‘magnet’           | koo-magu            |
| Condition III   | toomarisu| fasunaa| ‘fastener’          | too-fasu            |
| Condition I     | teepamosu| warabii| ‘wallaby’          | tee-wara            |

| Condition II     | siitoresu| tapioka  | ‘tapioca’          | sii-tapi            |
| Condition III    | seedomonii| dabingu  | ‘dubbing’          | see-dabi            |
| Condition I      | kiinoruni| nareyson | ‘narration’        | kii-nare            |
| Condition II     | koosomuro| saraburred| ‘thoroughbred’ | koo-sara            |
| Condition III    | kaayorika| yahuu    | ‘Yahoo’            | kaa-yahu            |
| Condition I      | taaponasu| parasyuuto| ‘parachute’       | taa-para            |
| Condition II     | keebonado| barukinii| ‘balcony’          | kee-baru            |
| Condition III    | soomoruto| masutaado| ‘mustard’          | soo-masu            |
| Condition I      | keeforumo| fakusimiri| ‘fascimile’       | kee-faku            |
| Condition II     | kooworodu| waserin  | ‘vaseline’         | koo-wase            |

| Condition III    | tectaruto| taburetto| ‘tablet’           | tee-tabu            |
| Condition I      | siidarisu| dameezi  | ‘damage’           | sii-dame            |
| Condition II     | saaranumo| natoriumu| ‘sodium’⁸         | saa-nato            |
| Condition III    | tocsarika| susapensu| ‘suspense’         | too-sasu            |
| Condition I      | teeyarimu| Yarappa | ‘Yalapa’⁹         | tee-yara            |
| Condition II     | tiiparisu| pareedo  | ‘parade’           | tii-pare            |

³³³ Yogurt brand.
⁸ From the German, Natrium.
⁹ The name of a plant.

Table 1. Examples of Pattern-B in each condition
4.2 Participants and Procedures

The experiment was conducted through an online questionnaire tool, SurveyMonkey. We prepared 10 compound words for each condition, and thus tested 30 pairs in total. Each pair was randomly presented. Forty-six native speakers of Japanese participated in the experiment.\(^\text{10}\) Participants were asked to choose which of the two possible truncation forms (Pattern-A or Pattern-B) sounded more natural based on their native speaker’s intuition. A page of the test session is presented in Figure 1 below.

![Screenshot of the test session]

**Figure 1.** Screenshot of the test session

5. Results

The rates of response to Pattern-B are indicated in Figure 2 below, in which an error bar represents 95% confidence intervals. The rate of Pattern B for each condition is: Cond I = 0.42; Cond II = 0.21; Cond III = 0.11 (see Figure 2). All these rates are less than 0.5 chance level, which indicates that each OCP constraint contributes to reducing the occurrence of Pattern-B. To compare each condition, we ran a generalized mixed-effects logistic regression using the glmer function of the language R and lme4 packages (Baayen 2008) with subjects and items coded as random effects. The results showed that there were significant differences between each condition (Cond I vs. Cond II: $z = -5.652; p < .001$; Cond II vs. Cond III: $z = -3.313; p < .001$). This suggests that the occurrence of Pattern-B is reduced by the consonantal and moraic OCP effects. Overall, the results have revealed that the OCP effects attested here influence patterns of compound truncation of loanwords.

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\(^{10}\) To avoid the influence of the native speakers' generational differences, we restricted the survey to younger speakers. Specifically, 32 were from 18 to 19 years old, and 14 participants were from 20 to 29 years old.
6. Discussion

Ito and Mester (1995, 2008) suggest that Japanese has four lexical strata: Yamato, Sino-Japanese, Mimetic and Foreign. Each morpheme class has a different property, as seen in (7).

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>*P</td>
<td>*P</td>
<td>*NT</td>
<td>*NT</td>
<td>*DD</td>
</tr>
<tr>
<td>*NT</td>
<td></td>
<td>*DD</td>
<td>*DD</td>
<td></td>
</tr>
<tr>
<td>DD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As Ito and Mester (1995: 819-820) claim, the Yamato stratum is the most restrictive because it observes all three constraints: *P (barring of the occurrence of single [p]), *NT (voicing of post-nasal obstruents), and *DD (prohibition of the occurrence of voiced germinate consonants). In contrast, the Foreign stratum is the least susceptible to these three phonological constraints. For example, the Foreign stratum allows voiced germinate consonants (DD) to occur in a single morpheme, as in (8).

(8) doggu “dog” budo “bed”

However, Nishimura (2006) claims that the constraint of *DD is also applicable to loanwords as seen in example (9).

(9) a. deddo, *detto “Ted” b. deddo, detto “dead”

(9a) and (9b) are a minimal pair. (9a) deddo has only one voiced obstruent (germinate) in a single morpheme déd, so it does not violate the constraint of *DD and can only be realized as the form deddo. On the other hand, (9b) deddo can also be realized as detto because deddo has a sequence of two voiced obstruents (e.g., d-deh) in a single morpheme, which violates an Obligatory Contour Principle, OCP (-son, voice), or Lyman’s Law.

Based on the discussion above, it is necessary to examine which constraints are applicable to which lexical strata. The previous experimental studies showed that OCP-C and OCP-CV effects apply to Yamato and Sino-Japanese strata (i.e., native and Sino-Japanese words) in word formation such as rendaku and group naming (Kawahara and Sano 2016; Kumagai and Kawahara 2018; Kumagai 2019). The current study, focusing on compound truncation in loanwords, reveals that
these effects are applicable to the Foreign (loanword) stratum as well. In all of these word formation processes, OCP-CV is more likely to be disfavored than OCP-C, which means that OCP-CV is more marked than OCP-C. This is summarized in Table 3 below.

<table>
<thead>
<tr>
<th></th>
<th>Lexical classes</th>
<th>unmarked</th>
<th>marked</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Word formation)</td>
<td>No violation</td>
<td>OCP-C</td>
</tr>
<tr>
<td>Kawahara and Sano (2016)</td>
<td>native words (rendaku)</td>
<td>iga-kaniro</td>
<td>iga-ganiro</td>
</tr>
<tr>
<td>Kumagai and Kawahara (2018)</td>
<td>native/ Sino-Japanese words (group naming)</td>
<td>hana-moka</td>
<td>hana-niko</td>
</tr>
<tr>
<td>Current study</td>
<td>loanwords (compound truncation)</td>
<td>kaya-taki</td>
<td>sito-tapi</td>
</tr>
</tbody>
</table>

Table 3. Summary of previous studies and the current study

Another interesting finding is that Pattern-B is avoided not only in Conditions II (repeated consonant) and III (repeated mora) but also in Condition I (no repetition). The rate of Pattern-B in Condition I is lower than chance level (=0.42). Why, then, is the Pattern-B avoided, even where there is no violation? As we mentioned in section 3, the compound truncation process in Japanese involves two important principles which are being formed by clipping the two initial morae from each component (i.e., the initiality principle) or by leaving elements enough to restore the meaning of the base word (i.e., the restoration principle). If the initiality principle is preferred, then Pattern-A will be dominant, but if the restoration principle is preferred, then Pattern-B will be dominant. Moon (2018b) found that, according to the database of truncation compounds (see footnote 3), Pattern-A is more dominant than Pattern-B, which suggests that the initiality principle is preferred to the restoration principle in Japanese. Therefore, Pattern-B is more likely eschewed even in Condition I.

7. Concluding Remarks

In this study, we have discussed markedness in loanwords, focusing on the case of compound truncation in Japanese. Specifically, we targeted OCP-C and OCP-CV effects on patterns of compound truncation with loanwords, which prohibit the repetition of consonants (OCP-C) and morae (OCP-CV) at morpheme boundaries. The results indicate that identical consonants and moraic-CV are more likely avoided in compound truncation. Therefore, based on the previous experimental studies using native and Sino-Japanese words, we suggest that the OCP-C and OCP-CV effects are at work pervasively across lexical strata in the Japanese lexicon, including in loanwords. Whether other OCP constraints that are not tested in the current study are applicable to all lexical classes is left for future research.

References


Moon, Changyoun. 2016. Hit sui genri (OCP) ga tansyukugo no keisei ni ataru eikyo ni tsuite
Markedness in Loanwords: The Case of Compound Truncation in Japanese


On a Special Interpretation of Evaluative Adjectives/Adverbs of Disposition and Luck

David Y. Oshima
Nagoya University

1. Introduction

This article aims to present a novel semantic analysis of a special interpretation of two types of evaluative adjectives, the D(isposition)-class exemplified in (1a) and the L(uck)-class exemplified in (1b), and of adverbs derived from them with the suffix -ly.

(1) a. **D(isposition)-class**: bold, brave, careful, careless, (in)considerate, cruel, foolish, (un)kind, mean, nice, (im)polite, (un)wise, smart, stupid
b. **L(uck)-class**: (un)lucky, (un)fortunate

The special usage in question is illustrated in (2) and (3); intuitively, the three sentences in (2) are by and large synonymous, and so are the two sentences in (3).

(2) a. Wisely, John took the bus. / John wisely took the bus.
b. John was wise to take the bus.
c. It was wise of John to take the bus.

(3) a. John luckily has a supporting family.
b. John is lucky to have a supporting family.

In its unmarked usage, a D-class predicate is used to characterize an entity, as in (4a), or an eventuality/action, as in (5a). For an expository purpose, I take the logical representations of (4a)/(5a) to be (4b)/(5b), respectively. The temporal information and the contextually-supplied comparison classes (to serve as an argument of \textit{wise} and \textit{on}) are left out for simplicity.

(4) a. John is wise.
b. \[\lambda w_1 [\exists e_1 [\text{wise}_1(w_1, e_1, \text{john})]]\]

(5) a. Bruce chose his partner wisely. (Specifically, he chose Robin rather than Speedy.)
b. \[\lambda w_1 [\exists e_1 [\text{choose-one's-partner}_1(w_1, e_1, \text{bruce}) \land \text{wise}_1(w_1, e_1, \text{john})]]\]

In (5b), it is considered that an eventuality’s being a ‘wise’ one is itself a kind of eventuality. Subscript \textit{err} and \textit{evt} respectively indicate that the logical predicate selects for an entity and eventuality, on top of a world and another eventuality, as an argument.

An L-class predicate may be used to characterize an entity, as in (6a), or a proposition,
as in (7a,b).

(6)  
  a. John is lucky. 
  b. $\lambda w_1[\exists e_1[\text{lucky}_{prp}(w_1, e_1, \text{john})]]$

(7)  
  a. It was lucky that it rained. 
  b. Luckily, it rained. 
  c. $\lambda w_1[\exists e_2[\text{rain}(w_1, e_2) \land \text{lucky}_{prp}(w_1, e_2, \lambda w_2[\exists e_3[\text{rain}(w_2, e_3)])]]$

In (7c), a proposition’s being a lucky one is treated as a kind of eventuality. Subscript _prp_ indicates that the logical predicate selects for a proposition, besides a world and an eventuality, as an argument. The “judge” argument of _lucky_{prp}, which may be explicitly realized with a _for_-phrase (as in _{lucky} for me_), is left out for simplicity. (7a) and (7b) are not entirely synonymous, in that the former conveys the evaluative meaning as an ‘at-issue’ (proffered) content while the latter conveys it as a ‘not-at-issue’ (conventionally implicated) content; this matter is put aside here.

The special interpretation of D- and L-class predicates, illustrated in (2) and (3), cannot be reduced to any of these basic uses. Henceforth, I will refer to the three constructions in (2a)/(3a), (2b)/(3b), and (2c) respectively as (i) the Agent-oriented adverb (AOAdv) construction, (ii) the ‘Adj + to Inf’ construction, and (iii) the ‘Adj + of NP’ construction (the first label is adopted from Ernst 2002, and the second and third from Oshima 2009). An L-class predicate does not participate in the ‘Adj + of NP’ construction.

For convenience, I will sometimes refer to the components of the three constructions corresponding to ‘John’, ‘wise(ly)’, and ‘take the bus’ in (2) as $e$, $P_{eval}$, and $P_{act}$. Throughout the article, the term ‘Agent’ will be understood to mean a participant of an eventuality (i) that is sentient, (ii) outranks all other participants in the participant role hierarchy, but (iii) does not necessarily have high ‘agentivity’ (in being volitionally involved in the eventuality, etc.). The terms ‘action/act’ will be understood to mean an eventuality that has an Agent, but is not necessarily volitional or dynamic. (In this parlance, John’s having a supporting family counts as an act(ion), with John being its Agent.)

As in Oshima (2016), I assume conventionally encoded meaning to be divided into (i) proffered content and (ii) non-proffered content, and refer to the latter as conventional implicature (CI). CI then is divided into (ii-a) non-presuppositional CI (i.e. CI in Potts’s 2005 sense) and (ii-b) presuppositional CI, which is most often simply called ‘presupposition’ in the literature (Figure 1).

![Figure 1: The taxonomy of conventionally encoded meaning](image-url)
In the AOAAdv construction,  $P_{oa}(a)$ is foregrounded while the evaluative component is backgrounded, as evidenced by the observation that in (8) only the latter projects out of the conditional clause.

(8) If John wisely had taken the bus, he would have arrived on time.

I take the CI induced by an Agent-oriented adverb to be non-presuppositional. This supposition is supported by the intuition that (2a), as well as (8), can be uttered felicitously in a context where the addressee has no previous knowledge concerning the advantages of different means of transportation.

In contrast, in the ‘Adj + to Inf’ construction, typically it is the evaluative component that is proffered, while $P_{oa}(a)$ is non-proffered. Observe that (9a) and (9b) (on their prominent interpretation) both entail that John took the bus, while they convey opposite evaluative judgements about John’s action.

(9) a. John was wise to take the bus. 
   b. John was not wise to take the bus.

As discussed by Karttunen et al. (2014), however, the ‘Adj + to Inf’ construction marginally allows a ‘reversed’ interpretation as well, as in (10).

(10) a. I wasn’t fortunate to live extremely close to my Mom and Dad for most of my adult life. The closest was when I was in Denver and they were in Garden City, KS. 
   b. This is my first trip to Italy, so I was not brave to venture out alone. 
   \hspace{1cm} (Karttunen et al. 2014: 234)

This less typical reading of the ‘Adj + to Inf’ construction will be put aside in the discussion to follow. The CI of the ‘Adj + to Inf’ construction on its more typical interpretation is again, non-presuppositional. For example, (9a) and (9b) (on the relevant interpretation) can be felicitously uttered when it is contextually clear that the addressee has not been informed that John took the bus.

In the ‘Adj + of NP’ construction, it is invariably the evaluative component that is proffered; (11a) and (11b) both entail that John took the bus.

(11) a. It was wise of John to take the bus.
   b. It was not wise of John to take the bus.

Arguably, in this construction the CI, namely ‘$P_{oa}(a)$’, is a presupposition. (11a,b) appear to sound odd and trigger accommodation if it is contextually clear that the addressee has not previously known that John took the bus.

In what follows, I will argue that the illustrated three constructions convey that the described eventuality has the property associated with the D/L-class predicate not only in the world of evaluation, but also in other worlds delimited by an accessibility relation based on the similarity (between worlds); in other words, their meanings involve a metaphysical necessity claim. A central motivation for this proposal is what is called the ‘embeddability puzzle’ in the literature, which will be explained presently.
2. The embeddability puzzle

A proper semantic analysis of the three constructions need to account for what Oshima (2009) calls the ‘embeddability puzzle’. As observed by Wilkinson (1970) and Barker (2002), the ‘Adj + to Inf’ and ‘Adj + of NP’ constructions resist embedding under a predicate of intention, desire, or command; the AOAdv construction does not exhibit this property. Examples (12)–(15) illustrate these points.

(12) a. Pat asked Rick [to be bold].
   b. #Pat asked Rick [to be bold to jump off the cliff].

(13) a. I wanted [Claire to be lucky].
    b. #I wanted [Claire to be lucky to get that job].

(14) a. Ann intended [to be rude (by being utterly honest)].
    b. #Ann intended [to be rude to be utterly honest].
    cf. Ann intended [to, rudely, be utterly honest].

(15) a. Mike wanted [Nancy to be kind].
    b. #Mike wanted [it to be kind of Nancy to drive him to the airport].
    cf. Mike wanted [Nancy to, kindly, drive him to the airport].

The two constructions actually resist embedding under a wider class of, if not all kinds of, prioritizing-modal (deontic, bouletic, teleological, ...) operators, while they allow embedding under epistemic-modal operators rather freely.

(16) a. #It is obligatory that John {is/be} wise to take the bus.
    b. #John was permitted to be wise to take the bus.

(17) a. It is {likely/plausible} that John was wise to take the bus.
    b. It was {probably/certainly} wise of John to take the bus.

3. The ‘hidden conditional’ approach

Motivated by the embeddability puzzle, in Oshima (2009) it is proposed that the three constructions ascribe a property (concerning disposition or luckiness) to the Agent, while also conveying an epistemic modal meaning, (2a) and (2b,c), for example, are assigned meanings along the lines of (18) and (19), respectively.

(18) proffered: ‘John took the bus.’
    non-proffered: ‘If John took the bus, then he must have been transitorily wise.’

(19) proffered: ‘If John took the bus, then he must have been transitorily wise.’
    non-proffered: ‘John took the bus.’

In more general terms, it is claimed that the three constructions involve (20) either as a proffered or non-proffered semantic component, where \( \Box_E \) is an epistemic necessity operator.
(20) \[\Box e_1 [P_{\text{act}}(a)(e_1) \rightarrow \exists e_2 [\text{transitorily}(P_{\text{eval}})(a)(e_2)]]\]

Under this analysis, it is not surprising that the ‘Adj + to Inf’ and ‘Adj + of’ constructions cannot be embedded under predicates of desire, request, etc., as this is the pattern shared by epistemic modal statements in general; in (21)/(22), it is intended that must receives the epistemic, rather than prioritizing (deontic), interpretation.

(21) a. #I wanted John to be such that he must be rich.
    b. #I wanted it to be the case that John must be rich.
    cf. I wanted it to be the case that John is rich.

(22) a. #I asked John to be such that he must be rich.
    b. #I asked that John must be rich.
    cf. I asked that John be rich.

The observation that the AOAdv construction allows embedding is not problematic, as generally non-proffered meaning is not construed as part of the target of a prioritizing-modal operator.

Ernst (2002: 54–62; see also Kubota 2015) proposes a similar analysis for D-class Agent-oriented adverbs, which involves inference from an eventuality’s holding to its Agent’s having a certain property. According to his claim, the semantic contribution of wisely in (2a) is roughly as follows:

(23) The described eventuality of taking the bus warrants positing (more) wisdom in the agent John (than the norm for eventualities in general).

Martin (2015), however, points out an empirical flaw in Oshima’s (2009) analysis, which Ernst’s (2002) too suffers from. Namely, it supports certain intuitively invalid inferences, such as the one in (4).

(24) premises: (i) There is a man-eating monster X, who only eats people who are (at least transitorily) wise; (ii) X ate Pat.

conclusion: {Wisely, Pat was eaten by X. / Pat was wise to be eaten by X. / It was wise of Pat to be eaten by X.}

Martin proposes to amend (20) with the relation of ‘manifestation’ between a quality (disposition) and an action. She formulates her idea as in (25), adopting a neo-Davidsonian framework: Manifest(s, e) is to be read as: ‘State s manifests itself through action e’.

(25) \[\exists e_1 [P_{\text{act}}(a)(e_1) \land \text{Agent}(a, e_1) \land \Box e_2 [\forall e_3 [P_{\text{act}}(e_2) \land \text{Agent}(a, e_2) \rightarrow \exists s_1 [P_{\text{eval}}(s_1) \land \text{Holder}(a, s_1) \land \text{Manifest}(s_1, e_2)]]]\]

Although empirically more adequate, the semantic representation proposed by Martin is highly complicated and seems rather ad hoc, the relation of Manifest not being independently motivated. This is not to say that Oshima’s or Ernst’s version is simple; they are already alarmingly complicated, and if an additional complication needs to be introduced
to make them work, that makes it very tempting to seek a simpler, alternative solution.¹ In the following, I will propose such.

4. Proposal: Ascription of a necessary property to an eventuality

In brief, my proposal is that the three constructions convey that the described eventuality has the property associated with the D/L-class predicate (i.e., being wise, lucky, etc.) not only in the world of evaluation, but also in other worlds delimited by an accessibility relation based on the similarity (between worlds). That is, their meanings involve a necessity claim, in a way similar as (25a,b) do.

(26a) (Not surprisingly, John passed the math exam. He is a math genius.)
    He could not have failed it.

(26b) If John had taken the math exam, he would (surely) have passed it.

(26a) asserts that John’s passing the exam was a (variety of) metaphysical necessity. He passed it not only in the actual world, but also in others similar to it. In some such other worlds, he may have had a mild hangover. In others, the room of the exam may have been a little noisy. But such minor contingencies would not have affected the outcome. On the other hand, in worlds that are dissimilar enough from the actual one, e.g., where John did not get to go to school, the outcome may well have been different.

Counterfactuals like (26b) too are commonly taken to involve a metaphysical necessity. I take the logical representation of (26a,b) to be along the lines of (27a,b); Similar∗(w₁, w₂, p) is to be read as “w₁ and w₂ are similar in all respects except that p holds in w₁ but not necessarily in w₂”.

(27a) \[ \lambda w₁[\forall w₂[\text{Similar}(w₁, w₂) \Rightarrow \exists e₁[\text{fail-the-exam}(w₂, e₁, \text{john})]]] \]

(27b) \[ \lambda w₁[\forall w₂[\text{Similar}(w₁, w₂, \lambda w₂[\exists e₁[\text{take-the-exam}(w₂, e₁, \text{john})]]]) \]

I propose that the AOAdv construction (28a) conventionally implicates that Edy’s act of offering Meg a ride could not not have been not wise (in comparison to some other actions). Its logical form will be along the lines of (28b), where shading indicates the non-proffered status (see, e.g., Oshima 2016, forthcoming for a more sophisticated way to represent the proffered/non-proffered distinction).

(28a) Politely, Edy offered Meg a ride.

(28b) \[ \lambda w₁[\exists e₁[\text{offer-a-ride}(w₁, e₁, \text{edy, meg}) \land \forall w₂[\text{Similar}(w₁, w₂) \Rightarrow \exists e₂[\text{polite}(w₁, w₂, e₂, e₁)])]] \]

(28a) conveys not only that the offer was a polite act in the actual world, but also that it was (or its counterparts were) polite in other similar worlds. In some of them, the offer may have been made slightly earlier or later than it actually was. In some others, Edy’s tone of voice may have been friendlier, or less friendly, than it actually was. In any of such variant

¹ Different lines of analysis were/are proposed by McConell-Ginet (1982) and Barker (2002); see Geuder (2002) and Kubota (2015) for critical review of the former, and Oshima (2009) of the latter.
scenarios, the (act of making an) offer would (still) count as a polite action.

For the ‘Adj + to Inf’ construction, I propose a similar analysis where the proffered and
non-proffered contents are switched.

\[ (29) \]
\begin{align*}
  a. & \quad \text{Edy was polite to offer Meg a ride.} \\
  b. & \quad \lambda w_1 \exists e_1 \{ \text{offer-a-ride}(w_1, e_1, \text{edy}, \text{meg}) \land \\
  & \quad \forall w_2 \{ \text{Similar}(w_1, w_2) \rightarrow \exists e_2 \{ \text{polite}(w_2, e_2, e_1) \} \} \} \\
\end{align*}

The meaning of the ‘Adj + of’ NP construction is minimally different from that of the
‘Adj + to Inf’ construction in that ‘\( P_{\text{adj}}(a) \)’ is presupposed; ‘\( \text{CG}(p) \)’ is to be read as ‘It is
common ground that \( p \).’

\[ (30) \]
\begin{align*}
  a. & \quad \text{It was polite of Edy to offer Meg a ride.} \\
  b. & \quad \lambda w_1 \exists e_1 \{ \text{CG}(\lambda w_2 \{ \text{offer-a-ride}(w_2, e_1, \text{edy}, \text{meg}) \}) \land \\
  & \quad \forall w_2 \{ \text{Similar}(w_1, w_2) \rightarrow \exists e_2 \{ \text{polite}(w_2, e_2, e_1) \} \} \} \\
\end{align*}

The proposed analysis explains our intuition that, to judge the truth and felicit
y of (28a), (29a), and

(30a), one only needs to know whether Edy offered Meg a ride or not, and does not need to
know whether Edy said, say, ‘It would be my pleasure to give you a ride.’ in a friendly tone,
or ‘I can give you a ride if you want.’ rather curtly. Importantly, such details do matter when
a D-class adjective is used as a regular manner adverb or an adjective characterizing an entity,
as in: Edy offered Meg a ride politely and Edy was polite when he offered Meg a ride.

What exactly makes two worlds ‘similar (enough),’ in different types of modal
statements and in different kinds of contexts, is a broad and intricate question concerning the
general semantics of modals (including counterfactuals and generics), which I cannot do full
justice to here. I will address it briefly, however, in the following section.

5. A solution to the embeddability puzzle

As mentioned in Section 3, epistemic modals cannot be embedded under a prioritizing-modal
operator (\#It is obligatory that he will probably come). How about metaphysical modals?

It appears that the embeddability of a metaphysical modal depends on how restrictive
the accessibility relation involved is. The accessibility relation relevant to the interpretation of
could, would, etc. is rather flexible. In (26a), for example, the speaker adopts a relatively
restrictive one, which only picks up worlds fairly similar to the actual one. One may refute its
truth by imposing a looser (more permissive) one, which covers less realistic worlds.

\[ (31) \]
(Metaphysically speaking.) John could have failed the exam. Some extraterrestrial
entity could have swapped his brain with that of a frog right before the exam.

When the accessibility relation is constrained weekly (if at all), embedding of a
metaphysical modal leads to sheer oddness.

\[ (32) \]
\begin{align*}
  a. & \quad \# \text{The king asked that a building could (not) be taller than itself.} \\
  b. & \quad \# \text{It is imperative that a building could (not) be taller than itself.} \\
\end{align*}
With a more restrictive accessibility relation, embedding appears to become more tolerable.

(33) (There are no frogs around the royal palace. There could not be any. Last year, the king ordered his gardeners to exterminate frogs within and in the vicinity of the palace, because the young princess is very scared of them. The mission was duly accomplished.)

(?) {The king asked/it is imperative} that there could not be any frogs around the royal palace.

Clauses claiming that it is a metaphysical necessity that a certain eventuality has the property associated with a D/L-class predicate resist embedding. The following pairs illustrate this point.

(34) a. The director asked [that Frank’s (act of) transporting the explosive be not careless].
   b. ?The director asked [that Frank’s (act of) transporting the explosive could not be careless].

(35) a. The president wanted Emma’s (act of) greeting the diplomat [to be such that it may not/ is not allowed to] be video-recorded].
   b. ?The president wanted Emma’s (act of) greeting the diplomat [to be such that it could not be rude].

(36) a. It is imperative [that Gina’s (act of) nominating the next president will not be stupid].
   b. ?It is imperative [that Gina’s (act of) nominating the next president could not be stupid].

Generic statements, such as Birds lay eggs and It is dangerous to drive when tired, too are commonly held to involve metaphysical modality (e.g. Cohen 1999, Greenberg 2003). It can be shown that clauses where a D/L-class predicate characterizes a certain genus of eventualities resist embedding.

(37) **intended meaning:** ‘The governor intended to make people find it stupid to try to evade taxes (by imposing severe punishments, etc.).’
   a. ?The governor intended (for) it to be stupid to try to evade taxes.
   b. ?The governor intended (for) the act of trying to evade taxes to be stupid.

---

2 Cohen (1999: 17) illustrates this point with the following example. She points out that () will be judged as false when it is true by mere coincidence (rather than due to some social convention) that all supreme court justices have or had an even social security number.

(i) Supreme court justices have an even social security number.

This suggests that a generic statement of the form: ‘α’s are P’ is not only about what the actual instances of α are like, but also makes reference to their counterparts in some other worlds similar to the actual one.
(38) intended meaning: ‘Henry wants people to consider snorting a polite gesture.’
   a.  ?Henry wants it to be polite to snort.
   b.  ?Henry wants the act of snorting to be polite.

(39) intended meaning: ‘The king asked people to find it fortunate to serve the country as a soldier.’
   ?The king asked that it be fortunate to serve the country as a soldier.

If a governor believes that it is not stupid to evade tax (because one has a good chance of benefitting from it, etc.), it is fully sensible for him to have the desire to, and take an action to, make it not the case. However, this cannot be readily expressed by a statement of the form: The governor intends/wants/asks p.

Under the analysis proposed in the previous section, the ‘Adj + to Inf’ and ‘Adj + of NP’ constructions precisely claim (as a proffered meaning) that it is a metaphysical necessity that a certain eventuality (a’s Pr-thing) has the property associated with a D/L-class predicate. Their resistance to embedding under a prioritizing modal can thus be taken to have the same root as the unacceptability of (34b), (35b) and (36b), as well as that of (37)–(39).

It should be noted that the unacceptability of sentences like (12b), (13b), (14b), (15b), and (16a,b) appears to be somewhat more acute than that of (34b), (37a,b), etc. A plausible cause of this is that the ‘Adj + to Inf’ and ‘Adj + of NP’ constructions require that the involved accessibility relation be a relatively permissive one, while modal auxiliaries like could and generic statements allow it to be a stricter one. (Recall the point made above: The more restrictive the accessibility relation is, the more readily a metaphysical modal allows embedding under a prioritizing-modal operator.)

It is also worth noting that the acceptability of sentences of the same form as (12b), (13b), etc. improves with appropriate contextualization, perhaps to a degree comparable to that of (34b), (37), etc.

(40) intended meaning: ‘The governor wants the state of affairs to be such that people will consider the merchants’ acts of trying to evade taxes to be stupid.’
   ??The governor wanted those merchants to be stupid to try to evade taxes.

(41) intended meaning: ‘The king asked that the state of affairs be changed so that people would consider the young soldiers to be fortunate to serve the country.’
   ??The king asked that the young soldiers be fortunate to serve the country.

6. Conclusion

I presented a novel semantic analysis of the three constructions involving a predicate (adjective or adverb) of disposition or luck: (i) the AOAdv construction, (ii) the ‘Adj + to Inf’ construction, and (iii) the ‘Adj + of NP’ construction. I argued that in these constructions, what is evaluated as wise, lucky, etc., are actions (eventualities with a sentient Agent), rather than entities, and that this evaluation is ascription of a metaphysically necessary property to an action. The proposed analysis provides a solution to the observation that the ‘Adj + to Inf’ and the ‘Adj + of NP’ constructions cannot be embedded under prioritizing-modal operators, including predicates of intention, desire, and command (the ‘embeddability puzzle’), utilizing only the independently motivated apparatus for the semantic representation of various modal
constructions including counterfactuals and generics.

References

1. **Issue: Association with Focus and the C-command Condition**

The subject of this paper is Japanese focus particles, such as additive *mo* ‘also’. One of their assumed properties is that they get associated with a focus, just as English focus adverbs such as *even* and *only* do (e.g., Jackendoff 1972, Rooth 1985). First, take it for granted that the focus of a sentence is a constituent that contains an intonational prominence. Then, when we say that a particle gets associated with a focus, it means that the particle induces an inference on an alternative to what the focus denotes. For example, consider (1), assuming with Aoyagi (1998) that the particle *mo* is attached to the vP.

(1) John-wa [ep *syasir-o yaburi]-mo si-ta.  
John-Top photo-Acc break-also do-Past  
‘John also broke the photo.’

In this example, *mo* may induce at least three different inferences, according to which constituent is identified with the focus. This point is illustrated by the paradigm in (2), where intonationally prominent constituents are in boldface and those which are identified with the foci are boxed.

(2) a. John-wa [ep *syasir-o yaburi]-mo si-ta.  
(b) John-Top photo-Acc break-also do-Past  
(focus = V)  

b. John-wa [ep *syasir-o yaburi]-mo si-ta.  
(c) John-Top photo-Acc break-also do-Past  
(focus = object)  

c. John-wa [ep *syasir-o yaburi]-mo si-ta.  
(d) John-Top photo-Acc break-also do-Past  
(focus = vP)  

The foci in (2a), (2b), and (2c) are identified with the verb V, the object NP, and the vP, respectively, and this identification is possible, since all the constituents contain an intonational prominence. In (2a), *mo* involves an alternative to the V, and adds the inference that John did something else to the photo than breaking it (e.g., throwing it to the ground). In (2b), *mo* involves an alternative to the object NP, and adds the inference that John broke something else than the photo (e.g., a letter). In (2c), *mo* involves an alternative to the vP, and adds the inference that John did something else than breaking the photo (e.g., throwing a letter to the ground). In this way, if *mo* is associated with a different focus, it introduces a different inference.

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Importantly, it has been assumed in the literature that focus association in Japanese is conditioned by c-command; that is, a focus particle may only trigger downward association, in the sense that it must c-command its focus associate (e.g., Aoyagi 1998, Kotani 2008). However, while the c-command condition has been shown to work in English (e.g., Jackendoff 1972; but see Erlewine 2014 for important discussion), its validity is not clear for Japanese. For instance, as observed by Kuroda (1965) and Shudo (2002), Japanese allows upward association, which is a pattern where the particle does not c-command, and is dominated by the focus. An example of upward association is given in (3); here we assume that the subject NP is base-generated at the edge of vP (e.g., Kuroda 1988).

(3) \[ \text{TP [vP [nF John-mo] [v piano-o] hita-ita].} \]
   \hspace{1cm} \text{John-also piano-Acc play-Past}
   \hspace{1cm} \text{‘John also played the piano.’} \]

In this structure, mo only c-commands the subject NP; it does not c-command, and is dominated by the vP, for example. Thus, the c-command condition predicts that mo can only get associated with the subject NP. This is not the case. While mo can indeed get associated with the subject NP as shown in (4a), it can also get associated with the vP as shown in (4b); (4b) is as acceptable a discourse as (4a).

(4) a. Kyo-wa Bill-ga piano-o hita-ita. So-site John-mo piano-o hita-ita
   today-Top Bill-Nom piano-Acc play-Past and John-also piano-Acc play-Past
   ‘Today, Bill played the piano, and John also played the piano.’

b. Kyo-wa Bill-ga aria-o uta-ta. So-site John-mo piano-o hita-ita
   today-Top Bill-Nom aria-Acc sing-Past and John-also piano-Acc play-Past
   ‘Today, Bill sang an aria, and John also played the piano.’

The point is that, in (4b), mo is not associated with the subject NP, because it does not force the inference that someone else than John played the piano; (4b) is acceptable even if only John played the piano. Rather, mo seems to be associated with the vP, since it only requires some parallelism between the events described by the vPs in the first and second clauses. Note that upward association is not limited to the case of subject-mo. For example, consider (5), where mo is attached to object NPs. Here too, mo can get associated, not only with its sister NP, but also with the vP, as shown in (5b).

(5) a. Kyo-wa John-ga giita-o hita-ita. So-site kare-wa piano-mo hita-ita
   today-Top John-Nom guitar-Acc play-Past and he-Top piano-also play-Past
   ‘Today, John played the guitar, and he also played the piano.’

b. Kyo-wa Bill-ga aria-o uta-ta. So-site John-ga piano-mo hita-ita
   today-Top Bill-Nom aria-Acc sing-Past and John-Nom piano-also play-Past
   ‘Today, Bill sang an aria, and John also played the piano.’

In (5b), mo forces no inference on an alternative to the referent of the object NP; (5b) is acceptable even if John played no other instrument than the piano. Rather, mo appears to add the inference that there was an event parallel to that of John’s playing the piano, which suggests that mo is associated with the vP. Given these examples, therefore, the pattern of upward association is general enough, where the c-command condition is apparently violated.

However, the c-command condition has been maintained in the literature. For example, Aoyagi (1998) updates Kuroda’s (1965) transformational rules and proposes that some focus particles in Jap
anese can undergo covert particle raising. In particular, Aoyagi proposes that the particle *mo* can be covertly adjoined to the head T, as schematized below.

(6)  

\[
\text{Covert Mo-to-T Raising} \\
\text{[TP } [v_p \ldots \text{NP-}L\ldots ] T-mo \]
\]

This covert raising allows *mo* to extend its c-command domain, even when *mo* overtly occurs within vP, it can covertly move to the head T, and c-command vP. Thus, *mo* is predicted to potentially get associated with any constituent within the complement of T. This is one possible way to accommodate the ease of upward association without abandoning the c-command condition.

The goal of this paper is to argue against this sort of syntactic approach to upward association; namely, we argue that covert particle raising should be eliminated together with the c-command condition. To this end, the paper is organized as follows. Section 2 points out two empirical problems with covert particle raising, demonstrating that it overgenerates. Section 3 develops an alternative approach to upward association, based on the semantics of the particle *mo*. In particular, we propose a new meaning of *mo* by introducing Krifka’s (1998) event semantics and Szabolcsi’s (2015) postpositional semantics. Section 4 concludes with some prospects for the future research.

2. Data: Empirical Problems with the Syntactic Approach

There are at least two problems with the syntactic approach based on covert particle raising. First, we note that it predicts the availability of the third association pattern, which we call sideward association. As shown in (7), this is one of the patterns that covert Mo-to-T raising should logically derive.

(7)

In this structure, *mo* is overtly attached to the subject NP, and downward association (7a) and upward association (7b) are possible, as we have shown above. The question is whether sideward association (7c) is possible; for example, can *mo* get associated with the focused object NP when it is attached to the subject NP? Under the syntactic approach, it should be possible, because *mo* becomes able to c-command the object NP after it is covertly raised to T.

However, the prediction is not borne out. For instance, consider the contrast in (8); in (8a), *mo* is overtly attached to the subject NP, whereas in (8b), it is covertly attached to the object NP.

\[1\] See also Kotani (2008) for a different implementation of Kuroda’s (1965) approach. Although we do not review Kotani’s proposal, we believe that it is faced with the same criticism we raise for Aoyagi’s proposal.
today-Top John-Nom guitar-Acc play-Past and he-Top piano-Acc play-Past
‘Today, John played the guitar, and he also played the piano.’

b. Kyō-wa John-ga *gitar-o hii-ta. Sozite kare-wo piano-wo hii-ta
today-Top John-Nom guitar-Acc play-Past and he-Top piano-also play-Past
‘Today, John played the guitar, and he also played the piano.’

Discourse (8a) is simply unacceptable, and it can never be interpreted in the same way as discourse (8b) is, where *mo successfully induces an object-association reading. That is, (8a) can only induce a subject-association reading, forcing the truth of the inference that someone else than the referent of the pronoun kare, played the piano. This inference is not compatible with the context, since the pronoun refers to John, and the context does not provide any other person than John. Thus, it is impossible for sideward association to hold, and this fact reveals a limitation with covert particle raising.\(^2\)

The second problem with the syntactic approach is that it predicts the availability of covert repair, by which we mean that covert Mo-to-T raising should allow *mo to avoid being interpreted in its overt position. One testing ground for this prediction is provided by universal quantifiers (UQ) such as zen’in ‘everyone’. First, the contrast in (9) shows that *mo cannot be overtly attached to a bare UQ.

today-Top Bill-only run-plan-be-Past-but after-all everyone-Nom run-Past
‘Today, only Bill was supposed to run, but after all, everyone ran.’

today-Top Bill-only run-plan-be-Past-but after-all everyone-also run-Past
‘Today, only Bill was supposed to run, but after all, everyone also ran.’

The question is about this UQ-*mo construction; what happens if an upward vP-association reading is forced in the UQ-*mo construction? Under the syntactic approach, it is predicted that covert repair should be possible, improving the status of the UQ-*mo construction, since covert Mo-to-T raising should allow *mo to get interpreted in a different position than next to its sister UQ.

Again, the prediction is not borne out. For instance, consider the contrast in (10); in (10a), *mo is overtly attached to the subject UQ, whereas in (10b), it is overtly attached to the vP.

(10) a. * Kyō-wa Bill-deke ari-e-wo uta-ta. Sozite zen’in-wo piano-wo hii-ta
today-Top Bill-Nom aria-Acc sing-Past and everyone-also piano-Acc play-Past
‘Today, Bill sang an aria, and everyone also played the piano.’

b. Kyō-wa Bill-deke ari-e-wo uta-ta. Sozite *zen’in-wo piano-wo hiki-wo-sita
today-Top Bill-Nom aria-Acc sing-Past and everyone-Nom piano-Acc play-also-did
‘Today, Bill sang an aria, and everyone also played the piano.’

\(^2\) In fact, Aoyagi (1998) himself notes the problem of sideward association, and attempts to overcome it by positing a condition on focus assignment, which can be summarized as follows (see Aoyagi 1998: 172-4); (i) a focus particle must copy its focus-feature onto a constituent that it c-commands at overt syntax, and (ii) the focus must be identified with one of the constituents which dominate the copied focus-feature. This focus assignment condition can derive the unacceptability of (8a), because *mo only c-commands the subject NP at overt syntax, and cannot assign its focus-feature to the object NP, which prevents identifying the object NP with the focus. However, this kind of condition is a stipulation at best, because focus assignment is a procedure independent of the existence of focus particles; regardless of whether a sentence contains a focus particle or not, focus assignment must apply in order to determine which constituent is the focus of the sentence. In short, it is not clear what requires a focus particle to copy its focus-feature onto others elements.
Discourse (10a) is not acceptable, but discourse (10b) is. The problem for the syntactic approach is that, if covert Mo-to-T raising is possible in (10a), *mo* should be able to get interpreted in a different position than next to the UQ, as is the case with (10b). Thus, although we do not analyze the case of \( \nu P \text{-}mo \), the contrast in (10) shows that covert repair is also impossible.

To summarize, the syntactic approach has at least two empirical problems; that is, it cannot account for why sideward association and covert repair are impossible, although they should be possible with covert particle raising. It is therefore concluded that covert particle raising overgenerates and should be eliminated altogether. Importantly, this conclusion entails that the e-command condition should also be abandoned, because it is already challenged by the existence of upward association; the e-command condition has no account of its availability, once covert particle raising is denied.

### 3. Claim: An Event-based Postpositional Approach

In this section, we develop a semantic approach to association with focus in Japanese. Note that any successful approach must answer at least three questions; (i) why upward association is possible; (ii) why sideward association is impossible; and (iii) why covert repair is impossible. Given this, we propose a new denotation of NP-*mo* within Krifka’s (1998) event semantics, assuming that the set of entities is divided into two sets of *individuals* and *eventualities*, with the following variables available.

\[
\begin{align*}
(11) & \quad \text{a. } x, y, \ldots \quad \text{are variables over individuals} & \text{(type } e) \\
& \quad \text{b. } e, e', \ldots \quad \text{are variables over eventualities} & \text{(type } v) \\
& \quad \text{c. } P, P', \ldots \quad \text{are variables over event properties} & \text{(type } \langle v, P \rangle) \\
& \quad \text{d. } R, R', \ldots \quad \text{are variables over thematic relations} & \text{(type } \langle e, \langle v, t \rangle \rangle) \\
& \quad \text{e. } K, K', \ldots \quad \text{are variables over nominal quantifiers} & \text{(type } \langle e, \langle v, t \rangle \rangle, \langle v, t \rangle \rangle)
\end{align*}
\]

Importantly, we assume with Krifka (1998) that the set of entities is mereologically structured. That is, the set of entities is closed under the operation \(*\text{Join} \otimes\) which means that if \(a\) and \(b\) are entities, then the join of \(a\) and \(b\) (i.e., \(a \otimes b\)) is also an entity. Also, the set of entities is organized by the partial-order relation *Part-of \(\leq\)*, whereby any two entities \(a\) and \(b\) are part of their join \(a \otimes b\). On the basis of this, we adopt Krifka’s (1998) hypothesis that all thematic relations \(R\) are *cumulative* in the following sense.

\[
(12) \quad \text{Any thematic relation } R \text{ is cumulative if} \quad \forall x \forall y \forall e \forall e' \quad [R(x)(e) \land R(y)(e') \rightarrow R(x \otimes y)(e \otimes e')].
\]

This property means that if a thematic relation \(R\) holds both between \(x\) and \(e\) and between \(y\) and \(e'\), then the same thematic relation \(R\) also holds between \(x \otimes y\) and \(e \otimes e'\). For example, if \(e\) is an event of playing an instrument \(x\), and \(e'\) is an event of playing an instrument \(y\), then \(e \otimes e'\) is an event of playing \(x \otimes y\). As we will show later, this cumulative property of thematic relations plays a crucial role in checking whether the inference induced by *mo* is satisfied by the context or not.

Let us begin by considering the semantic type of NP-*mo*. While we agree with Shimoyama (2006), Yatsushiro (2009), and Mitrović and Sauerland (2016) that NP-*mo* as a whole is a quantifier, we do not adopt their assumption that the particle *mo* is a determiner, which is a function from predicates to quantifiers. Rather, we suggest that *mo* is a function from quantifiers to quantifiers, an expression of type \(\langle\langle e, \langle v, t \rangle \rangle, \langle v, t \rangle \rangle, \langle\langle e, \langle v, t \rangle \rangle, \langle v, t \rangle \rangle\rangle\). This treatment is empirically motivated. For instance, *mo* can be combined with a quantifier, as shown in (13).$^3$

---

$^3$ The author is indebted to Yuto Hirayama (p.e.) for pointing out illustrative data such as presented in (13).
Given this fact, we propose the at-issue content of the particle *mo* as shown in (14).

\[ [m o] = \lambda.K.\lambda.e.\.K(R)(e) \]
(for the NP-*mo* construction)

This definition amounts to saying that *mo* is an identity function that takes a quantifier \( K \) and returns the same quantifier \( K \). Note that the argument \( K \) need not be an inherent quantifier (e.g., *everyone*), because under Partee's (1987) type-shifting theory, any expression of type \( e \) can be a quantifier. Thus, if the proper name *John* is type-shifted to a quantifier, it denotes the function mapping a thematic relation \( R \) that the individual \( j \) holds, to the set of every event \( e \) such that \( j \) holds the relation \( R \) to \( e \) (i.e., \( \lambda.j.e.\.R(j)(e) \)). Let us now apply the at-issue content of *mo* to example (3), repeated here.

\[ ([\text{TP} [\text{VP} [\text{John}\text{-}mo \ [v \ \text{piano}\text{-}o \ \text{hit}]\text{-}ta].]] \]
John-also \ piano-Acc \ play-Past

First, suppose that *mo* and its sister NP form a quantificational phrase (QP), and are combined semantically by the composition rule *Function Application* (Heim and Kratzer 1998), as depicted below.

```
\[ [\text{QP}] = [\text{mo}](\text{[John]}) \]
\[ = \lambda.K.\lambda.e.\.K(R)(e) [\lambda.R.\lambda.e. [\lambda.j.e. [R(j)(e)]]]) \]
\[ = \lambda.R.\lambda.e. [\lambda.j.e. [R(j)(e)]] \]
\[ = \lambda.R.\lambda.e. [R(j)(e)] \]
```
(by function application)
(by lexical specification)
(by \( \lambda \)-conversion)
(by \( \lambda \)-conversion)
(by \( \lambda \)-conversion)

Then, the QP is applied to its sister \( v \). Here we assume that the light verb *v* encodes the thematic relation *Ag(ent)* (e.g., Kratzer 1996), and that the meaning of \( v \text{P} \) is composed as shown below.

\[ [\text{VP}] = [\text{play}](\text{[piano]}) \]
\[ = \lambda.x.\lambda.e. [\text{play}\{x\}(e)](\text{[piano]})) \]
\[ = \lambda.e. [\text{play}][\text{piano}](e) \]
\[ = \lambda.e. [\text{play}(p)(e)] \]
\[ [v] = [p](v) \]
\[ = \lambda.p.\lambda.e. [\text{Ag}(x)(e) \land P(e)](v) \]
\[ = \lambda.e. [\text{Ag}(x)(e) \land \text{play}(p)(e)] \]
\[ [\text{VP}] = [\text{QP}](v) \]
\[ = \lambda.x.\lambda.e. [\text{Ag}(x)(e)](v) \]
\[ = \lambda.e. [\text{Ag}(x)(e)] \land \text{play}(p)(e) \]

\[ 4 \text{ Departing from Kratzer (1996), we assume that the light verb *v* denotes } \lambda.P.\lambda.x.\lambda.e. [Ag(e)(x) \land P(e)]. \]
Setting aside the semantic contribution of the T head, which is irrelevant for our purpose, if the final output $[vP]$ is existentially closed, then it yields the proposition $\exists e. [\text{Ag}(j)(e) \land \text{play}(p)(e)]$, which means that there is an event $e$ such that $j(\text{John})$ is the agent of $e$ and $e$ is an event of playing $\text{piano}$. This is how the at-issue content of $\text{mo}$ derives an at-issue proposition.

Let us then consider the non-at-issue content of $\text{mo}$. We adopt Szabolcsi’s (2015) dynamic semantic view of $\text{mo}$, under which it imposes, not a presupposition, which is a condition on the input context, but a postsupposition, which is a condition on the output context.$^5$ Informally, the context of a discourse is the conjunction of every proposition that the speakers have accepted as true (cf. Stalnaker 1978), and the input context is a context that they have before one of them makes an assertion, while the output context is a context that the speakers have after one of them makes an assertion, including the latest assertion made. For example, consider discourse (4a), which is repeated below.

\begin{quote}
(4a)  a. Kyo-wa Bill-\text{ga} piano-o hitt-ta. \\
\hspace{1em}Sosite John-\text{mo} piano-o hitt-ta. \\
\hspace{1em}‘Today, Bill played the piano, and John also played the piano.’
\end{quote}

Before the second clause is uttered, the context at least includes the first clause, but once the second clause is uttered, the context is updated and includes the second clause, too. In other words, the output context of (4a) is the conjunction of at least two at-issue propositions given by the first and second clauses, which is represented as: $\exists e. [\text{Ag}(b)(e) \land \text{play}(p)(e)] \land \exists e'. [\text{Ag}(j)(e') \land \text{play}(p)(e')]$. Importantly, these two propositions derive another proposition, because all thematic relations, including $\text{Ag}$ and $\text{play}$, are cumulative. That is, since there are two events $e$, $e'$ such that $e$ is an event in which $b$ plays $p$, and $e'$ is an event in which $j$ plays $p$, it follows that there is an event $e''$ in which $b \mp j$ play $p \mp p$, where $e'' = e \mp e'$. Moreover, given that the join operation $\mp$ is idempotent as defined by Krifka (1998), it follows that $p \mp p = p$. Thus, the output context of (4a) can be described as follows.

\begin{quote}
(17)  The output context of (4a) entails: $\exists e''. [\text{Ag}(b \mp j)(e'') \land \text{play}(p)(e'')]$
\end{quote}

Then, the question is what postsupposition $\text{mo}$ imposes on this output context. We propose the non-at-issue content of $\text{mo}$ as shown in (18), which departs from Szabolcsi’s original semantics of $\text{mo}$, as it cannot give any account of upward association; see Szabolcsi (2015: 170, 20) for her proposal.

\begin{quote}
(18)  For any $K$ and any $R$, the postsupposition of $[\text{mo}](K)(R)$ is satisfied iff the output context entails $\exists K', \exists R'. [K' \subseteq K \land R \subseteq R' \land \exists e. [K'(R')(e)]]$.
\end{quote}

In words, the postsupposition of $[\text{mo}](K)(R)$ requires the output context to provide alternatives $K'$ and $R'$ such that $[a] K'$ is a proper subset of $K$, $[b] R$ is a subset of $R'$, and $[c] K'(R')(e)$ is true for some $e$.\footnote{Szabolcsi (2015) points out: some fact that cannot be captured by the standard view of $\text{mo}$ as a presupposition trigger, which leads her to propose a postsuppositional semantics. For details, see Szabolcsi (2015: 167-8).} In short, clause $[a]$ requires the alternative $K'$ to be distinct from and stronger

\begin{quote}
\footnote{The idempotent property of an operation $O$ is defined as follows; any two-place operation $O$ is idempotent iff, for any $x$, $O(x, x) = x$. That is, an idempotent operation, if the same elements are given, returns the same one.}
\end{quote}

\begin{quote}
\footnote{Note that, though the two relations $\subseteq, \subseteq$ are set-theoretical ones, they can be defined functionally as follows.

$\begin{array}{ll}
K \subseteq K' & \text{iff } K \neq K' \land \forall R \forall e. [K(R)(e) \rightarrow \exists e'. [e \leq e \land K'(R')(e)]] \\
R \subseteq R' & \text{iff } R \neq R' \forall K \forall e. [K(R)(e) \rightarrow \exists e'. [e \leq e \land K(R')(e)]]
\end{array}$

\end{quote}
than $K$. Thus, if $K$ is, say, [[most boys]], then $K'$ must be a distinct quantifier that “entails” [[most boys]]. For example, $K'$ may be identified with [[every boy]], but not with [[some boy]], because if every boy ran, it entails that most boys ran, but if some boy ran, it does not entail that most boys ran. On the other hand, clause [b] requires the alternative $R'$ to be identical to or a hyponym of $R$. For example, what is a hyponym of [[play the piano]] or [[sing an aria]]? It may be [[perform]], because if John played the piano or sang an aria, it entails that John performed (or gave a performance). Thus, if $R$ is [[play the piano]], the alternative $R'$ must be identical to [[play the piano]] or must be one of its potential hyponyms, such as [[perform]]. In a nutshell, clause [a] may be called a **Stronger Alternative Requirement**, and clause [b] may be called an **Analogueal Alternative Requirement**. Let us now consider the postsupposition for (4a), which is represented below, where $[v'] = \lambda x.\lambda e. [\text{Ag}(x)(e) \land \text{play}(p)(e)]$ (see (16)).

$$\exists e. ([\text{Bill} \& \text{John}]([v \ [\text{play the piano}]]) \langle e \rangle)$$

This postsupposition is satisfied by the output context of (4a), because it can generate alternatives $K'$, $R'$ that meet clauses [a], [b], and [c]. For example, suppose $K' = [\text{Bill} \& \text{John}] = \lambda \in.\lambda e. [\text{R}(b \oplus j)(e)]$, and $R' = [v \ [\text{play the piano}]] = \lambda x.\lambda e. [\text{Ag}(x)(e) \land \text{play}(p)(e)]$. These alternatives $K'$, $R'$ meet clauses [a] and [b], respectively; $K'$ is stronger than $[\text{John}]$, and $R'$ is identical to $[v']$. Then, once we identify the values of $K'$, $R'$ this way, it turns out that clause [c] conveys the following existential proposition.

$$\exists e. [\text{Ag}(b \oplus j)(e) \land \text{play}(p)(e)]$$

Importantly, this is equivalent to, and thus entailed by the output context of (4a) (see (17)). This result means that the postsupposition of $mo$ is satisfied, predicting that discourse (4a) is acceptable.

We now consider the case of upward association in (4b), which is repeated below.

(4) b. Kyō-wa Bill-ga aria-o uta-ta Sōsite John-no piano-o hiru-ta

Today-Top Bill-Nom aria-Nom sing-Past and John-also piano-Nom play-Past

“Today, Bill sang an aria, and John also played the piano.”

The question is why discourse (4b) is acceptable. First, the output context of (4b) may be regarded as $\exists e. [\text{Ag}(b)(e) \land \text{sing}(a)(e)] \land \exists e'. [\text{Ag}(j)(e) \land \text{play}(p)(e')]$. Still, it is important to note that these propositions entail $\exists e. [\text{Ag}(b)(e) \land \text{perform}(e)] \land \exists e'. [\text{Ag}(j)(e) \land \text{perform}(e')]$, since [[sing an aria]] and [[play the piano]] have [[perform]] as a hyponym; that is, it is assumable that, if someone sang an aria or played the piano, it entails that she performed. Thus, due to the cumulative nature of thematic relations, these deduced propositions entail the existence of an event $e''$ in which $b \oplus j$ perform. Thus, the output context of (4b) can be described as follows.

(20) The output context of (4b) entails: $\exists e'\,'. [\text{Ag}(b \oplus j)(e'') \land \text{perform}(e'')]$

8 We assume that the coordinator head $&$ denotes $\lambda x.\lambda y.\lambda R.\lambda e. [R(y\oplus x)(e)]$ (cf. Mitorvici and Sauerland 2016). Thus, given that [[Bill]] and [[John]] are of type $e$ here, $[\text{e} \langle [\text{John}] \langle [\text{Bill}] \rangle \rangle = \lambda R.\lambda e. [R([Bill] \oplus [John])(e)]$.

9 The importance of “hyponym inference” for the analysis of $mo$ is intensively discussed by Shudo (2002).
Then, the postsupposition of (4b) is as shown below, which is actually identical to that of (4a) in (19).

\[(21) \quad \text{The postsupposition of } [[\text{mo}]]([[\text{John}]])([[\text{v}}])) \text{ is satisfied iff}
\text{the output context entails } \exists K'. \forall K'. \left[ K' \subseteq [[\text{John}]] \land [[\text{v}}]] \subseteq R' \land \exists e. [K'(e)'] \right].\]

This postsupposition is entailed by the output context of (4b), because it can also derive alternatives \( K' \), \( R' \) that meet clauses [a], [b], and [c]. Let us suppose \( K' = [[\text{Bill & John}]] = \lambda e. R(bej(e)), \) and \( R' = [[\text{v}}][\text{perform}]] = \lambda x. \lambda e. [\text{Ag}(x)(e) \land \text{perform}(e)]. \) These alternatives \( K' \) and \( R' \) satisfy clauses [a] and [b], respectively; \( K' \) is stronger than [[\text{John}]], and \( R' \) is a hypernym of [[\text{v}}]]. With these values of \( K' \) and \( R' \), it follows that clause [c] expresses the following existential proposition.

\[\exists e. [[\text{Bill & John}]]([[\text{v}}][\text{perform}]])(e) \]
\[= \exists e. [\text{Ag}(bej(e)) \land \text{perform}(e)].\]

This proposition is equivalent to, and thus entailed by the output context of (4b) (see (20)). In other words, the postsupposition of \( \text{mo} \) is met, predicting that there is no problem with discourse (4b).

Now consider the problems of sideward association and covert repair. First, why is (8a) out?

(8) a. * Kyoto \( \text{John-ga} \) guitar-o hita-ta. Sosite karer-no \( \text{piano-o} \) hita-ta
\text{today-Top John-Nom guitar-Acc play-Past and he-Top piano-Acc play-Past}
\text{‘Today, John played the guitar, and he also played the piano.’}

Here the argument \( K \) of \( \text{mo} \), [karer], refers to [[\text{John}]], and there is no other person mentioned. That is why (8a) is out, as the output context does not offer any alternative \( K' \) that is stronger than [[\text{John}]]. Thus, (8a) should be improved if the speaker utters it by pointing at another person, say, Bill. This is the case, as shown in (22), where the subjects are assigned different indices.

(22) Kyoto \( \text{John-ga} \) guitar-o hita-ta. Sosite karer-no \( \text{piano-o} \) hita-ta
\text{today-Top John-Nom guitar-Acc play-Past and he-Top piano-Acc play-Past}
\text{‘Today, John played the guitar, and he also played the piano.’}

A similar account can be applied to the impossibility of covert repair. Let us consider (10a).

(10) a. * Kyoto \( \text{Bill-ga} \) aria-o utat-ta. Sosite \( \text{gen’in-no} \) piano-o hita-ta
\text{today-Top Bill-Nom aria-Acc sing-Past and everyone-also piano-Acc play-Past}
\text{‘Today, Bill sang an aria, and everyone also played the piano.’}

(10a) is out, because the argument \( K \) of \( \text{mo} \) is a UQ; it is logically impossible to obtain an alternative quantifier \( K' \) that is stronger than a UQ, whose quantificational force is the strongest. Here is a prediction: a partitive UQ like ‘everyone else’ should be good as the argument \( K \), as it has a stronger alternative \( K' \), i.e., ‘everyone’. This prediction is borne out, as shown in (23).

(23) Kyoto \( \text{Bill-ga} \) aria-o utat-ta. Sosite \( \text{nokori-no gen’in-no piano-o} \) hita-ta
\text{today-Top Bill-Nom aria-Acc sing-Past and rest-Gen-everyone-also piano-Acc play-Past}
\text{‘Today, Bill sang an aria, and everyone else also played the piano.’}
4. Conclusion: Some Prospects for the Future Research

We have shown that our semantic account of upward association by *mo* is more tenable than the syntactic account with covert particle raising. Here are two prospects for the future research. First, our account can be extended to the behavior of *mo*’s cross-linguistic counterparts, which can also trigger upward association, as shown by Szabolesi (2015). Second, as the e-command condition is falsified by the ease of upward association, it must be eliminated and derived from a theory of focus assignment. This shift is plausible in Schwarzhchild’s (1999) discourse-oriented framework, under which the contribution of focus is viewed as signaling “exemption from givenness”; that is, focused constituents need not be contextually given. We leave the demonstration of these points for the future research.

References


Revisiting Topic-Subject/Object Asymmetry from POP
Shin-ichi Tanigawa
Nagasaki University

1. Introduction

This paper revisits topicalization exemplified in (1) and (2) from the POP framework advocated by Chomsky (2013, 2015) by placing a special emphasis on the differences between topic-subjects and topic-objects.

(1) a. Him, Mary likes.
    b. I think that him, Mary likes.
(2) a. He likes Mary.
    b. I think that he likes Mary.

This paper argues that unlike topic-objects, topic-subjects lack overt movement to SPEC-C. Specifically, this paper elaborates on the analysis proposed by Tanigawa (2019), claiming that topic-subjects remain in SPEC-T due to the inheritance of a topic feature from C by T. This paper argues that this derivational difference triggers several syntactic differences between topic-subjects and topic-objects observed in the embedded clause. Finally, this paper provides some implications for the absence of string-vacuous movement from SPEC-T to SPEC-C.

This paper is organized as follows. Section 2 gives an overview of previous analyses regarding topicalization, suggesting that topic-subjects and topic-objects are located in different positions. Section 3 proposes analyses on topicalization based on the POP framework. This section discusses topic-subjects with a distinctive analysis where they remain in SPEC-T while a topic feature is inherited from C by T. Besides, this section analyzes embedded topicalization in terms of the CP-recursion analysis proposed by Watanabe (1993) in which the lower C, which serves as the phase head, head-raises to the upper C. It claims that embedded topic-subjects remain in SPEC-T due to the topic-feature inheritance from the lower C by T. Section 4 demonstrates the consequences and implications of the proposed analyses. It argues that the derivational differences between topic-objects and topic-subjects are responsible for a number of syntactic differences between the two types of topicalized elements. It also argues that string-vacuous movement from SPEC-T to SPEC-C is suspended in different types of A'-movement. Finally, section 5 makes some concluding remarks.

2. Previous analyses

Section 2 overviews some previous analyses on topicalization to suggest that unlike topic-objects, topic-subjects lack A'-movement to the C-domain.

It is widely accepted that topic-objects undergo A'-movement to SPEC-C. If the cartographic approach proposed by Rizzi (1997) is elaborated as in (3), this movement is accompanied by
agreement between topic features that are assigned to C and topic-objects.

(3) \([\text{CP} \: \text{him}_{\text{[Top]}} \: C_{\text{[Top]}} \: [\text{TP} \: \text{Mary} \: T \: \text{like} \: t_{\text{obj.}}]]\)

In (3), the topic feature \([\text{Top}]\) of the topic-object establishes a matching/agreement relationship with that of C by occupying SPEC-C. One would be tempted to insist that this analysis should be applied to topic-subjects as in (4), where the topic-subject moves from SPEC-T to SPEC-C for matching/agreement of the topic features.

(4) \([\text{CP} \: \text{he}_{\text{[Top]}} \: C_{\text{[Top]}} \: [\text{TP} \: t_{\text{subj.}} \: T \: \text{like} \: \text{Mary}]]\)

However, this analysis does not satisfactorily explain the difference between topic-subjects and topic-objects in anaphor binding. Consider (5).

(5) a. John, thinks that himself, Mary likes.
   b. *John, thinks that himself likes Mary. \(\text{(Lasnik and Saito (1992: 110-111))}\)

As Lasnik and Saito (1992) observe, unlike the embedded topic-subject, the embedded topic-object can be coreferential with the matrix subject. This implies that the two elements are located in different positions in the embedded clause. This observation leads Lasnik and Saito (1992) to the claim that topic-subjects remain in SPEC-T while topic-objects are dislocated to the A'-position above TP.\(^1\)

Agbayani (2006) provides a similar analysis for topic-subjects. Based on the observation of (5), he proposes the derivation in (6).\(^2\)

(6) \([\text{CP} \: \text{he}_{\text{[Top]}} \: C_{\text{[Top]}} \: [\text{TP} \: t_{\text{subject}} \: \text{like} \: \text{Mary}]]\)

In this analysis, only the topic feature \([\text{Top}]\) that the subject bears undergoes movement to the C-domain, while the topic subject \(\text{he}\) remains in SPEC-T. He assumes that the relevant feature movement is not accompanied by the physical or phonological movement of \(\text{he}\) because movement from SPEC-T to SPEC-C is string-vacuous and does not affect the phonological realization of the sentence.

3. Proposals

Section 3 proposes analyses of topicalization based on the POP framework. This section provides topic-subjects with a distinctive analysis where they remain in SPEC-T while a topic feature is inherited from C by T. This section also refutes standard analyses where topic-subjects undergo string-vacuous movement from SPEC-T to SPEC-C. Specifically, this section argues that the relevant string-vacuous movement is prohibited because it results in labeling failure. Furthermore, this section puts a special focus on embedded topicalization by adopting the CP-recursion analysis of Watanabe (1993). With the underlying assumption that the lower C, which serves as the phase head, head-raises to the upper C, this section claims that embedded topic-subjects remain in SPEC-T due to the topic-feature inheritance from the lower C by T.

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1 In the analysis of Lasnik and Saito (1992), topic-objects undergo A'-movement to the TP-adjoined position rather than SPEC-C.
2 Throughout this paper, traces of moved or inherited features are marked with special letters such as \([\text{[\_]}\).
3.1. Matrix topicalization

Adopting the POP framework, this paper resurrects the analysis provided by Lasnik and Saito (1992) and elaborates on the analysis provided by Tanigawa (2019) to propose different derivations for topic-subjects and topic-objects. As for topic-objects, the standard derivation in (7) is adopted where topic-objects undergo movement to SPEC-C.

(7) \[
\beta \ uTop_{him} \ C_{[\underline{\alpha} \ Mary \ u\phi]} \ T_{[\underline{\alpha} \ like \ t_{\text{obj.}}]} \]

Once topic-objects have moved to this position, an unvalued topic feature \([u\text{Top}]\) of topic-objects enters into an agreement relation with its valued counterpart \([\text{Top}]\) in C, whereby \(\{\beta \ DP, \ CP\}\) obtains the label of \(<\text{Top}, \text{Top}>\).

On the other hand, the distinctive derivation in (8) is proposed for topic-subjects.

(8) \[
\beta \ C_{[\underline{\alpha} \ he]} \ [\underline{\alpha} \ t_{\text{subj.}} \ T_{[\underline{\alpha} \ u\phi]} \ T_{\text{subj. like Mary}}] \]

Topic-subjects remain in SPEC-T instead of moving up to SPEC-C, and \([\text{Top}]\) is inherited from C by T concomitantly with unvalued \(\phi\)-features \([u\phi]\). Due to the topic-feature agreement, \(\{\alpha \ DP, \ TP\}\) receives the label of \(<\phi, \phi>\).

Here it is crucial to note that unlike (8), the derivation in (9), in which topic-subjects undergo string-vacuous movement from SPEC-T to SPEC-C, is infeasible due to labeling failure.

(9)* \[
\beta \ C_{[\underline{\alpha} \ he]} \ [\underline{\alpha} \ t_{\text{subj.}} \ T_{\text{subj. like Mary}}] \]

Chomsky (2013, 2015) states that, in the POP framework, all operations, except External Merge, apply at the phase level, and Chomsky (2015) suggests that such operations must be applied in some fixed order. With respect to the issue of order, this paper assumes with Chomsky (2015) that agreement and labeling occur posterior to feature inheritance and Internal Merge (movement). This order yields the derivation in (9), in which the subject \(he\) undergoes movement to SPEC-C and \([u\phi]\) is inherited by T prior to agreement and labeling. The relevant string-vacuous movement fails to induce \(\phi\)-agreement because topic-subjects, which bear \([\phi]\), have been dislocated from SPEC-T, while \([u\phi]\) has been inherited by T. Consequently, \(\{\alpha \ DP, \ TP\}\) remains unlabelled, and this labeling failure causes a crash of the derivation. Furthermore note that, concomitantly with \([u\text{Top}]\), \([u\phi]\) cannot remain in C under the POP framework because T in English is assumed to be a weak head. If \([u\phi]\) is not inherited by T, the non-head \(\alpha\) is never labeled, and this results in a crash of the derivation.

In fact, Chomsky (2015) proposes (10c) rather than (10b) as the derivation of \(wh\)-subjects.

(10) a. Who likes Mary?
    b. * \[
    \beta \ C_{[\underline{\alpha} \ who]} \ C_{[\underline{\alpha} \ T_{[\underline{\alpha} \ u\phi]} \ T_{\text{subj. like Mary}}]} \]
    c. \[
    \beta \ C_{[\underline{\alpha} \ who]} \ C_{[\underline{\alpha} \ T_{[\underline{\alpha} \ u\phi]} \ T_{\text{subj. like Mary}}]} \]

As in the case of (9), the derivation in (10b) is invalid in that string-vacuous movement prevents \(\{\alpha \ DP, \ TP\}\) from obtaining a label. Under the POP framework, topic-subjects and \(wh\)-subjects must be treated on a par as constructions rejecting string-vacuous movement from SPEC-T to SPEC-C.

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3.2. Embedded topicalization

This paper extends (7) and (8) to embedded topicalization by assuming with Watanabe (1993) that embedded topicalization has a CP-recursion structure where the lower head C1, which is realized as the complementizer that, head-raises to the higher head C2 while topicalized phrases are hosted in SPEC-C1. According to his CP-recursion analysis, sentence (11a) has the derivation in (11b).

(11) a. John thinks that him, Mary likes.
   b. John think [CP2 that C1 him] [CP1 Mary like] [TP him]

In terms of the POP framework, this paper reformulates the CP-recursion analysis and proposes the analyses in (13) for embedded topicalization.

(12) a. I think that him, Mary likes.
   b. I think that he likes Mary.
   b. I think [γ C1[α he] Top C2 [β he like] C1 [α Mary like] T like]

This paper assumes that, by bearing [uφ] and [Top], C1 counts as the phase head, according to the definition of the phase head as the original locus of features. As illustrated in (13a), topic-objects move up to SPEC-C1 while C1 retains [Top] and discharges [uφ] to T. Topic-subjects remain in SPEC-T while C1 discharges [Top] and [uφ] to T. In (13a) and (13b), α, which is the complement of the phase head C1, is transferred to the interfaces, whereby it is inaccessible to further operations. Once C2 merges with β, C1 head-raises to C2.

Here it is essential to highlight when and how agreement and labeling are implemented in embedded topicalization. Consider (14).

(14) [β him] C1[α Mary like] T like

Recall from (9) that all operations except for External Merge apply at the phase level and that agreement and labeling follow feature inheritance and Internal Merge (movement). In (14), the relevant agreement and labeling take place after [uφ] is discharged to T and the topic-object is displaced to SPEC-C1. At the phase level C1, [uTop] of the topic-object undergoes agreement with [Top] of C1, and {β DP, CP} receives the label of <Top, Top>. Even though C1 subsequently head-moves to C2, the label of {β DP, CP} i.e. <Top, Top> is not detached because it has already been fixed at the phase level C1.

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4 Watanabe (1993) claims that the CP-recursion structure must involve the head movement of C1 to C2 to ensure that the matrix verb directly selects not only the higher head C2 but also the lower head C1.

5 An anonymous reviewer wonders how sentence (ia) is ruled under the POP framework. This paper assumes with Chomsky (2015) that in (ia), the phase status of the embedded C is shifted down to T.

(i) a. Who do you think likes him?
   b. [β C[α who] T like him]
4. Consequences and implications

Section 4 demonstrates the consequences and implications of the proposed analyses. It shows that the structural and derivational differences between embedded topic-objects and topic-subjects yield a number of syntactic differences between the two types of elements such as anaphor binding, island, and extraction. Furthermore, it implies that string-vacuous movement from SPEC-T to SPEC-C is suspended in different types of A'-movement.

4.1. Consequences

The proposed analysis ensures that embedded topic-objects and topic-subjects exhibit several syntactic differences. This section highlights anaphor binding, island, and extraction. The difference regarding anaphor binding illustrated in (5), which is reproduced here in (15), is explained in terms of the Phase Impenetrability Condition (hereafter PIC) of Chomsky (2000).

(15) a. John, thinks that himself, Mary likes.
   b. *John, thinks that himself, likes Mary. (Lasnik and Saito (1992: 110-111))

(16) a. John think [γ C1+C2 [β himself[μTop]] tC1[Top] [α Mary[φ] T[μobj] ... tobj ...]]
   b. John think [γ C1+C2 [β tC1 [α himself[φ]] μTop] T[μobj][Top] like Mary]]

(17) Phase-Impenetrability Condition (PIC)

In phase α with head H, the domain of H is not accessible to operations outside α; only H and its edge are accessible to such operations. (Chomsky (2000: 108))

As shown in (16a) and (16b), C1 counts as the phase head, whereby its complement α is transferred to the interfaces. As long as the local domain of binding is reduced to the phase accessibility, embedded anaphors are accessible to their matrix antecedents only from the phase edge. Since the anaphor himself is located in SPEC-C1 only in the case of topic-objects, (15a)—and not (15b)—obeys Binding Condition A.

This paper also argues that the derivational difference as to whether topic phrases are hosted by SPEC-C or SPEC-T yields other instances of subject/object asymmetry in island and extraction. The asymmetry in island in (18) is explained in terms of PIC.

(18) a. *What do you think that to him, Mary gave?
   b. What do you think that he gave to Mary?

Topic-objects constitute an island for wh-movement because wh-phrases cannot be unbound from the transferred domain, as shown in (19).

(19) [γ C1γ μTop+C2 [β to himμTop] tC1 [α Mary[φ] T[μobj] give what tPP]]

Since C1 is the phase head in the embedded derivation, its complement α, which contains what, is transferred. Consequently, the wh-phrase cannot undergo movement to the matrix domain without violating PIC. If this analysis is correct, topic island is treated on a par with the wh-island as in (20a); that is, both are attributed to a PIC violation.

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label of {α DP, TP} is fixed at this phase level and continues to be maintained in the matrix phase. For this reason, movement from SPEC-T is permitted in (ia). Compare this derivation with (9).
(20) a. *What do you wonder how John repaired?

   b. [β how[what] C[α] |[Q] [α John[what] repair what]]

Note that in (20b), *what cannot move to the matrix clause without violating PIC because there is no way for wh to escape from the transferred domain.

In contrast, topic-subjects do not constitute an island for wh-movement because SPEC-C1 remains vacant as an escape hatch for wh-phrases.

(21) a. [β what[what] C1[α] [[SPEC]] [α he[what] give to Mary ]]
   b. [γ C1+C2 [β what[what]] C1[α] [[SPEC]] [α he[what] give to Mary ]]

As shown in (21a), the wh-phrase undergoes movement to SPEC-C1 at the phase level C1. The POP framework adopts Free Merge, under which Internal Merge (movement) as well as External Merge operates freely without any motivation such as agreement or edge feature. Under Free Merge, it is reasonable to claim that the wh-phrase is displaced to SPEC-C1 without any motivation. Since SPEC-C1 is defined as the phase edge, it is accessible to operations in the matrix clause, and this ensures that the wh-phrase reaches the final landing site, that is, SPEC-C in the matrix clause.

Finally, this section discusses the asymmetry in extraction exemplified in (22).

(22) a. ??Which athletes do you think that pictures of, Mary bought.
   b. *Which athletes do you think that pictures of are on sale.

Unfortunately, this paper cannot provide any explanations for why sentence (22b) is ungrammatical. Following the traditional generalization in the literature, this paper assumes that SPEC-T, by its very nature, strictly resists extraction while SPEC-C allows extraction. Here, it is essential to address one question: Why is extraction from topic-objects less worse than that from topic-subjects. This paper claims that again, this difference is attributed to whether or not PIC is observed. Illustrated below are derivations of (22a, b) and the structure of the topicalized element pictures of which athletes.

(23) a. [δ C[Q] ... [γ C1+C2 [β pictures of which athletes[what] C1[α] Mary ... ]]]
   b. [δ C[Q] ... [γ C1+C2 [β pictures of which athletes[what] C1[α] Mary ... ]]]
   c. [ D[what][uTop] [ pictures [ of which athletes[what] ]] ]

In (23a), the topic-object is located in SPEC-C1. Since this position is the phase edge, the topic-object is accessible to operations in the matrix clause. Namely, the wh-phrase is allowed to undergo movement to the matrix SPEC-C without violating PIC. The marginality of (22a) originates from the structure and the feature distribution of the topicalized element. As the internal structure of the topicalized element, this paper assumes (23c), in which D bears [uTop] while the wh-phrase which athletes bears an unvalued Q-feature [uQ]. Following Chomsky (2013) and Tanigawa (2018), this paper makes an additional assumption that [uTop] and [uQ] are of the same type as the force feature [uF]; [uF] as well as [F] in C is decomposed into [uTop] and [uQ], and this realization varies depending on the circumstance. In (23c), the bearer of [uTop] c-commands the bearer of [uQ]. Even though the POP framework draws on Free Merge, Internal Merge (movement) must obey minimality. Because a valued Q-feature [Q] in the matrix C is a realization of [F], it gives rise to a minimality violation if [uQ] moves across [uTop] to enter an agreement relation with [Q] in the matrix left periphery. The presence of a minimality violation rather than a PIC violation renders (22a) marginal
acceptability. In contrast, the quite low acceptability of (22b) stems from extraction from SPEC-T. Given that extraction from SPEC-T is impossible for some reason, the wh-phrase which athletes cannot move up to SPEC-C1, even though this position is available as an escape hatch, as shown in (23b). Once α is transferred, which athletes is not accessible to operations in the matrix clause; if it moves out of α, a PIC violation occurs. For this reason, (22b) is much worse than (22a), which involves only a minimality violation.

4.2. Implications

The proposed analysis for topic-subjects is in line with Chomsky’s (2015) analysis for wh-subjects, in which they remain in SPEC-T while [Q] is inherited from C by T. This implies that string-vacuous movement from SPEC-T to SPEC-C is uniformly banned in A'-movement. If so, focus movement such as negative inversion must be treated on an equal footing, and indeed, this argument is supported by the correspondence between wh-questions and negative inversion in Subject-Auxiliary Inversion (hereafter, SAI). As illustrated in (24) and (25), SAI is observed only in cases where objects are shifted to the sentence-initial A'-position.6

(24)a. Who saw Mary?
   b. Who did John see?
   b. Only John does Mary like.

Unlike the b-examples, the a-examples, in which subjects are wh-phrases and negative elements, reject SAI. The lack of SAI in (24a) and (25a) can be an effect of the empty C, provided that SAI is triggered only by the stuffed C, whose specifier as well as head is occupied by features and/or lexical elements. Notice that if string-vacuous movement from SPEC-T to SPEC-C is prohibited in these cases, all the features are discharged from C to T and the subjects stay in SPEC-T. This leaves C empty, and the emptiness of C leads to the suspension of SAI in (24a) and (25a).

5. Concluding remarks

In sum, the POP framework ensures that topic-subjects are differentiated from topic-objects in derivation. Due to the topic-feature inheritance, topic-subjects remain in SPEC-T rather than undergoing string-vacuous movement to SPEC-C. Within the POP framework, the relevant string-vacuous movement is ruled out because it results in labeling failure. Consequently, this derivational difference gives rise to a number of syntactic differences between the two elements in the embedded clause such as anaphor binding, island, and extraction. Based on a thorough consideration of both the theoretical and the empirical aspects, it can be said that the lack of string-vacuous movement from SPEC-T to SPEC-C must be true for other types of A'-movement such as wh-questions and negative inversion.

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6 This paper owes the discussion provided here to Tanigawa (2019).
1 Introduction

This study investigates properties of additive complex cardinals such as “21”. Ionin and Matushansky (2018) pursue an analysis in which additive complex cardinals have a coordinate structure of two nominals. According to their analysis, additive complex cardinals are derived by deletion of the head noun. One option for the NP-deletion is illustrated in (1).

(1)  

| a. | [NP three [NP hundred [NP girls]]] & [NP three [NP girls]] | *(NP-deletion)* |
| b. | [NP three [NP hundred [NP girls]]] & [NP three [NP girls]] | *(English)* |
| c. | *three hundred three girls* |

Under Ionin and Matushansky’s (2018) analysis, each conjunct is headed by the head noun in the coordinate structure. In what follows, I refer to their analysis as the NP coordination analysis.

Although I follow Ionin and Matushansky (2018) regarding the existence of the coordinate structure of additive complex cardinals, I argue in this paper that in addition to the coordinate structure as in (1), additive complex cardinals can also have a non-coordinate structure. Specifically, I propose that a lower-valued cardinal (“three” in “three hundred three”) can directly adjoin to a higher-valued cardinal (“three hundred” in “three hundred three”). The major motivation for the existence of the non-coordinate structure comes from the human classifier *ri* in Japanese, contracted forms of Chinese cardinals, and “21” in Polish.

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2 The human classifier *ri in Japanese

Firstly, I consider human numeral classifiers in Japanese. A contextual restriction of the human classifier *ri in Japanese provides support for the existence of non-coordinate additive complex cardinals. Japanese is an obligatory classifier language, and numerals must co-occur with an appropriate classifier to modify a noun phrase. Japanese has two classifiers for common nouns referring to human beings: *nin and *ri. Crucially, the classifier *ri has a contextual restriction regarding the type of a cardinal it combines with. It co-occurs with the native Yamato cardinals hito ‘one’ and huta ‘two’ as in (2a), but not with the Sino-Japanese cardinals ichi ‘one’ and ni ‘two’, as shown in (2).

(2) a. \{hito | huta\}-ri-no gakusei
   one-CLS-GEN student

   b. \{*ichi | *ni\}-ri-no gakusei [Japanese]
   one-CLS-GEN student

   ‘[one | two] student(s)’

Regarding Japanese numeral classifiers, I assume that they are functional heads for measurement. The noun phrase in (2a) thus has the following structure. (See Saito and Murasugi (1990) and Huang and Ochi (2014) for the adjunct status of pre-nominal numeral classifier phrases in Japanese.)

(3) (= 2a)

\[
\begin{array}{c}
\text{NP} \\
\text{Clsp} \\
\text{YP} \\
\text{Cls} \\
\text{student} \\
\{one | two\}
\end{array}
\]

In Japanese, when a nominal modifier precedes a noun phrase, the genitive linker no intervenes between the pre-nominal modifier and the noun phrase (e.g. gengogaku-no gakusei linguistics-GEN student ‘students of linguistics’). Following Kitagawa and Ross (1982), and Watanabe (2006), I assume that the genitive linker no is morphologically inserted.

I propose that the classifier *ri is selected as an exponent of the classifier head when hito and huta are a sister of the classifier head dedicated to human beings. In (3), the simplex cardinal (YP) is a sister of the classifier phrase (Clsp), and the relevant contextual restriction holds between them.

Crucially, the contextual restriction is violated when a cardinal occurs in an additive complex cardinal, as in (4a). In this environment, the classifier *nin, which is the elsewhere exponent of the classifier head dedicated to human beings (Watanabe (2010, 2014)), must be used together with the Sino-Japanese cardinals, as shown in (4b).
Under the NP-coordination analysis, additive complex cardinals have the NP-coordination structure as in (1). The NP-coordination analysis predicts that the additive complex cardinal in (4a) includes the structure in (3) as one of the conjuncts. Therefore, the NP-coordination analysis does not expect the contrast between (2a) and (4a).

However, if a non-coordinate structure is available for Japanese additive complex cardinals, the contrast can be accounted for. Specifically, the unacceptability of (4a) can be captured by assuming that it has the non-coordinate structure as in (5).

(5) Non-coordinate additive complex cardinal

\[
\text{NP} \quad \text{Cl}_{\text{P}} \quad \text{Cl}_{\text{s}} \quad \text{NP}
\]

\[
\text{XP} \quad \text{YP}
\]

\[
\text{four-ten} \quad \{\text{one} \mid \text{two}\}
\]

In (5), the lower-valued cardinal (i.e. YP) is an adjunct of the higher-valued cardinal (i.e. XP). Since the lower-valued cardinal is not a sister of the classifier head in (5), the relevant contextual restriction between them is violated. This problem does not arise when *hito or *huta are used as simplex cardinals because they are sisters of the classifier head dedicated to human beings, as shown in (3). The contrast between (2a) and (4a) can thus be seen as a piece of evidence for the existence of a non-coordinate structure of additive complex cardinals.

It should be noted here that it seems that Japanese additive complex cardinals can have the coordinate structure in some cases. As shown in (6), Japanese additive complex cardinals can contain the overt coordinator *to ‘and’ (Hiraiwa (2016)). What is important is that the contextual restriction of the classifier ri is respected in the presence of *to.

(6) [yon zyuut [hito | *huta] -ri-no gakusei] [Japanese]

four ten and one two -CLS-GEN student

‘forty and {one | two} students’
The noun in (6) can be treated as a case of NP-coordination. In (7), the lower-valued cardinal (YP) is a sister of the classifier head in the second conjunct. The contextual restriction is therefore satisfied in (7). (The Japanese conjunctive particle to appears between two nominal conjuncts. (c.g. Yuta to Hiro ‘Yuta and Hiro’))

Ionin and Matushansky (2018) propose that additive complex cardinals generally involve coordinate structures, and an overt coordinator can be overtly realized in some languages. In fact, the presence/absence of an overt coordinator seems to be superficial in some languages such as Serbo-Croatian, as discussed in Section 5. However, I showed in this section that Japanese additive complex cardinals have different syntactic structures, according to the presence/absence of an overt coordinator, which makes a significant difference regarding morphosyntactic behaviors.

3 Contracted forms in Mandarin Chinese

Contracted forms of Chinese cardinals also offer supporting evidence for the existence of non-coordinate additive complex cardinals. Chinese is an obligatory classifier language, and a cardinal must appear with an appropriate classifier when it modifies a noun, as shown in (8).

(8) san *(tiao) xianglian 
    three  CLS  necklace
    ‘three necklaces’

[Mandarin]

Mandarin Chinese has a contracted form consisting of san ‘three’ and the general classifier ge, as shown in (9b).¹

(9) a. san-ge xUESheng
    three-CLS student
    ‘three students’

Mandarin

b. sa xUESheng
    three-CLS student
    ‘three students’

However, as observed by He (2015), the contracted form cannot appear in additive complex cardinals, as in (10).

¹ liang ‘two’ also has a contracted form; lia. Since lia behaves like sa, I use examples with sa in this paper.
I propose that Chinese additive complex cardinals have the non-coordinate structure. First, let us consider the simplex cardinal in (9). I assume that the noun in (9a) has the structure represented in (11).\(^2\) Here, the numeral “three” appears in the specifier position of the phrase headed by the numeral classifier \(ge\).

\[(11)\]

Suppose that \(san\) ‘three’ and the classifier \(ge\) can be fused only when they are in a Spec-Head relation. In (11), they can then undergo morphological fusion without any problems.

On the other hand, when \(san\) ‘three’ appears inside an additive complex cardinal, \(sishi\) ‘forty’ and \(san\) ‘three’ form a constituent, resulting in the non-coordinate structure in (12).\(^3\)

\[(12)\]

In (12), \(san\) ‘three’ adjoins to \(XP\), and morphological fusion cannot take place because \(san\) and \(ge\) are not in a Spec-Head relation. The unavailability of a contracted form can thus be captured by assuming that additive complex cardinals have the non-coordinate structure in Chinese.

It should be noted here that the coordinate structure of additive complex cardinals should be unavailable in Chinese. If the coordinate structure as in (13) were available in Chinese additive complex cardinals, it would be expected that the numeral “three” and the general classifier \(ge\) should be able to undergo morphological fusion, contrary to the fact. This is because the cardinal “three” and the numeral classifier are in a Spec-Head relation in the second conjunct of the NP-coordination structure in (13).

\(^2\)For a detailed syntactic analysis of Chinese classifier phrases, see Zhang (2013) and references therein.

\(^3\)This is the approach taken by He (2015) although the details are different.
Note also that Chinese additive complex cardinals do not allow the presence of an overt coordinator, as in (14), in contrast to Japanese additive complex cardinals.

(14) *sishi he san-ge xuesheng
    forty and three-CLS student
    ‘forty three students’

The unacceptability of (14) indicates that the coordinate structure of additive complex cardinals is unavailable in Chinese.

4 “21” in Polish

Support for the non-coordinate structure also comes from a non-classifier language; Polish. In Polish, the cardinal “one” is normally adjectival, and shows agreement with a noun in number, case and gender, as shown in (15a). However, when the cardinal “one” appears in an additive numeral, the agreement is blocked, as shown in (15b).

(15) a. Jan zobaczył { *jeden | jeden } dziewczynę.  
    Jan saw one.NOM.M one.ACC.F girl.ACC.SG.F
    ‘Jan saw one girl.’

b. Jan zobaczył dwadzieścia { *jeden | jeden } dziewcząt.  
    Jan saw twenty.NOM.M one.ACC.F girl.GEN.PL
    ‘Jan saw twenty-one girls.’ (Asia Pietraszko, p.c.)

Ionin and Matushansky (2018) assume that cardinals are phrasal adjunct when they agree with the head noun. Following their analysis, I assume the object noun in (15a) has the structure in (16a). The cardinal “one” in (15a) agrees with the noun, and it is analyzed as an adjunct of the head NP.

The cardinal “one” in (15b) cannot be analyzed in the same way. If the object noun in (15b) could have a coordinate structure, it would have the structure in (16b).
In the second conjunct of (16b), the cardinal “one” and the noun phrase form a constituent. Since the second conjunct in (16b) is identical to (16a), it is expected that the cardinal “one” in (16b) should behave like the cardinal “one” in (16a) regarding agreement, contrary to the fact. Therefore, we need another analysis of the additive complex cardinal in (15b).

In order to account for the agreement pattern in (15b), I propose that the object noun in (15b) have the non-coordinate structure, as represented in (17a).

In (17a), the lower-valued cardinal “one” adjoins to the higher-valued cardinal (i.e. XP), without involving coordination. In (17a), the cardinal “one” is not a modifier of the overt noun “girl”, and does not receive relevant feature specifications via agreement from “girl”. As a result, the elsewhere exponent jeden must be used in (17a).

It should be noted here that the head noun “girl” in (15b) receives the so-called genitive of quantification (GQ). With regard to case marking, I assume that genitive of quantification in Polish is an inherent case assigned by a functional head, which I refer to as F for expository purposes. Slavic languages differ as to whether they treat genitive of quantification as structural or inherent case (see Franks (1994, 1995), Bošković (2006, 2013) for detailed discussion). Although the status of Polish in this respect is controversial (Franks (1995)), I assume, following Franks (1995), that genitive of quantification in Polish is an inherent case assigned by a functional head. Moreover, I assume following Bošković (2006) that F assigns case to its complement only when it has a specifier.

In (17a), NP2 receives genitive case from F and accusative case from the verb. When a single noun bears a structural case and an inherent case, the conflict is resolved by realizing the inherent case. (This essentially follows Franks (1994), Bošković (2006)). In (17a), NP2 therefore exhibits genitive of quantification. Recall that when the cardinal “one” alone is used as a simplex cardinal, it has the adjunct structure given in (16a). In this case, F will appear above the modified noun phrase, as shown in (17b).
In (17b), the cardinal “one” is an adjunct of the NP, and it exhibits agreement with the NP. Cardinals appear below F, and F does not have a specifier. Recall that I assume that only F that has a specifier can assign genitive of quantification. In (17b), F thus does not assign genitive of quantification to the head noun phrase. Note that a similar correlation between the case assigning ability of a functional head and the presence of the specifier has been argued in the verbal domain (e.g. Burzio’s generalization).

To recapitulate, I proposed in this section that the agreement pattern in (15) can be explained by assuming the non-coordinate structure of additive complex cardinals, as in (17a).

5 More on additive complex cardinals in Slavic languages

Before concluding the paper, I discuss my assumptions about other Slavic complex cardinals. This is because the agreement pattern of “21” in Polish is somewhat peculiar. It is important to note that I am not claiming that all additive complex cardinals in Polish have the non-coordinate structure as in (17a). The opacity of the lower-valued cardinal is observed only when the cardinal “one” is used in Polish. For instance, the paucal cardinal “two” agrees with the overt head noun, even when it occurs in an additive complex cardinal as in (18b).

(a) Jan zobaczył dwie dziewczyny. [Polish]
   Jan saw two.ACC.F girl.ACC.PL.F
   ‘Jan saw two girls.’

(b) Jan zobaczył dwadzieścia dwie dziewczyny. [Polish]
    Jan saw twenty,ACC.20.ACC.F girl.ACC.PL.F
    ‘Jan saw twenty-two girls.’

The agreement pattern in (18b) can be captured under the current analysis. The object noun phrase in (18b) has the coordinate structure represented in (19).

Recall that I do not deny the existence of the NP coordinate structure as in (16b). In (19), the lower-valued cardinal “two” is an adjunct of NP2, and agrees with the overt noun “girl”.

It should also be noted here that the opacity of the cardinal “one” in additive complex cardinals is not observed in most other Slavic languages. For instance, the cardinal “one” in Serbo-Croatian agrees with the noun it combines with, even when it appears in a complex cardinal, as shown in (20).
(20) *Peter je vidio dvadest (i) jednu djevojku.*  
Peter is seen twenty one.F.ACC girl.F.ACC.SG  
‘Peter saw twenty one girls.’

The cardinal “one” in these languages behaves alike in a simplex cardinal environment and in a complex cardinal environment. Under the current analysis, these agreement patterns are explained by assuming that the cardinal “one” in these languages always has the NP-coordination structure, as represented in (21).

(21) a. \[\text{NP} \quad \text{YP} \quad \text{NP} \quad \text{one} \quad \text{NP} \quad \text{girl}\]  
b. \[\text{NP1} \quad \text{NP2} \quad \& \quad \text{NP1} \quad \text{NP2} \quad \text{&} \quad \text{twenty} \quad \text{girl} \quad \text{YP} \quad \text{one} \quad \text{NP} \quad \text{girl}\]

What is important is that the cardinal “one” adjoins directly to NP2 in (21a,b), unlike the cardinal “one” in the non-coordinate structure given in (17a). Given this variation among Slavic languages, I maintain two structures for additive complex cardinals: the coordinate structure as in (19) and the non-coordinate structure as in (17a).

The question immediately arises as to why only the cardinal “one” in Polish exhibits the peculiar behavior. Let me mention one potentially relevant factor. The presence of an overt coordinator is optional in Serbo-Croatian, as shown in (20). On the other hand, the cardinal “one” in Polish disallows the presence of an overt coordinator when it occurs in an additive complex cardinal. The relevant example is given below.

(22) *Jan zobaczył dwadzieścia i jeden dziewcząt.*  
Jan saw twenty.NOM.ACC and one.NOM.M girl.GEN.PL.F  
Int. ‘Jan saw twenty-one girls.’

When “one” is used as a lower-valued cardinal in an additive complex cardinal, the overt coordinator “and” cannot intervene between the two cardinals in Polish. Under my analysis, the unacceptability of (22) can be taken to indicate that the cardinal “one” cannot occur in the NP coordination structure in Polish, unlike “one” in Serbo-Croatian. (Note also that the opacity of “one” is not observed in other Slavic languages such as Russian.) I stipulate here that “21” in Polish exhibits the peculiar behavior because the cardinal “one” in Polish is incompatible with the NP-Coordination structure. The typological variation of additive complex cardinals may be related to the nature of coordinators in a given language, but I leave further examination of the variation for future research.
6 Conclusion

This paper argued that additive complex cardinals can have the non-coordinate structure in Japanese, Chinese and Polish. Recall that Ionin and Matushansky (2018) argue that additive complex cardinals generally involve a coordinate structure. However, I showed that Japanese additive complex cardinals behave differently, depending on the presence/absence of an overt coordinator. This pattern is not expected under Ionin and Matushansky’s analysis. The contracted form in Chinese also posits a problem for their analysis. Support for the non-coordinate structure also comes from a non-classifier language: Polish. The data from these languages can be accounted for by assuming the non-coordinate structure of additive complex cardinals.

References

1. Introduction

The goal of this paper is to provide a semantic analysis for the incompleteness effect of Mandarin verb doubling clefts (henceforth VDCs) discussed in Cheng and Vicente (2013). The gist of the proposal is that such effect results from VDCs being contrastive topic (CT) constructions, where the initial verb copy is a CT and the second verb copy is an F-marked expression associated with a copula introducing verum focus. It will also be shown that CT interpretation can be observed in several other syntactic environments in Mandarin, and thus the results of this work provide a framework for the semantic effects of overt movement generally in this language.

2. Verb doubling clefts in Mandarin: What they are and what they mean

Sentences such as (1) have been referred to as VDCs (Cheng and Vicente 2013). Two characteristics of VDCs are (a) two identical verb copies and (b) the copula shì ‘be’ preceding the second copy.

(1) Chi, Lisi shì chi le...
    eat  Lisi be eat ASP
    ‘As for eating, Lisi indeed has eaten (but...)’

The idea that (1) syntactically resembles a cleft construction is supported by the fact that clefts in Mandarin generally involve the copula (Cheng 2008, inter alia), e.g. in (2).

(2) Ta shì zuotian lái (de).
    he be yesterday leave DE
    ‘It was yesterday when he left.’

Zhong (2016) and Yang and Wu (2017) further note that VDCs are context-sensitive: The verb copies are anaphoric contextually to some aforementioned events. Thus, (1) is felicitous in the context in (3), but not in (4) where eating does not exist in the previous discourse.

(3) (John: “Has Lisi eaten?”) (adapted from Zhong 2016: 149-150)
    Chi, Lisi shì chi le...
    eat  Lisi be eat ASP
    ‘As for eating, Lisi indeed has eaten (but...)’
Mandarin Verb Doubling Clefts as Contrastive Topic Constructions

(4) (John: “I watched a movie yesterday.”)
    #Chi, Lisi shi chi le...
    eat Lisi be eat ASP
    #As for eating, Lisi indeed has eaten (but...)

Note that the context in which a VDC is felicitous may be more restricted: In the scenario in (5), even if eating has been mentioned by John, the VDC is not appropriate. Intuitively, the context must contain, or at least imply, the non-negated proposition ‘Lisi has eaten’ in order to “license” the VDC.

(5) (John: “Lisi didn’t eat.”)
    #Chi, Lisi shi chi le...
    eat Lisi be eat ASP
    #As for eating, Lisi indeed has eaten (but...)

Most importantly, VDCs consistently give rise to an incompleteness effect such that they sound incomplete or “unsolved” if without a continuation of some sort, for example (6). The continuation often involves a contrasting or “polarity-reversing” proposition to the VDC that is led by a coordinator like ‘but’, as in (7), though it can also be one that expresses uncertainty, as in (8).

(6) #Chi, Lisi shi chi le.
    eat Lisi be eat ASP
    #As for eating, Lisi indeed has eaten. (incomplete)

(7) Chi, Lisi shi chi le, dan mei chi-bao.
    eat Lisi be eat ASP but not eat-full
    “As for eating, Lisi indeed has eaten, but wasn’t full.”

(8) Chi, Lisi shi chi le, zhishi bu zhidao chi-bao le mei.
    eat Lisi be eat ASP just not know eat-full ASP not
    “As for eating, Lisi indeed has eaten, but it’s not certain if he was full.”

Cheng and Vicente (2013) refer to the contrasting continuation in (7) as an “adversative implicature,” while Liu (2004) opts for the term “concession.” Regardless of the descriptive label, the intuition is clear and robust: VDCs must be supplemented by some contrastive content in order to be “complete.” The question now is where the incompleteness comes from.

Cheng and Vicente propose a syntactic analysis for VDCs, according to which the initial verb is related to the second via overt head movement, as shown in (9) below. This structure follows Cheng’s (2008) general theory of Mandarin clefts in taking the complement of the copula shì to be a Small Clause (SC); in VDCs, the subject of the SC is a vP, which is followed by a null pro predicate that moves to the left of shì (i.e. predicate inversion). Support for the movement analysis includes locality effects and lexical identity effects.

\[
(9) \quad [\text{cp } V_1 [\text{XP pro}^\text{RED} \text{shì} [\text{SC } [\text{vP } V_2 \ldots V_n ] \text{vPRED }]]]
\]

(Cheng and Vicente 2013: 8)

Moreover, Cheng and Vicente maintain that shì is interpreted as verum focus, which affirms the truth of the proposition in its scope. By focalizing the event argument introduced by the main verb, a VDC asserts that the event under discussion did take place (ibid.: 6-7).

Nevertheless, it is unclear how the presence of verum focus and the syntactic structure (9) should
deliver the incompleteness or contrastive effect: Verum focus per se does not render a proposition incomplete, and V-movement is a purely syntactic operation. The full meaning of VDCs therefore has remained unexplained under Cheng and Vicente’s account, and indeed under all other accounts I am aware of (Zhong 2016, Yang and Wu 2017). We now turn to the main proposal of this paper.

3. VDCs are contrastive topic constructions

3.1. Büring (2003) on contrastive topics

Contrastive topic (CT) constructions in English are encoded with a fall-rise contour (Jackendoff 1972, Büring 2003, among many others). In (10)a below, the subject Fred is a CT (indicated by the subscript ‘CT’) that is accompanied by a focus, beans. In (10)b, the pattern is reversed. The different CT+F markings have semantic consequences; While (10)a can answer the question *What did Fred eat?* in a context where different individuals eating different things is under discussion, (10)b cannot. The latter is only felicitous as a response to the question *Who ate the beans?* in the same context.

(10) a. Fred_{CT} ate the beans_
    b. Fred_{CT} ate the beans.

Büring (2003) develops a non-compositional pragmatic theory in which English CTs have a CT-value (parallel to F-marked expressions having a focus semantic value; Rooth 1992) that is generated based on the following CT-value formation rule in (11).

(11) CT-value formation (Büring 2003: 519)

a. Step 1: Replace the focus with a wh-word and front the latter; if focus marks the finite verb or negation, front the finite verb instead.

b. Step 2: Form a set of questions from the result of step 1 by replacing the contrastive topic with some alternative to it.

Taking (10)a as example, Step 1 turns it into the question ‘What did Fred eat?’, and Step 2 forms the set of questions in (12) out of Step 1, which is the CT-value of (10)a.

(12) {‘What did Fred eat?’, ‘What did Mary eat?’, . . .} = \{x ate y | y ∈ D, x ∈ D\}

The (sub)questions in (12) are all connected to the more general, overarching question *Who ate what?* in a hierarchical discourse structure, and the relation between a (sub)question and the overarching question is understood as a stratgy, following Roberts (1996). Since the CT-value formation rule generates a different CT-value when CT-marking falls on a different phrase, that (10)a and (10)b have distinct meanings follows.

From here, Büring addresses another semantic property of CT-marking, namely that it conveys additional discourse-related meaning. For instance, (10)a infers that other people ate other things (than beans). Büring suggests that such inferences arises as a conversational implicature: Given that the CT-marking on Fred indicates the existence of a complex discourse structure containing questions of the form *What did x eat?*, and that the speaker of (10)a only mentions Fred rather than a more informative answer, we can conclude that while she is aware of other people having eaten, she is not aware they ate beans or is aware that they didn’t eat beans.
3.2. Proposal for VDCs

I propose that Mandarin VDCs are essentially a kind of CT constructions, where the initial verb copy is a CT and the second verb copy an F-marked phrase by the copula. Schematically:

(13) [Chi][CT. Lisi shi [chi][adj... eat] Lisi be eat ASP

‘As for eating, Lisi indeed has eaten (but...’)

The parallelism between (13) and an English CT construction such as (10)a should be obvious, except that in the former the elements marked by CT and F are two *identical* verbs. The basic idea about the incompleteness effect of VDCs, then, is the following: VDCs obligatorily trigger *a set of implicit questions* (by virtue of CT-marking) but only address one such question, and the fact that there is at least one other question raised but unresolved results in the perceived incompleteness of VDCs.

One assumption to be adopted in what follows is that the copula *shi* in VDCs is interpreted as verbum focus, exactly as proposed by Cheng and Vicente (2013). However, I will further adopt Romero & Han’s (2004) semantics of verbum focus, which is defined as the epistemic modal in (14).

(14) [[VERUM]]^\phi = I P_{CG} = (w: Y \in \text{Epi}_{\phi}(w) \cap \text{Con}_{\phi} (w) \cap \text{CG}(w)) = \text{SURE-CK}_{\phi}

When combined with a proposition \( p \), the VERUM operator asserts that for every world \( w \) ‘compatible with \( x \)’ knowledge in \( w \), for every world \( w' \) where the conversational goals of \( x \) in \( w \) are fulfilled, \( p \) is part of the Common Ground (Stalnaker 1978). In plain words: The speaker of \( \text{VERUM}(p) \) is certain that \( p \) should be added to the CG. From now on, I will replace *indeed* with the expression *it is for sure* in the following informal paraphrases of the verbum focus meaning in (14).

Back to VDCs, I propose (15) for VDCs following Büning’s (2003) CT-value formation rule.

(15) CT-value formation of Mandarin VDCs

a. Step 1: Form an alternative question by replacing the *shi-V* complex with its polar alternative (with the copula providing verbum focus).

b. Step 2: Form a set of alternative questions from the result of Step 1 by replacing the CT-marked verb copy with some alternative to it.

It is obvious that (15) is fully parallel to (11). But notice that, since the CT-marked expression is identical to the F-marked one in a VDC, the replacing process in Step 2 necessarily affects the latter, i.e., when the CT-marked verb is replaced by an alternative, the F-marked verb will get replaced by the same alternative as well. Cheng and Vicente’s (2013) movement analysis is highly relevant here. If the two verbs share the same origin, it is indeed expected that any interpretation rule that affects one should also affect the other.

For concreteness, let us take (13) as an example. Step 1 generates the set of propositions in (16)a, which amounts to the alternative question *As for eating, is it for sure that he has eaten?*. In Step 2, let us first assume for simplicity that there is only one alternative to the CT *chi* ‘eating’, namely the resultative compound *chi-hao* ‘eating to full’. Replacing the CT in (16)a with this alternative yields the second set of alternative questions in (16)b, and the entire set of questions in (16)c, which is the CT-value assigned to (13), can be roughly paraphrased as: ‘For every action \( P \), is it for sure that he has done \( P^* \)’. I treat the ‘as for’ phrase in each alternative question as a thematic topic.
(16) a. {‘As for eating, it is for sure he has eaten’, ‘As for eating, it is not for sure he has eaten’}
   = ‘As for eating, is it for sure that he has eaten?’

   b. {‘As for eating, it is for sure he has eaten’, ‘As for eating, it is not for sure he has eaten’},
   {‘As for eating to full, it is for sure he has eaten to full’, ‘As for eating to full, it is not for sure
   he has eaten to full’}
   = {‘As for eating, is it for sure that he has eaten?’, ‘As for eating to full, is it for sure that he
   has eaten to full?’}
   = ‘For every action P, is it for sure that he has done P’

This, I argue, is the source of the incompleteness of VDCs: By uttering (13), the speaker (call her S)
indicates she acknowledges the relevance of the complex discourse containing the two alternative
questions in (16)b. And yet, S only asserts (13) to respond to one of them, namely the first one. This
leads to the perceived incompleteness. In the present analysis, it amounts to the lack of a complete set
of answers that can resolve all the questions raised by the CT (i.e. the initial verb copy).

Moreover, if S knew the answer to the second question, she would have made a more information
statement to address both questions (e.g. ‘It is for sure he has eaten and was full’). Since she didn’t,
we can infer that she knows the other question is relevant but is not sure about the answer, or that (if S
is well-informed) she is sure the answer is negative, i.e., he has not eaten to full. The two inferences,
one expressing uncertainty and the other expressing contrast, can be reinforced, as shown in the two
kinds of continuations in (8) and (7), respectively.

The reader might wonder whether it is necessary to analyze verum focus as a modal, the meaning
of which has been informally paraphrased as ‘it is for sure’ all along. Indeed, without representing the
semantic contribution of shi this way we still seem to obtain the same result. The key observation here
is that a focused sentence by shi, such as (17) below, cannot serve as a felicitous response to the
wh-question, unlike the counterpart sentence that has no shi.

(17) (What did Lisi buy in the market yesterday?)
   Ta (shi) mai-le manh bao.
   he be buy-ASP bread

   ‘(It is for sure) he bought bread.’ (Okay if without shi)

Intuitively, this shi-sentence implies (perhaps as a presupposition) that the proposition ‘Lisi bought
bread’ has already been entertained previously. Since this requirement is not met in the QUD set up
above, (17) is out. Such property of shi aligns well with Romero & Han’s (2004) modal
characterization of VERUM: If the argument proposition p does not already exist in the CG, it would
make little sense for a speaker to express certainty that p should be added to the CG (instead, she
should simply utter p). This supports the view that shi is a modal signaling speaker certainty.

4. Further issues

The analysis sketched above raises a few questions. First, although Cheng and Vicente (2013), Zhong
(2016), Yang and Wu (2017) and the present discussion so far have only dealt with the VDCs in
which the initial copy is a verb head, it is actually not true that only a V-head can be copied in this
construction. (18) shows a case where a VP constituent including a V and an object can be copied; in
(19) the resultative verbal compound chi-bao ‘eat to full’ is copied; and in (20) the V-head together
with the negation is copied.
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(18) Lisi mai hua shi mai hua le...
    Lisi buy flower be buy flower ASP
    'As for buying flowers, it is for sure Lisi has bought flowers (but...)

(19) Lisi chi-bao shi chi-bao le...
    Lisi eat-full be eat-full ASP
    'As for paying the fee, it is for sure Lisi has paid (it) (but...)

(20) Lisi mei qu shi mei qu...
    Lisi not go be not go
    'As for not going, it is for sure Lisi didn’t go (but...)

For reasons not clear to me, examples like (18)-(20) are less natural if the copied expression is placed at the sentence-initial position before the subject, or if the copied expression is made longer. There appear to be certain phonological constraints on how much material can be realized in the upper copy, but I will not attempt to investigate this issue here.

VDCs, it seems, are perhaps just variants of “VP doubling clefts” or “predicate doubling clefts” in which the VP/predicate contains only a bare V. The current analysis can be extended to VP doubling as well, since the pragmatic mechanism that generates a CT-value is independent of the syntactic category of the CT. The syntactic account of Cheng and Vicente (2013), though, would have to be reformulated as involving phrasal movement of a VP. There is some initial support for this revision: The examples in (21), which are adapted from Cheng and Vicente’s (2013) with the initial verb copy moved to follow the subject for the sake of naturalness, seem to be synonymous to those in (22) where the copied material includes more than a bare verb.

(21) a. Wo chi shi xiang chi...
    I eat be want eat
    'As for eating, it is for sure I want to eat (but...)

    (cf. Cheng and Vicente 2013, ex. 9a)

    b. Wo chi shi yiding hui chi...
    I eat be certainly will eat
    'As for eating, it is for sure I will certainly eat (but...)

    (cf. Cheng and Vicente 2013, ex. 9b)

    c. Wo chi shi chi-guo...
    I eat be eat-ASP
    'As for eating, it is for sure I ate (but...)

    (cf. Cheng and Vicente 2013, ex. 67)

(22) a. Wo xiang chi shi xiang chi...
    I want eat be want eat
    'As for wanting to eat, it is for sure I want to eat (but...)

    b. Wo hui chi shi yiding hui chi...
    I will eat be certainly will eat
    'As for going to eat, it is for sure I am certainly going to eat (but...)

    c. Wo chi-guo shi chi-guo...
    I eat-ASP be eat-ASP
    'As for having eaten, it is for sure I have eaten (but...)

In other words, the examples in (21) might be those in (22) that have undergone PF-deletion of partial material (a modal verb or aspectual marker) that is copied from the second VP.

But this conclusion may be too hasty. At least in some cases, the initial verb copy is a bare V without anything else. In the scenario depicted in (23), I could felicitous respond with (24a) but not with (24)b. The latter is infelicitous because it requires that me wanting to eat desserts has been
mentioned or implied by Zhangsan, i.e. the initial copy expression must be anaphoric to a discourse entity (which, in turn, makes their CT-values different as well).

(23) Scenario: Zhangsan and I walked past a dessert shop and saw delicious desserts through the window. He told me to get some to eat, but without knowing what my desire is.

(24) a.  Wo chi shi xiang chi, dan bu neng chi.
    I want eat but not can eat
    ‘As for eating, it is for sure I want to eat, but I cannot eat.’

b.  #Wo xiang chi shi xiang chi, dan bu neng chi.
    I want eat be want eat but not can eat
    ‘As for wanting to eat, it is for sure I want to eat, but I cannot eat.’

On the other hand, if Zhangsan asks whether I want to eat desserts, then both (24)a and (24)b are fine, in which case the former can be said to involve PF-deletion of the modal verb ‘want’. This is because, assuming that alternatives must be of the same semantic type as the base form from which they are generated, (24)a should only trigger the CT-value in (25), which contains alternatives to the verb ‘eat’ but no alternatives to the modal ‘want’, and thus (24)a should not allow the continuation ‘but cannot eat.’ The fact that (24)a is felicitous indicates that the modal ‘want’ has an implicit form in its syntactic structure.

(25) ‘As for eating, is it for sure I want to eat?’, ‘As for buying, is it for sure I want to buy?’

= ‘For every action P, is it for sure I want to do P?’

In short, at least some instances of VDCs should involve VP or predicate doubling together with PF-deletion applied to the initial VP-predicate-copy.

A closely related issue on PF-deletion is what determines the material to be deleted at PF. A quick comparison of (26) and (27) below reveals an interesting pattern: A VP containing a V and an object can undergo deletion of a subpart in either the first or the second VP-copy, but a VP containing a V and a resultative morpheme only allows deletion of a subpart in the first VP-copy.

(26) a.  Lisi mai hua shi mai hua le...
    Lisi buy flower be buy flower ASP
    ‘As for buying flowers, it is for sure that Lisi has bought flowers (but…)’

b.  Lisi mai hua shi mai hua le...
    Lisi buy flower be buy flower ASP
    ‘As for buying, it is for sure that Lisi has bought flowers (but…)’

(27) a.  Lisi chi bao shi chi bao le...
    Lisi eat-full be eat-full ASP
    ‘As for paying the fee, it is for sure that Lisi has paid (it) (but…)’

b.  *Lisi chi bao shi chi bao le...
    Lisi eat-full be eat-full ASP

What governs the PF-deletion as seen above seems also to be what governs ellipsis in topic-comment configurations more generally. For instance, in a ‘speaking-of’ topic construction such as (28), the object phrase in either the topic or the comment clause can be elided, but the resultative morpheme in the comment cannot, as in (29). If we take the initial and second VP-copies of (26) to correspond to the topic and comment in (28), respectively, then the grammaticality of (29)a is no surprise. Similarly,
the resultative bao “full” in the initial copy of (27)a can be dropped just as bao in the topic of (29)a can.
In short, VDCs behave just like the “speaking-of” topic construction with respect to PF-deletion.

(28) a. Shuodao mai hua, Lisi mai hua le.
    speaking.of buy flower Lisi buy flower ASP
    ‘Speaking of buying flowers, Lisi has bought (flowers).’

b. Shuodao mai hua, Lisi mai hua le.
    speaking.of buy Lisi buy flower ASP
    ‘Speaking of buying, Lisi has bought (flowers).’

    speaking.of eat-full Lisi eat-full ASP
    ‘Speaking of eating, Lisi has eaten (to full).’

    speaking.of eat-full Lisi eat-full ASP

Yet another challenge to my analysis was alerted to me by Mingming Liu (p.c.): Whereas English
CT+F constructions can serve as a final response, as shown in (30), VDCs cannot, as shown in (31). If
VDCs are CT+F constructions on a par with (30), the observed difference is unexpected.

(30) (What did John and Bill do yesterday?) (Constant 2012: 430)
    [John]CT [went dancing], [Bill]CT [stayed home].

(31) #Lisi chi shi chi le, chi-bao shi chi-bao le.
    Lisi eat be eat ASP eat-full be eat-full ASP
    Intended: ‘As for eating, it is for sure that Lisi has eaten, and was full as well.’

To understand this discrepancy, note that in both English CT-constructions and Mandarin VDCs, the
CTs are interpreted exhaustively (for English, see van Rooij & Schulz 2017). That is, the first clause in
(30) conveys ‘only John went dancing,’ and the second clause ‘only Bill stayed home.’ Adding the
second clause answers an alternative question triggered by the CT John, while also satisfying the
exhaustivity requirement on each CT as mentioned. The example (32) below, due to Böring (2016),
is odd because the second clause creates a conflict with the exhaustivity requirement of CT-marking,
namely that there is only one individual who is from Paris.

(32) (Where are you guys from?) JacquesCT is from ParisF, #and ColetteCT is from ParisF.

Following the analysis in Section 3, the first VDC clause in (31) is interpreted exhaustively as
well in the sense that it conveys that the only action carried out by Lisi which the speaker is certain
about is eating. The second VDC clause is interpreted similarly, that the speaker is only certain that
Lisi ate to full and isn’t certain if he did anything else. Now if we conjoin the two VDCs as in (31),
the result is that there are two actions performed by Lisi that the speaker is certain about, namely (i)
Lisi ate and (ii) he ate to full. This violates the exhaustivity associated with the CT in the VDCs, and
therefore (31) is deemed inadmissible. It is therefore not surprising that VDCs are strongly related to a
contrastive interpretation (what Cheng and Vicente (2013) call “adversative implicature”), which can
only be overtly marked by ‘but’ but not by ‘and’, as illustrated below in (33).
(33) #Lisi chi shi chi le, erqie (hai) chi-de heng bao.
Lisi eat be eat ASP and further eat-ASP very full
‘As for eating, it is for sure that Lisi has eaten, and has eaten to full.’ (incomplete)

In a nutshell, the difference between (30) and (31) is caused by their distinct exhaustivity contents:
The VDC requires that the CT denote the only action that the speaker is certain about, whereas the
English CT-construction requires that the CT be the only person that satisfies the description of the
rest of the sentence, allowing the speaker to be certain about other people having done other things.

5. Extensions: SOV order and even-type dou-constructions

It has been noticed that, in Mandarin, a contrastive interpretation is obligatory when an object is
proposed to a preverbal, post-subject position. Example (34) is due to Tsai (1994: 138):

(34) Wō zhe-pian lunwen xīhuān, *(ru-pian lunwen bu xīhuān).
I this-CL paper like that-CL paper not like
‘This paper, I like; but that paper, I don’t.’

The upshot is that clauses of the SOV order resemble VDCs in three regards: (i) Overt movement, (ii)
incompleteness, and (iii) contrastiveness. The overt movement in (34) is of course phrasal movement,
not head movement. The third property is also not as strong as that of VDCs: As evidenced by (35),
the continuation clause does not have to be conjoined with ‘but’ and neither clause requires that this
paper is the only thing liked by the subject, i.e. there is no exhaustivity applied to speaker certainty.
Rather, (35) comes closer to the English example (36) (Büring 2016).

I this-CL paper like that-CL paper also even more like
‘This paper, I like; that paper, I like (it) as well/even more.’

(36) (Where are these guys from?) Jacques CT is from Paris, and Colette CT is from Paris, too.

It is thus plausible to analyze (34) also as a kind of CT-construction, in which the proposed object
corresponds to the CT-marked phrase and the rest of the sentence (or just the main predicate) is
F-marked. The incompleteness effect then follows from the now familiar CT-value formation: The
first step generates the polar question (37)a, and the second step the set of polar questions in (37)b.
Since the first clause of (35) only responds to the first question in (37)b, the former is perceived as
incomplete given the triggered CT-value.

(37) a. ‘Do I like this paper?’
b. ‘Do I like this paper?’, ‘Do I like that paper?’

In fact, this analysis is fully parallel to what Büring (2003: 532) has suggested for sole CTs in English.
SOV sentences are not the only constructions closely related to VDCs in Mandarin. In addition to
VDCs, Cheng and Vicente (2013) discuss at length another case where verb doubling is manifested:
The even-type lian… dou focus construction, as exemplified in (38).
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(38) Lian kan ta dou bu kan.
    LIAN look he DOU not look
    ‘As for looking, he didn’t even look.’

The focus of Cheng and Vicente is that (38) involves overt verb movement on a par with VDCs. But it is widely recognized by many studies (see Shyu 1995, Badan 2008 and references therein) that such *dou*-construction instantiates obligatory phrasal movement as well, e.g. (39).

(39) Lishi lian [yi-ben shu], dou mei mai [ed].
    LISHI LIAN one-CL book DOU not buy
    ‘Lisi didn’t even buy one book.’

While the syntactic movement in (39) does not seem to correlate with incompleteness, unlike other cases discussed above, the interpretation of (39) does need to factor in the alternatives of ‘one book,’ i.e., books of different quantities. I argue that (39), too, is a CT-construction where *lian* marks ‘one book’ as a CT and the *dou*-clause serves as the focus constituent. Its CT-value is the set of questions in (40)b, which is formed by replacing the CT ‘one book’ in (40)a with scalar/quantity alternatives.

(40) a. ‘Didn’t Lisi buy one book?’
    b. ‘Didn’t Lisi buy one book?’, ‘Didn’t Lisi buy two books?’,…

The reason that (39) does not give rise to incompleteness, I propose, is that the focus particle *dou* contributes to the meaning that the CT-construction is the most informative/strongest answer among all answers to the questions in the CT-value, where informativity is defined by entailment. Since all answers are entailed, (39) is perceived as “complete.” This analysis shares with most accounts the intuition that the *lian…dou* construction has an even-like focus flavor, while departing from these accounts in not treating *dou* as a focus operator over focus alternatives. Rather, *dou* is taken to operate on the answers to the CT-value triggered by overt phrasal movement, the latter being the very same kind of syntactic operation as observed in all other CT-constructions discussed above.

References
1. Introduction

Mandarin *yi* ‘one’ has been suggested to have grammaticalized from a numeral to an indefinite article (e.g., Chen 2003; Zhang 2013), but no syntactic analysis of the grammaticalization process has been provided. This paper will go beyond previous analyses and systematically explore the grammaticalization process of Mandarin *yi*. In particular, I will propose that the grammaticalization of Mandarin *yi* is an ongoing process and *yi* is ambiguous between a numeral and an indefinite article, and that the grammaticalization of Mandarin *yi* is an instantiation of a well-known phenomenon: specifier-to-head reanalysis (e.g., Lyons 1999; Wood 2003; van Geldern 2001, 2004). I will further argue that there is an intermediate stage of grammaticalization: a numeral ‘one’ starts as a specifier of a phrase; then, it adjoins to a head before it is reanalyzed as an independent head projecting a separate phrase. In other words, at this intermediate stage, the indefinite article ‘one’ is head-joined to another head. Cantonese *jat* ‘one’ and Turkish *bir* ‘one’ will provide evidence for this intermediate stage.

The paper is organized as follows. Section 2 will discuss the unique characteristics of Mandarin *yi* ‘one’. A new account will be proposed in Section 3 to cover the characteristics of Mandarin *yi*. In particular, I will discuss the spec-to-head reanalysis of Mandarin *yi*. Then Section 4 will describe Cantonese *jat* ‘one’ and discuss the intermediate stage of grammaticalization. I will then provide Turkish data to support the proposal of an intermediate stage. Section 5 will conclude this paper.

2. Ambiguity of *yi*

The possibility of the existence of indefinite articles in Mandarin has been discussed in some works (e.g., Wang 1989; Chen 2003). For instance, Wang (1989) suggests that in Old Chinese, when the classifier *ge* occurs in CI-N phrases, it can serve as an indefinite article. In this respect, also relevant is Chen (2003), who discusses a grammaticalization process involving numeral *yi* ‘one’ and classifiers in Mandarin. Chen (2003) suggests that Mandarin has an indefinite article. In particular, he suggests that in *yi*-CI-N phrases, ‘yi+CI’ (*yi* ‘one’ and a classifier) together can be used as an indefinite article, while in CI-N phrases the classifier alone is an indefinite article ¹.

¹ Note that Chen (2003) simply suggests that ‘yi+CI’ semantically function as an indefinite article, in that ‘yi+CI’ can be used in the situations where an indefinite article (e.g., *a/an* in English) is usually used. No specific syntactic analysis is, however, given in the paper.
Following Chen (2003), I argue that *yi* has grammaticalized from a numeral to an indefinite article and that *yi* is ambiguous between a numeral and an indefinite article. The ambiguity analysis can cover a range of observations. First, numeral expressions with *yi* ‘one’ in Mandarin can be interpreted as indefinite specific or non-specific, while numeral expressions with other numerals are usually interpreted only as indefinite non-specific (e.g., Huang 1987, Tsai 1996). The Numeral (Num)-Classifier (Cl)-Noun (N) phrases, like *san-ge xuesheng* (three-Cl-student) in (1), are standardly referred to as numeral expressions in Mandarin. Two types of numeral expressions are assumed to exist in Mandarin (e.g., Li 1998): individual-denoting and quantity-denoting expressions. The former refers to some entities/individuals, while the latter expresses the quantity of entities/individuals (e.g., Li 1998). For instance, the numeral expression in (1) refers to some students. The numeral expression in (2) just denotes the quantity and the verb expresses the sufficiency of a certain amount.

(1). wo kandao san-ge xuesheng.
    I see three-Cl student
    ‘I saw three students.’

(2). san-ge xuesheng bu gou.
    three-Cl student not enough
    ‘Three students is not enough.’

(Huang et al. 2009)

Individual-denoting numeral expressions in Mandarin are generally considered to be indefinite non-specific expressions (e.g., Huang et al. 2009). They usually do not appear in subject or topic positions (see (3b) and (3c)), since these positions in Mandarin do not allow non-specific readings (e.g., Chao 1968; Li & Thompson 1981; Lee 1986; Li 1996).

(3). a. wo kandao-le san-ge xuesheng.
    I see-ASP two-Cl student
    ‘I saw two students.’

b. ??san-ge xuesheng chi-le dangao.
    three-Cl student eat-ASP cake
    ‘Three students ate the cake.’

   (Huang et al. 2009)

   c. *san-ge xuesheng, wo yiwei chi-le dangao.
    three-Cl student I think eat-ASP cake
    ‘Three students, I thought (they) ate the cake.’

   (Huang et al. 2009)

As a quantity-denoting expression, a numeral phrase can occur in these positions. However, quantity expressions show different structural properties from individual-denoting numeral expressions. For example, quantity-denoting expressions cannot co-refer with a pronoun, as in (4). I will not go into these issues here, since they are not relevant to the main topic of the paper (for relevant discussion, see Li (1998) and Huang et al. (2009)). In this paper, I will focus on individual-denoting numeral expressions. The term ‘numeral expression(s)’ will be used to refer only to individual-denoting numeral expressions.
(4). *liang-ge daren, bu ru tamen, de san-ge xiaohai you liqi.
   two-Cl adult not compare they DE three-Cl children have strength
   ‘Two adults are not as strong as their three children.’ (Huang et al. 2009)

As mentioned above, numeral expressions in Mandarin are indefinite non-specific expressions and are disallowed in subject/topic positions, as in (3). However, yi ‘one’-Cl-N phrases are different in this respect. They can be either specific or non-specific. Thus, Tsai (1996) noted that numeral expressions with yi ‘one’, but not other numerals like ‘two’ or ‘three’, can be specific (see also Huang 1987). As a result, yi-Cl-N phrases, unlike other numeral expressions, can occur in subject positions, as in (5).

(5). yi-ge xuesheng chi-le dangao.
   one-Cl student eat-ASP cake
   ‘A student ate the cake.’

These data suggest that numeral expressions with yi ‘one’ in Mandarin can be interpreted as indefinite specific or non-specific, while numeral expressions with other numerals are usually interpreted only as indefinite non-specific. Then the question is why expressions with yi ‘one’ is different from other numeral expressions in this aspect. In fact, the proposal that yi is ambiguous between a numeral and an indefinite article can account for these data. I argue that yi in (5) actually is an article, not a numeral. As discussed above, numeral expressions in Mandarin are indefinite non-specific, so they cannot appear in subject/topic positions. However, yi can function as an indefinite article. Then it is not surprising that expressions with an indefinite article can be interpreted as indefinite specific and can occur as a subject or a topic in Mandarin.

Another unique feature of Mandarin yi is that when yi-Cl-N phrases stay under the scope of negation, a ‘not any’ interpretation may emerge. As illustrated by (6), a yi-Cl-N phrase stays under the scope of negation (i.e., congmei ‘never’) and then they can be interpreted as ‘not any’ (i.e., ‘Xiaohong has never had any boyfriend’).

(6). Xiaohong congmei jiao-guo yi-ge nanpengyou.
   Xiaohong never make-EXP a-Cl boy,friend
   ‘Xiaohong has never had any boyfriend.’

I argue that with the ‘not any’ interpretation, yi in (6) is an indefinite article, not a numeral. Similar patterns are found in English. As shown by (7a), when the object contains an indefinite article (i.e., a boy,friend), the sentence can be interpreted as ‘Mary has never had any boyfriend’. However, if the object is a numeral expression (i.e., one boy,friend), the ‘not any’ interpretation disappears, as in (7b).

(7). a. Mary has never had a boyfriend.
   ‘Mary has never had any boy,friend.’
   b. *Mary has never had one boy,friend.
   Intended meaning: ‘Mary has never had any boy,friend.’
In summary, Mandarin yi demonstrates some unique characteristics, and differs from other numerals in some aspects. Numerals expressions in Mandarin are interpreted as indefinite non-specific. However, expressions with yi ‘one’ can be interpreted as specific. Furthermore, yi-Cl-N phrases under the scope of negation be interpreted as ‘not any’. This parallels the phrases with an indefinite article in English. I have argued that these unique features of Mandarin yi can be explained by its ambiguity status. In particular, I proposed that in these two special cases, yi functions as an indefinite article, rather than a numeral. The next section will focus on the grammaticalization process of Mandarin yi and I will propose syntactic analyses for the two different yi.

3. Specifier-to-head reanalysis

In terms of the diachronic reanalysis over the grammaticalization process, I propose that yi ‘one’ as a numeral stays in the specifier of CIP (i.e., Spec CIP), and then the grammaticalization process leads to a reanalysis as an indefinite article, which heads a Quantifier Phrase. As shown in (8a), numerals are located in the Spec CIP (following e.g., Tang (1990), I assume that a classifier heads its own projection above NP), while the indefinite article yi ‘one’ is a head projecting a Quantifier Phrase, as in (8b).

![Diagram]

It should be noted that we may be dealing here with a more general grammaticalization process. Thus, by examining diachronic variations between Old English, Middle English, and Modern English, van Geldern (2001, 2004) argues that many functional categories developed as a result of a change of a specifier of a phrase to a head that projects a separate phrase. In fact, similar claims have also been made for many elements within CP (like complementizers) and DP, like demonstratives (see also Lyons 1999; Wood 2003; van Geldern 2001; Huddleston & Pullum 2002; Willis 2007, among others).

As discussed above, I argue that yi ‘one’ in Mandarin is ambiguous between an indefinite article and a numeral. As shown by (8a), a numeral is in the specifier of CIP, so its existence is closely related to the presence of a classifier. In other words, whenever there is a numeral, a
Classifier Phrase is projected; a numeral cannot occur without a Classifier Phrase. In contrast, as displayed in (8b), the indefinite article (i.e., *yi ‘one’ in the indefinite article usage) is the head of QP, whose existence is not dependent on the presence of a classifier. This predicts that expressions where indefinite article *yi ‘one’ (not the numeral *yi ‘one’) is directly followed by a noun may be possible in Mandarin. Because there is no numeral, there is no need for a Classifier Phrase. This is borne out, H. Huang (1981) and Lü et al. (1999)\(^2\) observed that *yi can directly combine with bare nouns without a classifier, while other numerals cannot, as in (9).

(9). a. *yi nanhai
   one boy
   ‘a boy’

b. san-*(ge) nanhai
   three-Cl boy
   ‘three boys’

Furthermore, numeral phrases in Mandarin can be used to answer ‘how many’ questions. As illustrated by (10a) and (10b), numeral expressions (i.e., *yi-ben shu and san-ben shu) can be used as an answer to a ‘how many’ question. However, *yi-N phrases cannot be used as answers here, as in (10c).

(10). ni mai-le duoshao shu?
    you buy-ASP how many book
    ‘How many books did you buy?’

   a. wo mai-le yi-ben shu.
      I buy-ASP one-Cl book
      ‘I bought one book.’

   b. wo mai-le san-ben shu.
      I buy-ASP three-Cl book
      ‘I bought three books.’

   c. *wo mai-le yi shu.
      I buy-ASP one book
      ‘I bought a book.’

Similar patterns are found in English: numerals can be used to answer ‘how many’ questions, while indefinite articles (i.e., *a/an) are degraded as an answer here. As shown in (11), numerals, like *one and *three, can be used to answer the ‘how many’ question (see (11a) and (11b)), while the indefinite article cannot be used here, as in (11c). Thus, the impossibility of Mandarin *yi-N phrases as an answer to ‘how many’ questions provides further support for the current analysis in which *yi is an indefinite article in *yi-N phrases.

(11). How many books did you buy?
    a. I bought one book.
    b. I bought three books.

\(^2\) H. Huang (1981) and Lü et al. (1999) do not provide an analysis for *yi-N phrases. They only briefly mentions that when the numeral is *yi ‘one’, the classifier sometimes can be optional.
c. ??I bought a book.

In summary, this section has investigated the grammaticalization process. In particular, I argued that Mandarin yi ‘one’, as a numeral, is located in the specifier of a Classifier Phrase; a grammaticalization process leads to its reanalysis as the head of a Quantifier Phrase. This diachronic reanalysis is an instantiation of a well-known phenomenon: specifier-to-head reanalysis (e.g., Lyons 1999; Wood 2003; van Gelderen 2001, 2004). The following section will propose an intermediate stage of grammaticalization with evidence from Cantonese.

4. Intermediate stage of grammaticalization

In this section, I will argue that jat ‘one’ in Cantonese is also undergoing the grammaticalization process from a numeral to an indefinite article. However, I will further argue that jat has not grammaticalized as much as yi in Mandarin: jat has not been reanalyzed as an independent head projecting a separate phrase; instead, jat is head-adjoined to the classifier head.

Numeral expressions in Cantonese are usually interpreted only as indefinite non-specific, while numerals expressions with jat ‘one’ can be interpreted as indefinite specific or non-specific. As illustrated by (12a), numeral expressions in Cantonese usually do not appear in subject/topic positions, since these positions usually do not allow indefinite non-specific expressions. However, a jat-Cl-N phrase in the subject/topic position is much better, as shown in (12b).

(12). a. ??saam-go hoksaang mei lei.  
   three-CI student not come  
   ‘Three students didn’t show up.’

   b. jat-go hoksaang mei lei.   
   a-Cl student not come  
   ‘A student didn’t show up.’

I argue that jat in (12b) actually is an article, not a numeral. Numerical expressions in Cantonese are indefinite non-specific, so they cannot appear in subject/topic positions. If jat can function as an indefinite article, then it is not surprising that jat-Cl-N phrases differ from other numeral expressions.

Furthermore, when jat-Cl-N phrases stay under the scope of negation, the ‘not any’ interpretation emerges, as in (13). As discussed above, Mandarin yi and English a/an show similar patterns, as in (6) and (7). This provides more support for the proposal that jat in (13) is an indefinite article, not a numeral.

(13). Siuhung chung-mut gaau jat-go naampangyau.  
   Siuhung never made a-Cl boyfriend  
   ‘Siuhung has never had any boyfriend.’

Therefore, Cantonese jat ‘one’ differs from other numerals in various aspects. Based on its unique features, I argue that jat in Cantonese is ambiguous between a numeral and an indefinite article. In these special cases (e.g., in subject/topic positions; interpreted as ‘not any’), jat function as an indefinite article, rather than a numeral. Then the next question is what the syntactic structure of jat is. If we follow the proposal for Mandarin, the structure should be like (14). In this structure,
numerals stay in Spec CIP, but the indefinite article *jat ‘one’ has been diachronically reanalyzed as the head of a QP, as in (14b).

\[(14). \quad \text{a. [CIP samm [CF -go [NP hoksaang] three CI student three students]}} \quad \text{b. [QP [CF jat [CIP [CF -go [NP hoksaang] a CI student ‘a student’]}} \]

According to the structures proposed in (14), the article *jat then would not be dependent on the presence of a classifier and should be directly combinable with a noun. As discussed above, Mandarin yi can combine with a noun without a classifier in between. However, it is not the same case for Cantonese *jat. Cantonese *jat always needs a classifier, as in (15).

\[(15). \quad \text{jat-*(go) hoksaang a/one-Cl student ‘a student/one student’} \]

One potential explanation for this cross-linguistic variation is that *jat in Cantonese and yi in Mandarin have grammaticalized to different degrees. *Jat ‘one’ may not have grammaticalized as much as yi ‘one’. Then, even when *jat ‘one’ functions as an indefinite article, it still requires the presence of a classifier. Based on this, I argue that the current structure for Cantonese numeral phrases should be like (16). In (16a), numerals, including the numeral *jat ‘one’, stay in Spec CIP. On the other hand, the article *jat is adjoined to the classifier head, as in (16b). The expectation is that in a further stage of grammaticalization, the indefinite article *jat will be reanalyzed as a head heading its own projection, as in Mandarin. At that time, *jat-N phrases may be expected to emerge in Cantonese.

\[(16). \quad \text{a. CIP \quad b. CIP} \]

\[
\begin{array}{c}
\text{Num} \\
\text{CI’} \\
\text{NP} \\
\text{Cl} \\
\text{numerals}
\end{array}
\quad \quad
\begin{array}{c}
\text{CI’} \\
\text{NP} \\
\text{Cl}
\end{array}
\]

As discussed above, van Gelderen (2001, 2004) shows that many functional categories developed from a specifier of a phrase to a head that projects a separate phrase (see also Lyons 1999; Wood 2003; Huddleston & Pullum 2002; Willis 2007). Here I propose that before being reanalyzed as a head that can project by itself, a functional category first adjoins to another head. Applying this more general pattern of grammaticalization, numeral ‘one’ starts as a specifier of a phrase; then, in the grammaticalization process, it adjoins to a head before it is reanalyzed as a head that can project a phrase by itself. Regarding why this intermediate stage exists, it is standardly assumed that when a specifier is merged into the structure, its sister projects. I suggest that when a specifier
is reanalyzed as a head, initially it cannot project, which means at this point it cannot take a complement. As a result, the relevant element is first adjoined to another head.

Turkish provides more evidence for the proposed intermediate stage. Turkish has been assumed to have an indefinite article which has grammaticalized from the numeral ‘one’. It is worthwhile exploring whether Turkish, Mandarin, and Cantonese share any common features in the relevant respects.

Turkish has a unique way to distinguish the indefinite article bir from the numeral bir: the ordering of adjectives and bir. When bir immediately precedes the nominal head, it is interpreted as an indefinite article, as in (17a). On the other hand, when bir is separated from the head noun by adjectives, it is interpreted as a numeral rather than an article, as in (17b).

(17). a. bir /i/ yeni bir kitap
    /a good new book
    => *one good new book

b. bir /i/ yeni kitap
    /a good book
    => *a good new book

(Yukseler 2000)

The ordering of adjectives and bir shown in (17) suggests that the indefinite article bir cannot be separated from the head noun. Therefore, I propose that Turkish numerals stay at Spec of Numeral Phrase (18a), while the article bir is head-adjoined to Noun head (18b). As a result, the indefinite article bir cannot be separated from the head noun by any other elements.

(18). a. [Num bir [Num yeni [NP kitap] one new book
    [NP bir kitap]
    a book

The fact that the indefinite article bir in Turkish cannot be separated from the head noun can be taken as providing supporting evidence for the ‘head-adjunction’ analysis. Furthermore, based on the proposed structures for Mandarin yi, Cantonese jat, and Turkish bir, I argue that over the grammaticalization process from a numeral ‘one’ to an indefinite article, ‘one’ needs to first adjoin to a head before it can be reanalyzed as a head heading an independent Quantifier Phrase. It is then expected that in a further stage of grammaticalization, both Cantonese jat ‘one’ and Turkish bir ‘one’ will be reanalyzed as a head heading a Quantifier Phrase. At that time, Turkish bir, as a true indefinite article, should be able to be separated from the head noun by other elements (like adjectives), because it will no longer be head-adjoined to the Noun head.

\[^3\] It is actually not completely clear if yi in Mandarin, as an indefinite article, is adjoined to the Noun head or not. As shown in (i), adjectives occurring between yi-Cl and a noun can appear with de or without de.

\[\begin{array}{ll}
    \text{i. yi-su o mei guo} & \text{(de) gao xiao} \\
    \text{\textit{a/o} American university} \\
\end{array}\]

However, there is speaker variation regarding whether de can be present in yi-N phrases. As shown in (ii), adjectives without de are uniformly acceptable in yi-N phrases. But when de is present here, there is speaker variation (indicated by #).

\[\begin{array}{ll}
    \text{ii. yi mei guo (\#de) gao xiao} \\
\end{array}\]

Bošković and Hsieh (2013) suggest that adjectives with de are adjoined to NP, while adjectives without de are head-adjoined to the Noun head. If this is correct, it is possible that for the speakers who allow examples like (ii), yi as an
5. Conclusion

This paper has systematically discussed the grammaticalization process of Mandarin yi. In particular, I proposed that Mandarin yi is ambiguous between a numeral and an indefinite article, and that the grammaticalization of Mandarin yi is an instantiation of a well-known phenomenon: specifier-to-head reanalysis (e.g., Lyons 1999; Wood 2003; van Geldern 2001, 2004). Then I argued that Cantonese jat ‘one’ is also undergoing a grammaticalization process from a numeral to an indefinite article. However, Cantonese jat has not grammaticalized as much as Mandarin yi. In particular, I argued that Cantonese jat is at an intermediate stage of grammaticalization: a numeral ‘one’ starts as a specifier of a phrase; then, it adjoins to a head before it is reanalyzed as an independent head projecting a separate phrase. Turkish bir ‘one’ provides more evidence for this intermediate stage.

References


indefinite article projects its own phrase, and for those who disallow (ii), yi as an indefinite article is adjoined to N, hence only adjectives that are adjoined to N (i.e., adjectives without de) can intervene between yi and N for these speakers. The speaker variation in question could be taken as another argument for an intermediate stage where the indefinite article is head-adjoined, which precedes the full reanalysis where the indefinite article heads its own projection (i.e., the speaker variation here could be a result of an ongoing grammaticalization process from a numeral to a true indefinite article).


1. Introduction

Japanese aspectual expressions such as *hazime* ‘start,’ *taduke* ‘continue,’ and *oe* ‘finish’ select two different types of complements, as shown in (1)a (Type 1 construction) and (1)b (Type 2 construction; traditionally called the syntactic V-V compound). The complement in Type 1 construction is headed by a complementizer *koto* ‘C’ with what looks like a tense morpheme -*ru* ‘PRS.’ In the Type 2 construction, -*hazime* is immediately preceded by a bare verb *osie* ‘teach’ with no intervening T or C elements.

(1) a. *Kanozyo-wa eigo-o osie-ru* *koto*{-o* hazime-ta.* Type 1
    she-TOP English-ACC teach-PRS C-ACC start-PST
    ‘She began teaching English.’

    b. *Kanozyo-wa eigo-o osie* -*hazime-ta.* Type 2
    she-TOP English-ACC teach -start-PST (Syntactic V-V compound)
    ‘She began teaching English.’

In order to highlight the difference from a third type of construction, *i.e.,* the lexical V-V compound (e.g., (2)b), Type 1 and Type 2 constructions are generally considered synonymous (Shibatani 1973; Kuno 1983; Matsumoto 1996; Yumoto 2005; Fukuda 2012; Kageyama 1993, 2016). As shown in (2)a, lexical V-V compounds do not have a corresponding paraphrase using a *koto.* In contrast, syntactic V-V compounds can be paraphrased using a *koto,* which is taken as an important empirical test to distinguish Type 2 construction from the lexical V-V compound.

(2) a. *Kanozyo-wa eigo-o kik-u-koto-o tot-ta.*
    she-TOP English-ACC listen-PRS-C-ACC take-PST
    ‘She listened to and comprehended the English (announcement).’

    b. *Kanozyo-wa eigo-o kiki* -*tot-ta.*
    she-TOP English-ACC listen -take-PST (Lexical V-V compound)
    ‘She listened to and comprehended the English (announcement).’

While their similarity has been highlighted in previous studies, it has not been seriously considered how Type 1 and Type 2 constructions are different. Here, I argue against the conventional position that Type 1 and Type 2 constructions are synonymous. Exploring the morpho-syntax and the semantics of these constructions, this paper argues that only Type 1 construction is involved with a defective CP-TP$_{ad}$ layer, which precludes non-habitual readings. In a nutshell, this is tantamount to saying that Type 1 construction is a control construction while Type 2 is not. However, I do not argue
that the two *hazime’s ‘start’* in (1) are homonymous or polysemous between a control predicate and a non-control predicate. Rather, inheriting important assumptions from Distributed Morphology, I propose that (i) their similarity in meaning is attributed to the fact that they share the same root and (ii) their differences come from the properties of categorizing heads to which the root is combined, contributing to a growing body of literature that arrives at similar conclusions with respect to the division of labor between a root and categorizing heads (Marantz 1997, Embick and Marantz 2008, Embick 2010, Alexiadou 2001, Borer 2003, 2014). To articulate this analysis, detailed denotations of the relevant nodes are also provided; although the denotation of the root is the same, the semantics of the defective T triggers a presupposition which is never obtained under Type 2 construction.

2. Data
2.1 Observation 1: Prosody

This section presents four important contrasts between Type I and Type 2. Here, let us start with a phonological difference. In Japanese, each mora must be assigned either a low pitch accent or a high pitch accent. When a VV-compound is created, a [%LH…HL% pitch contour is given to the sister node of T. Observe the sentences in (3), where the bracketed region is the sister node of the past tense suffix (T). As the bracketed region (= the complement of T) gets longer with additional verbal suffixes (such as -rare ‘can’ in (6)b and -masi ‘HON-a’ in (6)c), the high-pitch region also extends so the entire bracketed region receives an [%LH…HL% intonational contour (see Yamada 2018 for details).

(3) a. L H H H L L L L | [Kan.gae]-ta-yo. 
consier-PST-SFP
(‘I considered.’)

b. L H H H L L L L | [Kan.gae-rare]-ta-yo
watch-can-PST-SFP
(‘I could consider.’)

c. L H H H H H L L L | [Kan.gae-rare-masi]-ta-yo
consider-can-HONa-PST-SFP
(‘I could consider (polite).’)

Aspectual markers in Type 2 construction show the same prosodic contour; the presence of *hazime* extends the high-pitch region as in (4). In contrast, in the Type 1 construction, there exist two [%LH…HL% intonational contours as in (5), suggesting that a TP lies between *hazime* and *kanga*.

c onsider-begin-PST-SFP
(‘I began considering.’)

consider-begin-PST-SFP
(‘I began considering (intended).’)

consider-PRS C-ACC begin-PST-SFP
(‘I began considering.’)

consider-PRS C-ACC begin-PST-SFP
(‘I began considering (intended).’)

2.2 Observation 2: Adjacency

In Type 1 construction, but not in Type 2 construction, adverbial elements can intervene between the main verb and the aspectual marker. Though *kino* ‘yesterday’ intervenes between *osie* and *hazime* in (6a), the sentence is licit, while the presence of an adverb makes the sentence in (6b) ungrammatical.

Type 1
she-TOP English-ACC teach-PRS C-ACC yesterday begin-PST
‘Yesterday, she began teaching English.’

Akitaka Yamada

Type 2

The contrast shows that *hazine* is a word in Type 1 construction while it is a suffix in Type 2 construction. This is, perhaps, a rather surprising fact from point of view of English, because in English, aspectual markers such as *begin* and *start* are always a word irrespective of their complements, e.g., *he started [a company]*, *he started [running]* and *he started [to run]*. In contrast, the data in (6) suggests that whether it is a suffix or not is correlated with the complement it is combined with.

2.2 Observation 3: Volitionality

The subject of Type 1 construction must be a volitional entity, while this restriction does not apply to the Type 2 construction. First, consider the sentences in (7). The intended reading of (7)a is ‘the bell began ringing.’ The reading is illicit unless it is metaphorically interpreted (for example, in a folk tale where a bell is described as an object with its own will which can volitionally start ringing). Note that an inanimate entity can occupy this subject position as we already saw in (1)a. In contrast, an inanimate subject is licit in Type 2 construction, as shown in (7)b.

Akitaka Yamada

Type 1

A bell began ringing (intended).’

b. Kane-wa [nar]-hazine-ta.  
Akitaka Yamada

Type 2

The bell began ringing.’

Second, Type 2 construction is indifferent to the active/passive distinction as in (8)b, while in Type 1 construction a passive sentence with an inanimate subject is unacceptable (= (8)a) despite the fact that its active counterpart (e.g., (1)a) is acceptable, supporting the above conclusion that the subject of Type 1 construction must be a volitional entity.

Akitaka Yamada

Type 1

English-NOM elementary school-at teach-PASS-PRS C-ACC begin-PST

‘English began being taught in elementary schools (intended).’

b. Eigo-ga [syogokko-de osie-rare]-hazine-ta.  
Akitaka Yamada

Type 2

English-NOM elementary school-at teach-PASS-begin-PST

‘English began being taught in elementary schools.’

2.4 Observation 4: Habituality

Whereas both constructions have the habitual reading (*i.e.*, the habit of his teaching English had begun), Type 2 use has a reading not available for Type 1, namely, the single-event reading, in which there is a single seamless event of teaching. Consider the following two scenarios.

[Scenario A] A graduate student of linguistics was visiting the high school where she graduated. She bumped into her old English teacher, who invited her to his class and asked her to take over the entire lecture for the day. She initially refused, but eventually she began teaching English to the students. She returned home the following day.

[Scenario B] A graduate student of linguistics was visiting the high school where she graduated. She bumped into her old English teacher, who invited her to his class and asked her to come in for just a single lecture. She initially refused, but eventually she began teaching English to the students. She returned home the following day.
In this scenario, it is obvious that this graduate student does not have a permanent job as an English teacher, so there is only one event of her teaching English. If the underlined sentence is translated into Japanese, (1)a is illicit whereas the sentence in (1)b is perfectly acceptable under the given context. In contrast, the following scenario is compatible with both sentences.1

[Scenario B] A graduate student studying linguistics finished her PhD study. Though she had been studying in US, she had to go back and find a job in Japan. Luckily, she got a position at an English department. She began teaching English two weeks ago.

Note that, in this Scenario B, she does not have to be currently engaged in the activity of teaching English. For example, suppose that the new semester started on April 8th and she taught her first class on the 9th. Now the reference time is set to be on the 10th, which is a holiday, so she stays in her house all day long. Despite the fact that she was not teaching at the very moment of the reference time, the sentences are licit in this Scenario B as long as an English teaching habit has been established.

3. Analysis

We have a dilemma. On one hand, the same aspectual marker *hazime* ‘start’ can be used in both constructions, so we want to capture this commonality. On the other hand, there are salient differences in morpho-syntactic and semantics. Can we propose a unified semantics for *hazime* in both constructions while deriving the above differences in a systematic way? In this section, I give an affirmative answer by proposing that (i) the detailed morpho-syntactic and semantic characteristics are determined by categorizing heads and (ii) due to a particular categorizing head, *hazime* in Type 1 construction selects a *koto*-clause with a defective T whose semantics guarantees habituality of similar events.

3.1 Syntax

Adopting assumptions from Distributed Morphology (Marantz 1997, Embick and Marantz 2008, Embick 2010), I assume that there are two distinct types of morphemes, namely roots and functional morphemes. Though the detailed characterization of roots is still under debate, this study takes it to be the case that (i) roots are devoid of syntactic category as well as of any discernible morpho-phonological complexity and (ii) they are combined with a categorizing head to acquire/specific detailed morpho-syntactic properties, e.g., an ability to take a complement (Alexiadou 2001; Borer 2003, 2014; but for a different view, see Harley 2014). In order to analyze the aspectual constructions, I put forward this baseline framework about the division of labor between a root and a categorizing head by proposing the following three roles as important properties of categorizing heads:

(9) Categorizing heads
   a. Suffix/word distinction is determined by a categorizing head.
   b. e-selection is determined by a categorizing head.
   c. AGNET theta-role assignment is determined by a categorizing head.

---

1 Acceptability judgment: Hiroshi Aoyagi (p.c.) points out that the acceptability of the sentence in (1)a gets ameliorated with an adverbial modification; e.g., *sushitu* ‘reluctantly’ as in (i). Since it remains true that without an adverb the sentence in (1)a is unacceptable, this paper takes the contrast in (1) for granted and leaves this adverbial puzzle to future studies.

(i) ? Kanazawa-wa [eigo-o oshita koto]-o sushitu hazime-ku.
    she-TOP English-ACC teach-PRES C-ACC reluctantly begin-PST
    ‘She reluctantly began teaching English.’
First, the statement in (9)a is important when we explain Obs. 2. I consider that (i) there is a category-neutral \texttt{BEGIN} ready to be merged with a categorizing head and (ii) the word/affix distinction is introduced by this categorizing head.\footnote{Notation: It would be better to use an index notation but, for the sake of readability, I use capitalized \texttt{BEGIN} to refer to the relevant root.} When Vocabulary Insertion recognizes a \texttt{v} in the structure (e.g., \texttt{[\texttt{v} + \texttt{BEGIN}]}, the node is realized as a word; and, when it finds \texttt{Aux} (e.g., \texttt{[Aux + \texttt{BEGIN}]}, it gets realized as an affix.\footnote{Status of \texttt{Aux}: In current CM, categorial heads specifically refer to heads relating to traditional notions of lexical category (i.e., \texttt{v}, \texttt{n}, maybe \texttt{a}), which are considered as phase heads. Some might take issue with the analysis in this section criticizing that \texttt{Aux} is analyzed as a categorizing head. For such readers, I propose to reinterpret \texttt{Aux} as another \texttt{v} (let us call it \texttt{v'}) with a different feature specification so (i) it acts as a phase head but (ii) has a c-selection, theta-role and word/affix status different from \texttt{v}; an auxiliary \texttt{\texttt{v'}} verb is still a verb but is a special type of verb. I thank Alison Biggs for pointing out this issue.} If the affix/word distinction was already presupposed as (or determined by) an intrinsic property of a root, the derived items would be either \texttt{all words} or \texttt{all affixes}, which is not compatible with the presented data.

Second, the statement in (9)b is necessary because we want to capture the fact that the word \texttt{hazime} (Type 1 construction) cannot be used with a bare verb (i.e., it must take a \texttt{CP}), while the suffix \texttt{-hazime} (Type 2 construction) does not select a \texttt{CP} (i.e., it must take a bare verb). This suggests that the c-selection is correlated with a categorizing head. By assuming that \texttt{Aux} and \texttt{v} decide what their complement should be, this correlation is easily explained. \texttt{Aux + \texttt{BEGIN}} takes a \texttt{VoiceP}, whereas \texttt{v + \texttt{BEGIN}} c-selects a \texttt{CP-TP}_\texttt{def} in the sense of Chomsky (2000, 2001). Based on this reasoning, I propose the following structures for the two constructions (for a similar view, see Fukuda 2012; Kishimoto 2014). The defectiveness of \texttt{T} results in a \texttt{PRO} in the embedded clause subject.

\begin{equation}
\begin{align*}
\text{(10) a. Type 1} & \quad \text{TP} \\
& \quad \text{VoiceP} \\
& \quad \text{\texttt{TeachEng}} \\
& \quad \text{\texttt{She began teaching English.}} \\
\text{b. Type 2} & \quad \text{TP} \\
& \quad \text{VoiceP} \\
& \quad \text{\texttt{TeachEng}} \\
\end{align*}
\end{equation}

The primary reason for assuming a \texttt{CP-TP}_\texttt{def} (rather than a canonical \texttt{CP-TP}) for Type 1 construction comes from the fact that the complement clause of aspectual markers lacks a tense distinction. Consider the example in (11). Even though the teaching event and the beginning event did happen in the past, a past tense morpheme is never allowed in the embedded clause.

\begin{equation}
\begin{align*}
\text{(11) \texttt{Kanozyo-wa \{eigo-o \texttt{TeachPRS/PST} o \texttt{hazime-te.}} & \quad \text{Type 1} \\
\text{\texttt{She began teaching English.}} \\
\end{align*}
\end{equation}
Syntax and semantics of aspectual constructions in Japanese: Defective T and habituality

Figure 1 Lattice structure and a domain reduction

These structures easily explain the contrast in pitch-accent assignment (Obs. 1). The high-pitch region is sensitive to the sister node of T. There are two T’s in (10)a. This is why there are two pitch accent contours in (5)a and one prosodic unit in (4)a.

Third, the statement in (9) explains the puzzle about the theta-role assignment. Under a common view that v/Voice is the source for Agent introducing an external argument (Kratzer 1996), a conclusion is naturally drawn that the referent of the main clause subject in (10)a must be assigned an Agent (who voluntarily initiates the event) from Voice (or, more precisely, the combination of Voice and v + \( \backslash \text{begim} \)) whereas she in Type 2 has no such requirement (Obs. 3). In addition, being defective, TP<sub>def</sub> has no ability to assign a nominative to the Spec, Voice<sub>p</sub>, necessitating that a PRO exist in this Spec, Voice<sub>p</sub>. As this PRO in the embedded clause gets its own theta-role (Agent; the person who teaches English) from the lower Voice (or rather, from the combination of Voice and v + \( \backslash \text{teach} \)), the referent of the subject must be associated with two different theta-roles, one of which is an Agent.

In this way, the proposals in (9) successfully explain important contrasts regarding the two aspectual constructions (Obs. 1 to 3). What remains unaddressed is the semantic contrast in Obs. 4, namely the difference in habituality. But this last puzzle is not a difficult hurdle to overcome under our current analysis. As we saw above, the \( \text{koto} \)-clause selected in Type 1 construction is involved with a defective T. Being defective means being tenseless, and being a tenseless means that it refers to no single time. By assuming that the defective T is the source of genericity in the verbal domain, as convincingly argued by previous studies (Križka’s 1987 1-genericity; Carlson 2011), we can explain why the Type 1 construction is not used in Scenario A, where there exists a particular, single event. In the next subsection, let us flesh out this intuition by giving denotations to the relevant nodes.

3.2 Semantics

3.2.1 Backgrounds

To formally discuss the issue of habituality, let us adopt a version of event semantics proposed by Kratzer (2007) (see also Križka 1992; Landman 1996; Ferreira 2016), which assumes the set in (12)a is the domain for the eventuality (\(- D_i\)), rather than the classic assumption in (12)b.

\[
\begin{align*}
(12) \ a. \ D_E &= \{e_1, \ldots, e_n, e_1 \otimes e_2, e_1 \otimes e_3, \ldots, e_1 \otimes e_2 \otimes e_3, \ldots\} \\
& \ b. \ D_E^{\text{5G}} = \{e_1, \ldots, e_n\}
\end{align*}
\]

To explain this, consider the left panel in Figure 1, which illustrates how we create a lattice structure based on the set of events in (12)b. Here, for simplicity’s sake, our original set of singular events is set to \([e_1, e_2, e_3]\); they are the objects on the ‘first floor’ of this lattice building. By taking two of these elements, we can get elements on the ‘second floor,’ namely \(\{e_1 \otimes e_2, e_2 \otimes e_3, e_3 \otimes e_1\}\). Finally, by taking three elements from the original set, we get the ‘third floor’ element, i.e., \(\{e_1 \otimes e_2 \otimes e_3\}\). The set \(D_E\) in (10)a is a generalized lattice structure with \(n\) events for the baseline set \(D_E^{\text{5G}}\) (= (10)b).
3.2.2 Denotations
Having laid out the ontological background, now let us turn to the denotations. First, following Kratzer (2007), I assume that verbs are born as plurals, where singularities are special cases of pluralities (= (12)b) (i.e., $D^p_s \subset D_s$) and that the boldfaced VoicePs in (10)a and (10)b both denote a characteristic function on the set $D_s$; that is, a set of both singular and plural events.

\[ \text{VoiceP} = \lambda e \in D_s. \text{teach}(e) \land \text{AG}(e, \text{she}) \land \text{PAT}(e, \text{Eng}). \]

Second, reflecting our intuition that presence of a defective $T$ is associated with multiplicity of events, I propose the job of the defective $T$ is a domain restriction to $D_s \setminus D^p_s$ as given in (14).

\[ \text{Ta} \in \lambda \lambda e \in D_s \setminus D^p_s. P(e). \]

Visually, this domain restriction is interpreted from the set in the left panel to the right panel in Figure 1. Metaphorically speaking, in Type 1, $\text{Ta}$ subtracts the objects on the ‘first floor’ (= singular events; (12)b) from the entire set (= (12)a), resulting in the set of the non-singular events (= $D_s \setminus D^p_s$). In Type 2, no such domain restriction is applied, hence compatible with both singular and plural events.

Third, we need to articulate the relation between two time-intervals. Whether it is merged with $\nu$ or $\text{Aux}$, the chief function of $\text{\textsc{begin}}$ is to specify the relation between two intervals (= (15)); for the sake of simplicity, I assume that $\nu$ and $\text{Aux}$ serve as identity functions. For all the best worlds, there is a relevant period in which an event/state holds (the event interval, $\text{EI}$), such that (i) the reference interval ($\text{RI}$), i.e., $\text{INT}(e)$, is situated within this $\text{EI}$ and (ii) the end point of the $\text{RI}$ needs to precede the contextually-given threshold, which determines the end point of the ‘beginning’ part of this interval; for the idea that aspectual expressions are involved with modal ingredients, see Dowty (1977), Landman (1992, 1996), Portner (1998) and Ferreira (2016). In the semantics in (7)c, $\text{MIN}(P(\eta))$ and $\text{MAX}(P(\eta))$ refer to the initiating/terminating point of the $\text{EI}$ and the threshold is the point that divides this $\text{EI}$ into $1:(n - 1)$ (where $n$ is the contextually given parameter). When there are multiple events, this $\text{EI}$ refers to the period where the habit exits and, thus, $\text{MIN}(P(\eta))$ is set to the beginning time of the first event and $\text{MAX}(P(\eta))$ is the terminating time of the last event.

\[ \text{\textsc{begin}} = \lambda P, \lambda e, \lambda w. \forall w' \in \text{BEST}(w). \exists e'. \]

\[ \text{INT}(e) \subseteq \left[ \left( \text{MIN}(P(e')) + (n - 1)\text{MIN}(P(e'))/n \right) \right] \text{in} w'. \]

Intervals are considered as a convex set of real numbers, so the proposal in (15) can be paraphrased as a statement about the relation between two grey areas in Figure 2. First, the beginning part is represented as the region between the two dashed lines in Figure 2a. This is a set of real numbers that lie in the interval of $\{r: r \in [\text{MIN}(P(e)), \text{MAX}(P(e))/n + (n - 1)\text{MIN}(P(e))/n]\}$. Second, the $\text{RI}$ is required to be inside this beginning part of the $\text{EI}$. This is what is shown in Figure 2a. So far, there is no difference between Type 1 and Type 2 constructions. Third, in Type 1, $\text{Ta}$ requires us to have multiple time intervals in $\text{EI}$ corresponding to multiple subintervals in which she teaches English as shown in Figure 2b; the beginning and the terminating point of each interval is referred to by $a_i$ and $b_i$ ($i \in \mathbb{N}$). In this case, three events, e.g., $e_1 \otimes e_2 \otimes e_3$, are identified. In contrast, Type 2 construction
allows the configuration in Figure 2c, where the EI is constituted by a singular event of her teaching.

Notice the above denotation says nothing about the relation between RI and each subevent in EI, so it is predicted that not only the configuration in Figure 3a but also the one in Figure 3b is equally accepted. As pointed out in Section 2.4, this prediction is borne out. The sentences in (1) can be used in a situation when the reference time is set to be on a holiday (as long as the referent of she regularly repeats similar teaching events in the best worlds); in contrast, when there is only one single event, the referent of she must be teaching during the reference time as illustrated in Figure 3c.

4. Conclusion and future directions

In this way, the defective T analysis has provided reasonable accounts both to the syntax and the semantics; (i) $T_{de}$ yields a control construction (syntax; Obs. 1-3), and (ii) it also provides the I-genericity (semantics; Obs. 4). The conclusion is summarized in Table 1. First, the assumption that there exists a CP-TP layer in Type 1 construction also explains why there exists a prosodic contrast. Since a pitch-accent contour is determined phase-by-phase (Ishihara 2003; Yamada 2018) and the sister node of T is the relevant prosodic domain, Type 1 construction is equipped with two pitch accent contours while Type 2 only receives a single pitch accent contour. Second, the data concerning the adverbial intervention is explained by the difference between a word and a suffix, which is attributed to the property of categorizing head, a property external to the root. Third, the defective TP requires there to be a PRO in the embedded clause. In addition to this PRO, the subject of the main clause must receive a theta-role from the Voice (or its combination with $hazime$ and $v$), namely AGENT; hence, the subject of the Type 1 construction has to be a volitional entity. Finally, the semantics of the defective TP is the source for the habitual reading. Type 1 construction has this defective embedded tense, and thus it disallows the non-habitual reading.

Implications. Not only does this analysis give a full explanation to the four empirical desiderata presented in Section 2 but it has several important implications for future studies. First, this study also contributes to a growing number of studies on the Japanese complementizer system (Kuno 1983; Yamada and Kubota 2018; Yamada 2019, to appear). It is known that embedding predicates taking a koto-clause form a rather heterogeneous group, consisting of predicates with and without a tense distinction, those with and without a de-se reading, and those with and without an overt non-PRO subject. It is therefore wrong to assume that all koto-clauses are equipped with a defective T. By interpreting the conclusion of this paper as a case study that analyzes a subset of koto-taking predicates, future studies are expected to discuss (i) why a koto-clause is used with a variety of embedding
Table 1. Summary of the analysis.

<table>
<thead>
<tr>
<th>Observation 1</th>
<th>Observation 2</th>
<th>Observation 3</th>
<th>Observation 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosody</td>
<td>Adacency</td>
<td>Theta-roles</td>
<td>Habituality</td>
</tr>
<tr>
<td>syntax</td>
<td>Type 1: word</td>
<td>Type 1: NP + PRO</td>
<td>Type 1: √ T_{def}</td>
</tr>
<tr>
<td></td>
<td>Type 2: suffix</td>
<td>Type 2: NP</td>
<td>Type 2: * T_{def}</td>
</tr>
<tr>
<td></td>
<td>Type 2: one TP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>semantics</td>
<td></td>
<td>Type 1: Two</td>
<td>Type 1: T_{def} disallows singular events</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type 2: One</td>
<td>Type 2: compatible with singular and non-singular events</td>
</tr>
</tbody>
</table>

predicates and (ii) when a defective T is used with a koto-clause to propose a theory about the e-selection mechanism and Japanese complementation system. Second, this paper has developed an idea that treats categorizing heads as independent ingredients in grammar distinguished from roots and characterized their functions from both morphosyntactic and semantic perspectives. However, as discussed in Alexiadou and Lehndal (2017), the division of labor between roots and categorizing heads may exhibit crosslinguistic variation. For example, as mentioned above, English begin and start cannot be used as affixes, which is a difference from Japanese. If the present analysis is on the right track, the next important question would be to ask whether such characteristics of categorizing heads are attributed to more general properties from which we can predict the way languages differ. Finally, the analysis of this paper can also extend to a general discussion on grammaticalization. Affixation is regarded as an important property of grammaticalization in general (Lehner 1995; Hopper and Traugott 2003) and the suffix use (hazime in Type 2) is also considered as a grammaticalized use developed from the word hazime in Type 1 construction. Under the presented analysis, grammaticalization is interpreted as a change in categorizing head; i.e., a change as to what categorizing head a root is combined with. As long as it is combined with a v, it is considered as a verb (a word), which is merely a contentual element. But, when a language system allows it to take a different categorizing head (in our case, it is an Aux), it is analyzed as a suffix with a more abstract function.

Selected references

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Ferreira, Marcelo. 2016. The semantic ingredients of imperfectivity in progressives, habituals, and
1. Introduction

In Japanese, lexically related transitive and anticausative verbs generally exhibit distinct morphological forms (e.g., *waru* “break [transitive]” and *wareru* “break [anticausative]”); however, there are a small number of intransitive verbs that can be used transitively without changing the form; this is illustrated in (1).

(1) a. Taroo-no kuchi-ga ai-tei-ru.¹ (anticausative with no object)
   Taro-GEN mouth-NOM open.intr-ASP-PRES
   “Taro’s mouth is open.”

   b. Taroo-ga kuchi-o ai-tei-ru. (anticausative with an object)
   Taro-NOM mouth-ACC open.intr-ASP-PRES
   “Taro’s mouth is open.”

   c. Taroo-ga kuchi-o ake-tei-ru. (transitive)
   Taro-NOM mouth-ACC open.tr-ASP-PRES
   “Taro opens his mouth (intentionally).”/Taro’s mouth is open.”²

The same verb form *aku* “open.intr” is used in intransitive sentence (1a) and in transitive sentence (1b). Although the verb takes an accusative object, the subject *Taro* in (1b) is not construed as an agent. The meaning of transitive sentence (1b) is almost the same with intransitive sentence (1a). Thus, the verb *aku* in (1b) is syntactically transitive, but semantically and morphologically anticausative. Several previous studies have been conducted cross-linguistically on the phenomena of transitive–intransitive alternation (Haspelmath (1993), Levin and Rappaport (1995), and Alexiadou,

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²Abbreviations used in this paper are as follows: NOM (Nominative), TOP (Topic), ACC (Accusative), DAT (Dative), GEN (Genitive), PASS (Passive), PRES (Present), PAST (Past tense), ASP (Aspectual), GER (Gerund), tr (transitive), intr (intransitive), and REF. (reflexive).

²The sentence in (1c) has two interpretations: “Taro opens his mouth (intentionally)” and “Taro’s mouth is open.” Note that the second interpretation is shared with the sentence in (1b). Then, what is the difference between (1c) and (1b) in this construal? The sentence in (1b) indicates that Taro’s mouth opens of its own accord, whereas the sentence in (1c) denotes that Taro brought about the opening of his mouth regardless of whether it was intentional or unintentional. I suppose that the subject in (1c) has an agent or causer role, whereas the subject in (1b) does not.
Anagnostopoulou and Schäfer (2015) are among many others); however, in Japanese, cases where anticausatives take an accusative object have rarely been mentioned in the literature.

The purpose of this paper is to present a theoretical analysis of anticausatives taking an accusative object as in (1b). On the basis of Schäfer's (2008) typology of Voice heads into thematic and non-thematic ones, this paper will represent that anticausatives taking an accusative object are associated with a non-thematic Voice. A consequence of this theoretical analysis is that the morphological form of anticausatives is sensitive to the semantic property of Voice at least in some conventionalized cases such as in (1b).

The organization of this paper is as follows: Section 2 will present a list of anticausatives that can take an accusative object and will show their general characteristics. Section 3 will provide an overview of our research study’s theoretical framework and provide theoretical analysis of anticausatives taking an accusative object. Section 4 will highlight empirical evidence for our analysis, and Section 5 will provide concluding remarks.

2. Anticausatives Taking an Accusative Object

The number of anticausatives that can take an accusative object is extremely small. The following list of anticausatives taking an accusative object includes anticausatives that have been cited in previous studies, for example, Suga (1981), Jacobsen (1992), and Yao (2007).

(2) a. Inaho-ga koobe-o tare-ta.
   ear of rice-NOM head-ACC hang.intr-PAST
   “An ear of rice hung.”

b. Taroo-ga ryohiza-o jimen-ni tsui-ta
   Taro-NOM both knees-ACC ground-DAT stick.intr-PAST
   “Both of Taro’s knees touched the ground.”

c. Taroo-ga mune-o hadake-ta.
   Taro-NOM chest-ACC expose.intr-PAST
   “Taro’s chest was exposed.”

d. Taroo-ga nemuke-o moyooshi-ta.
   Taro-NOM drowsiness-ACC feel.intr-PAST
   “Taro felt sleepy.”

e. Kawa-ga nizukasa-o mashi-ta.
   river-NOM volume of water-ACC increase.intr-PAST
   “The river rose.”

f. Shokubutu-ga ne-o hat-ta.
   plant-NOM root-ACC spread.intr-PAST
   “The root of the plant spread.”

g. Umi-ga uzu-o mai-ta.
   sea-NOM whirlpool-ACC roll.intr-PAST
   “The sea produced whirlpools.”

Some anticausatives taking an accusative object have a causative transitive verb variant (e.g., aku “open.intr” and okeru “open.tr,” tareru “dribble.intr” and tarasu “dribble.tr,” and isuku “stick.intr” and isukeru “stick.tr”); others, however, have no causative transitive verb variant, namely, hadakeru “expose.intr,” moyooshi “feel.intr,” mashi “increase.intr,” haru “spread.intr,” and maku “roll.intr.” Further, a selectional restriction prevails on the type of accusative objects that these anticausatives can
take. Moreover, the referent of the accusative object has to be a part of the referent of the subject. For example, *kuchi* “mouth” is interpreted as Taro’s body part in (1b), and *koobe* “head” is construed as a part of an ear of rice in (2a). Thus, a kind of reflexive relation prevails between the subject and object of these anticausatives.

Yasuhara (2011) displays that anticausatives that can take an accusative object are more compatible in subordinate clauses, which is another of their characteristics. For example, the sentence in (3b) sounds more natural than that in (3a). The former is a complex sentence, whereas the latter is a simple sentence.

(3) a. Taroo-ga kuchi-o ai-ta.  
    Taro-NOM mouth-ACC open.intr-PAST  
    “Taro’s mouth opened.”

b. Taroo-ga kuchi-o ai-te ne-tei-ru.  
    Taro-NOM mouth-ACC open.intr-GER sleep-ASP-PRES  
    “Taro is sleeping with his mouth open.”

In Japanese, subordinate clauses headed by *te* generally denote unintentional events that accompany the action of an agent denoted by the main clause. Anticausatives also indicate that the events occur in their own accord. Therefore, it is natural that anticausatives taking an accusative object tend to occur in subordinate clauses.³

### 3. Theoretical Framework

At first glance, examples such as (1b) and (2) appear to be idiosyncratic to Japanese. In this study, however, I will reveal that they can be explained by positing that they involve non-thematic Voice (Schäfer 2008). Further, I will argue that the non-thematic Voice analysis can be applied to Japanese anticausative phenomena.

Schäfer (2008) argues that two types of anticausatives prevail—marked and unmarked anticausatives—cross-linguistically. In German, this distinction is represented by the presence or absence of a reflexive pronoun, as shown in (4).⁴

(4) a. Das Wasser kühlt ab. (unmarked anticausative)

b. Das Wasser kühlt sich ab. (marked anticausative)

³Anticausatives taking an accusative object seem to be a semi-productive phenomenon. Embedding them in a subordinate clause rescues some anticausatives taking an accusative object that have not been mentioned in previous studies.

(i) Kare-wa koko-ro-o ochitei-te sugoshi-tei-ru.  
    he-TOP mind-ACC calm down.intr-GER spend-ASP-PRES  
    “He spends time with composure.”

(ii) Kare-wa koshi-o kigan-de arui-ta.  
    he-TOP loins-ACC stoop.intr-GER walk-PAST  
    “He walked with a stoop.”

⁴The terms “marked” and “unmarked” anticausatives should be understood as labels for two distinct anticausative categories, and they do not imply that the latter is more natural than the former. For example, it is the case that some anticausatives have both marked and unmarked counterparts, but others have either unmarked or marked forms in German.
the water   cools    REFL   down
“The water cools down.” (Schäfer 2008)

The structures of the unmarked and marked anticausatives are shown in (5).

(5)  a.  [VP v DP]  (e.g., (4a))  
      [non-thematic-Voice]  REFL  non-thematic-Voice [VP v DP]]  (e.g., (4b))

The marked anticausative in (4b) is syntactically transitive, but semantically anticausative. Moreover, this mismatch is explained by positing non-thematic Voice. Non-thematic Voice introduces an external argument, but it is thematically inert, and hence, only the referent of the internal argument is involved in the event of the verb.

I propose that the verb (*aka) in (1a) and (1b) corresponds to the unmarked and the marked anticausative, respectively; they occur in the following syntactic structures.

(6)  a.  [VP v kuchi “mouth”]  (e.g., (1a))  
      [non-thematic-Voice]  Taroo non-thematic-Voice [VP v kuchi “mouth”]]  (e.g., (1b))

The subject in (1b) is non-thematic, and therefore, it is not thematically involved in the event of the verb. As a result, (1b) exhibits an anticausative interpretation while retaining transitive syntax.

Further, two caveats are in order here, and the first one is concerned with the reflexive pronoun that co-occurs with marked anticausatives. German marked anticausatives such as (4b) take a reflexive pronoun, but the anticausatives taking an accusative object in (1b) and (2) take a body part object such as *kuchi “mouth” rather than the reflexive pronoun *jibunjishin “oneself.” Gunji (2001) reveals that several body part nouns in Japanese, such as sugata “figure,” karada “body,” and kao “face” behave like the reflexive pronoun *jibunjishin “oneself,” and hence, they can be regarded as a kind of reflexive pronouns. This contrast can be observed in the following.

(7)  Er {wusch/rasierte} sich. (German)
    he washed/shaved REFL
    “He washed/shaved.” (Oya 2008)

(8)  He {washed/shaved} himself.

(9)  Kare-ga  {jibunjishin-o/karada-o}  arat-ta. (Japanese)
    he-NOM  {oneself-ACC/body-ACC}  wash-PAST
    “He washed.”

In German and English, the verbs *wusch “wash” and *rasierte “shave” can take the reflexive pronoun *sich “oneself.” In Japanese, on the contrary, such verbs can take body part nouns such as *karada “body,” but not the reflexive pronoun *jibunjishin “oneself” in these reflexive constructions. Further, these body part nouns have to be interpreted as a part of the referent of the subject NP when they occur in such reflexive constructions. On the basis of these observations, I assume that the body part objects taken by anticausatives in Japanese serve as reflexive pronouns, in parallel with *sich in German marked anticausatives.

The second caveat is about the syntactic position of the reflexive pronoun in marked anticausatives. Schäfer (2008) argues that the reflexive pronoun *sich occurs in the external argument position, as it could serve as an expletive element that does not have to receive a thematic interpretation. However, in this paper, I assume that the referential DP *das Wasser in (4b) is merged...
in the external argument position, and the reflexive pronoun occurs in the internal argument position. This explains the case assignment of *das Wasser* and *sich*. *Das Wasser* bears the nominative case, and the reflexive pronoun *sich* bears the accusative case. Hence, I assume the syntactic structure in (10) for the sentence in (4b).

(10)  [non-thematic Voice] *Das Wasser* expletive-Voice [vP v *sich*]

The referential DP *das Wasser* is merged in the specifier of the non-thematic Voice, so it receives no thematic interpretation. However, as this DP is referential, it must be integrated into the event of the vP through the binding of the reflexive pronoun *sich* in the internal argument position. Otherwise, this referential DP cannot be accurately interpreted. In this way, although the referential DP that occurs in the external argument position has no thematic role, it can be properly interpreted through the binding of the reflexive pronoun. The external argument indirectly receives a theme or a patient role, which is assigned to the internal argument, because of the coreference between the two arguments.

On the basis of these assumptions, I propose that the anticausatives taking an accusative object can be regarded as a kind of marked anticausatives and have a syntactic structure like (11b).

(11)  a.  Taiyoo-no sugata-ga kemono-shironi hide:intr-PAST
        sun-GEN figure-NOM behind the clouds
        “The sun disappeared behind the clouds.”
    b.  Taiyoo-ga kemono-shironi sugata-o hide:intr-PAST
        behind the clouds figure-ACC
        “The sun disappeared behind the clouds.”

The NP *Taiyoo* occurs in the external argument position of the non-thematic Voice, and the body part noun *kemono* “mouth,” which serves as a reflexive pronoun in this case, is associated with the internal argument position. The referential DP *Taiyoo* receives no thematic role, and therefore, it binds the internal argument *kemono* “mouth” to be accurately interpreted. As a result, a reflexive or inalienable possessor-possessee relation prevails between the external and internal arguments. This explains the selectional restriction on the type of DPs that can occur as the object of anticausatives.

4. Syntactic and Semantic Properties of Anticausatives Taking an Accusative Object

In the previous sections, I proposed that anticausatives taking an accusative object are associated with non-thematic Voice and can be considered a kind of marked anticausatives.

This section will show that this analysis is borne out by comparing anticausatives taking an accusative object with marked anticausatives. Yasuhara (2017) argues that examples such as (12b)–(19b) can be considered marked anticausatives in Japanese.

(12)  a.  Tsuki-no sugata-ga kemonoaidakara mien-PAK
        moon-GEN figure-NOM from between clouds
        “The moon appeared from behind the clouds.”
| (14) | a. Taiyoo-ga kumonoushiro-kara araware-ta. | sun-NOM from behind clouds appear-PAST |
|      | b. Taiyoo-ga kumonoushiro-kara sugata-o arawashi-ta. | sun-NOM from behind clouds figure-ACC show-PAST |
|      | “The sun appeared from behind the sun.”            |                                             |
| (15) | a. Furui tatemono-ga kie-ta.                        | old building-NOM disappear-PAST |
|      | b. Furui tatemono-ga sugata-o keshi-ta.            | old building-NOM figure-ACC erase-PAST |
|      | “An old building disappeared.”                      |                                             |
| (16) | a. Kare-no karada-ga koware-ta.                     | he-GEN body-NOM break-PAST |
|      | b. Kare-ga karada-o kowashita.                      | he-NOM body-ACC break(tr)-PAST |
|      | “He became ill due to overwork.”                    |                                             |
| (17) | a. Kare-no atama-ga nayan-cla.                      | he-GEN head-NOM worry.intr-AST |
|      | b. Kare-ga atama-o nayanase-ta.                     | he-NOM head-ACC worry.tr-AST |
|      | “He worried.”                                       |                                             |
| (18) | a. Kare-no taichoo-ga kuzure-ta.                    | he-GEN physical condition-NOM collapse.intr-PAST |
|      | b. Kare-ga taichoo-o kuzushita.                     | he-NOM physical condition-ACC collapse.tr-PAST |
|      | “He became sick.”                                   |                                             |
| (19) | a. Kare-no ishiki-ga tushinat-ta.                   | he-GEN consciousness-NOM lose-PAST |
|      | b. Kare-ga ishiki-o tushinat-ta.                    | he-NOM consciousness-ACC lose-PAST |
|      | “He dropped into unconsciousness.”                  |                                             |

The sentences in (a) are unmarked anticausatives, and those in (b) are marked anticausatives. Japanese marked anticausatives tend to denote the events of appearance or disappearance, as in (12)–(15), as well as the events of becoming sick, as in (16) and (18).\(^3\) I noted that the marked anticausatives in (12)–(15) have unmarked anticausative counterparts. However, the marked anticausatives in (16)–(19) have no unmarked anticausative counterpart. This situation is not idiosyncratic to Japanese (see footnote 4).

Our non-thematic Voice analysis is empirically supported by the following four pieces of evidence. The first one is concerned with the absence of agentivity. As the external argument of

\(^3\) Yasuhara (2017) argues that English also has marked anticausatives. Following examples display that most marked anticausatives in English tend to denote the events of appearance.

(i) a. Religious faith expresses itself in a variety of ways.
    b. His illness began to manifest itself at around this time.
non-thematic Voice is thematically inert, it does not permit intentionality adverbs and instrumental phrases, both of which require Agents. The examples in (20) are marked anticausatives and the examples in (21b)–(23b) are anticausatives taking an accusative object.

(20) a.* Taroo-ga {wazato/dokude} karada-o kowashi-ta.
    Taro-NOM {deliberately/with poison} body-ACC break.tr-PAST
    “Taro became sick {deliberately/with poison}.”

b.* Kare-ga wazato atama-o nayamase-ta.
    he-NOM deliberately head-ACC worry.tr-AST
    “He worried deliberately.”

c.* Kare-ga wazato taichoo-o kuzushi-ta.
    he-NOM deliberately physical condition-ACC collapse.tr-PAST
    “He became sick deliberately.”

d.* Kare-ga wazato ishiki-o ushinat-ta.
    he-NOM deliberately consciousness-ACC lose.tr-PAST
    “He dropped into unconsciousness deliberately.”

(21) a. Taroo-wa {wazato/ryootede} kuehi-o ake-tei-ru.
    Taro-TOP {deliberately/with both hands} mouth-ACC open.tr-ASP-PRES
    “Taro {deliberately/with both hands} opened his mouth.”

b.* Taroo-wa {wazato/ryootede} kuehi-o ai-tei-ru.
    Taro-TOP {deliberately/with both hands} mouth-ACC open.intr-ASP-PRES

(22) a. Taroo-wa wazato kuchi-kara yodare-o tarashi-ta.
    Taro-TOP deliberately mouth-from saliva-ACC dribble.tr-PAST
    “Taro deliberately dribbled saliva from his mouth.”

b.* Taroo-wa wazato kuchi-kara yodare-o tare-ta.
    Taro-TOP deliberately mouth-from saliva-ACC dribble.intr-PAST

(23) a. Taroo-ga wazato ryohiza-o jimen-ni tsuke-ta.
    Taro-NOM deliberately both knees-ACC ground-DAT stick.tr-PAST
    “Taro deliberately kneaded down on the ground.”

b.* Taroo-ga wazato ryohiza-o jimen-ni tsui-ta.
    Taro-NOM deliberately both knees-ACC ground-DAT stick.intr-PAST

The sentences in (21a)–(23a) are transitive sentences with a lexically causative verb that takes an agent subject, and hence, they are compatible with these intentionality adverbs.

Second, passivization cannot be applied to anticausatives taking an accusative object as well as marked anticausatives. The examples in (24) are marked anticausatives, and those in (25) are anticausatives taking an accusative object.

(24) a.* Karada-ga Taroo-ni kowas-are-ta.
    body-NOM Taro-DAT break.tr-PASS-PAST

b.* Atama-ga Taroo-ni nayamase-are-ta.
    head-NOM Taro-DAT worry.tr-PASS-PAST

c.* Taichoo-ga Taro-ni kuzus-are-ta.
    physical condition-NOM Taro-DAT collapse.tr-PASS-PAST

d.* Ishiki-ga Taro-ni ushinaw-are-ta.
    he-NOM Taro-DAT lose-PASS-PAST

(25) a.* Kuchi-ga Taroo-ni ak-are-ta.
Anticausatives Taking an Accusative Object in Japanese

German marked anticausatives do not permit passivization either (see Schäfer (2008) for the theoretical analysis of the unavailability of passivization of marked anticausatives).

Third, both marked anticausatives in (26) and anticausatives taking an accusative object in (27) are compatible with adverbial phrases that indicate that the event happened spontaneously such as *hitotōri* "by itself" and cause phrases that suggest that the event was brought about by an external cause such as karōode "due to overwork."

(26) a. Kare-ga {hitotōri/karōode} karada-o kowashi-ta.
   he-NOM {by itself/due to overwork} body-ACC break.tr-PAST
   "He became ill {by himself/due to overwork}."

b. Kare-ga {hitotōri/shakkinde} atama-o nayamase-ta.
   he-NOM {by itself/due to debt} head-ACC worry.tr-AST
   "He worried {by himself/due to debt}."

c. Kare-ga {hitotōri/kazede} taisei-o kuzushi-ta.
   he-NOM {by itself/due to a cold} physical condition-ACC collapse.tr-PAST
   "He became sick {by himself/due to a cold}."

d. Kare-ga {hitotōri/karōode} ishiki-o ushirat-ta.
   he-NOM {by itself/due to overwork} consciousness-ACC lose-PAST
   "He dropped into unconsciousness {by himself/due to overwork}."

(27) a. Inaho-ga {hitotōri/kazede} kōbe-o tare-ta.
   ear of rice-NOM {by itself/from wind} mouth-ACC hang.intr-PAST
   "An ear of rice hung {by itself/from wind}."

b. Taro-o-ga hitotōri kuchi-o ai-ta.
   Taro-NOM by itself mouth-ACC open.intr-PAST
   "Taro’s mouth opened by itself."

c. Ryōhiza-ga {hitotōri/kazede} jimen-ni tsui-ta.
   both knees-NOM by itself ground-DAT stick.intr-PAST
   "Both knees touched the ground by themselves."

These phrases are generally compatible with anticausatives, but not with transitive sentences (cf. Schäfer 2008).

(28) a. Taro-o-ga {hitotōri/kazede} tobira-o ake-ta (transitive)
   Taro-NOM by itself/from wind door-ACC open.tr-PAST

b. Doa-ga {hitotōri/kazede} a-i-ta (anticausative)
   both knees-NOM by itself/from wind open.intr-PAST

Our analysis is further supported by the unavailability of modification of object NPs. The object NP of marked anticausatives does not permit modifications, as in (29).

(29) a. Kare-ga ookina karada-o kowashi-ta.
The main function of reflexive pronouns in marked anticausatives is to retain the coreference with their antecedents. Therefore, body part nouns that serve as reflexive pronouns are different from ordinary nouns and are generally incompatible with modifications. The same characteristic is true of anticausatives taking an accusative object NP, as in (30b)–(32b).

(30) a. "His big mouth is open."
   Kare-wa ookira kuchi-o ake-tei-ru.
   he-TOP big mouth-ACC open.tr-ASP-PRES

b. "He is dribbling a lot of saliva."
   Kare-wa takusan-no yodare-o tare-tei-ru.
   he-TOP a lot of-GEN saliva-ACC dribble.tr-ASP-PRES

(31) a. "Both of Taroo’s dirty knees touched the ground."
   Taro-wa yogoreta yohiza-o jimen-ni tsuke-ta.
   Taro-NOM dirty both knees-ACC ground-DAT stick.tr-PAST
   he-TOP a lot of-GEN saliva-ACC dribble.tr-ASP-PRES

b. "Both of Taroo’s dirty knees touched the ground."
   Taro-wa yogoreta yohiza-o jimen-ni tsui-ta.
   Taro-NOM dirty both knees-ACC ground-DAT stick.intr-PAST

The body part nouns in (30b), (31b), and (32b), which function as reflexive pronouns, cannot be modified by an adjective or a quantifier. The body part nouns in (30a), (31a), and (32a), which are object NPs of ordinary transitive sentences, do not serve as reflexive pronouns, permitting modifications.
5. Conclusion

This paper provided a theoretical analysis for the anticausatives that take an accusative object in Japanese. I further claimed that they are associated with non-thematic Voice and that they can be regarded as a kind of marked anticausatives. I provided four pieces of empirical evidence substantiating this claim. In most cases, Japanese marks lexically related transitive and anticausative verbs with morphologically different suffixes. However, anticausatives taking an accusative object have the same morphological form as those taking no accusative object, as shown in (1) and (2). The number of anticausatives taking an accusative object is very small, and they are not productive. Hence, I suppose that the morphological markings on change-of-state verbs are generally sensitive to the syntactic property of Voice (i.e., whether or not Voice takes an external argument); however, in some conventionalized cases, they are also sensitive to the semantic properties of Voice (i.e., whether or not Voice has an agent/causer role).

References

Mandarin polar questions: their answers, contextual requirements and intonation

Mengxi Yuan and Yurie Hara
Jinan University and Waseda University

1. Introduction

Mandarin has at least two constructions that function as a polar question. Ma questions (henceforth MAQs) are obligatorily marked by the particle ma and make one answer syntactically explicit, as in (1). A-not-A questions (henceforth ANAQS) spell out both answers in the syntax, as in (2).

(1)  Ni he jiu ma?  
     you drink wine ma  
     ‘Do you drink wine?’

(2)  Ni he-bu-he jiu?  
     you drink-not-drink wine  
     ‘Do you drink wine or not?’

If we simply followed Hamblin (1973), all polar questions should denote the same set \( \{p, \neg p\} \). This cannot explain why (1) and (2) are answered differently and have distinct contextual requirements. This paper aims to account for the similarities and differences of the two questions by deriving their semantics compositionally from each construction.

2. Previous studies

Dong (2009) argues that MAQs and ANAQS denote the same Hamblin set of propositions, which cannot explain the contrast in a biased context like (3). Here, MAQs are felicitous but ANAQS are not.\(^1\) MAQs can be responded by verb-echo answers and the answer particles (bu) shide ‘(not) be’\(^2\) (Guo, 2000).

(3)  Biased: A visits B’s home for the first time and sees some wine bottles in B’s refrigerator.

\begin{align*}
A1: & \checkmark \text{Ni he jiu ma? ‘Do you drink wine?’} & (\text{MAQ}) \\
A2: & \#\text{Ni he-bu-he jiu? ‘Do you drink wine or not?’} & (\text{ANAQ})
\end{align*}

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\(^2\) The infelicity of ANAQS in biased contexts was first observed by Li and Thompson (1981). The particles (bu) shide cannot be simply translated to English ‘yes/no’. When (bu) shide is used to answer a positive MAQ \( p \)-\text{ma}? \( \), shide confirms the positive proposition \( p \) and \( \text{bu shide} \) rejects \( p \). When (bu) shide is used to answer a negative MAQ \( \neg p \)-\text{ma}? \( , \) shide confirms the negative proposition \( \neg p \) and \( \text{bu shide} \) rejects \( \neg p \).
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B: wo (bu) he. / Shide./ Bu-shide.
   'I (don’t) drink./ 'Yes.'/ 'No,'

Krifka (2015) proposes that a MAQ p-ma? is a biased monopolar question which restricts the future development of the context in such a way that the only legal continuation is the commitment to p by the addressee, whereas ANAQs are neutral bipolar questions which allow two legal continuations, i.e., the commitment to p (by the addressee) and the commitment to ¬p. Thus, the speaker of a MAQ proposes only one legal continuation to the addressee. This explains why the MAQ can be used in (3), where A is suggesting the commitment to p ‘B drinks wine’ by B. In contrast, the speaker of an ANAQ is suggesting both the commitment to p by B and the commitment to ¬p by B. The latter suggestion is inconsistent with the fact that A has observed evidence supporting p, thus the ANAQ cannot be used in (3).

Krifka’s analysis, however, cannot explain why MAQs behave just like ANAQs in a neutral context like (4). Here, both MAQs and ANAQs can be used and can be answered with p ‘I drink wine’ or ¬p ‘I don’t drink wine’. That is, MAQs in neutral contexts allow both continuations, i.e., the commitment to p and the commitment to ¬p by the addressee, just like bipolar neutral questions. This contradicts Krifka’s proposal that MAQs only allow one legal continuation.

(4) Neutral: before preparing dinner for a guest B, A wants to find out whether B drinks wine.

A1: √ Ni he jiu ma? ‘Do you drink wine?’ (MAQ)
A2: √ Ni he-bu-he jiu? ‘Do you drink wine or not?’ (ANAQ)
B1: wo (bu) he./ #Shide./ #Bu-shide.
   'I (don’t) drink./ #'Yes./ #'No.'

To explain the contrast in (3) and (4), Ma (2018) argues that MAQs in neutral contexts, just like ANAQs, denote a Hamblin set, whereas MAQs in biased contexts have the same syntax and semantics as tag questions. That is, the MAQ in (3) is syntactically and semantically equal to the tag question in (5), both composed of a declarative clause Ni he jiu ‘You drink wine’ and an interrogative clause shi ma? ‘Is it right?’.

(5) Ni he jiu, shi ma?
   you drink wine be ma
   ‘You drink wine, right?’

Given that tag questions can co-occur with the adverb bijing ‘after-all’, as in (6), however, this wrongly predicts that MAQs in biased contexts could also combine with bijing, which is not the case as can be seen in (7).

(6) Bijing, ta yijing lai le ma?
   after-all he already come PERF be ma
   ‘After all, he has already arrived, right?’

Also, the adverb randao, which literally means ‘difficult-say’ and marks the speaker’s incredulity towards the presented proposition, collocates with biased MAQs but not with tag questions, as in (8) and (9). Ma’s analysis wrongly predicts that tag questions, just like MAQs,
can co-occur with *nandao.

(8)  Ni nandao he jiu ma?  you nandao drink wine ma  ‘Do you mean that you drink wine?’
    #Ni nandao he jiu, shi ma?
    ‘Do you mean that you drink wine?’

To recapitulate, Dong (2009) treats MAQs and ANAQs as having the same semantics, which cannot explain their different contextual requirements. Krifka (2015) analyzes MAQs as monopolar questions and ANAQs as bipolar ones, which fails to explain their similarity in neutral contexts. Ma (2018) claims that MAQs have the same syntax and semantics as tag questions. This cannot explain why these two constructions collocate with different adverbs.

3. Embeddability

Another difference between MAQs and ANAQs is that MAQs cannot be embedded while ANAQs can. For example, the MAQ cannot be embedded under the verb *zhidaor ‘know’, as in (10), whereas the ANAQ can, as in (11). However, if a sentence-final particle *ne is attached to the ANAQ, the ANAQ cannot be embedded, as in (12).

(10)  *Wu zhidaor [Li he jiu ma.]  (11)  Wu zhidaor [Li he-bu-he jiu.]
      Wu know Li drink wine ma           Wu know Li drink-not-drink wine
      Intended: ‘Wu knows if Li drinks wine.’  ‘Wu knows if Li drinks wine or not.’

(12)  *Wu zhidaor [Li he-bu-he jiu ne.]
      Wu know Li drink-not-drink wine ne
      Intended: ‘Wu knows if Li drinks wine or not.’

4. Semantics of MAQs

We propose that the *ma particle in MAQs is a force marker, which introduces a question force head and occupies the head position of a ForceP. Thus, (1) has the structure depicted in (13). This correctly predicts that MAQs cannot be embedded, as we have seen in (10), since clauses indicating sentential forces cannot be embedded in Mandarin. As pointed out by Han (1998), there are many languages in which embedded clauses cannot express force. This is indeed the case in Mandarin. Mandarin clauses marked as questions or commands cannot be embedded.

(13)  ForceP
      / \  
     /   
    |    
   TP  Force
   /    / ma
  / he jiu

(14)  [Wu zhidaor Li he jiu] ma
     Wu know Li drink wine  0
     \ Does Wu know that Li drinks wine?
    # Wu knows if Li drinks wine.

(15)  Li yaoqiu [ni lai wo jia ba]
      Li request you come my home BA
      Li requests: ‘(You) come to my home!’
      (‘my home’ = Li’s home)
can be grammatical but what is embedded is not a MAQ. Here, the declarative clause
Wu zhidaow Li he jiu ‘Wu knows that Li drinks wine’ combines with the particle ma to form a
root MAQ. In (15), it appears as if the clause ni lai wo jia ba were embedded, but it is in fact
a direct quotation of the command ‘Come to my home’ uttered by Li.

In order to formalize the composition of Mandarin polar questions, we adopt McCready’s
(2010) type system for conventional implicatures, which have semantic objects of at-issue
type (which are marked by the superscript a) and objects of shunting type (which are marked
by the superscript s). Shunting types are for those semantic objects that ‘shunt’ information
from one meaning dimension to another. We propose that the force-marker ma is an expres-
sive that changes the at-issue type of its argument to expressive shunting type. Ma combines
with an at-issue expression, i.e., a proposition p, by McCready’s shunting-type functional
application (16) and creates a shunting-type expressive, i.e., a Hamblin set containing p and
its negation, as in (17), where T = ((s, t), t). The semantic composition of (1) is depicted in
the typed tree in (18). Given that expressives cannot be embedded, this correctly predicts that
MAQs cannot be embedded, as we have seen in (10).

\[ \alpha(\beta) : \tau^a \]
\[ \alpha : \{\sigma^a, \tau^s\} \quad \beta : \sigma^0 \]

\[ [ma] \in D_{(s^a, t^a), T^s} \]
\[ [ma] = \lambda p.\{p, \neg p\} \quad \text{(to be revised)} \]

\[ \{p, \neg p\} : T^s \]
\[ p : (s^a, t^a) \quad \lambda p.\{p, \neg p\} : (s^a, t^a), T^s \]

The analysis in (17) is motivated by the fact that ma is historically derived from a negative
word *bu* ‘not’ (Ota, 1958). Given that the denotation of a question corresponds to its possible
answers, this correctly predicts that MAQs in all contexts can be responded by the verb-echo
answers p or \( \neg p \), as we have seen in (3) and (4).

In a biased context like (3), the MAQ, together with the contextual information, expresses
a bias towards the proposition ‘B drinks wine’. Here, the bias meaning is not encoded in the
MAQ, but contributed by the contextual compelling evidence (Büring and Gunlogson, 2000):

\[ \text{(19)} \]

Contextual Evidence is evidence that has just become mutually available to the participants
in the current discourse situation. Evidence for p is compelling if, considered in isolation, it
would allow the participants to assume p (i.e. the evidence could reasonably be considered
to justify the inference that p).

Büring and Gunlogson (2000: 7)

In (3), “A sees some wine bottles in B’s refrigerator” is a piece of compelling evidence
for p ‘B drinks wine’, because this evidence is mutually available to the participants and it
would allow the participants to assume p. This explains why MAQs in biased contexts like
(3) can be answered by (bu) shide ‘(not) be’ while MAQs in neutral contexts like (4) cannot.
We propose that the answer particle (bu) shide is joined to an elided/covert clause (which

\[ ^3 \text{See Davis & Hara (2014) and Hara (2017) for a formalization of the notion of evidence based on causation.} \]
denotes a proposition) and presupposes that this proposition is salient in the discourse (cf. Kramer and Rawlins, 2011). As in (20), the particle *(bu) shide* is adjoined to the elided clause *wo he jiu* and presupposes that p ‘I drink wine’ is salient.

(20) Biased context: A visits B’s home and sees some wine bottles in B’s refrigerator.

A:  
*ni he jiu ma?* ‘Do you drink wine?’  

B:  
*shide.* (= Wo he *jiu*)  

yes I drink wine  

‘Yes. I drink wine.’

B’:  
*bu-shide.* (= Wo bu he *jiu*)  

No I not drink wine  

‘No. I don’t drink wine.’

A proposition is salient if it is a member of the set of the salient alternatives, i.e., SalAlts, as defined in (21) following Biezma and Rawlins (2012).

(21)  
\[ p \in \text{SalAlts} \text{ if and only if there is contextually compelling evidence for } p \text{ or } \neg p \text{ is asserted by some discourse participant.} \]  

(Modified from Biezma and Rawlins 2012: 288)

When the presupposition is satisfied, *shide* indicates a confirmation of this salient proposition whereas *bu shide* indicates a rejection of it. Since there is compelling evidence for p ‘B drinks wine’ in (20), p is salient and the answer particles can be used. In (4), with no compelling evidence for p, p is not salient and the particles cannot be used.

Our proposal can also explain (7) and (9). A tag question is composed of a declarative and an interrogative (Asher and Reese, 2007), and the bias meaning of a tag question is encoded in the declarative. The adverb *bijing* ‘after all’, like its English equivalent, can co-occur with declaratives but not with interrogatives (cf. Sadock, 1971). We therefore assume that *bijing* requires a declarative as an argument. A tag question like (6) involves a declarative, hence can co-occur with *bijing*, while a MAQ like (7) does not involve a declarative and cannot combine with it. In contrast, the adverb *nandao* can occur in interrogatives but not in declaratives. According to Xu (2017), *nandao* takes the interrogative denotation of \{p, \neg p\} as an argument and creates an epistemic preorder of the two on the part of the speaker by conveying that \neg p is more likely to be the true answer than p. Since *nandao* requires an interrogative as an argument, it cannot be combined with the declarative as seen in (9).

\footnote{Grammatically, *nandao* can be attached to the interrogative tag of the tag questions, as in (i). But (i) is semantically awkward, as the speaker is committed to p ‘You drink wine’ by asserting p first and then expresses his doubt towards p by using an interrogative with *nandao.*}

(i)  

*ni he jiu, nandao shi zheyang ma?*  
you drink wine nandao be this-way ma  

‘You drink wine. Is it actually the case?’
MAQs cannot be embedded. A MAQ denotes a Hamblin-set of propositions, which explains why MAQs can always be responded by the verb-echo answers p or \( \neg p \). When a MAQ occurs in a biased context, the contextual compelling evidence contributes to the bias meaning by introducing a salient proposition into the context. Since the answer particle (bu) shide presupposes a salient proposition, the MAQ in the biased context can be responded by the answer particle. In Section 6, we will entertain some modifications of the semantics of MAQs in order to account for the differences between positive and negative MAQs.

5. Semantics of ANAQs

Following Huang (1991), we assume that the ANAQ (22) is derived from the deep structure in (23). The feature R is realized by a reduplication rule, which copies a sequence following T and inserts bu ‘not’ between the original and its copy. The question operator Q, which can be optionally realized as the sentence-final particle ne, introduces the question force, and thus occupies the head position of a ForceP.

\[
\text{(22) Li he-bu-he (ne)? Li drink-not-drink Q 'Does Li drink or not?'}
\]

The feature R, as defined in (24), creates an at-issue Hamblin-set containing a proposition and its negative counterpart. The particle ne, just like nea, changes the type of its argument to expressive shunting type. Ne combines with an at-issue Hamblin set and creates a shunting-type one, as in (25). The semantic composition of (22) is depicted in the typed tree (26).

\[
\begin{align*}
\text{[R]} & \in D(\langle e^n, (e^n, T^n) \rangle, (e^n, T^n)) \\
\text{[R]} & = \lambda p. \lambda x. \{P(x), \neg P(x)\}
\end{align*}
\]

\[
\begin{align*}
\text{[ne]} & \in D(T^n, T^n) \\
\text{[ne]} & = \lambda \varphi. \varphi
\end{align*}
\]

\[
\begin{align*}
\text{(26) } & \{\text{DRINK}(L), \neg \text{DRINK}(L)\}: T^a \\
L: e^n & \quad \lambda x. \{\text{DRINK}(x), \neg \text{DRINK}(x)\}:
\langle e^n, T^n \rangle \\
\lambda p. \lambda x. \{P(x), \neg P(x)\} & \quad \lambda x. \text{DRINK}(x):
\langle (e^n, (e^n, T^n)), (e^n, T^n) \rangle \\
\end{align*}
\]
The A-not-A construction, i.e., the TP in (23) does not require a force head to create a Hamblin-set, therefore the A-not-A construction, which is an at-issue type, \( (s^a, t^a) \), can be embedded, as we have seen in (11). However, once the particle \( ne \) is attached as in (12), it cannot be embedded since it is an expressive of type \( (s^e, t^e) \).

\( \text{ANAQs} \) cannot be responded by the answer particles \( (bu) \, sh i d e \), as shown in (4), since the particles are used to confirm/reject a salient proposition and confirming or rejecting a non-singleton set would not count as an answer to a question.

The semantics of \( \text{ANAQs} \) is not complete yet. There is another element in \( \text{ANAQs} \), i.e., a low boundary tone \( L\% \) (Shen, 1990). Following Biezma and Rawlins’ (2012) analysis of English alternative questions, we propose that the final \( L\% \) tone on \( \text{ANAQs} \) indicates the presence of a closure operator (Zimmermann, 2000) which expresses exhaustivity. According to Zimmermann (2000), the closure operator, signalled by the final falling intonation, applies to a list and indicates that nothing but the list items has the property in question. For example, in (27), the closure operator, signalled by the falling tone \( \downarrow \), indicates that the listed stations are each one stop from Oxford Circus, and no other stations are one stop from Oxford Circus.

(27)  
A: Which tube stations are one stop from Oxford Circus?  
B: Piccadilly Circus, Bond Street, Tottenham Court Road, Green Park, Warren Street, Regent’s Park \( \downarrow \) (Zimmermann, 2000: 261)

Biezma and Rawlins (2012) propose that an alternative question, which ends with a low boundary tone, also has a closure operator which indicates that nothing but the listed alternatives are the salient alternatives in the context of utterance, i.e., every alternative listed in the question is a salient alternative. Similarly, the closure operator in a Mandarin \( \text{ANAQ} \) also indicates that only the presented two alternatives, i.e., \( \text{p} \) and \( \neg \text{p} \) are salient.

We propose that the closure operator \( L\% \) is paratactically associated (Bartels, 1997) to the force head, as in (28) (the paratactic association is indicated by ‘\( \otimes \)’). We adopt a composition rule of paratactic association (29) proposed by Hara (2019), which merges two functions into one by abstracting over the argument type of the two functions (\( \bullet \) is a metalogical operator that combines expressions of different types). The resulting function, \( \lambda \chi . \alpha (\chi) \bullet \beta (\chi) \), is combined with an at-issue expression \( \chi \) of type \( \sigma^e \) by the shunting-type functional application (16) and outputs a pair of shunting-type expressions \( \alpha (\chi) \bullet \beta (\chi) \) of type \( \tau^a \times \upsilon^d \).

(28)  
\[
\begin{array}{c}
\text{TP} \\
\otimes L\%
\end{array}
\]  
(29)  
\[
\lambda \chi . \alpha (\chi) \bullet \beta (\chi) : (\sigma, \tau \times \upsilon)
\]

As shown in (30), \( L\% \) combines with an at-issue Hamblin set (e.g., \( \{p, \neg p\} \)) and creates an expressive proposition which says that the SalAlts is exactly the set \( \{p, \neg p\} \) (that is, both \( p \) and \( \neg p \) are salient and no other ones are salient in the context) or that SalAlts is empty (when the \( \text{ANAQ} \) occurs at discourse-initial position). The \( L\% \) tone and the force head are paratactically-associated as shown in (31).
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(31) \[
\{\text{p}, \neg\text{p}\} \vdash \mathcal{L}\% (\{\text{p}, \neg\text{p}\}) : \\
T^a \times (s^a, t^a)
\]

\[
\lambda\varphi. \varphi \vdash \mathcal{L}\% (\varphi) : \\
T^a, T^b \times (s^a, t^a)
\]

\[
\lambda\varphi. \mathcal{L}\% (\varphi) : \\
T^a, T^b \times (s^a, t^a)
\]

Our analysis of ANAQs correctly predicts that the ANAQ is felicitous in (32), where both p ‘Li drinks wine’ and \(\neg\text{p}\) have been asserted hence became salient.

(32) A: Li he jiu. ‘Li drinks wine.’
B: Bu, Li bu he jiu. ‘No, Li does not.’
C: Li he-bu-he jiu? ‘Does Li drink wine or not?’

It also correctly predicts that the ANAQ is felicitous in (4), where no alternative is salient. In (3), only one proposition ‘B drinks wine’ is salient, which does not meet the exhaustivity requirement, hence the use of ANAQs is infelicitous. In contrast, MAQs lack the falling tone and does not express this exhaustivity. Therefore, MAQs can occur in biased contexts.

In summary, the A-not-A construction denotes an at-issue Hamblin set of propositions, which can be embedded. The force head \(ne\) combines with the at-issue Hamblin set and creates an expressive Hamblin set, thus ANAQs followed by \(ne\) cannot be embedded. The low boundary tone \(L\%\) on ANAQs contributes to an expressive proposition which says that all and only the listed alternatives are salient. This explains why ANAQs cannot be used in biased contexts where only one alternative is salient.

6. Positive and negative MAQs

The analysis of MAQs in Section 4 cannot account for the differences between the positive MAQs and the negative ones. The negative MAQ is felicitous in (33) but the positive one is not. The semantics in (17) would predict that a positive MAQ and a negative one denote the same set, which cannot explain their different felicity in (33). We will entertain some possible modifications to the semantics of MAQs in this section to explain this difference.

(33) Context: A is in a windowless room. B enters this room holding a dripping wet umbrella.

We propose that a positive MAQ \(\text{p}-\text{ma}\) imposes a requirement on the discourse that the positive proposition \(\text{p}\) is salient. The semantics of the positive MAQ is redefined as in (34).

(34) The definition of a positive MAQ:
\[\llbracket \text{p}\rrbracket \text{ma} \] is defined if \(\text{p} \not\in \text{SalAlts}\) or \(\text{SalAlts} = \emptyset\). When defined, \(\llbracket \text{p}\rrbracket \text{ma} = \{\text{p}, \neg\text{p}\}\).

(34) correctly predicts that the positive MAQ can be used in (35). Here, the positive proposition \(\text{p}\) ‘It is sunny’ is suggested by the evidence ‘B’s umbrella is dry’ and is thus salient.
Hence, the speaker can use a positive MAQ to question about $p$. A positive MAQ can also occur discourse-initially as in (36), where there is no salient proposition (i.e., SalAtts = $\emptyset$).

$$\text{(35) } \text{A and B are in a windowless room. B leaves the room with a umbrella. When B returns, A sees that B's umbrella is dry.}$$

$$\text{A: Shi qingtian ma? 'Is it sunny?' } \quad \text{A would like to know about the weather in B's city, so A calls B and asks him:}$$

$$\text{Shi qingtian ma? 'Is it sunny?'}$$

Unlike positive MAQs, negative MAQs can only be used when the negative proposition $-p$ is salient, as defined in (37). This correctly predicts that the negative MAQ ‘Is it not sunny?’ can be used in (33), where $-p$ ‘It is not sunny’ is suggested and hence salient. (37) also correctly predicts that a negative MAQ cannot occur in a discourse-initial position, as in (38).

$$\text{(37) The definition of a negative MAQ: } \quad \text{(38) A would like to know about the weather in B's city, so A calls B and asks him:}$$

$$[m(\neg p)] \text{ is defined if } \neg p \in \text{SalAtts.} \quad \# \text{Bu shi qingtian ma? 'Is it not sunny?'}$$

When defined, $[m(\neg p)] = \{p, \neg p\}$. # Bu shi qingtian ma? ‘Is it not sunny?’

7. Conclusion

This study investigates the similarities and differences between Mandarin MAQs and ANAQs. A MAQ denotes a Hamblin set of propositions. The question force marker $ma$, as an expressive, creates an expressive Hamblin-set, therefore MAQs cannot be embedded. The positive MAQs differ from the negative ones in that the former questions about the positive proposition while the latter questions about the negative proposition. This difference can be captured by defining a positive MAQ as presupposing a salient positive proposition whereas a negative MAQ as presupposing a salient negative proposition. The A-not-A construction denotes an at-issue Hamblin-set, which is embeddable. The force marker $ne$ is also an expressive, thus ANAQs with $ne$ cannot be embedded. Furthermore, ANAQs end with the L% tone that introduces an exhaustivity requirement, which explains why ANAQs cannot be used in biased contexts where only one of the alternatives is salient. MAQs do not have the exhaustivity requirement and can be used in biased contexts.

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A Discourse Model for Mandarin ba-interrogatives

Xueqin Yuan
University of Connecticut

1. Introduction

In this paper l develop an account of the behavior of Mandarin utterance-final particle ba in questions. ba is an unembeddable discourse particle, which can attach to declaratives or morphosyntactically-marked interrogatives in Mandarin. As shown in (1) and (2), when ba attaches to declaratives\(^1\), it adds the meaning of uncertainty or confirmation-seeking to the utterance it attaches to:

(1) a. ni chi you eat
ing hao de very good DE

‘Eat!’

b. ni chi ba you eat ba

(How about you) eat.’

(2) a. ting hao de

‘Very good.’

b. ting hao de ba

‘(Maybe) very good.’

ba’s meaning in declaratives has been widely discussed in the previous literature. For instance, Li and Thompson (1989) have described the function of ba as ‘soliciting-agreement’, and Chu (2009) generalizes the uses of ba as ‘uncertainty’. More recently, Ettinger and Malamud (2013) try to provide a unified account of the meaning of ba. They argue that ba serves to weaken the force of the assertion or the directive it attaches to. While capturing some crucial intuitions about the meaning of ba, these generalizations fail to describe the so-called ‘unfriendly effect’ that appears when ba occurs in questions.

(3) Context: John and Bill have been discussing how to resolve a mathematical problem for a long time. Bill rejected every solution that John gave, so John says to Bill:

zhe shi zemen ban ba

this thing how do BA

‘Come on, how do this?’

---

\(^1\) In Mandarin, declaratives are usually not morphosyntactically-marked. Interrogatives can be marked in many ways: by sentence-final particle ma, by wh-words, by question-prosody, etc. In this paper, I only discuss the relevant data of questions without ma, since ma and ba cannot co-occur.

\(^2\) Imperatives are not necessarily marked in Mandarin. Some imperatives are considered as declaratives in this paper.
In (3), *ba* gives an additional effect to the question: the speaker (namely John) is impatient about their current conversation status. Concentrating on the data of *ba*-interrogatives as in (3), I will show that *ba*-interrogatives traverse the discourse trees backward (see Büing 2003, Rojas-Esponda 2014 a.o.): *ba* can either attach to the contextually salient Question Under Discussion (QUD), or to a question challenging the presupposition of the QUD (i.e. whether the QUD is answerable). I propose that *ba*-interrogatives are licensed under two preconditions: (i) the addressee has been committed to there being an answer to the QUD, and (ii) the previous conversation signals that the QUD might not be answerable. I will formalize this analysis within a revised version of the Table model (Farkas and Bruce 2010).

2. Basic paradigm

The contexts where *ba*-interrogatives are felicitous are restricted. Native Mandarin speakers, including myself, tend to accept *ba*-interrogatives in the so-called “impatient” scenarios, described in (4) and (6).

**Impatient scenario**

(4) (i) B: *wo xiang chi dango*.  
   (ii) A: *hao, ni chi bu chi caomei dango?*  
   (iii) B: *bu*.  
   (iv) A: *ni chi bu chi qiaoqeli dango?*  
   (v) B: *bu*.  
   (vi) A: *no ni chi shenme dango ba?*  
   (vii) A: *na ni chi bu chi dango ba?*  

B: I want to eat cake.  
A: Okay, will you eat strawberry cake?  
B: No.  
A: Will you eat chocolate cake?  
B: No.  
A: Then what cake will you eat *ba*?  
A': Then will you eat cake *ba*?

(5) #A': *na ni chi bu chi dango*.  
A': Then will you eat cake?

A paraphrase for (4vi) and (4vii) can be *What cake will you even eat?* and *Will you eat cake even*? respectively. (4) exemplifies a context where two kinds of *ba*-interrogatives are felicitous: in (4) the QUD of the whole conversation (*what cake will you eat*) is broken down into two simpler questions (4ii, 4iv), and the addressee has been committed to the presupposition of the QUD, i.e. I eat cake, by uttering (4i). In other words, (4ii) triggers the QUD. In this context, *ba* can attach to either the QUD (4vi), or a yes-no question challenging the presupposition of the QUD (4vii). Note that the underlined part in (4vi) and (4vii) signals that they are syntactically-marked interrogatives: *shenme* is a wh-word, and *chi-bu-chi* is an A-not-A construction, marking one type of yes-no question in Mandarin. (5) shows that in (4)'s scenario, a simple yes-no question without *ba* is infelicitous: the answer of (5) has been given in the previous context (4i), and thus the speaker A’s move of re-asking this question is trivial. Another typical impatient scenario where *ba*-interrogatives are used is demonstrated in (6).

**Impatient scenario**

(6) Context: John enters a bakery.  
(i) A: *ze shi women zhihao-de dango*. A: This is the best cake that we have.  
(ii) John: *zhege dango duashaqian?*  
(iii) A: *ta shi yong zhihao-de naiyou zhizuo de*. A: It is made of our best cream.
The behavior of (6vi) can be explained in a similar way as *be*-interrogatives in (4). Since A works at the bakery, she is implicitly committed to there being an answer to the question that John wants to resolve (*How much is the cake*). In other words, A is committed to her knowing the price of the cake. The *be*-question (6vi) appears after several unsuccessful attempts of resolving the question (i.e. A avoided answering the question directly), similar to (4vi). The only difference between (4) and (6) is that the interlocutors in (4) tries to resolve the QUD by asking simpler questions, while in (6) the QUD has been explicitly asked. The contextual conditions licensing *be*-interrogatives are summarized in (7).

**Summary of data**

(7)  

a. Anchor questions that *ba* can attach to:  

(i) the contextually salient QUD, or  

(ii) the question challenging the presupposition of the QUD.

b. Preconditions on the input contexts for *be*-interrogatives:  

(i) the addressee has been committed to there being an answer to the QUD, and  

(ii) the previous conversation signals that the QUD might not be answerable.

If the generalizations in (7) are on the right track, we would expect that *be*-interrogatives are infelicitous if no commitment to the presupposition of the QUD has been made previously, or if there is no sign in the previous conversation showing that the QUD might not be answerable. This is demonstrated in an out-of-the-blue scenario as in (8).

**Out-of-the-blue scenario**

(8)  

Context: B is having dinner in A’s house. A plans to serve cake as dessert now.  

a. A doesn’t know if B eats cake (B never explicitly express her preference before):  

A: *# mi chi bu chi dangao ba?*  

A: Do you eat cake *ba*?  

(out-of-the-blue)  

b. A doesn’t know if B eats cake, but she assumes that B does:  

A: *# mi chi shennu dangao ba?*  

A: Do you eat cake *ba*?  

(no commitment)

3. Proposal

In this section I will give an account of the behavior of *be* in questions which contains two parts: (i) I argue that *be*-interrogatives traverse the discourse trees backward\(^3\); (ii) I propose
two preconditions on the input context of ba-interrogatives, formalized within the Table model, which allows for an account of the asymmetry of the commitments of discourse participants.

3.1 Discourse tree

I argue that ba-interrogatives traverse the discourse trees backward as follows. To resolve a complex question (the QUD), interlocutors in a conversation may proceed from the complex question to several subquestions, i.e. simpler questions providing complete or partial answers to the complex question\(^4\). The idea is that as long as the subquestion(s) are resolved, their higher QUD will also get resolved. The QUDs and their subquestions together form a discourse hierarchy, a d-tree, which contains a sequence of nodes of questions (Roberts 1996; Büring 2003; Rojas-Espanda 2014 a.o.). (9) presents a possible discourse tree of the conversation in (4).

\(\text{(9)}\)

![Discourse tree diagram](image)

Take the conversation in (4) as an example. The QUD of the conversation is *what cake do you eat*, triggered by (4i) *I want to eat cake*. (4i) satisfies the presupposition of the QUD, i.e. (4i) makes sure that there should be at least some cake that the addressee eats. Assuming this, the speaker uses several simpler subquestions (*will you eat strawberry cake? will you eat chocolate cake?*) as strategies to resolve the higher QUD. This is a natural move within the d-tree: from a higher node to lower nodes. However, as the conversation goes, the subquestions that the speaker asks seem to give the QUD the “residual” answer (Hamblin 1973); in other words, the conversation signals that there might be a presupposition failure. In this situation, it is reasonable for the speaker to perform two kinds of moves using *ha*: (i) the speaker assumes there is no presupposition failure given the addressee’s commitment, and asks for the answer to the QUD by explicitly uttering the QUD; (ii) doubting whether the presupposition of the QUD is valid.

The standard traversal rule of a d-tree corresponds to the linear order of the nodes, i.e. interlocutors may move from a node to its sister or daughter. We argue that a ba-interrogative marks a move from a node to its predecessors, which requires a conflict to exist in the context: the addressee has been committed to the presupposition that the QUD is answerable, whereas the unsuccessful attempts of resolving the QUD in the previous conversation signal that the

\(^4\) Unlike Rojas-Espanda's definition of d-tree (or, in her term, S-tree), which defines subquestions as questions providing partial answer to their higher QUD, I adopt Büring and Roberts' version of d-tree in this paper, whose conditions are more permissive than the former, that is, questions that can provide complete answers are also allowed as subquestions in d-trees in this paper.
QU D might not be answerable. The implied impatience or anger of a ba-interrogative is thus generated from this conflict.

3.2 Contextual preconditions for ba-interrogatives

Farkas and Bruce’s Table model decomposes Stalnaker’s update of an assertion into two steps: the speaker proposes the update and puts the content of an assertion onto the Table; the content of an assertion will be added onto the Common Ground only if the addressee accepts the proposal. Their initial model is composed of five components:

(10) a. Common Ground (CG): the set of propositions that all discourse participants are committed to;
    b. Context Set (CS = \bigcap CG): the set of possible worlds that are compatible with all the propositions in the CG;
    c. Discourse Commitments (DC): the set of propositions that each discourse participant is publicly committed to;
    d. The Table (T): a stack of sets of propositions (issues);
    e. Projected Set (PS): the set of supersets of the current CG that projects future common grounds relative to which the issue on the Table is decided.

Assuming all the discourse components stated above, I propose the contextual preconditions for ba-interrogatives as follows. We assume that a context c is a tuple (A, T, DCx, CG, PS). A is a set of discourse participants. DCx represents a set of propositions that the participant x is publicly committed to. T, CG and PS correspond to Farkas and Bruce (2010)’s Table, Common Ground and Projected Set separately. Usual stack operations are assumed, PUSH (e, T) represents the new stack obtained by adding the issue e onto the stack T (Kaufmann 2000; Farkas and Bruce 2010):

(11) a. PUSH (e, T) adds e to stack T;
    b. POP (T) pops off the top item of stack T;
    c. TOP (T) gives the top item of stack T.

I also assume the question operator proposed by Farkas and Bruce (2010) for ba-interrogatives as in (12), as ba does not change the semantic denotation of the question it attaches to. A question operator QUEST is a function from an input context c0 to an output context c1 of the following form, where Q represents a question denoting a set of propositions that count as possible answers to the question; \( f \) = input, \( o \) = output. Only updated discourse components are listed below; unmentioned aspects remain the same as their inputs.

(12) QUEST (Q, c0) \( = c1 \) such that:
    a. \( T_o = \text{PUSH} (Q, T) \)
    b. \( PS_o = PS_i \cup Q \) \hspace{1cm} (Modified from Farkas and Bruce 2010)

(12) says that when a question is raised, the Hamblin set of the question is pushed onto the stack, and each proposition in the set is added to the existing PS in the PS. For example, when the question will you eat strawberry cake is asked, the Hamblin set of the question \{p, \neg p\} is
A Discourse Model for Mandarin *ba*-interrogatives

added as the topmost item on the Table. If the current issue is resolved (that is, the content of an assertion or the answer to a question has been accepted by all interlocutors and added to the CG), the PS should be empty, and further discourse moves should update the existing CG. However, there might be other unresolved issue still on the Table when the question “will you eat strawberry cake” is asked. For example, in (4) the QUD “what cake will you eat” is still unresolved. So it could be that at the point the question is asked, the PS is not empty. We use $p_s$ to represent the current status in the PS. The updated PS contains two future CGs: $PS_1 = p_s \cup \{p, \neg p\} = \{cg \cup \{p\}, cg \cup \{\neg p\}\}$. The whole process is shown in (13).

(13) **Update with will you eat strawberry cake?**

$$
\begin{array}{c c c c}
\text{c0:} & \text{c1:} \\
\text{PS0} & \{cg\} & \text{T} & \{\{p, \neg p\}, \{\ldots\}\} \\
\end{array}
$$

In addition to (12), I propose the following two preconditions on the input contexts for *ba*-interrogatives as in (14). $s$ and $a$ represent the speaker and the addressee respectively, $p_s$ represents a potential update of CG in the PS, and $Q^+$ represents the QUD. Note that $Q^+$ denotes a set of propositions which does not contain the residual answer.

(14) Formally, *ba* adds the following two preconditions:

\begin{align*}
\text{a.} & \quad \lambda \text{w. } \exists p \in Q^+ \exists p(w) \in DC_{\text{in}}, \\
\text{b.} & \quad p_s \cup Q^+ = \emptyset \quad \text{(i.e. for all cg \in p}_s, \cap (cg \cup \{UQ^+\}) = \emptyset)
\end{align*}

(14a) accounts for our first observation (7bi) that the addressee must commit herself to the presupposition of the QUD before uttering *ba*-interrogatives: the presupposition is already in addressee’s input DC. The formula in (14a) tells us there is a true answer in $Q^+$. (14a) follows Gunlogson (2001)’s definition *discourse commitments*. According to Gunlogson’s definition in (15), propositions in DCS are also part of the CG. The function of DCS is to keep a record the source of commitments.

(15) Let CG{A, B} be the Common Ground of a discourse in which A and B are the individual discourse participants.

\begin{align*}
\text{a.} & \quad DC_{\text{a}} \text{ of CG}{A, B} = \{ \text{p: ‘A believes p’ \in CG}{A, B}\} \\
\text{b.} & \quad DC_{\text{b}} \text{ of CG}{A, B} = \{ \text{p: ‘B believes p’ \in CG}{A, B}\}
\end{align*}

(Gunlogson 2001: 41)

(14b) sets a condition on the input PS such that updating the PS with the QUD $Q^+$ returns an empty set. In other words, *ba*-interrogatives require a precondition on the input PS such that updating the PS with the QUD will be inconsistent. This accounts for our second observation that before uttering *ba*-interrogatives the previous discourse seems to entail that $Q^+$ is not answerable.
Let us see how (14b) implements our informal generalizations of contextual restrictions for ba-interrogatives. Take conversation (4) again as an example. When (4i) I want to eat cake is uttered, addressee’s commitment is added to $DC_a$, and the QUD what cake will you eat is put onto the Table. For simplicity, we assume that there are only two kinds of cake: strawberry and chocolate.

\[ (16) \text{ Update with } \text{I want to eat cake } (p = a \text{ eats cake}, p_1, p_2 = \text{possible answers}) \]

<table>
<thead>
<tr>
<th>$T$</th>
<th>$\emptyset$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c_1$:</td>
<td></td>
</tr>
<tr>
<td>$PS_0$</td>
<td>${cg}$</td>
</tr>
<tr>
<td>$DC_a$</td>
<td>${\ldots}$</td>
</tr>
<tr>
<td>$T$</td>
<td>$\langle {p_1, p_2}, \emptyset \rangle$</td>
</tr>
<tr>
<td>$c_2$:</td>
<td></td>
</tr>
<tr>
<td>$PS_1$</td>
<td>${cg \cup {p_1}, cg \cup {p_2}}$</td>
</tr>
<tr>
<td>$DC_a$</td>
<td>$\langle {p_1 \lor p_2, \ldots} \rangle$</td>
</tr>
</tbody>
</table>

Next, the speaker A asks two subquestions of the QUD. By answering with no, both subquestions are resolved and popped off the stack. (17) shows the state of context after updating with (4iii) “no”.

\[ (17) \text{ Update with } \text{-will you eat strawberry cake?-No.} \]

$p_1 = a \text{ will eat strawberry cake}$

<table>
<thead>
<tr>
<th>$T$</th>
<th>$\langle {p_1, p_2}, \emptyset \rangle$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c_1$:</td>
<td></td>
</tr>
<tr>
<td>$PS_1$</td>
<td>${cg \cup {p_1}, cg \cup {p_2}}$</td>
</tr>
<tr>
<td>$DC_a$</td>
<td>${p_1 \lor p_2, \ldots}$</td>
</tr>
<tr>
<td>$T$</td>
<td>$\langle {p_1, p_2}, \emptyset \rangle$</td>
</tr>
<tr>
<td>$c_2$:</td>
<td></td>
</tr>
<tr>
<td>$PS_2$</td>
<td>${cg \cup {p_1} \cup {\neg p_1}, cg \cup {p_2} \cup {\neg p_1}}$</td>
</tr>
<tr>
<td>$DC_a$</td>
<td>${p_1 \lor p_2, \neg p_1, \ldots}$</td>
</tr>
</tbody>
</table>

The update of the question will you eat chocolate cake and its response no simply repeats the process in (17). The final context state we get after updating the “chocolate cake” set is shown in (18): the PS turns out to be empty, but the issue (the QUD) is still on top of the Table, which gives us the conflict. When the input preconditions what cake will you eat ba (QUD restated) and will you eat cake ba (presupposition of the QUD) are possible moves.

\[ (18) \text{ Update with } \text{-will you eat chocolate cake?-No.} \]

$p_2 = a \text{ will eat chocolate cake}$

<table>
<thead>
<tr>
<th>$T$</th>
<th>$\langle {p_1, p_2}, \emptyset \rangle$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c_1$:</td>
<td></td>
</tr>
<tr>
<td>$T$</td>
<td>$\langle {p_1, p_2}, \emptyset \rangle$</td>
</tr>
<tr>
<td>$c_3$:</td>
<td></td>
</tr>
</tbody>
</table>
A Discourse Model for Mandarin ba-interrogatives

4. Conclusion

In this paper, I have discussed the usage of Mandarin particle ba in interrogatives, which typically generates the “unfriendly” effect. I have shown that ba is sensitive to the discourse hierarchy (d-trees): it can only attach to the QUD or presupposition-challenging questions. I proposed that a ba-interrogative carries two preconditions by which it (i) indicates a conversational crisis, and (ii) records the source of commitment so that it identifies who to “blame”.

For future directions, the first important question to ask is whether we can unify the uses of ba in declaratives and interrogatives. Secondly, it is still not clear why ba is sensitive to the QUD, which will also be an interesting question to investigate. Lastly, it seems that ba also interacts with different intonation contours in Mandarin (such as rising or falling), which opens another exciting field for us to explore.

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References


The Multiple Mechanisms for Mandarin Sluices
Bornui Zhang and Jason Overfield
University of Minnesota and Oakland University

1. Introduction

Sluicing, originally discussed by Ross (1969), is exemplified by the pair of English sentences in (1).

(1) a. Kim, saw Sue somewhere, but I don’t know where she, saw Sue.
    b. Kim saw Sue somewhere, but I don’t know where $\Delta$.

Descriptively, it is possible to omit the clausal material expected to follow the wh-phrase, as shown in (1b). As a supposed species of ellipsis, a significant amount of work has gone into determining what, if any, linguistic material is present in the sluicing site $\Delta$.

A portion of the literature has converged on the idea that, at some level of representation, there is full clausal syntax in the omission site.\(^1\) Even so, the exact identity of the clausal material has been up for debate. An influential analysis proposes that (1b) has the representation in (2), involving ellipsis of an IP from which the remnant wh-phrase has been extracted (e.g., Ross 1969, Merchant 2001). It has also been proposed—especially for wh-in-situ languages—that sluices have representations like (3), resulting from ellipsis of either a copular or cleft construction (e.g., Merchant 1998, Potsdam 2007, Adams and Tomioka 2012, Gribanova 2013, and others).

(2) Kim saw Sue somewhere, but I don’t know where $\{ \text{Kim saw Sue$x$} \}$.
(3) Kim saw Sue somewhere, but I don’t know where $\{ \text{it was (that Kim saw Sue$x$)} \}$.

With this in mind, our goal in this paper is to investigate the syntax of sluicing-like constructions (SLCs) in Mandarin Chinese, a wh-in-situ language. A relevant pair of examples is provided in (4).

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\(^1\) Alternative analyses of sluicing in this vein propose that the ellipsis site is supplied its content post-syntactically (e.g., Chung et al. 1995), contains a proform that is pragmatically resolved (e.g., Lobeck 1995, Messick et al. 2019), or lacks linguistics content altogether (e.g., Culicover and Jackendoff 2001).
(4)  a. Zhangsan, zai moudi kanjian-le Lisi.
    Zhangsan at somewhere saw-ASP Lisi
    dan wo bu zhidao ta, zainali kanjian-le Lisi
    but I NEG know he where saw-ASP Lisi
    ‘Zhangsan saw Lisi somewhere, but I don’t know where he saw Lisi.’

    b. Zhangsan, zai moudi kanjian-le Lisi, dan wo bu zhidao (shi) zainali
    Zhangsan at somewhere saw-ASP Lisi, but I NEG know COP where
    ‘Zhangsan saw Lisi somewhere, but I don’t know where.’

The example in (4b) demonstrates the ability to omit the clausal material expected to follow
the wh-phrase shi ‘who.’ We argue that Mandarin employs at least two different strategies
to generate SLCs: an extraction strategy, like (2), and a clef reduction strategy, like (3).
Which strategy is employed is reliably betrayed by the presence or absence of the copula shi.

The motivation for this analysis comes from the account it provides for a well-known puzzle
regarding the distribution of the element shi in SLCs, which we illustrate in section 2.
Our treatment of SLCs presented in section 3 finds additional support from previously
observed connectivity effects and a novel corpus study, which are presented in section 4.
Finally, we show in section 5 how this analysis provides a way to understand a set of
otherwise puzzling facts regarding the distribution of shi with the remnant zemeyang ‘how.’
We conclude the paper in section 6.

2. The Puzzling Asymmetric Distribution of shi in Mandarin SLCs

A well-known property of Mandarin SLCs is the variable presence of the element shi, which
is normally identified as a copula or focus marker. As was shown by the example in (4b), shi
may be optional in an SLC. The non-optionality of shi in examples like (5) have led to the
generalization that shi is optional only with adjunct wh-phrases, see (4b), but obligatory with
argument wh-phrases (e.g., Adams 2004, Wang and Wu 2006).

(5)  Zhangsan, kanjian-le mouren, dan wo bu zhidao *(shi) shui
    Zhangsan saw-ASP someone, but I NEG know COP who
    ‘Zhangsan saw someone, but I don’t know who.’

Wang and Wu (2006: 383) argue that the optionality of shi reflects role as a Case
assigner to the remnant. As an argument wh-phrase, shi ‘who’ in (5) requires Case, which
is asserted to be assigned at PF under adjacency. The presence of shi fulfills this need of Case
assigning, while the adjunct zainali in (4b), does not need Case or does not have to rely on shi
for Case. Thus, shi is optional in these instances.

There is a reason to think that this empirical generalization does not accurately
characterize the data and, therefore, that this analysis does not sufficiently account for the
distribution of shi. Adams and Tomioka (2012: 223, (9d)) provide the example in (6), in
which an argument wh-phrase appears in an SLC with shi optionally present.

(6)  Lisi bu xihuan yishou ge, danshi wo bu zhidao (shi) na yi shou ge
    Lisi NEG like one-CL song but I NEG known COP which one CL song
    ‘Lisi doesn’t like a song, but I don’t know which one/song.’
The remnant in (6) would be expected to require Case assignment at PF under adjacency, just like the remnant in (5). The optionality of *shi*, then, is incorrectly predicted.

In response to this and other data, Adams and Tomioka (2012: 222) state the necessity of *shi* as a function of the identity of the *wh*-phrase. We state the generalization as in (7).

\begin{enumerate}
  \item A Mandarin SLC has *shi*
  \item obligatorily before simplex argument *wh*-phrases (*shui* ‘who’, *shenme* ‘what’) and
  \item optionally before other *wh*-phrases (*zainali* ‘where’, *hanshui* ‘with whom’, etc.)
\end{enumerate}

This generalization has been used to motivate or bolster analyses that tie the presence or absence of *shi* instead to the type of predication relationship that can be established inside the SLC (e.g., Adams 2004, Wei 2004, Park & Li 2013). Space precludes doing proper justice to these analyses. However, we would recommend that the reader see the discussion in Li & Wei 2017 for considerations against these approaches. It is for these reasons that we present the alternative account of (7) that is found below.

### 3. Multiple Paths to Sluices

#### 3.1. Sluicing and Pseudo-sluicing

As stated above, we propose that Mandarin makes use of two different strategies for generating SLCs. Moreover, which strategy is employed is reliably betrayed by the presence or absence of the copula *shi*.

In an SLC without the copula *shi*, we propose that the *wh*-phrase is a remnant of IP-ellipsis. This is intended to resemble genuine sluicing in a language like English, but to be more closely analogized to the focus-driven sluicing argued for by Wang and Wu (2006) and Song and Yoshida (2017). The example in (8) illustrates the syntax of the example in (4b) with what we will refer to as IP-Sluicing.

\begin{align*}
(8) & \text{IP-Sluicing} \\
& \ldots \text{dan wo bu zhidao } [_{\text{CP}} \text{zainali}_1] [_{\text{IP}} \text{Zhangsan-x, kanjian-le Lisi}] \\
& \quad \text{but 1 NEG know where Zhangsan see-ASP Lisi} \\
& \quad \ldots \text{but I don’t know where Zhangsan saw Lisi.}
\end{align*}

For concreteness, we assume with the research cited just above that the *wh*-phrase undergoes focus-driven movement to a clause peripheral position. In this position, it escapes ellipsis of an embedded IP constituent.

SLCs that contain the copula *shi*, we suggest, have a different underlying syntax. The presence of *shi* in (4b) signals the Pseudo-sluicing strategy provided in (9).

\begin{align*}
(9) & \text{CP-Pseudo-Sluicing} \\
& \ldots \text{dan wo bu zhidao } [_{\text{CP-pro_{rep}}} \text{shi zainali}_1] [_{\text{CP}} \text{Zhangsan-x, kanjian-le Lisi-de}] \\
& \quad \text{but 1 NEG know COP where Zhangsan see-ASP Lisi DE} \\
& \quad \ldots \text{but I don’t know where it was that Zhangsan saw Lisi.}
\end{align*}
Like Adams and Tomioka (2012), we suppose that the presence of *shi signals an embedded copular construction. However, we more closely follow Wang and Wu (2006) and Song (2016) in supposing that the remnant *wh-phrase is formally related to a position in relative-like clause. In other words, we propose that *shi signals what we will descriptively refer to as a reduced *shi-de-cleft strategy, whereby an embedded CP is elided.2

The claim, therefore, is that there are two different clause-reduction strategies for generating SLCs in Mandarin. In the following sections, we will see how this provides a handle on the generalization in (7). However, we can observe here that treating both strategies as elliptical configurations leads us to expect the binding connectivity effects observed by Song and Yoshida (2017), independent of the presence of *shi. A relevant example is provided in (10).

(10) Ta_{i} gen san-ge Lisi de pengyou qu kan-le dianying, dan wo bu zhidiao ...
He with three-CL Lisi GEN friend go watch-ASP movie but I NEG know
a. *gen ji-ge Zhangsan, de pengyou, [i_{i} ta_{i} x_{i}, qu kan-le dianying] with how many-CL Zhangsan GEN friend he go watch-ASP movie
b. **shi gen ji-ge Zhangsan, de pengyou, [c_{i} ta_{i} x_{i}, qu kan-le dianying] SHI with how many-CL Zhangsan GEN friend he go watch-ASP movie DE

*He, went to the movies with three of Lisi’s friends, but I don’t know with how many of Zhangsan’s friends he went to the movies.’

The disjoint reference effects associated with Condition C arise in the absence of *shi, as in (10a), and in the presence of *shi, in (10b). As Song and Yoshida (2017) point out, this is expected from a clause reduction analysis of Mandarin SLCs. This follows from our proposal, wherein the two available strategies, betrayed the presence or absence of *shi, are both generated by a clause-reduction mechanism.

3.2. Wh-fronting in simple sentences predicts *shi in SLCs

We proposed in (8) that Mandarin SLCs without the copula *shi involve focus-driven movement of the *wh-remnant out of an elliptical IP. The requirement for *shi with simplex argument *wh-phrases, therefore, can be understood as a reflection of the general inability of these elements to appear in IP-Sluicing configurations. Consider the contrast below:

(11) *Shui_{i} [i_{i} Zhangsan kanjian-le x_{i}]?
who Zhangsan see-ASP
‘Who did Zhangsan see?’
(12) Zainali [i_{i} Zhangsan x_{i}, kanjian-le Lisi ]?
where Zhangsan see-ASP Lisi
‘Where did Zhangsan see Lisi?’

These examples demonstrate that simplex argument *wh-phrases like shui ‘who’ in (11) cannot independently appear clause-initially. On the other hand, other *wh-phrases, including

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2 We will remain intentionally vague with regard to the internal syntax of the cleft construction in (9). The remnant *wh-phrase may be extracted from the embedded CP or may be mediated with a CP-internal position via an operator chain (see Park & Li 2013). Choosing between these two options must be left for future research. As we will see, the important property of this construction is its status descriptively as a type of *shi-de construction. Thus, we are also not committed to the idea that CP-Pseudo-Sluicing can be fed by just any type of *shi-de construction (see Cheng 2008 and Paul & Whitman 2008).
zainali ‘where’ in (12), can independently appear clause-initially. This can be taken to reveal that the underlying syntax that we take to be responsible for SLCs without shi (IP-Sluicing), which is shown in (13), is not available to simplex argument wh-phrases.

(13) *... dan wo bu zhidao shui [IP Zhangsan kanjian le x] 
  but I NEG know who Zhangsan saw-ASP
  ‘Zhangsan saw someone, but I don’t know who.’

Given this, the obligatoriness of shi with simplex argument wh-phrases follows from the fact that they can only be generated by CP-Pseudo-Sluicing. That is, the example from (6) necessarily has the representation in (14).

(14) ... dan wo bu zhidao [CP pro shi shui [CP Zhangsan kanjian le x de]]
  but I NEG know COP who Zhangsan saw-ASP DE
  ‘Zhangsan saw someone, but I don’t know who.’

The optionality of shi with other wh-phrases can be understood, not strictly as the optionality of the copula shi, but as an option between two different mechanisms for sluicing. The independent ability to front the non-simplex wh-phrases, like zainali ‘where’ in (12) reveals the availability of IP-Sluicing as a mechanism for generating SLCs like (4b), in which case there will be no shi.

(15) ... dan wo bu zhidao zainali [CP pro shi Zhangsan x kanjian le Lisi]
  but I NEG know where Zhangsan saw-ASP Lisi
  ‘Zhangsan saw Lisi somewhere, but I don’t know where.’

On the other hand, when these wh-phrases appear with shi, we propose the SLC has been generated by CP-Pseudo-Sluicing. Thus, (4b) may have the representation below in (16).

(16) ... dan wo bu zhidao [CP pro shi zainali [CP Zhangsan x kanjian le de]]
  but I NEG know COP where Zhangsan saw-ASP DE
  ‘Zhangsan saw Lisi somewhere, but I don’t know where.’

While the analysis that has been presented here provides an account of (7), it remains to be demonstrated that the presence of shi in an SLC necessarily indicates an elliptical shi-de cleft. To this end, we provide the non-elliptical versions of (4b) and (5) in (17) and (18), respectively.

(17) Zhangsan zai moudi kanjian-le Lisi,
    Zhangsan at somewhere saw-ASP Lisi,
    dan wo bu zhidao [CP pro shi zainali [CP Zhangsan x kanjian-le de]]
    but I NEG know COP who Zhangsan saw-ASP DE
    ‘Zhangsan saw Lisi, but I don’t know where Zhangsan saw Lisi.’

---

3 See Song (2016) for a similar observation about other focus constructions.
(18) Zhangsan kanjian-le mouren,  
\[\text{Zhangsan saw-ASP someone,} \]  
\[\text{dan wo bu zhidao \textsubscript{cop} \textsubscript{realm} \textsubscript{shi} shui,} \]  
but I NEG know COP who \[\text{Zhangsan saw-ASP DE} \]  
\[\text{Zhangsan saw some, but I don’t know who Zhangsan saw.}\]

The sentences in (17) and (18) are unacceptable without the element \textit{de} at the end of the sentences. These non-elliptical examples demonstrate, first, that simplex argument \textit{wh}-phrases and other \textit{wh}-phrases are both independently able to appear in what we have referred to as \textit{shi}-\textit{de}-clefts. This supports the claim that, in SLCs with \textit{shi}, the elliptical material contains an elided CP of a \textit{shi}-\textit{de}-cleft. Second, these examples illustrate that in non-elliptical versions of the sentences of interest, the sentence final particle \textit{de} is obligatory. This provides further support for the claim that, in the presence of \textit{shi}, a Mandarin SLC has elided an embedded relative-like CP of the shape provided in these examples.

4. Treebank Corpus Search Evidence

To further support our claim of multiple sluicing strategies in Mandarin Chinese, we conducted a corpus search in the Chinese Penn Treebank 7.0 (CTB7). Our search was conducted with two questions.

4.1. Evidence for previous observations on simplex \textit{wh}-phrases

First, we asked about the validity of the previous observations in the literature regarding the obligatoriness of \textit{shi} with simplex \textit{wh}-phrases; see (7i). We searched for instances of SLC with a simplex \textit{wh}-phrase and the occurrences of the copula \textit{shi} preceding the \textit{wh}-phrase. We labeled the data with [SHI+simplex-wh] for the \textit{wh}-phrase appearing with \textit{shi} and [-SHI+simplex-wh] for the ones without \textit{shi}. If (7i) is correct, we will expect to only find [SHI+simplex-wh] examples, as Table 1 shows, which are representatives for this kind of construction in the corpus. On the other hand, we expect to observe a zero (or near zero) co-occurrences of simplex argument \textit{wh}-phrases without \textit{shi}.

\begin{table}[h]
\centering
\begin{tabular}{ll}
Corpus Examples (elliptical) & Translations \\
\hline
a. ...kao gu xue jia bu zhidao & “… the archaeologists don’t know what.”  
sheng & \\
b. ...houlai you you jiquan & “… more punches came into my face, (I)  
da zai wo lian & don’t know who.”  
shang, bu & 
zhida & 
shui & 
shui & 

table 1: Examples of elliptical version of [SHI + simplex-wh] in CTB7
\end{tabular}
\end{table}

The result of corpus counting is shown in Table 2 on the following page.\textsuperscript{4} The comparison of the two elliptical versions in Table 2 reflects the predictions of (7i). In this 780,000-word corpus, simplex argument \textit{wh}-phrases appear without \textit{shi} in only 2.1\% of the relevant examples, while the ones with \textit{shi} appear much more frequently in 46.9\% of the examples.

\textsuperscript{4} The remaining constructions in the total count were non-embedded instances of \textit{shi}-\textit{de} constructions and, thus, not immediately relevant to the questions at hand.
Elliptical version  |  Counts  |  Percentage
---|---|---
[ SHI + simplex-wh ] | 45/96 | 46.9%
[ -SHI + simplex-wh ] | 2/96 | 2.1%

Table 2: The counts of the presence versus the absence of shi with simplex wh-phrases in the elliptical version in CTB7

In addition to confirming the previous observations in (7i), the search results in Table 2 also support what we propose in this paper: that the absence of *shi* indicates an application of IP-slicing (8), whereas the presence of *shi* indicates an application of the CP-Pseudo-slicing (9). The high versus low percentages of these two kinds of constructions suggest that IP-slicing is not accessible to simplex *wh*-phrases, but CP-Pseudo-slicing is.

4.2. Evidence for shi...de construction as an underlying form

Second, we asked whether non-elliptical instances of embedded CPs provided evidence for the claim surrounding (17) and (18) that the presence of shi in SLCs implicates the presence of a shi-de constructions underlyingly, before applying CP-Pseudo-Slicing.

To answer this question, we searched for non-elliptical embedded *wh*-clauses. Among these selected sentences, we compared the rate of occurrence of embedded *wh*-clauses with shi-de surrounding the *wh*-phrase to the occurrence rate of those constructions with only shi preceding a *wh*-phrase and no subsequent de. The two kinds of constructions are labelled as [+SHI+DE] and [+SHI-DE] in the data, respectively. If what we proposed in section 3 is correct, we should expect to observe high occurrences of the [+SHI+DE] construction, as shown in the example sentences in Table 3. On the other hand, we should expect to see very low occurrences of the [+SHI-DE] constructions.

<table>
<thead>
<tr>
<th>Corpus Examples (non-elliptical)</th>
<th>Translations</th>
</tr>
</thead>
<tbody>
<tr>
<td>c. ... na ge shaonian <em>shi zai nali</em> dedao yizhi qiang de</td>
<td>“… (asked) where the young man got the gun.”</td>
</tr>
<tr>
<td>d. ...kankan duoshu ren <em>shi zenne</em> xiang de</td>
<td>“… see how the majority thinks of this.”</td>
</tr>
</tbody>
</table>

Table 3: Examples of non-elliptical version of [+SHI +DE] in CTB7

The search results of these two kinds of constructions are shown in Table 4. They bear out the prediction of the claim made above. The sentences with the [+SHI +DE] construction occur more frequently than the [+SHI -DE] construction in the corpus with a ratio of 65:13.

<table>
<thead>
<tr>
<th>Non-elliptical version</th>
<th>Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+SHI + DE ]</td>
<td>65</td>
</tr>
<tr>
<td>[+SHI - DE ]</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 4: The counts of the presence versus the absence of de with *wh*-phrases in the non-elliptical version in CTB7
The ratio shows that the instances of embedded wh-clauses containing *shi-de* constructions outnumber those with only *shi*. For the purpose of this particular search, we excluded many kinds of *shi-de* constructions, such as relative clauses and main clause questions (e.g., *ni shi nali de* ‘where are you from’). If we would have included these less relevant examples, the resulting ratio could be even greater due to the higher number of occurrences of *shi-de*.

To sum up this section, the two corpus search results provide supporting evidence for the previous observation of the obligatoriness of *shi* with simplex argument wh-phrases, as well as our proposal for the distinct underlying representation of SLCs containing *shi*.

5. The *Zenmeyang*-Puzzle

The generalization in (7) is a fairly well-accepted description of the distribution of *shi* in Mandarin. However, there is a well-known, but little understood, complication to these facts. We extend our analysis here to account for this complication.

5.1 *Zenmeyang* ‘how’ behaves like simplex argument wh-phrases

The wh-adverbial *zenmeyang* ‘how’ appears in SLCs but, contrary to expectations, necessarily co-occurs with *shi*. In other words, *zenmeyang* patterns with simplex argument wh-phrases despite being neither (obviously) simplex nor an argument wh-phrase. The example in (19) is provided to illustrate this observation.

(19) Zhangsan xiuru-le Lisi, dan wo bu zhidao *(shì)* zenmeyang.
    Zhangsan humiliate-ASP Lisi, but I NEG know COP how
    ‘Zhangsan humiliated Lisi, but I don’t know how.’

The analysis that was presented in the previous section would assert that this pattern reflects the fact that *zenmeyang* can not be generated as a wh-remnant by way of the IP-Sluicing strategy introduced in (8). Instead, the analysis would assert, only the CP-Pseudo-Sluicing strategy from (9) is available for generating SLCs with *zenmeyang* ‘how’.

This makes specific predictions about how *zenmeyang* ‘how’ will behave in non-elliptical constructions. Specifically, we expect that *zenmeyang* ‘how’ will continue to pattern with simplex argument wh-phrases in non-elliptical constructions. The following examples are provided to show that this prediction is borne out.

(20) *Zenmeyang* [IP, Zhangsan xì, xiuru-le Lisi]? how
    Zhangsan humiliate-ASP Lisi
    ‘How did Zhangsan humiliate Lisi?’
(21) Zhangsan xiuru-le Lisi,
    Zhangsan humiliate-ASP Lisi,
    dan wo bu zhidao [CP pro-obl shì zenmeyang [CP Zhangsan xì, xiuru-le *(de)*]]
    but I NEG know COP how Zhangsan humiliate-ASP DE
    ‘Zhangsan humiliated Lisi, but I don’t know how Zhangsan humiliated Lisi.’

---

3 There are some alternatives of *zenmeyang*: *zenme*, *zenyang*, and *ruhe* to refer to ‘how’ in Mandarin. We believe that the claims here can be extended to these additional wh-phrases as well.
The example in (20) shows that *zenmeyang* ‘how’ is not independently able to be fronted to a clause-initial position from its underlying position as a modifier of the predicate. In the same way as above, this supports the claim that IP-Sluicing is unavailable for making *zenmeyang* ‘how’ a *wh*-remnant. The effect is that CP-Pseudo-Sluicing will be the required strategy, which has the effect of requiring that *shi* be present (19). The example in (21) demonstrates that *zenmeyang* ‘how’ is independently able to appear in a *shi*-de-cleft and, moreover, that the presence of *shi* requires the presence of *de*.

5.2 Corpus evidence on *Zenmeyang*

With the goal of testing whether *zenmeyang* ‘how’ behaves like simplex argument *wh*-phrases, and whether CP-Pseudo-sluicing underlies examples like (19), we repeated the second study from section 4 on only those constructions containing *zenmeyang* ‘how.’ We searched for non-elliptical embedded *wh*-clauses with *zenmeyang* ‘how.’ We then compared the rate of occurrence of *shi*-de surrounding the *wh*-phrase to the occurrence rate of those constructions with only *shi* was present.

The result is shown below in Table 5.

<table>
<thead>
<tr>
<th>Non-elliptical version of <em>zenmeyang</em></th>
<th>Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>[-SHI -DE ]</td>
<td>5</td>
</tr>
<tr>
<td>[+SHI -DE ]</td>
<td>0</td>
</tr>
<tr>
<td>[+SHI +DE ]</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 5: The counts of the presence versus the absence of *shi*-de with *zenmeyang* ‘how’ in the non-elliptical version in CTB7

Looking at the left column in Table 5, [-SHI -DE] indicates examples that have *zenmeyang* ‘how’ occurring without either *shi* or *de*; [+SHI -DE] indicates *zenmeyang* without *de*; and [+SHI +DE] indicates *zenmeyang* surrounded by *shi*-de. That evidence again supports our claims that, first *zenmeyang* syntactically behaves like simplex argument *wh*-phrases. There is an overwhelming preference for *zenmeyang* to occur with *shi*. Secondly, when *shi* is present, it must co-occur with *de*. This suggests in the same way as above that CP-Pseudo-Sluicing is the underlying representation for SLCs containing *zenmeyang*.

6. Conclusion

In this paper we have argued that Mandarin employs two different strategies for generating sluicing configurations. These include a IP-ellipsis strategy familiar from languages like English as well as a reduced cleft construction that employs CP-ellipsis. This treatment allows for an account of the apparent optionality of *shi* that also predicts a well-known asymmetry between simplex argument *wh*-phrases and other *wh*-phrases. We also showed how this multiple-strategy analysis can be extended to provide an understanding of the otherwise puzzling observation that the *wh*-remnant *zenmeyang* ‘how’ patterns with simplex argument *wh*-phrases in requiring *shi*.
Selected references


1. Introduction

This paper addresses the three fundamental uses of gradable adjectives in Mandarin Chinese. It aims to answer, without a morphological distinction between the so-called positive and comparative forms (e.g., tall vs. taller), how comparisons are encoded in Mandarin Chinese, and how distinctive interpretations are derived and understood by the users of the language.

As illustrated in (1), the three fundamental uses of gradable adjectives are the positive use (see (1a)), the comparative use (see (1b)), and the use in measurement constructions (see (1c)). In these English examples, evidently, the comparative form of gradable adjectives (e.g., longer) is morphologically more complex than the form used in the positive use and measurement constructions (e.g., long).

(1)  

<table>
<thead>
<tr>
<th></th>
<th>Positive use</th>
<th>Comparative</th>
<th>Measurement construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>This rope is <strong>long</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>This rope is <strong>longer</strong> than that rod is.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>This rope is 6 meters <strong>long</strong>.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cross-linguistically, it has been widely acknowledged that the morphology of the comparative form is usually not less complex than that of the positive form (see Table (2) from Grano 2012; see also e.g., Klein 1980, Bobaljik 2012).

(2)  

<table>
<thead>
<tr>
<th></th>
<th>Positive form</th>
<th>Comparative form</th>
<th>DERIVED COMPARATIVE FORM</th>
<th>PERIPHRACTIC COMPARATIVE</th>
<th>NO CONTRAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>tall</td>
<td>taller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irish</td>
<td>ard</td>
<td>anda</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish</td>
<td>alto</td>
<td>más alto</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French</td>
<td>grand</td>
<td>plus grand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swahili</td>
<td>mrefu</td>
<td>mrefu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japanese</td>
<td>takai</td>
<td>takai</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Intriguingly, in the formal semantics literature, there is a long-noted puzzling phenomenon: as illustrated by (3), it has been claimed that the ‘unmarked’ use of gradable adjectives in Mandarin Chinese seems comparative, rather than positive (see (3a)), and then to convey the positive interpretation, using the form ‘hěn+Adj’ (here hěn gāo ‘very tall’) is more preferred than simply using the gradable adjective alone (see (3b)) (see e.g., Sybesma 1999, Grano 2012).
Are these examples shown in (3) against the generalization illustrated in Table (2)? In other words, does the contrast shown in (3) mean that in Mandarin Chinese, the positive form (which seems to be hěn gāo) is morphologically more complex than the comparative form (which seems to be simply gāo)? Does this mean that the semantics of gradable adjectives in Mandarin Chinese is inherently comparative?

Grano (2012)’s answer to all these questions is ‘no’. Grano (2012) proposes that in Mandarin Chinese, both positive tall and comparative taller are spelt out as gāo, resulting in the same pattern as that of Japanese and Swahili. However, comparative gāo has a silent comparative morpheme (equivalent to English -er) that enables gāo to project to the TP level, but positive gāo needs the assistance of overt elements like hěn (‘very’) to project to TP. Essentially, what makes the morphosyntax of positive gāo seemingly more complex is due to a distinction between a syntactically visible silent morpheme (used along with comparative gāo) and a syntactically invisible interpretation rule (a type-shifting operation for positive gāo).

In this paper, I argue against Grano (2012)’s account and propose a new analysis that still validates the generalization in Table (2). In a nutshell, I propose that the notion of comparison underlies all the three uses of gradable adjectives. The semantics proper of gradable adjectives is to relate and compare the measurement of an individual with a standard value, yielding a certain difference, and the three uses of gradable adjectives differ with regard to their distinctive standard and difference. I.e., for gradable adjectives in Mandarin Chinese, there is no so-called morphosyntactic difference between the positive and comparative forms. Thus, the use of gradable adjectives is inherently ambiguous, and it is the use of other elements (e.g., hěn) that helps to disambiguate (e.g., by selecting a certain kind of standard or difference), so that the non-use of these disambiguating elements leads to a seemingly ‘default’ interpretation. Overall, my proposed account is purely semantic and pragmatic, irrespective of any syntactic factors.

In the following, I first argue against Grano (2012)’s account (Section 2). I present my own proposal in Section 3 and discuss implications in Section 4. Section 5 concludes.

2. Challenging cases for Grano (2012)’s account

I focus on three cases that challenge Grano (2012)’s account. First, the “unmarked” comparative use of (3a) forms the very foundation for Grano (2012)’s account, but when uttered out of blue, (3a) does not sound perfectly unambiguous. (3a) can be ambiguous between a positive and a comparative reading, depending on context. Then, when context is fleshed out, the interpretation of gāo in (4) and (5) is unambiguously positive and comparative, respectively.

Footnote 1
Presumably, this claim holds not only for Mandarin Chinese, but also cross-linguistically (see Oda 2003 for a similar view for gradable adjectives in Japanese). However, a thorough cross-linguistic investigation is beyond the scope of the current paper and has to be left for future research. I focus on Mandarin Chinese phenomena in this paper and briefly discuss English data in Section 4.
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Liu (2010b) observes that the positive reading of a gradable adjective is often freely (i.e., without the use of hěn) available under certain conditions (like negation, focus, etc., see (4)). Based on this, Grano (2012) claims that it is crucially the presence of these conditions that satisfies the T[+V] constraint for syntactic grammaticality in Mandarin Chinese, and then he proposes that since a gradable adjective cannot satisfy this constraint itself, elements like a silent comparative morpheme -er or an explicit hěn need to be used to help it project to TP, satisfying the syntactic requirement and leading to a comparative or positive reading.

Thus, under this analysis, without the assistance of special conditions (like negation or focus) or the use of hěn, (3a) should only have an unambiguously comparative reading. This contradicts our intuition that (3a) sounds rather ambiguous when uttered out of blue.

Then, second, for sentences like (6a), which contain a measurement expression (here liǎng mǐ ‘two meters’), Grano (2012)’s analysis also predicts that for the gradable adjective cháng (‘long’) here, a silent morpheme -er is needed to satisfy the T[+V] constraint, and thus the sentence is predicted to be unambiguously comparative.

However, this prediction is again not borne out. When uttered out of blue, (6a) is ambiguous between a comparative and a measurement reading, and it seems that the measurement reading is even more readily available. Moreover, the preferred form for an unambiguous comparative reading here typically involves adding a bǐ-phrase or an aspectual marker le (see (6b)). The preferred addition of le is particularly puzzling for Grano (2012)’s analysis: if a silent morpheme -er already satisfies the T[+V] constraint, how can this le be licensed? What does it serve for? If silent -er and other elements like le can co-occur to satisfy the syntactic requirement, does it mean that the comparative reading is always available for any use of gradable adjectives? How can it disappear under certain conditions (see (4)) or when hěn is present (see (3b))?}

Finally, according to Grano (2012), when a gradable adjective is used attributively, as shown in (7a), since it no longer needs to project to TP to satisfy the T[+V] requirement, it...
does not need the assistance of hén to give rise to a positive reading. Crucially, to support this view, Grano (2012) argues that this kind of prenominal modification (in (7a)) is distinct from the use of relative clauses (see (8)): relative clauses can appear either to the left or to the right of ‘numeral + classifier’, while attributives can only appear to the right of ‘numeral + classifier’ (i.e., (7b) is unacceptable if hén is not added; when hén is added, (7b) contains a relative clause).

\[(7) \quad \text{a.} \quad \text{一封长的信} \quad \text{yī fēng cháng de xìn} \quad \text{one classifier long(-er) particle letter} \quad \text{positive (hén is obligatory)}
\]

\[(7) \quad \text{b.} \quad \text{很长的一封信} \quad \text{*hén cháng de yī fēng xìn} \quad \text{very long(-er) particle one classifier letter} \quad \text{intended: ‘a long letter’} \quad \text{positive (hén is obligatory)}
\]

\[(8) \quad \text{a.} \quad \text{新来的两个老师} \quad \text{xīn lái de liǎng gè lǎo-shī} \quad \text{new come particle two classifier teacher} \quad \text{‘two teachers who have newly arrived’} \quad \text{Yip \\& Rimmington (2004), Grano (2012)}
\]

\[(8) \quad \text{b.} \quad \text{两个新来的老师} \quad \text{liǎng gè xīn lái de lǎo-shī} \quad \text{two classifier new come particle teacher} \quad \text{‘two teachers who have newly arrived’} \quad \text{Yip \\& Rimmington (2004), Grano (2012)}
\]

Presumably, this analysis only means that in (7a), cháng de (‘long’) can be analyzed as an attributive. This analysis does not rule out the possibility that in principle, cháng de in (7a) and (7b) should still be able to be analyzed as relative clauses. Moreover, when analyzed as relative clauses, cháng de (‘(NP) that is long/longer’) should still need a silent -er to satisfy the T[+V] constraint within relative clauses and thus be interpreted in a comparative way. However, (7a) has by no means a comparative reading, and without hén, (7b) is simply unacceptable.

Overall, in order to argue that the positive form of gradable adjectives in Mandarin Chinese does not have a heavier morphology than their comparative form, it seems that Grano (2012) ends up transferring the burden of licensing the positive reading to their syntax. This analysis predicts a comparative reading for (3a) and (6a), where actually, ambiguity arises, and it should predict ambiguous readings for (7a), which has only an unambiguous positive reading.

3. Proposal

My proposal starts with the ambiguity of (3a) and (6a): both are ambiguous between a comparative and a non-comparative use. For (3a), the comparative use seems, at least, the not less prominent one, and the more preferred form for a positive reading involves the use of hén (see (3b)), while for (6a), the measurement use seems more prominent, and the more preferred form for a comparative reading involves the use of a bi-phrase and/or aspectual marker le (see (6b)).

Obviously, for gradable adjectives in Mandarin Chinese, no matter what kind of silent morphemes or interpretation rules we propose for them, if there is morphosyntactic unbalance between their comparative and non-comparative use, then when hén or other conditions are absent, the use associated with the morphosyntactically unmarked (or less marked) form should always be more available and, in ambiguous cases, more prominent. (3a) speaks against the mor-
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phosphysyntactic unmarkedness of the non-comparative use, while the example (6a) speaks against the morphosyntactic unmarkedness of the comparative use. Overall, these data speak against any morphosyntactic imbalance between the comparative and non-comparative use.

Thus, I propose that the use of gradable adjectives in Mandarin Chinese is inherently ambiguous, and the notion of comparison underlies all the three uses of gradable adjectives.

I analyze the semantics of gradable adjectives as a relation among three items: the comparison between the measurement of an individual $x$ and a certain standard $\sigma$ results in a difference $\delta$ (see (9)). The three uses of gradable adjectives differ in their arguments $\sigma$ and $\delta$.

For the positive use, $\sigma$ is a contextually relevant average and often overtly expressed with the use of hên (see (3b)), and $\delta$ is an always covert, unspecified positive value. hên, which marks $\sigma$, usually appears to the left of a gradable adjective (see (3b)), but with the insertion of particle de, it can also appear to the right of a gradable adjective (see (10)).

For the comparative use, $\sigma$ is a contextually salient standard or introduced by a bǐ-phrase (see (6b)), and $\delta$ can be a covert (see (3a)) or overt positive value (see (6a), (6b)). When $\delta$ is overt, it can be a numerical measurement phrase (see (6a), (6b)) or less specified (see (11)).

The measurement use is actually only available for gradable adjectives associated with a scale that has an absolute zero point (e.g., găo ("tall"), chăng ("long"), see Susoon 2010). Thus, while (6a) is ambiguous between a comparative and a measurement reading, (12) is unambiguously comparative: the scale associated with duăn ("short") has no absolute zero point, so the measurement reading cannot be available. Therefore, for the measurement use, $\sigma$ refers to this absolute zero point, which is always covert, and $\delta$ is a numerical measurement phrase, which is always overtly expressed.

(9) $\sigma_{\text{高 găo}}[d, [d, \sigma]] \overset{\text{标准}}{\Rightarrow} \lambda \sigma, \delta \Delta_{\text{găo}}, \lambda \chi. \text{HEIGHT}(\chi) \rightarrow \sigma = \delta$

$\sigma$: the standard in a comparison; $\delta$: the difference in a comparison; HEIGHT: a measure function that takes $\chi$ as input and returns the measurement of $\chi$ on the scale of height.

<table>
<thead>
<tr>
<th></th>
<th>$\sigma$ (standard)</th>
<th>$\delta$ (difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>a typical or relevant average (OFTEN OVERT) (e.g., hên)</td>
<td>an unspecified value (ALWAYS COVERT)</td>
</tr>
<tr>
<td>Comparative</td>
<td>a salient standard (e.g., bǐ-phrase) (COVERT OR OVERT)</td>
<td>a measurement phrase (COVERT OR OVERT)</td>
</tr>
<tr>
<td>Measurement</td>
<td>the absolute zero point of the scale (ALWAYS COVERT)</td>
<td>a measurement phrase (ALWAYS OVERT)</td>
</tr>
</tbody>
</table>

(10) 张三高得很
Zhăng Săn găo de hên
"Zhăng Săn is very tall."

(11) 张三高得多
Zhăng Săn găo hên duō
"Zhăng Săn is much more"

(12) 张三高得多
Zhăng Săn găo hên duō
"Zhăng Săn is much taller."

---

This presumably, the semantics of hên refers to an unspecified high value serving as the standard on a relevant scale. Thus, for (3b), the use of hên (as the standard on the scale associated with gradable adjective găo) naturally gives rise to the positive reading. Then in (10), I propose that there is a silent găo following hên, so that overall, găo de hên (găo) is interpreted roughly as tall to the extent of "very tall", i.e., a positive reading.
Evidently, my analysis explains how comparisons are encoded in Mandarin Chinese: comparisons are encoded by gradable adjectives themselves, and thus the comparative use is not special in involving comparisons and does not need a silent marker.

The use of **gèng**

It is worth noting that the use of some morphemes like **gèng** (‘furthermore’) or **hǎi-áu** (‘still’) often co-occurs with the comparative reading. For example, without **gèng**, (3a) is ambiguous between a comparative and a positive reading, while with the use of **gèng**, (13) is unambiguously comparative. This contrast gives the impression that **gèng** seems a marker of comparison. However, as illustrated in (14), in unambiguous comparative sentences, the use of **gèng** is quite optional. As pointed out by Liu (2010a), **gèng** actually brings a presuppositional requirement. For (14), without the use of **gèng**, there is no presupposition, while with the use of **gèng**, the sentence presupposes the existence of another comparison: i.e., **Li Si**, whose height serves as the standard in the asserted comparison, is already tall (i.e., taller than the typical or relevant average).

Thus, **gèng** is not a marker of comparison (see (15) and (16) for lexical entries of **gèng** and **bǐ**): it is a modifier forgradable adjectives that makes the asserted comparison a second comparison. In other words, **gèng** is the marker of the existence of a presupposed comparison. Under the current analysis, since all uses of gradable adjectives encode a comparison, there is no need to mark the asserted comparison.

Then since **gèng** marks the existence of a presupposed comparison, **gèng** actually also indicates the discourse salience of **σ**, i.e., the standard used in the asserted comparison. Then since this standard needs to be a salient discourse referent, it can be neither the absolute zero point nor a typical average, ruling out the measurement or the positive interpretation for the asserted comparison. Therefore, due to the use of **gèng**, which indicates the discourse salience of the standard in the asserted comparison, (13) has an unambiguous comparative reading.

(13) 张三 比李四 (更) 高 (五厘六)

Zhāng Sān bǐ Lǐ Sì (gèng) gāo

‘Zhāng Sān is (even) taller.’

(14) 张三 比 李四 (高) 高 (五厘六)

Zhāng Sān bǐ Lǐ Sì (gèng) gāo

‘Zhāng Sān is (five centimeter) taller than Lǐ Sì.’

**With gèng**: the sentence presupposes that Lǐ Sì is tall;

**Without gèng**: there is no presupposition.

(15) \[ [[gèng_{d,(d,\sigma)}],(d,\sigma)]^{\Delta} \lambda G_{(d,(d,\sigma)), \lambda \sigma, \lambda \delta, \lambda \zeta} \geq \sigma' - \sigma = \delta \]

**Assertion**: the measurement of \(x\) exceeds the standard \(\sigma\) by a difference value \(\delta\).

**Presupposition** (the underlined part): the standard \(\sigma\) exceeds another standard \(\sigma'\) (Most likely, \(\sigma'\) does not have discourse salience, yielding a positive reading for this presupposed comparison).

(16) \[ [[bǐ_{d,(d,\sigma)}],(c,d)]^{\Delta} \lambda G_{(d,(d,\sigma)), \lambda \sigma, \lambda \delta, \lambda \zeta} \geq \sigma' - \sigma = \delta \]
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(12) 这根绳子短两米
zhè gēn shéng-zi duàn liǎng mǐ
this classifier rope short(-er) two meter
‘This rope is 2 meters shorter.’ ~ Unambiguously comparative (cf. (6a))

Evidently, my analysis explains how comparisons are encoded in Mandarin Chinese: comparisons are encoded by gradable adjectives themselves, and thus the comparative use is not special in involving comparisons and does not need a silent marker.

**The use of gēng** It is worth noting that the use of some morphemes like gēng (‘furthermore’) or hài-yào (‘still’) often co-occurs with the comparative reading. For example, without gēng, (3a) is ambiguous between a comparative and a positive reading, while with the use of gēng, (13) is unambiguously comparative. This contrast gives the impression that gēng seems a marker of comparison. However, as illustrated in (14), in unambiguous comparative sentences, the use of gēng is quite optional. As pointed out by Liu (2010a), gēng actually brings a presuppositional requirement. For (14), without the use of gēng, there is no presupposition, while with the use of gēng, the sentence presupposes the existence of another comparison: i.e., Lǐ Sī, whose height serves as the standard in the asserted comparison, is already tall (i.e., taller than the typical or relevant average).

Thus, gēng is not a marker of comparison (see (15) and (16) for lexical entries of gēng and bǐ): it is a modifier for gradable adjectives that makes the **asserted comparison** a second comparison. In other words, gēng is the marker of the existence of a **presupposed comparison**. Under the current analysis, since all uses of gradable adjectives encode a comparison, there is no need to mark the asserted comparison.

Then since gēng marks the existence of a presupposed comparison, gēng actually also indicates the discourse salience of σ, i.e., the standard used in the asserted comparison. Then since this standard needs to be a salient discourse referent, it can be neither the absolute zero point nor a typical average, ruling out the measurement or the positive interpretation for the asserted comparison. Therefore, due to the use of gēng, which indicates the discourse salience of the standard in the asserted comparison, (13) has an unambiguous comparative reading.

(13) 张三更高
Zhāng Sān gēng gāo
Zhāng Sān gēng tall(-er)
‘Zhāng Sān is (even) taller.’ ~ comparative

(14) 张三比李四高 (五厘米)
Zhāng Sān bǐ Lǐ Sì (gēng) gāo (wǔ cǐ-mǐ)
Zhāng Sān COMPARE Lǐ Sì gēng tall(-er) five centimeter
‘Zhāng Sān is (5 cm) taller than Lǐ Sī.’

**With gēng**: the sentence presupposes that Lǐ Sī is tall;

**Without gēng**: there is no presupposition.

(15) \[
[lc bǐ] (\langle d, \langle d, \langle d, \langle c, d \rangle \rangle \rangle) \overset{\text{def}}{=} \lambda G (\langle d, \langle d, \langle d, \langle c, d \rangle \rangle \rangle, \langle \sigma, \sigma', \delta \rangle, \langle \lambda_{\sigma}, \lambda_{\sigma'}, \lambda_{\delta} \rangle)
\]

**Assertion**: the measurement of \(x\) exceeds the standard \(\sigma\) by a difference value \(\delta\).

**Presupposition** (the underlined part): the standard \(\sigma\) exceeds another standard \(\sigma'\) (Most likely, \(\sigma'\) does not have discourse salience, yielding a positive reading for this presupposed comparison).

(16) \[
[lc bǐ] (\langle d, \langle d, \langle d, \langle c, d \rangle \rangle \rangle) \overset{\text{def}}{=} \lambda G (\langle d, \langle d, \langle d, \langle c, d \rangle \rangle \rangle, \langle \sigma, \sigma', \delta \rangle, \langle \lambda_{\sigma}, \lambda_{\sigma'}, \lambda_{\delta} \rangle)
\]
(19) A: 张三 不是 很 高
A: Zhāng Sān bù shì hěn gāo
A: Zhāng Sān NEG COPULA very tall(-er)

B: 那 李 四 相 比, 张三 低 不 高?
B: nà Lǐ Sì xiàng bǐ Zhāng Sān gāo bù gāo
B: then with Lǐ Sì compare Zhāng Sān tall(-er) NEG tall(-er)

"A: Zhāng Sān is not tall. B: Then compared with Lǐ Sì, is he taller?" ～ comparative

Intriguingly, for (4a), even if we use it to construct an example similar to (19), the comparative reading is still unavailable. (20) is unacceptable: if gāo is interpreted as tall, the sentence sounds contradictory, but gāo here can by no means be interpreted as taller. Presumably, to license the meaning that Zhāng Sān is taller than the other kids, the difference set ‘all kids minus Zhāng Sān’ needs to be a salient discourse referent, but it fails to be so.

(20) # 这些 孩子 都 很 矮 其中 就 张三 高
zhè xiě hái-zi dōu hěn ǎi qí zhōng jū Zhāng Sān gāo
these kids all very short(-er) among/inside only Zhāng Sān tall(-er)

Unavailable: ‘These kids are all short. Among them, only Zhāng Sān is taller.’

**Gradable adjectives used at prenominal position**

As shown in (21) and (22), the comparative reading is totally unavailable in these cases. To convey the meaning that she wrote a longer letter, additional elements like gēng or bi-phrases are necessary (see (23)).

It is worth noting that in (21) and (22), given their context, there are indeed global discourse-salient items that can serve as the standard for comparison. Thus, it remains unclear why the comparative reading is totally impossible in these cases. One potential reason is that in these examples, the global discourse-salient items might be inaccessible to the prenominal gradable adjectives, failing to satisfy the requirement of the comparative use. A more detailed investigation for this issue is left for future research.

(21) (之前 那 封 信 很 短)
zhī qián nà fēng xìn hěn duǎn
previously that CLASSIFIER letter very short

她 又 写 了 一 封 长 的 信
tā yòu xiě-le yī fēng zhǎng de xìn
3.SG.PF. again WRITE-ASPECT one CLASSIFIER long(-er) PARTICLE letter

"(The previous letter was short). She then wrote a long one."

(22) (之前 那 封 信 只 有 三 页)
zhī qián nà fēng xìn zhǐ yǒu sān yè
previously that CLASSIFIER letter only have three page

她 又 写 了 一 封 五 页 的 信
tā yòu xiě-le yī fēng wǔ yè de xìn
3.SG.PF. again WRITE-ASPECT one CLASSIFIER five(-er) PARTICLE letter

"(The previous letter has only 3 pages). She then wrote a 5-page-long letter."

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4. Discussion

According to my proposal, the meaning of comparison is inherent to the semantics of gradable adjectives in Mandarin Chinese. Thus there is no need to mark the comparison involved in the comparative use. This analysis is highly consistent with Oda (2005)'s account for the semantics of gradable adjectives in Japanese. This raises a new question for the generalization shown in Table (2): why is comparison still marked in languages like English and French? If the notion of comparison underlies all the uses of gradable adjectives cross-linguistically, then in principle, (asserted) comparison never needs to be marked.

At least for English, it seems likely that the fundamental semantic contribution of comparative morpheme -er/more is simply additive (see also Greenberg 2010, Thomas 2010, Zhang & Ling 2019). The most natural interpretation of (24) is that Mary continued drinking after blacking out, i.e., the amount she drank at a later time does not necessarily exceed the amount she drank previously. In this sense, -er/more actually behaves like additive particles (e.g., another, also) and has a discourse-level contribution. As illustrated in (25), -er/more brings a presuppositional requirement: compared to (25a), (25b) presupposes the existence of a salient degree of amount in the discourse, serving as the base for the asserted amount, so that the asserted amount is considered an increase on this presupposed base. By behaving like an additive particle, most likely, -er/more marks the discourse salience of the item serving as the standard in a comparison, and it does not mark comparison per se.

(24) Mary drank till she blacked out. Then she drank more.

(25) a. Mary drank some beer.  ~ existential assertion
b. Mary drank more beer.  ~ presupposition + existential assertion

5. Conclusion

To sum up, this paper analyzes the three fundamental uses of gradable adjectives in Mandarin Chinese: the positive use, the comparative use, and the measurement use. I have argued that since the notion of comparison underlies all these three uses, the meaning of comparison does not need to be marked, which explains why there is no need to morphologically make a distinction between comparative and non-comparative forms. I analyze the semantics of gradable adjectives as a relation among (i) the measurement of an individual, (ii) a standard value for comparison, and (iii) the difference between the above two. Thus, the distinction among the three uses can be naturally attributed to their distinctive standard and difference.

Without a specification of standard or difference, the use of gradable adjectives in Mandarin Chinese is inherently ambiguous. However, adding elements like hěn or bǐ-phanes can
help to disambiguate, and for pragmatic interlocutors, the non-use of these disambiguating
elements also helps them to get the more likely interpretation in literally ambiguous cases.

Can the currently proposed analysis lead to a new generalization for cross-linguistic data?
In the discussion, I have suggested that comparative morpheme -er in English probably does
not mark comparison, but the discourse salience of the standard in comparison. How about the
seeming markers of comparison in other languages? These issues are left for future research.

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welcome! Please send an email to zhanglinmin@gmail.com or linmin.zhang@nyu.edu.

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