

Lexical Decomposition in Syntax: New Evidence from Ellipsis

Yosuke Sato, Jianrong Yu
Seisen University, University of Arizona

1. Introduction ¹

Over the last 25 years or so, researchers working on argument structure and verbal meanings have accumulated a growing body of evidence that what appears to be a morphophonologically single verb is in fact decomposed into a series of semantically contentful functional projections and roots (Hale and Keyser 1993, Harley 1995, 2002, Kratzer 1996, Beck and Johnson 2004, to mention a few; see Harley 2012 for a recent summary), suggesting a return to a sharply constrained minimalist syntactic version of the deep insights of Generative Semantics (Morgan 1969; Lakoff 1970; McCawley 1971).

In this paper, we will furnish novel evidence for this decompositional theory of verb meanings through a previously unexplored angle of VP-ellipsis. Our central observation is that VP-ellipsis can target a sub-lexical constituent of a verb's structured meaning. We formulate a condition on VP-ellipsis that makes crucial reference to a superset-subset relation between the syntactic structures of the antecedent and the elided constituent. We then use this condition on VP-ellipsis as a probe into the articulated internal structure of VPs, (dis-)confirming particular decompositional analyses for controversial cases of verbs such as *kill*, *want*, *give*, *open*, *melt*, etc.

A number of important implications arise from this work. Firstly, because the superset-subset relation makes reference to (morpho-)syntactic identity, the data reported here constitute a powerful argument that ellipsis must be sensitive to syntactic structure, not just phonological identity, as argued in Goldberg (2005). Secondly, roots (or at least indices) must be present in the syntactic representation (Harley 2004) to evaluate proper containment relations between the antecedent-ellipsis pairs for verbs that show the causative-inchoative alternation, contra researchers who argue that roots are inserted late post-syntactically (Halle and Marantz 1993; Marantz 1995; Haugen 2009; Haugen and Siddiqi 2013). Lastly, granted that decompositional effects of verbs are real, the question remains whether the relevant decomposition takes place in the syntax or at some other pre-syntactic level of representation such as the GB-style lexicon or the so-called Lexical Conceptual Structure (Pustejovsky 1991; Levin and Rappaport-Hovav 1995). Our results reported here show that the decomposition in question must be represented *within syntax*, a theoretical conclusion that is also echoed in von Stechow (1995) and Beck and Johnson (2004) in their analyses of scope ambiguities with *again* in double object verbs.

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2. VP-Ellipsis: When Lexical Decomposition and Syntactic Identity Meet

It has been noted since Fodor (1970) that anaphoric expressions such as *it*, *that*, and *do so* can target smaller, sub-lexical components of a verb's meanings. This is easily observable with verbs that participate in the causative-inchoative alternation. In (1), the antecedent clause contains the causative variant, while the anaphoric pronouns may be interpreted as inchoative, as shown in (1b). Similarly, in (2), the *do so* pro-form can refer back to either the causative or the inchoative version of the verb *melt*.

- (1) Floyd melted the glass {and that/and it/which} surprised me.
 a. That Floyd melted the glass surprised me.
 b. That the glass melted surprised me. (Fodor 1970:429)
- (2) a. Floyd melted the glass though it surprised me that he would do so.
 b. Floyd melted the glass though it surprised me that it would do so. (Fodor 1970:429)

It is notable in this context to point out that VP-ellipsis can also target this type of sub-lexical meaning components of a verb. For example, in (3), the ellipsis site marked by ___ refers to the result state named by the root of the verb *opened* in the antecedent clause.

- (3) John opened the door at 2:00, but I didn't know, so when I came in, it surprised me that it was ___.

Crucially, as first pointed out by Sugimoto (2018), the directionality of the VP-ellipsis possibilities is unidirectional. More concretely, he points out that a causative variant of the verb licenses the ellipsis site to be interpreted as inchoative (or stative), but the inchoative does not license the ellipsis site to be interpreted as causative. Sugimoto's observation is illustrated in (4a, b).

- (4) a. John believed that the sunshine would melt [the big snowballs]_i, but they_i didn't <melt>.
 b. * John believed that [the big snowballs]_i would not melt, but the sunshine did <melt them_i>.
 (Sugimoto 2018:146-147)

Goldberg (2005) proposes the condition of full phonological identity, defined in (5), as the licensing condition on VP-ellipsis based on Hebrew data. Her observation is that VP-ellipsis in Hebrew is only licensed if the roots and derivational morphology are identical between the antecedent verbs and their ellipsis sites. This observation is illustrated in (6) and (7).²

- (5) The Verbal Identity Requirement (Goldberg 2005:171)
 The antecedent- and target- main Vs of VP Ellipsis must be identical, minimally, in their root and derivational morphology.

² The list of abbreviations used in this paper is as follows: ACC, accusative; FEM, feminine; NOM, nominative; PAST, past tense; SG, singular; 1/2/3, first/second/third persons.

(6) Hebrew VP-Ellipsis: *Non-Matching Root, Matching Binyan (Goldberg 1995:163)

Q: Rivka **hisi'a** otax le-beit ha-sefer?
 Rivka drive [PAST.3.FEM.SG] ACC.you [FEM.SG] to-house the-book
 '(Did) Rivka drive you to school?'

A: *Ken, hi **hevi'a**.
 yes he bring [PAST.3.FEM.SG]
 'Yes, she brought (me to school).'

(7) Hebrew VP-Ellipsis: *Non-Matching Binyan, Matching Root (Goldberg 1995:164)

Q: Li'ora **nas'a** etmol le-Tel Aviv?
 Liora travel [PAST.3.FEM.SG] yesterday to-Tel Aviv
 '(Did) Liora travel yesterday to Tel Aviv?'

A: * Ken – **hisa'tl**.
 yes-drove [PAST.1.SG]
 'Yes – I drove (her yesterday to Tel Aviv).'

VP-ellipsis fails in (6) because the antecedent verb and the verb in the VP-ellipsis site (which vacates the VP through head movement to T) have the matching binyan, but not the matching root. In a similar vein, VP-ellipsis also fails in (7), where the two verbs in question have the matching root, but not the matching binyan.

Following recent work on syntax-based identity conditions on ellipsis (Chung et al. 1995; Merchant 2008a, 2013a, b; Chung 2013), we propose instead that the morphosyntactic structure of the elided constituent must be a subset of the morphosyntactic structure of the antecedent. This general condition on ellipsis is formulated in (8) (Sato 2019a). See also Sugimoto 2018 for a similar proposal to the same effect.

(8) The Morphosyntactic Containment Condition (MCC) (Sato 2019a)

The syntactic structure of an antecedent must properly contain that of an elided constituent.

To illustrate how the MCC works in ellipsis licensing within sub-lexical domains of verbs' meanings, consider again VP-ellipsis with verbs like *melt* that participate in the causative-inchoative alternation, illustrated earlier in (4a, b). Let us assume, following von Stechow (1996), that causative verbs like *melt* are associated with the decompositional CAUSE + BECOME + \sqrt{melt} structure. Under the MCC-based analysis, the ellipsis of the inchoative *melt* licensed by the causative *melt* is permitted, as shown in (4a), since the decompositional BECOME + \sqrt{melt} structure of the inchoative variant is properly contained in the decompositional CAUSE + BECOME + \sqrt{melt} structure of the causative variant. The VP-ellipsis in (4b) is ill-formed, on the other hand, because the decomposed structure of the inchoative variant does not properly contain that of the causative variant, in violation of the MCC. The MCC then provides a principled explanation for the directionality of VP-ellipsis in the causative-inchoative alternation.

Our MCC contrasts with Goldberg's (1995) Verbal Identity Requirement defined in (5). For Goldberg, the ellipsis site needs to be understood as phonologically identical to the antecedent verb. However, as noted by Sugimoto (2018), there are certain cases, as in (9), where the ellipsis site is interpreted as a phonologically different verb than the antecedent verb. Some other examples of such cases are shown in (10–11). This point is also independently observed with the interpretive potentials of VP-anaphora processes such as pronoun resolution, as exhibited in (12)

- (9) a. John believed that the war would raise [oil prices]_i, but they_i didn't <rise>.
 b. *John believed that [oil prices]_i would rise, but the war didn't <raise them_i>. (Sugimoto 2018:150)
- (10) A: Do you want a beer?
 B: I shouldn't [VP Ø], but I will [VP Ø] just this one time.
- (11) a. Jonathan wants to have more toys than Benjamin.
 b. Jonathan wants more toys than Benjamin.
 → 'Jonathan wants more toys than Benjamin wants to have.'
 → 'Jonathan wants more toys than Benjamin has.' (den Dikken et al. 2018:52)
- (12) a. Joe wants a horse, but his mother won't allow it.
 b. Joe wants some horses, but his mother won't allow {it/*them}.
 c. Joe wants a wife, but his mother won't allow {it/*her}. (McCawley 1974:77)

The examples in (9) show that the inchoative version of the verb in the ellipsis site can be phonologically different from the verb in the antecedent clause. Similarly, the example in (10) illustrates that the elided VP is interpreted as *have a beer*, not *want a beer*. The comparative example in (11) makes the same point: the ellipsis site may be interpreted as being headed by either *want* or *have*. The examples in (12a–c) show that the anaphoric pronoun *it* may refer back to the *have*-component of the transitive verb *want*. Under Goldberg's (1995) Verbal Identity Requirement, the examples in (9–11) should be erroneously ruled out as the antecedent and ellipsis site have non-matching phonological spellouts. Our MCC-based theory, on the other hand, presents a straightforward account. Given the amply motivated decompositional analysis of *want* as INTEND + BE + P_{HAVE} (Quine 1960; McCawley 1974; Partee 1974; Richards 2001; Sato 2003) and of *have* as BE + P_{HAVE} (Harley 1995, 2003; Harley and Jung 2015), a proper containment relationship can be established between the two verbs in conformity with the MCC, thereby licensing the ellipsis site to be interpreted as *have* with *want* as its antecedent, as attested in (9–11).

Wechsler (2008) points to a variety of evidence suggesting that *want* contains transitive *have*, analyzed here BE + P_{HAVE}, within its structural decomposition based on coordination, case adjacency effects, and *right*-modification, among others. Consider examples in (13–15).

- (13) Coordination
- a. I want [DP a vodka martini] and [DP a hot bath].
 b. I want [PP out of these wet cloths] and [PP into a hot bath].
 c. * I want [PP out of these wet cloths] and [DP a martini].
 d. * I want [DP a martini] and [PP out of these wet cloths]. (Wechsler 2008:285)
- (14) Case Adjacency Effects
- a. He nibbled quietly [PP on the carrot].
 b. He nibbled (??) quietly [DP the carrot].
 c. He wants desperately [PP out of his job].
 d. * He wants (??) desperately [DP a better job]. (Wechsler 2008:286)

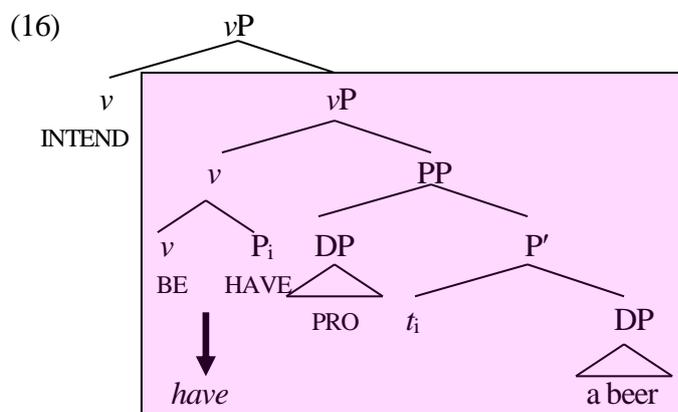
(15) *Right-Modification*

- a. So you bring this poor dog in from the rain, though he just wants right [PP back out].
 b. * He just wants right [DP a rapid exit].

(Wechsler 2008:286)

Firstly, coordination conjoins the same syntactic categories, as shown in (13a) and (13b). If the DP in the second conjunct in (13c) were headed by the prepositional P_{HAVE} , then it should be able to be coordinated with the first PP; the same point holds true in (13d), where the position of the two phrases is switched. The ill-formedness of these examples follows if the relevant DPs are just accusative DPs selected by the covert transitive verb *have* (i.e., BE + P_{HAVE}) within the decompositional structure of *want*. Turning now to (14), the accusative-marked direct object exhibits the so-called Case Adjacency Effect (Stowell 1981), unlike the prepositional object, as shown by the contrast between (14a) and (14b). Keeping this effect in mind, if the object of *want* in (14d) were headed by e prepositional P_{HAVE} , then it should exhibit the Case Adjacency Effect. The lack of this effect in (14d) then shows that the DP there is indeed an accusative DP selected by the invisible transitive *have*. Finally, the modifier *right* is known to attach to PP expressions such as *back out*, as shown in (15a). If the phrase *a rapid exit* were the prepositional object, then the same modifier should occur immediately before this phrase. The contrast between (15a) and (15b), then, indicates that the relevant phrase is indeed an accusative direct object of the covert transitive *have*.

Given the proposed decompositional analysis of *want* as containing the transitive *have* (i.e., INTEND + BE + P_{HAVE}), the MCC correctly predicts the grammaticality of VP-ellipsis cases as in (10) where the ellipsis site is interpreted as *have* with the verb *want* as its antecedent clause. The relevant part of the morphosyntactic structure for the antecedent clause is shown in (16).



Examples of VP-ellipsis with verbs like *want* in the antecedent clause licensing an ellipsis site with *have* thus provide strong support for a syntactic decompositional analysis of ellipsis whereby identity is imposed over syntactic structures like our MCC over a phonological identity-based analysis as proposed by Goldberg (2005), which limits identity on root and derivational morphology alone.

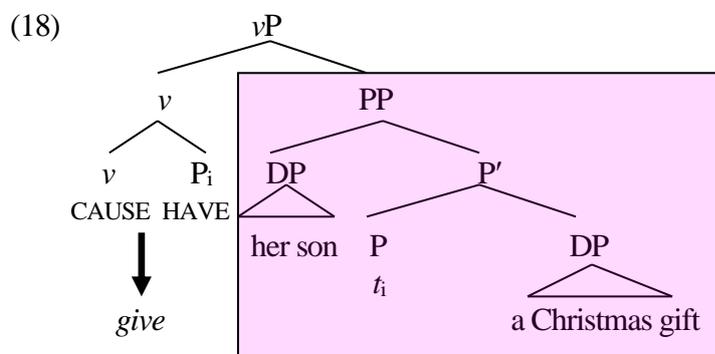
3. Further Probing the Internal Structure of VPs

We have shown thus far how we may employ VP-ellipsis as conditioned by the MCC as a critical probe into fine decompositional structures of VPs. As discussed in the previous section, *want* licenses VP-ellipsis where the elided verb is interpreted as *have*. Our analysis of this VP-ellipsis pattern raises

an important question about double object verbs such as *give*, which are widely argued in the literature to also contain the abstract P_{HAVE} that is also part of the overt verb *give* (Harley 2012; Harley and Jung 2015). The ungrammaticality of the example in (17), however, shows that VP-ellipsis where the ellipsis site is interpreted as *have* is disallowed with *give*.

(17) * Mary tried to give her son a Christmas gift yesterday, but he couldn't [_{VP} Ø] because of his sickness.

This example indicates then that the decomposed structure of *give* does not properly contain the decomposed structure of *have*. In other words, this example presents confirmatory evidence for decompositional accounts of *give* like Harley's (1995, 2003), where *give* is decomposed into CAUSE + P_{HAVE} . This point is schematically depicted in the relevant part of the syntactic structure for the antecedent clause in (17), shown in (18).



Since *have* (i.e., BE + P_{HAVE}) is not properly contained in *give* (i.e., CAUSE + P_{HAVE}), the ellipsis site cannot be interpreted as overt transitive *have* in (17).

We wish to point out further that our analysis, if strictly pursued, has non-trivial implications in areas such as the famous debate on deriving *kill* from more primitive semantic predicates such as CAUSE and DEAD (Fodor 1970). Somewhat surprisingly, here we have evidence against a decompositional approach to *kill* when we extend our reasoning based on the MCC to this notorious predicate. The VP-ellipsis site disallows interpretation as the inchoative *die* or the lexically denoted result state *dead*, as shown in (19) and (20) respectively. Similarly, anaphoric expressions such as *do so* and *it/that/which* cannot pick up the inchoative or result state predicate components of the same verb, as illustrated in (21b) and (22b).

(19) * John believed that the virus would kill [_{DP} the patient]_i, but he_i didn't <die>.

(Sugimoto 2018:150)

(20) * Mary killed John and it surprised me that he was [_{VP} Ø].

(21) a. John killed Mary and it surprised me that he did so.

b. * John killed Mary and it surprised me that she did so.

(Fodor 1970:431)

(22) John killed Mary {and that/and it/which} surprised me.

a. That John killed Mary surprised me.

b. * That Mary died surprised me.

Harley (2012) argues that the ungrammaticality of examples such as (21b) can be traced to a certain independent size restriction imposed on *do so* anaphora. Specifically, she argues that VP-ellipsis must target a verbalized constituent and consequently, a stative small clause structure is too small to be the licit target of VP-ellipsis. In favor of this restriction, she notes that *do so* cannot target a stative constituent, as shown in (23a), but embedding the stative small clause structure under the overt inchoative verb *become* improves the grammaticality, as shown in (23b).

- (23) a. * John made Mary happy and it surprised me that she did so.
 b. John made Mary become happy and it surprised me that she did so. (Harley 2012:338)

For a start, native speakers we consulted with reported that the example in (23b), which Harley labels as grammatical, sounds highly anomalous. Secondly, Harley claims that *do so* anaphora cannot target a stative constituent. However, we have already seen that such a case actually exists with VP-ellipsis, as shown in (3), with the transitive verb *open* as the antecedent licensing the ellipsis of the stative adjectival predicate *open*. This being said, note that, with the verb *kill*, the ellipsis site still cannot be interpreted as *dead* even with the auxiliary *was* instead of *do so*, as shown by the ill-formedness of (20) in contrast to (3). Taking these three points together, we can conclude that under the MCC account being proposed here, there is simply no inchoative BECOME + \sqrt{die} nor the stative DEAD in the syntactic structure of *kill* that can serve as an acceptable antecedent for VP-ellipsis.

If our analysis is right, then *kill* is not CAUSE + \sqrt{die} . It is rather simply CAUSE + \sqrt{kill} . As far as we know, there is no language where verbs of killing are morphologically derived from or even paradigmatically related to the intransitive verb meaning roughly *die*. For example, in Japanese, the lexical causative verb *korosu* ‘to kill’ has no morphological relation with the inchoative verb *sinu* ‘to die’ (see also Shibatani 1972), as shown in (24a, b).

- (24) a. Akira-ga Yusuke-o **korosi**-ta. (lexical causative)
 Akira-NOM Yusuke-ACC kill-PAST
 ‘Akira killed Yusuke.’
 b. Yusuke-ga **sin**-da. (inchoative)
 Yusuke-NOM die-PAST
 ‘Yusuke died.’

In defense of his lexical decompositional analysis of *kill* from CAUSE + BECOME + NOT + ALIVE, McCawley (1968) reports that the sentence in (25) has three paraphrases shown in (26a–c), which he takes to mean that the ambiguity is due to differences in scope of *almost* in the pre-syntactic lexical representation in the Generative Semantics tradition.

(25) John **almost** killed Harry.

- (26) a. John almost did something that would have killed Harry.
 b. John did something that came close to causing Harry to die.
 c. John did something that brought Harry close to death. (Kac 1972:117)

However, Shibatani (1972:126) cites Wallace Chafe’s observation that there is no such alleged three-way ambiguity there, but it is just simply two-way ambiguous between “John intended to kill Harry but he changed his mind” and ‘John, without intending to kill Harry, did something which could have killed Mary’, two readings yielded by the difference in intentionality of the subject

argument; see Sato (2019b, c) for relevant discussions on the structured meanings of verbs like *kill* across languages from the perspective of non-culminating change of construals of causative accomplishment verbs. Chafe's observation is certainly not captured by McCawley's proposed decompositional analysis of *kill*.

More recently, Bale (2007:465) points out that the so-called restitutive interpretation is not available in (27).

(27) Seymour killed the Zombie again. (*restitutive reading) (Bale 2007:465)

In his words, this example "...does not merely presuppose that the Zombie was dead before. It had to have been killed before." Such a reading should be available if *kill* were decomposed into the causative + inchoative or state components, just like double object verbs like *give*, which do give rise to this interpretation (von Stechow 1995; Beck and Johnson 2004).

To summarize, we have investigated the fine decompositional structure of different classes of verbs and shown whether they may license VP-ellipsis interpreted as their inchoative counterparts. The results of our investigation so far are summarized in Table 1.

Antecedent verb	Ellipsis site	VP-ellipsis	Example number
<i>melt</i> : CAUSE + BECOME + \sqrt{melt}	<i>melt</i> : BECOME + \sqrt{melt}	☺	(4)
<i>open</i> : CAUSE + BECOME + \sqrt{open}	<i>open</i> : BECOME + \sqrt{open}	☺	(3)
<i>raise</i> : CAUSE + BECOME + \sqrt{rise}	<i>rise</i> : BECOME + \sqrt{rise}	☺	(9)
<i>want</i> : INTEND + BE + P _{HAVE}	<i>have</i> : BE + P _{HAVE}	☺	(10)
<i>give</i> : CAUSE + P _{HAVE}	<i>have</i> : BE + P _{HAVE}	☹	(17)
<i>kill</i> : CAUSE + \sqrt{kill}	<i>die</i> : BECOME + \sqrt{die}	☹	(19)

Table 1: Lexical Decomposition and VP-Ellipsis under the MCC Approach

4. The Internal Structure of Complex Resultative Predicates

Given what we have discussed so far about the interaction of VP-ellipsis and the MCC, we may expect that VP-ellipsis can tell us a lot more about the fine structure of other VPs than those headed by verbs like *give*, *want* and *kill* as well as causative alternation verbs like *melt* and *open*. In this section, we show that VP-ellipsis can be used as diagnose the internal structure of resultative predicates.

Resultatives have been analyzed in the literature either as involving a causative structure embedding a result small clause, whereby an activity verb names the CAUSE component and a secondary adjectival/prepositional predicate names the result component (Hoekstra 1988; Sybesma 1999; Kratzer 2005), or as involving the CAUSE + BECOME + result structure (von Stechow 1995; Beck and Johnson 2004). Importantly, VP-ellipsis, coupled with the MCC, can be used to tease apart the predictions of these two analyses attributing different amounts of structure to the lower result component. Let us observe first that with adjectival secondary predicates such as *open*, the ellipsis site can be interpreted as the inchoative *open*. This point is illustrated in (28).

(28) John tried to kick the door open, but it didn't <open>.

Under our working assumptions, the grammaticality of this example indicates that the structure of the resultative construction with the intransitive *open* involves CAUSE + BECOME + \sqrt{open} , in line with von Stechow's/Beck and Johnson's analysis of resultatives since the intransitive verb has the

decompositional structure BECOME + \sqrt{open} (see Table 1).

On the other hand, it would seem that not all resultatives are equal in complexity of the result component. Thus, resultatives formed with adjectival predicates such as *flat* do not allow VP-ellipsis where the ellipsis site is interpreted as the inchoative verb *flatt(en)*, as illustrated by the ungrammaticality of (29).

(29) * John tried to hammer the metal flat, but it didn't <flatten>.

This example then suggests that resultative forms with *flat* crucially lack the inchoative BECOME component which would serve as the antecedent for VP-ellipsis. Rather, they seem to involve the simpler CAUSE + \sqrt{flat} structure without the inchoative component, a conclusion in line with small clause analyses of resultatives pioneered by Hoekstra (1988) and much subsequent works. We can conclude, therefore, that the range of (im)possible VP-ellipsis patterns with resultatives including various secondary predicates show that both small clause analyses and more complex causative + inchoative analyses are independently needed for different secondary predicates. This conclusion is in contrast with recent approaches to resultatives as in Harley (2012), who argues against a uniform CAUSE + BECOME + RESULT analysis of causative verbs including resultatives.

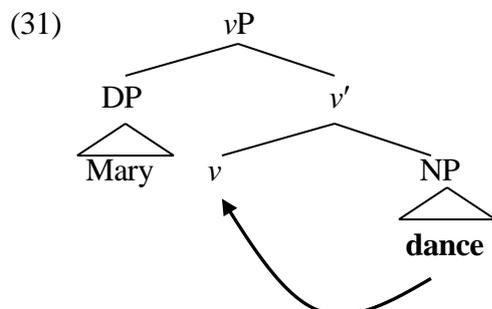
5. Wider Theoretical Implications of the MCC Approach to VP-Ellipsis

In our analysis of VP-ellipsis involving causative-alternation verbs, we have suggested that morphosyntactic identity is crucially involved in the form circumscribed by the MCC. Crucially, we have assumed that this class of verbs be decomposed into CAUSE + BECOME + root, and that the inchoative ellipsis site interpreted as BECOME + root must be properly contained within the decompositional structure of the causative variant. This result implies that root identity is a required condition for calculating containment relationships, and subsequently, roots must be individuated and present within the narrow syntactic derivation (Harley 2014).

5.1. Late Insertion of Roots?

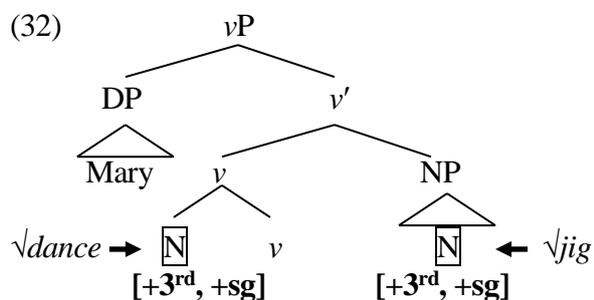
Different views, however, have been advanced in the Distributed Morphology literature regarding the timing and locus of root insertion. It has been suggested by previous works such as Halle and Marantz (1993), Marantz (1995), Haugen (2009), and Haugen and Siddiqi (2013) that Late Insertion, the operation in this theoretical framework which provides terminal nodes in the syntactic representation with Vocabulary Items linked to phonological and semantic material, applies not only to functional terminal nodes but also to root terminal nodes. Note that this late insertion view of roots directly contradicts the analytical premises of the MCC proposed here, for the condition requires that information about roots must be presented in the narrow syntactic derivation for proper containment relationships to be established between antecedent-ellipsis pairs. It is therefore worthwhile to revisit here the central arguments advanced for the late root insertion view. One of the main arguments in its favor, developed by Haugen (2009), is concerned with the derivation of denominal unergative verbs with hyponymous cognate objects. Example (30b) is a case in point. To set the stage for the argument for the late insertion view of roots, let us first consider the relevant part of the syntactic derivation of the denominal unergative verb *dance* in (30a), shown in (31).

- (30) a. Mary danced.
b. Mary danced a jig.



(adopted from Hale and Keyser 1993: 55, with minor modifications)

For Hale and Keyser (1993), the example in (30a) is derived by incorporating a nominal root \sqrt{dance} into a v head which selects it. The example in (30b), then, poses a challenge for such analyses, since the complement position of v is now occupied by a different, albeit hyponymous, nominal root \sqrt{jig} . Consequently, the nominal root \sqrt{dance} , which would feed the spell-out of the denominal unergative verb *dance*, cannot originate in the complement position of the v head. Haugen therefore proposes that incorporation involves only *abstract syntactic features* such as number and person rather than the (information on) nominal root itself, as schematically depicted in the derivation shown in (32).



(adopted from Haugen 2009:249, with minor modifications)

According to this proposal, the nominal root is inserted only *after* the syntactic derivation. In the case of denominal unergative verbs, then, the nominal root \sqrt{dance} is inserted into the head of the movement chain. With hyponymous object constructions such as the one in (30b), both the head and tail of the chain are spelled out via insertion of the two different nominal roots – \sqrt{dance} and \sqrt{jig} . Presumably, the interpretation of the lower object in (32) as hyponymous can be derived via appealing to pragmatic principles such as Grice's Maxim of Quantity, where multiple spellouts are ruled out unless there are appreciable interpretive consequences. The crucial point of Haugen's (2009) arguments for the late root insertion position is that incorporation involved here is of abstract syntactic features only, with the nominal roots being inserted post-syntactically, suggesting that the identities of roots are irrelevant to the syntactic derivation.

5.2. VP-Ellipsis, Root Insertion, and the Content of Roots

Recall that we have argued for a syntactic account of VP-ellipsis as governed by the MCC, where identity is calculated over syntactic structures. We show here that, upon closer examination, anaphoric processes with denominal unergative verbs like *dance* actually provide an argument for the early root insertion view, contra Haugen's late root insertion analysis. Our core observation in favor of this argument is that *do so* anaphora involving such verbs requires that the interpretation of the anaphoric site *must* include the hyponymous object; interpreting it as the hypernymous verb appears to be quite marked, while interpreting it as a different hyponymous object is unacceptable. These observations are illustrated in (33b, c).

- (33) Mary danced a jig and it surprised me that she did so.
- a. "Mary danced a jig and it surprised me that she <danced a jig>.
 - b. ?? "Mary danced a jig and it surprised me that she <danced>.
 - c. * "Mary danced a jig and it surprised me that she <danced ballet>.

If *do so* anaphora is also conditioned by morphosyntactic identity, as we have argued for VP-ellipsis, and roots are inserted late, then Haugen's late insertion analysis would predict that the anomalous and ungrammatical interpretations shown in (33b) and (33c) should be acceptable. This is because, under his analysis explicated above, the anaphoric site is conditioned by identity of the paired syntactic structures, which prior to spell-out only contain abstract morphosyntactic features such as person and number without any information on the root (identity). In other words, inserting the nominal root(s) post-syntactically to spell out only the head of the chain or both the head and the tail of the chain (with a different hyponymous root as the antecedent) should not be a problem for *do so* anaphora to apply. Instead, we see that *do so* anaphora with denominal unergative verbs with hyponymous objects must include the nominal root spelling out the hyponymous object in the anaphoric site. This observation strongly indicates that both nominal roots spelling out the head and tail of the incorporation/movement chain must be present within the narrow syntactic derivation. Tentatively, we suggest that nominal roots spelling out hyponymous objects are underlyingly present in the syntax, with the root corresponding to the surface verb being adjoined to the V head in a manner akin to Harley's (2005) theory of manner incorporation. Nonetheless, fleshing out the details and consequences of this technical suggestion would be out of the scope of this paper here and we leave this issue for future inquiry.

A different but related question taken by Harley (2014) concerns the content of roots. That is, do roots come with a fully specified range of phonological and semantic features? This is particularly relevant for our current purposes, since, as discussed earlier, Goldberg (1995) has presented suggestive evidence that VP-ellipsis makes reference to the identity of both roots and derivational morphology, entailing that phonological forms must be identical for her Verbal Identity Requirement to be met. Again, we believe that our approach to VP-ellipsis guided by the MCC yields more insights into the content of roots. On one hand, we have just argued that roots need to be present in the syntactic derivation to calculate proper containment relationships between antecedent-ellipsis/anaphora pairs. On the other hand, we have also shown that actual phonological forms/spellouts of the antecedent-elliptical verbs need not be the same so long as they are built around the same root. This point was illustrated in section 2 with *raise-rise* pairs in (9a), repeated here as (34).

- (34) John believed that the war would raise [oil prices_i], but they_i didn't <rise>. (Sugimoto 2018:150)

Our current approach to VP-ellipsis thus lends support to analyses of roots simply being indices in the syntax linked to particular phonological spellout rules based on the syntactic structure championed by Harley (2014) and Panagiotidis (2014), among others. The MCC imposes proper containment relationships between syntactic structures with roots as indices; if the indices are different, then there will be no containment relationships, blocking any occurrence of VP-ellipsis.

6. Conclusion

We have assumed in this paper, along with many others (Chung et al. 1995; Merchant 2008a, 2013a, b; Chung 2013), that licensing conditions on VP-ellipsis are syntactic in nature, a point captured by our formulation of the MCC. We have shown how the interaction of VP-ellipsis with the MCC can be used as a critical window into the fine internal structure of VPs. Specifically, we have assessed and confirmed particular decompositional analyses of causative alternation verbs such as *open*, *melt*, and *raise* as well as double object verbs such as *give*, while arguing against any decompositional account of verbs of killing. Going beyond the limited range of VP-ellipsis, the approach taken here has wider theoretical implications for the general architecture of theories of syntax-morphology interface such as the Distributed Morphology, specifically the timing of root insertion and the actual content of roots. We have shown that late insertion accounts of roots as in Haugen (2009) cannot account for the interpretive properties of VP-ellipsis/anaphora with denominal unergative verbs such as *dance* (Hale and Keyser 1993), and have suggested that the relevant pattern of interpretations actually attested in this context provides strong support for the early insertion view of roots, a position fully conformant with the conclusion that the MCC forces on the timing of root insertion. We have further indicated that while roots must be individuated in the syntax, they cannot inherently be associated with actual phonological spellouts/forms, for there exist cases with causative-inchoative alternation verbs such as *raise-rise* pairs wherein the ellipsis site is interpreted as having a different phonological form of the same root shared by the antecedent verb. Consequently, we have suggested that roots are individuated in the syntax purely in the form of indices, which has the function of linking a particular root to particular phonological spell-out rules.

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