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10-1-2020

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### Recommended Citation

Ausensi, Josep (2020) "Agent entailments in the semantics of roots," *University of Pennsylvania Working Papers in Linguistics*: Vol. 26 : Iss. 1 , Article 3.

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## Agent entailments in the semantics of roots

### Abstract

Many recent theories of event structure (e.g. Hale and Keyser 2002; Borer 2005; Ramchand 2008; Alexiadou et al. 2015) assume that verb meanings decompose into event templates (e.g. vBECOME, vDO) and roots (e.g. √KILL, √DIE). Crucially, under such theories, templatic meanings related to change or intentionality are never introduced by roots, but only by event templates (i.e. vBECOME, vDO respectively), as roots are assumed to provide real-world details about the event. In the present paper I argue, following Beavers and Koontz-Garboden (to appear), that there are certain classes of roots that inherently comprise as part of their entailments the meanings that some theoretical approaches assume to be part of templatic meanings introduced in the syntax by projections such as vDO (Folli and Harley 2005, 2007). More specifically, I make use of sublexical modification with *again* in order to show that templatic meanings related to intentionality cannot be severed from √MURDER-type roots (i.e. √MURDER, √SLAY, √ASSASSINATE, √SLAUGHTER, √MASSACRE), i.e. that entailments of intentionality are introduced by √MURDER-type roots.

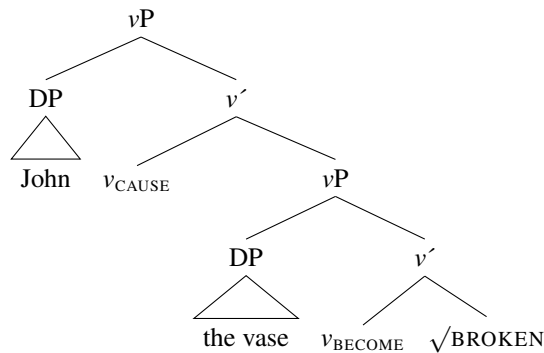
# Agent entailments in the semantics of roots

Josep Ausensi\*

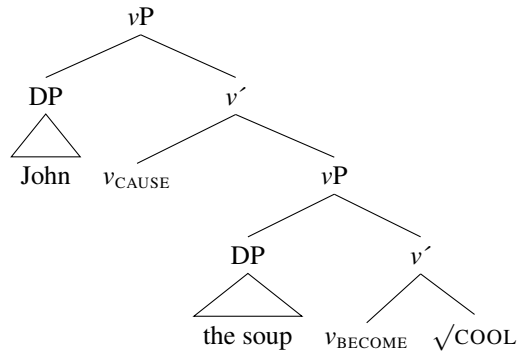
## 1 Introduction

In lexical semantics, verb meanings are assumed to consist of an event structure which restricts the types of events that the verb describes (see Dowty 1979). More specifically, a verb's event structure decomposes into event templates, which define the temporal and causal structure of the event, and roots, which provide real-world details about the event. As Koontz-Garboden and Beavers (2017) note, this division of labor between templates and roots is assumed in all theories of event structures, whether lexicalist (e.g. Pinker 1989; Rappaport Hovav and Levin 1998), constructionist (e.g. Goldberg 1995; Croft 2001) or neoconstructionist (e.g. Borer 2005; Ramchand 2008; Alexiadou et al. 2015). In this vein, a considerable body of work (Hale and Keyser 1993, 1997, 2002; von Stechow 1996; Marantz 1997; Harley 2003; Folli and Harley 2005; Borer 2005; Alexiadou et al. 2006, 2015, i.a) assumes that verbs are created in the syntax by merging a root with event templates, as in (1). More specifically, such approaches assume that meanings such as change (e.g. *become broken*) are introduced in the syntax, via so-called functional heads (e.g.  $v_{\text{BECOME}}$ ), and roots simply provide idiosyncratic information about the state (e.g.  $\sqrt{\text{FLAT}}$ ) or action (e.g.  $\sqrt{\text{RUN}}$ ) they name. Further, roots of change-of-state verbs such as *break* are stative and only acquire an entailment of change when merged with the corresponding functional head<sup>9</sup>. Thus, the roots of change-of-state verbs such as *break* or *redde*n only differ in the (real-world) information they provide about the state they denote.

(1) a. John broke the vase.



b. John cooled the soup.



\*I am grateful to Jianrong Yu, A. Koontz-Garboden and C. Real-Puigdollers for our discussions which were really helpful for the present work. I am also grateful to Josep M. Fontana for reviewing earlier versions and for valuable comments. This research was supported by the grant FFI2016-76045-P (AEI/MINEICO/FEDER, UE) and by an ICREA Academia award to Louise McNally. All remaining errors are my own.

Similarly, Folli and Harley (2005, 2007) (see also Hale and Keyser 1993, 2002) argue that meanings related to intentionality and/or agency are also introduced templatically, by the so-called functional head  $v_{DO}$ . More specifically, Folli and Harley argue that the little  $v$  (see Chomsky 1995; Kratzer 1996) that introduces the external argument has different ‘flavors’: while  $v_{DO}$  requires the external argument to be an agent, i.e. it introduces templatic meanings related to agency/intentionality,  $v_{CAUSE}$ , on the other hand, places no restrictions on the external argument.<sup>1</sup> In Folli and Harley’s (2005: 96) words: “These light verbs place different restrictions on their subjects and complements; in particular,  $v_{DO}$  needs an animate Agent subject, while  $v_{CAUSE}$  only requires that the subject be a possible Cause.” Folli and Harley’s core proposal lies on the observation that consumption verbs (e.g. *eat*) place animacy restrictions on their external arguments, but can also take inanimate subjects in resultative-like constructions. Folli and Harley propose then that such restrictions on alternations can be accounted for if little  $v$  (responsible for introducing the external argument) actually comes in two ‘flavors’, one of each with different semantic properties selecting for different kinds of external arguments. Compare the variable behavior of consumption verbs in the following examples (adapted from Folli and Harley 2005: 104).

- (2) a. John ate the sandwich.  
b. \*The sea ate the beach.  
c. The sea ate the beach away.
- (3) a. The carpenter carved the toy.  
b. \*The wind carved the beach.  
c. The wind carved the beach away.
- (4) a. The cowboy chewed the tough beef.  
b. \*The washing machine chewed the laundry.  
c. The washing machine chewed up the laundry.

However, under Folli and Harley’s analysis and approaches that assume that external arguments are introduced by a separate layer in the syntax (under *little v* in Chomsky 1995, *VoiceP* in Kratzer 1996), as they are not considered arguments of the verb itself, it remains unclear why it is the case that verbs like *murder* only allow intentional entities as their subjects, i.e. agents, in contrast to *kill* which appears to accept any type of entity as its subject (see Talmy 1985; Dowty 1991; Lemmens 1998; Van Valin and Wilkins 1996; Van Valin 2005; Rooryck 2011; Grano 2016; Solstad and Bott 2017; Ausensi to appear)

- (5) a. John murdered Tom (#by accident/#unintentionally).  
b. #The floods murdered the inhabitants of that town.  
c. #Cancer murdered every patient in that hospital.  
d. #The new machine weapon murdered all the enemies.
- (6) a. John killed Tom (by accident/unintentionally).  
b. The floods killed the inhabitants of that town.  
c. Cancer killed every patient in that hospital.

<sup>1</sup>In current syntactic theories of verb meaning, it is a widespread assumption that external arguments are not arguments of the verbs themselves, but are introduced instead by silent light verbs in the syntax. This is based on the proposal by Kratzer (1996) (see also Chomsky 1995) who argues that external arguments are not part of the verb’s argument structure as they are introduced by what she calls *Voice*. More specifically, external arguments are introduced by an independent predicate in a neo-Davidsonian fashion, added by means of secondary predication in the specifier position of the Voice projection (Folli and Harley 2005: 100). In this respect, Kratzer (following Marantz 1984) points out that only objects are ‘true’ arguments since verbs only impose selectional restrictions on objects, e.g. for *kill* to have the interpretation of ‘spend time doing x’ (e.g. *kill an afternoon reading books*) it selects an object that must denote time intervals, i.e. idiomatic meanings are only triggered by internal arguments. Kratzer notes that subjects, on the other hand, are rather special since verbs do not impose selectional restrictions on them, and therefore the type of subject rarely alters the meaning of the verb (but see Nunberg et al. 1994). While this analysis is generally assumed in approaches that assume that verb meanings are created in the syntax (Marantz 1997; Pytkäinen 2008; Alexiadou et al. 2006, 2015, i.a.), it has been challenged and remains controversial (Kiparsky 1997; Krifka 1999; Horvath and Siloni 2003; Wechsler 2005).

- d. The new machine weapon killed all the enemies.

In other words, if external arguments are introduced by a separate layer, and therefore not considered arguments of the verb, how do we account for the fact that such verbs place (strong) selectional restrictions on their subjects? In sum, as Folli and Harley (2005: 103) themselves point out, positing that all external arguments are introduced solely by little *v* has some shortcomings since “it was exactly the apparent absence of such selectional effects that led Kratzer to propose a neo-Davidsonian approach to external arguments.”

In a similar vein, theories of event structure further assume that there is a ‘clean divide’ between the meanings introduced by templates and the ones by roots, i.e. that there is a clear division of labor between templates and roots. In other words, if there is an entailment of change, it is because there is the corresponding template (or functional head in syntactified event structures) introducing such meaning. This is made explicit, for instance, in the so-called Bifurcation Thesis by Embick (2009) or in the Root Hypothesis by Arad (2005) (see also Borer 2005 and Dunbar and Wellwood 2016 for similar claims), yet this division of labor between roots and templates is also assumed (though implicitly) by all theories of event structure. In short, under theories of event structure, templatic meanings (e.g. change, intentionality) are only introduced templatically, when the root is merged with the corresponding event template (e.g.  $v_{\text{BECOME}}$ ,  $v_{\text{DO}}$ ), as in (1). Roots, on the other hand, never introduce templatic meanings, they just provide real-world details about the state or action they name.

In the present paper, I follow Beavers and Koontz-Garboden (to appear) in arguing that root meanings can be more complex than previously thought as they can introduce templatic meanings related to intentionality. Hence, I argue against the division of labor between roots and templates as assumed in theories of event structure and claim that  $\sqrt{\text{MURDER}}$ -type roots (i.e.  $\sqrt{\text{MURDER}}$ ,  $\sqrt{\text{SLAUGHTER}}$ ,  $\sqrt{\text{ASSASSINATE}}$ ,  $\sqrt{\text{SLAY}}$  and  $\sqrt{\text{MASSACRE}}$ ) have the templatic meanings introduced by  $v_{\text{DO}}$  as part of their entailments.

The present paper is structured as follows. In Section 2, I provide a short summary of the analysis of roots in Beavers and Koontz-Garboden (to appear), as they propose that a well-defined class of roots can have templatic meanings as part of their entailments. In Section 3, I develop the present analysis of  $\sqrt{\text{MURDER}}$ -type roots. Section 4 concludes the present paper.

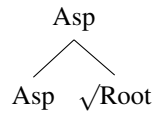
## 2 The semantics of roots

Beavers and Koontz-Garboden (to appear) (see also Beavers and Koontz-Garboden 2017; Koontz-Garboden and Beavers 2017; Beavers et al. 2017) (hereafter, BKG) convincingly show that (at least) a class of verbal roots do introduce templatic meanings such as change. More specifically, BKG show that entailments of change are introduced by the roots of Levin’s (1993) *crack*, *cook* and *kill* verb classes (what BKG call result roots), contrasting with deadjectival verb classes (e.g. *cool*, *flatten*, *brighten*), which do not introduce entailments of change on their own (see Levin 1993 for further details regarding such classifications). Recall that under theories of event structure, and more specifically, under the Bifurcation Thesis, all roots of change-of-state verbs are stative and only acquire an entailment of change when they are merged with the corresponding event template. Thus, BKG note that this predicts that in structures where the template responsible for introducing the entailment of change is absent, all roots of change-of-state verbs should lack entailments of change, since such an entailment is introduced templatically, and not by the root. BKG show that while this is the case for deadjectival change-of-state verbs, it is not borne out, however, for result roots, since even in structures void of event templates introducing entailments of change, result roots cannot be ‘disembodied’ from such meanings. BKG show this by considering the analysis of change-of-state verbs and adjectives as presented in Embick (2004).<sup>2</sup> The first structure is the one given below which creates what BKG call ‘basic states’ (7), i.e. it creates adjectives by merging the stative root

<sup>2</sup>BKG note that they make use of Embick’s analysis for clarity and expository purposes; other analysis might differ in specific details, though Embick’s proposal is the most widespread and assumed, especially in theories assuming that verbs are created in the syntax.

with adjectiving morphology (called Asp in Embick's theory). Crucially, though, this structure does not introduce any templatic meaning related to change, as this can be explicitly denied (8).

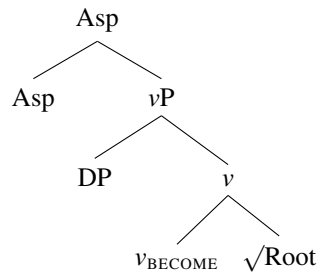
- (7) Basic states (e.g. *The red vase*) (Embick 2004: 363)



- (8) a. The red vase has never been reddened.  
 b. The bright picture has never been brightened.  
 c. The cool soup has never been cooled.

As BKG note, basic states contrast with result states whose event structure does include the functional head introducing entailments of change (9), and therefore explicitly denying that a prior change has occurred results in a contradiction (10).<sup>3</sup>

- (9) Result states (e.g. *The reddened vase*) (Embick 2004: 367)



- (10) a. #The reddened vase has never been reddened.  
 b. #The brightened picture has never been brightened.  
 c. #The cooled soup has never been cooled.

Recall that the Bifurcation Thesis (but also event structure theories assuming a split between the meanings introduced by templates and roots) predicts that all roots of change-of-state verbs should lack entailments of change when they are used in structures void of event templates introducing such meanings, e.g. in basic states as in (7). BKG observe that the Bifurcation Thesis correctly predicts that roots such as  $\sqrt{\text{RED}}$  will not entail prior change in basic state structures (7), but only in result state ones (8), since such roots only name a state and therefore the entailment of change, e.g. *becoming red*, must be introduced by the event template. However, as BKG also observe, result roots do not seem to appear in basic state structures since adjectives derived from result roots always introduce entailments of change. In other words, while roots such as  $\sqrt{\text{RED}}$  appear in both basic and result state structures, roots such as  $\sqrt{\text{BREAK}}$  do not appear in basic state structures, i.e. in structures where prior change is not entailed, as shown in (11).

- (11) a. #The broken vase has never been broken.  
 b. #The murdered man has never been murdered.  
 c. #The dead man never died.  
 d. #The shattered vase has never been shattered.

BKG (p. 65) suggest that adjectives derived from result roots should be found in contexts where prior change is not entailed since “in any particular context the adjective could be realizing [7], which lacks  $v_{\text{BECOME}}$ , and therefore any entailment of change.” In other words, result roots should be able to appear in basic state structures, i.e. in contexts void of entailments of change, as such roots

<sup>3</sup>As BKG note, Embick calls such functional head FIENT, though for clarity reasons, BKG label it  $v_{\text{BECOME}}$ . I also call it  $v_{\text{BECOME}}$  since this is the most assumed and widespread label when referring to the functional head responsible for introducing the entailment of change, especially in syntactified event structures.

are considered to be stative in theories of event structure. This, however, is not borne out: result roots, no matter the context, always introduce entailments of change, and therefore BKG conclude that such meaning must come from the root.<sup>4</sup>

### 3 Agent entailments within the semantics of roots

Just as result roots have as part of their entailments the meanings introduced by  $v_{\text{BECOME}}$ , i.e. entailments of change, in this section I argue that  $\sqrt{\text{MURDER}}$ -type roots have as part of their entailments an additional templatic meaning in contrast to result roots, i.e. they have the meanings introduced by  $v_{\text{DO}}$  as part of their entailments, namely intentionality associated with the external argument.<sup>5</sup> Drawing on BKG, I propose the following denotation for  $\sqrt{\text{MURDER}}$ -type roots:

$$(12) \quad \llbracket \sqrt{\text{MURDER-type}} \rrbracket = \lambda x \lambda s [ \text{dead}'(x, s) \wedge \exists e' \exists v [ \text{cause}'(v, e') \wedge \text{become}'(e', s) \wedge \forall v' [ \text{cause}'(v', e') \rightarrow \text{intentional}'(v') ] ] ]$$

Such a denotation predicates a result *dead* of an argument, but it specifies that it must have a cause, and that it must be of a certain type, of an intentional-type action (i.e. performing an action intentionally with the intention to bring about the result state *dead*). The denotation for  $\sqrt{\text{MURDER}}$ -type roots differs from the denotation for  $\sqrt{\text{KILL}}$ -type roots, as in (13), which also predicates the result state *dead* of a unique argument but crucially it does not require that it be brought about by any specific cause.

$$(13) \quad \llbracket \sqrt{\text{KILL-type}} \rrbracket = \lambda x \lambda s [ \text{dead}'(x, s) \wedge \exists e' \exists v [ \text{cause}'(v, e') \wedge \text{become}'(e', s) ] ]$$

In what follows, I provide evidence regarding the fact that  $\sqrt{\text{MURDER}}$ -type roots, in contrast to  $\sqrt{\text{KILL}}$ -type roots, come with entailments of intentionality, and therefore that the different semantic denotations for such classes of roots seem to be correct. The first piece of evidence comes from the fact that, just as result roots cannot be ‘disembodied’ from entailments of change,  $\sqrt{\text{MURDER}}$ -type roots cannot be disembodied from the meanings introduced by  $v_{\text{DO}}$ .

- (14) a. #The murdered man wasn’t killed intentionally/was killed by accident.  
 b. #The assassinated president wasn’t killed intentionally/was killed by accident.  
 c. #The slaughtered civilians weren’t killed intentionally/were killed by accident.  
 d. #The massacred civilians weren’t killed intentionally/were killed by accident.  
 e. #The slain dragon wasn’t killed intentionally/was killed by accident.

In this respect, I note that adjectives derived from such roots are instantiated in structures void of functional heads introducing meanings related to intentionality (recall (7) and (8)), thus suggesting that such meanings must come from the root itself. (Zero) derived nominals from  $\sqrt{\text{MURDER}}$ -type roots further support this claim.

- (15) a. #The murder of that man’s family was an accident/was not intentional.  
 b. #The assassination of the former president was an accident/was not intentional.  
 c. #The slaughter of the population was an accident/was not intentional.

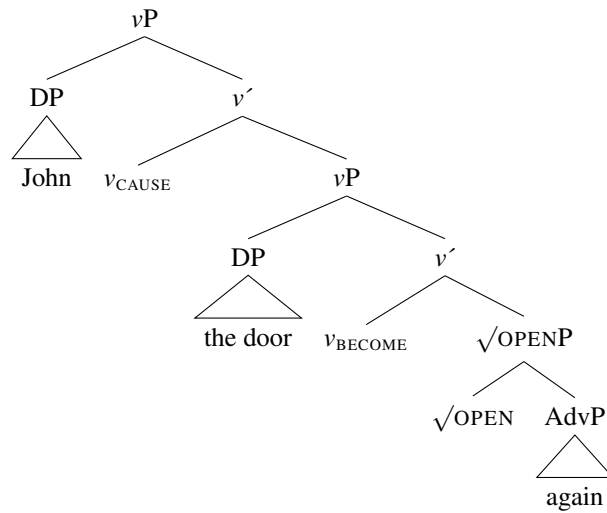
<sup>4</sup>BKG further show that result roots and deadjectival verbs differ in the readings that sublexical modification with *again* and *re-* give (see von Stechow 1995, 1996; Beck and Snyder 2001; Beck and Johnson 2004; Beck 2006; Marantz 2007, 2009, i.a.). More specifically, BKG note that while deadjectival verbs are ambiguous between so-called repetitive and restitutive readings, result roots do not show restitutive readings, but only repetitive readings. BKG note that this provides further evidence in favor of their claim, namely that result roots have entailments of change as part of their meaning: as the root introduces entailments of change, sublexical modification with *again* will necessarily scope over such meaning also on its lowest structural attachment site (i.e. when it modifies directly the root) thus disallowing restitutive readings.

<sup>5</sup>I follow BKG in assuming that  $\sqrt{\text{MURDER}}$ -type roots also introduce entailments of change, i.e. they are result roots under BKG’s classification. Since the goal of the paper is to show that such roots come with an additional templatic meaning, I do not show here that  $\sqrt{\text{MURDER}}$ -type roots also introduce entailments of change, but see BKG.

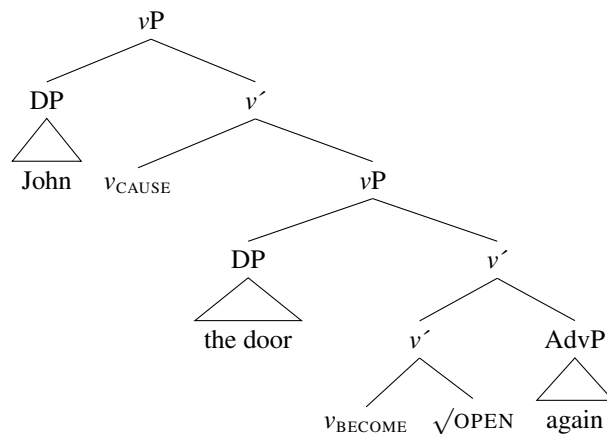
- d. #The massacre of the boys in that town was an accident/was not intentional.

Crucial evidence, however, comes from sublexical modification. At least since Dowty (1979), it is a well-known phenomenon that there exists a class of modifiers that can modify subparts of the event structure. For instance, the modifier *again* introduces a presupposition that the event it modifies has occurred before, thus allowing different interpretations depending on the structural height of its attachment site (see von Stechow 1995, 1996, 2003; Beck and Johnson 2004; Beck 2006; Marantz 2007, 2009). Thus, sentences like *John opened the door again* have (at least) three readings, namely the restitutive reading that John is restoring the door to a state of being open that it had before (16a) and (at least) two repetitive readings, that John is causing the door to undergo an opening event that the door had undergone in a previous stage (16b) and the repeating of the same event in which John was also the causer (16c). Compare this in (16) (adapted from BKG p. 17):

- (16) a. John opened the door again, and it had been open before. (Restitutive)



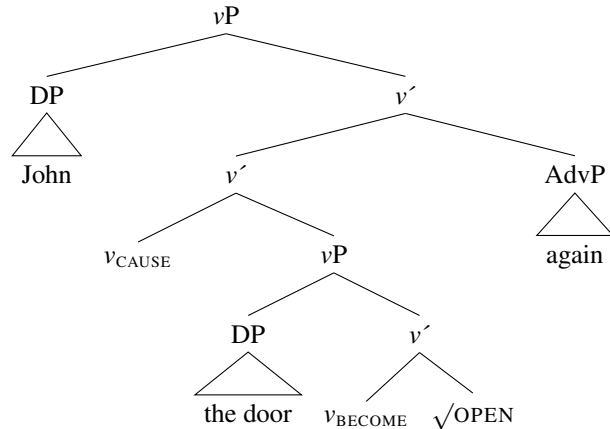
- b. John opened the door again, and it had opened before. (Repetitive #1)





c. John opened the door again, and he had opened it before.

(Repetitive #2)



It is important to note that when *again* is placed on the lowest structural site, i.e. (16a), it only has the meaning of the root in its scope, i.e. the truth conditions related to the state that the root names. Thus, if entailments of intentionality are introduced by the functional head  $v_{DO}$ , and not by roots, in sentences such as *John murdered the monster again* we should expect a presupposition where the intentionality associated with the external argument is not entailed on the lowest structural site. I note that while this is the case for  $\sqrt{KILL}$ -type roots, as they do not introduce entailments of intentionality, this is not borne out for  $\sqrt{MURDER}$ -type roots, as they always introduce entailments of intentionality regardless the structural height of *again*'s attachment site. This is predicted under the present account since  $\sqrt{MURDER}$ -type roots come with the meanings introduced by  $v_{DO}$ , whereas  $\sqrt{KILL}$ -type roots do not. Compare the different repetitive presuppositions in (17) and (18) for  $\sqrt{MURDER}$ -type and  $\sqrt{KILL}$ -type roots.

- (17) a. He murdered/assassinated the monster king again.  
**MEANS** He caused the monster king to become dead by intentionally killing it again.  
**CANNOT MEAN** He caused the monster king to become dead again by intentionally killing it but the last time it was killed by accident/unintentionally.
- b. He slaughtered/massacred the monsters again.  
**MEANS** He caused the monsters to become dead by intentionally killing them again.  
**CANNOT MEAN** He caused the monsters to become dead again by intentionally killing them but the last time they were killed by accident/unintentionally.
- c. He slew the dragon again.  
**MEANS** He caused the dragon to become dead by intentionally killing it again.  
**CANNOT MEAN** He caused the dragon to become dead again by intentionally killing it but the last time it was killed by accident/unintentionally.
- (18) He killed the monsters again.  
**CAN MEAN** He caused the monsters to become dead by intentionally killing them again.  
**CAN ALSO MEAN** He caused the monsters to become dead again by intentionally killing them but the last time they were killed by accident/unintentionally.

In sum, approaches that assume that entailments related to change or intentionality are introduced templatically, and not by roots, make some interesting predictions about the architecture of event structure. We have seen, however, that some predictions turn out to be contrary to fact in some cases, as in the present case for  $\sqrt{MURDER}$ -type roots. Such approaches would predict that for  $\sqrt{MURDER}$ -type roots a presupposed previous event that excludes intentionality should be possible, yet this is not the case. In other words, if the semantics of the functional head  $v_{DO}$  are severed from  $\sqrt{MURDER}$ -type roots, it is rather mysterious why the reading in (17) in which the intentionality associated with the external argument is not included in *again*'s presuppositions is not possible. If we assume, other other hand, that specific classes of roots have more complex entailments than pre-

viously thought and can introduce templatic meanings, the mysterious data such as the one in (17) can be then accounted for.

## 4 Conclusion

In the present paper, I have argued that  $\sqrt{\text{MURDER}}$ -type roots have as part of their entailments the meanings that in syntactified event structure theories are introduced in the syntax by projections such as  $v_{\text{DO}}$ , contra the Bifurcation Thesis and event structure theories that assume a division of labor between the meanings that event templates and roots introduce. Building the semantics of  $v_{\text{DO}}$  into  $\sqrt{\text{MURDER}}$ -type roots accounts for a wide range of phenomena that theories assuming a split between the meanings that templates and roots introduce leave unaccounted for. More specifically, the present analysis accounts for the fact that such a class of roots cannot be ‘disembodied’ from the meanings introduced by  $v_{\text{DO}}$  as well as the different repetitive presuppositions with *again*.

Sublexical modification has thus been crucial in showing that theories that assume that entailments of change or intentionality are only introduced templatically make false predictions about the architecture of event structure. Consequently, this suggests that specific classes of roots have more complex entailments than previously thought, since some roots can introduce templatic meanings.

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