Resultatives and the architecture of event structure*

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1 Introduction

- It is widely argued that more than **one result state cannot be predicated** in a single clause (Goldberg 1991, 1995; Tenny 1987, 1994; Levin and Rappaport Hovav 1995; Rappaport Hovav 2008, 2014).

- This is supported by the fact that **(i) two distinct result states** in a single clause are not possible.

(1) a. *Sam kicked Bill **black and blue** out of the room. (Goldberg 1991: 368)
b. *He wiped the table **dry** clean. (Goldberg 1991: 370)
c. *Sam tickled Chris **off her chair** silly. (Goldberg 1991: 368)

- **(ii) result verbs** (i.e. verbs encoding change of state/location, see Rappaport Hovav and Levin 2010) do not permit **result phrases** that introduce distinct result states.

(2) a. *She **carried** John giddy. (Simpson 1983: 147)
b. *Bill **broke** the vase worthless. (Jackendoff 1990: 240)
c. *The vase **fell** broken. (Rappaport Hovav 2014: 23)

- Crucially, **result verbs permit result phrases** but only if they **further specify** the result the verb encodes. Thus, in this case, there is only one 'actual' result state.

- This is what Rappaport Hovav and Levin (1998, 2010), following Tortora (1998), argue in favor of: **result verbs**, in contrast to **manner verbs**, only permit result phrases that further specify the result state by the verb.

(3) a. John **broke** the vase into pieces.
b. John **froze** the soup solid.
c. John **arrived** in Barcelona.

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- Regarding (1) and (2), Tenny (1987: 190) claims that "there may be at most **one 'delimiting'** associated with a verb phrase", where an eventuality can be delimited as a result of the meaning of the verb, as in (2), or through the use of a result phrase, as in (1).

- Similarly, Goldberg (1991: 368) argues that "if an argument x refers to a physical object, then **more than one distinct path** [= result states] cannot be predicated of x within a single clause", what she calls **the Unique Path Constraint**.

- However, there are some examples that apparently **violate such a grammatical restriction** as they involve **result verbs** combined with **path PPs** denoting a distinct result state.

  (4) a. The cook **cracked** the eggs into the glass. (Levin and Rappaport Hovav 1995: 60)
  b. Daphne **shelled** the peas onto the table. (Levin and Rappaport Hovav 1995: 60)
  c. He **broke** the walnuts into the bowl. (Goldberg 1991: 376)

- In relation to such examples, it is important to note that the **UPC** does not appear to constrain the number of result states per clause, but rather the number that can be predicated of **a single entity**.

- In light of this, Levin and Rappaport Hovav (1995) suggest then that such examples are possible since the **two distinct result states** are predicated of **distinct entities**, e.g. the eggshells break, whereas the contents move.

- Drawing on this, Beavers and Koontz-Garboden (2017a) argue then that **two distinct result states are possible** if they are predicated of distinct entities.

  (5) a. The skiers **skied** the trail clean of snow.
  b. The skiers **skied** their skies to pieces.

- Similarly, in Ausensi (2019, to appearc), I explicitly argued in favor of a more nuanced view of this phenomenon and proposed the **'One Scalar Change per Entity Constraint'**, where a scalar change is understood as a result state (see Rappaport Hovav and Levin 2010).

  (6) a. *The window **broke** its way into the room. (Jackendoff 1992: 213)
  b. The snow must have frozen so hard during the night that he couldn't **break** his way out. (COCA)

  (7) a. *The butter **melted** its way off the turkey. (Goldberg 1996: 45)
  b. When the Human Torch **melted** his way through a wall on his way to dispatching a couple of gangster thugs. (GBooks)

- Yet, this also runs into problems, since, as Goldberg and Jackendoff (2004) point out, there are examples of **result verbs and path PPs** in which the two distinct result states are predicated of the same entity as in *The chocolate melted out of the box.*[1]

[1]In Ausensi (to appearc), I am aware of such an example and suggest, following Yasuhara (2013), that such an example would not constitute a counterexample to my account since the two result states, i.e. the change of state denoted by *melt* and the change of location denoted by the PP, do not actually constitute two different result states, but a single one (i.e. the change of location by the PP is a further specification of the result state encoded by the verb). Although this might explain that example, such an explanation runs into problems in light of the examples below.

1.1 One overt result predicate per clause

THIS TALK: I focus on combinations of result verbs and result phrases denoting distinct result states.

- I propose that the grammatical restriction on the number of result states that can be predicated in a single clause is a **(syntactic) restriction regarding event structure**, insofar as there can only be one overt predicate denoting a result state, either a change of state or change of location.
- In more formal terms, I propose that **little *v*** can select for a predicate denoting a change of state (e.g. an AP) or a change of location (e.g. a PP), but never both in the same event structure.
- In short, I propose that it is not a restriction regarding whether combinations of result verbs and result phrases denoting distinct result states are grammatically possible.
- Evidence comes from the fact that there are **naturally-occurring examples** of **result verbs** and **path PPs** (8)-(9), as well as **result verbs** combined with **APs** where the result state that the APs denote is distinct from the one by the verb (10)-(11).

(8) a. He told her a plane had just **smashed** into the North Tower. (GloWbE)
b. A lot of the water sprayed onto the ship had **frozen** onto the steel. (GloWbE)
c. The snow **melted** off the lower part of the Range. (COCA)

(9) a. Jackfish **cleaned** the mud out of the car. (COCA)
b. They [...] **broke** the branches off the winterdry limbs. (COCA)
c. We **blasted** the tops off mountains. (COCA)

(10) a. Sailor finishes his beer [...] steps on it, **crushing** it flat. (COCA)
b. Huebner picked a nit from behind his ear and **squished** it dead. (COCA)
c. A couple of monks **broke** the corpse loose from the deck. (COCA)

(11) a. The ceiling **split** open. (COCA)
b. Car doors **banged** shut. (COCA)
c. The dog **tore** free. (Basilico 2012: 95)

- In sum: **result verbs can combine with result phrases denoting distinct result states**, and **two result states can be predicated of the same entity**.

2 Analysis

2.1 Assumptions

- I assume that **(a)** verb meanings consist of an **event structure** that decomposes into **event templates**, defining temporal and causal structure, and **roots**, providing real-world details about the event (Rappaport Hovav and Levin 1998; Borer 2003; Ramchand 2008; Alexiadou et al. 2015, *i.a.*)
- For ease of exposition, I adopt **a neoconstructionist approach to argument/event structure** (Harley and Noyer 2000; Embick 2004; Harley 2005; Borer 2005; Ramchand 2008; Alexiadou et al. 2006, 2015), whereby **verbs are created in the syntax by merging roots and functional heads** (see Hale and Keyser, 1993, 1997, 2002; von Stechow 1996; Marantz 1997; Harley 2003; Folli and Harley 2005; Mateu and Acedo-Matellán 2012; Acedo-Matellán and Mateu 2014).

- Under such theories, it is assumed that the meanings roots and templates introduce are **mutually exclusive**. For instance, Embick (2009) argues that roots never introduce templatic meanings such as change (e.g. v_{BECOME}), what he calls the **Bifurcation Thesis for Roots** (see also Arad 2005; Borer 2005; Dunbar and Wellwood 2016).

- Following Beavers and Koontz-Garboden (2020), Ausensi (to appeara), Ausensi et al. (to appear), I assume that some classes of **roots introduce templatic meanings** such as **change** or **intentionality**, contra theories of event structure.

- For instance, what Beavers and Koontz-Garboden call **result roots** (e.g. $\sqrt{\text{BREAK}}$), in contrast to **property concept roots** (e.g. $\sqrt{\text{COOL}}$), inherently comprise as part of their entailments meanings that some theoretical approaches assume to be part of templatic meanings introduced by projections such as v_{BECOME}.[2]

(12) a. $[\![\sqrt{\text{BREAK}}]\!] = \lambda x \lambda s[\textit{broken'}(x,\ s) \wedge \exists e'[\textit{become'}(e', s)]]$
b. $[\![\sqrt{\text{COOL}}]\!] = \lambda x \lambda s[\textit{cool'}(x,\ s)]$

2.2 Implementation

- Following Mateu (2002), Embick (2004), McIntyre (2004), Harley (2005), Mateu and Acedo-Matellán (2012), Acedo-Matellán and Mateu (2014), I argue that **roots** are structurally interpreted as **manner** or **result** depending on the position they occupy in the event structure: as **modifiers/adjuncts** or **arguments** of v_{CAUSE} or v_{BECOME}.

- I depart thus from Rappaport Hovav and Levin (1998, 2010) (also Rappaport Hovav 2017; Levin 2017) and other approaches that assume that the **ontological-type classification of roots** determine root insertion in the event structure (e.g. Alexiadou et al. 2015).[3]

- I propose that the grammatical restriction on the number of result states that can be predicated in a single clause is a (syntactic) restriction regarding **(sub)event structure** in the sense that there can only be **one overt result predicate per clause**: a vP or an aP denoting a change of state, or a path PP, denoting a change of location.

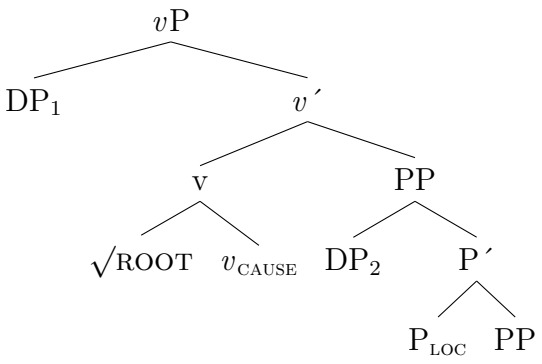
- In **transitive complex events** (McIntyre 2004; Embick 2004; Mateu 2008), where the verb encodes a result state (e.g. *John broke the eggs into the vase*), verbal roots are inserted as **modifiers** of v (as they describe the manner with which the causer brings about the result: e.g. *John got the eggs into the vase by breaking*).

- In this case, the little $\boldsymbol{v}$ head can only select for **a PP**, with P_{LOC} as its head, denoting a change of location (13) or for a $\boldsymbol{v}$**P** (14), in which a second root merges with v_{BECOME}, yielding a change of state interpretation. The two possible structures are given below, with examples for each.

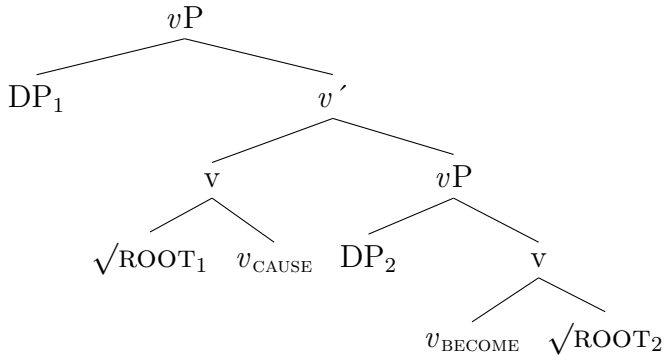
[2]The fact that some classes of verbal roots introduce templatic meanings such as change or intentionality has been shown to have grammatical consequences (at least) for morphology (Beavers et al. 2017; Koontz-Garboden and Beavers 2017; Beavers and Koontz-Garboden 2020), sublexical decomposition (Beavers and Koontz-Garboden 2020; Ausensi to appeara), argument structure (Beavers and Koontz-Garboden 2017b, 2020; Ausensi to appeara; Ausensi et al. to appear) and (in)direct causation (Ausensi to appearb).

[3]For other approaches that also propose/assume root ontologies, see Harley and Noyer (2000), Ramchand (2008), Alexiadou et al. (2006, 2015). Instead, the view that roots have an ontological-type classification relevant when determining grammatical properties is (explicitly) denied in Acquaviva (2008, 2014), Borer (2003, 2005) and Mateu and Acedo-Matellán (2012).

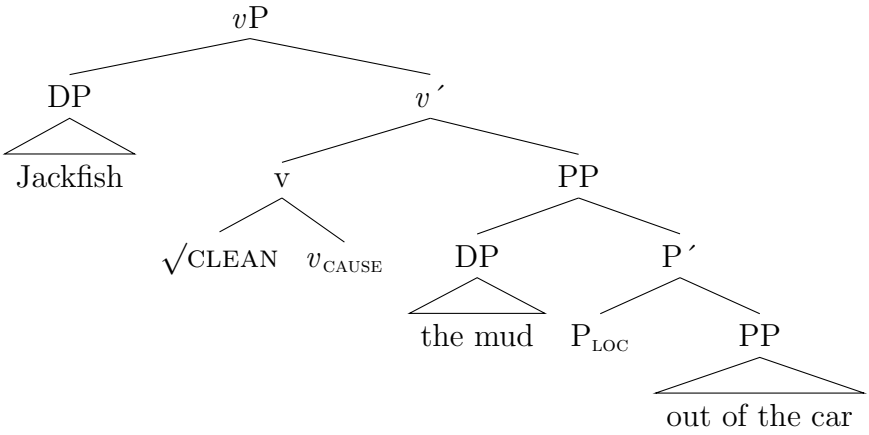
(13) DP_1 verb DP_2 path PP.



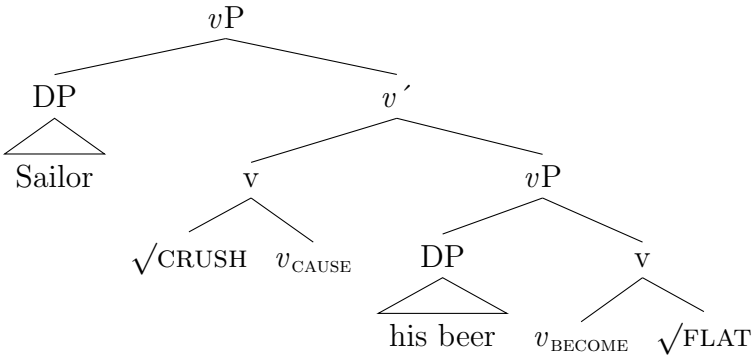
(14) DP_1 verb DP_2 AP.



(15) Jackfish **cleaned** the mud <u>out of the car</u>. (≈ get the mud out of the car by cleaning)

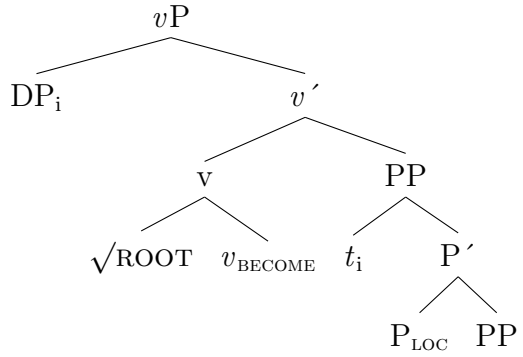


(16) Sailor **crushed** his beer <u>flat</u>. (≈ cause the beer to become flat by crushing)

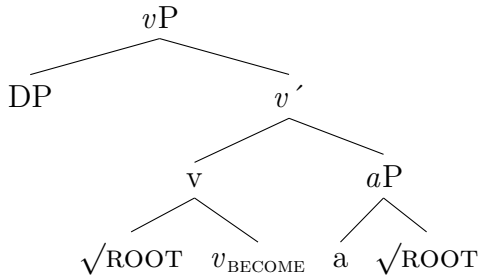


- In **intransitive complex events of change of state**, where the verb also encodes a result state (e.g. *The plane smashed into the tower*), verbal roots are inserted as modifiers of $\boldsymbol{v}_{\textbf{BECOME}}$ (as they describe the manner with which a theme achieves the result: e.g. *The plane got into the tower <u>by smashing</u>*).
- In this case, the little $\boldsymbol{v}$ head can only select for **a PP** (17), as in transitive complex events, or for an $\boldsymbol{a}$**P**, which contains **a second root** that merges with a, yielding a change of state (18). The two possible structures are given below, with examples for each.

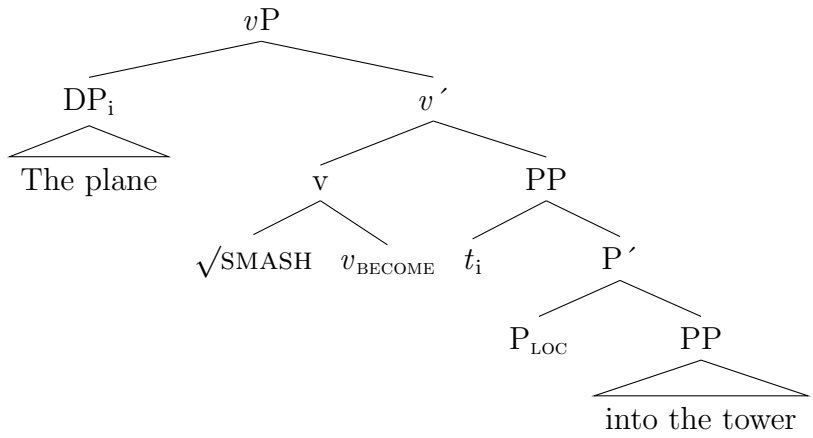
(17) DP verb path PP.



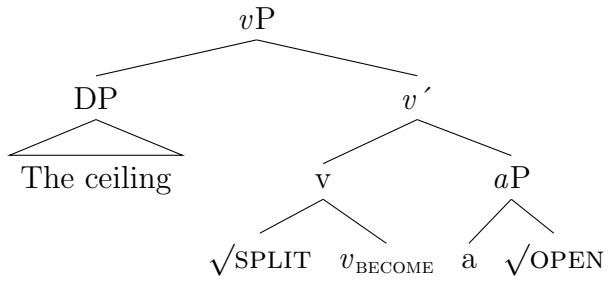
(18) DP verb AP.



(19) The plane **smashed** <u>into the tower</u>. (≈ get into the tower by smashing)



(20) The ceiling **split** <u>open</u>. (≈ become open by splitting)



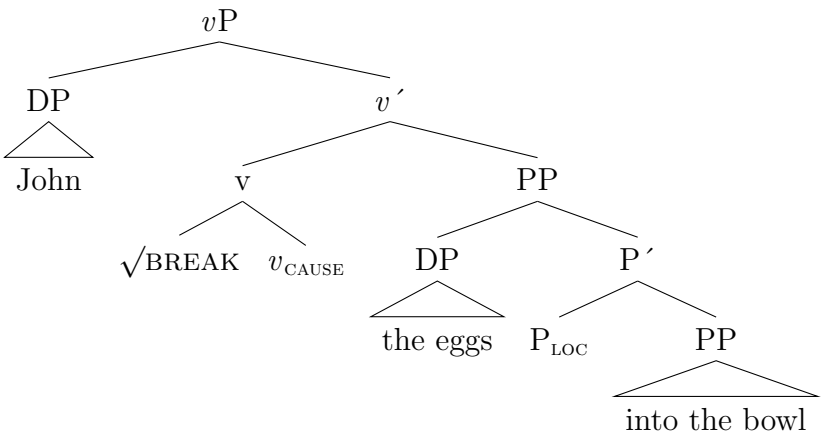
- Thus, in these cases, the verbal roots attach as **modifiers of v_{BECOME}** as they describe the manner with which the **result** (expressed by the PPs/APs) is achieved.
- The ungrammaticality of the **simplex events** in (1), repeated below as (21), is naturally accounted for in the present account since there are **two overt realizations of the same predicate**, i.e. there are two overt result predicates (a PP and an AP, or two PPs or two APs).

(21) a. *Sam kicked Bill **black and blue** <u>out of the room</u>. (Goldberg 1991: 368)
b. *He wiped the table **dry** <u>clean</u>. (Goldberg 1991: 370)
c. *Sam tickled Chris **off her chair** <u>silly</u>. (Goldberg 1991: 368)

- The apparent counterexamples in (4), repeated below as (22), are also naturally accounted for in the present analysis, as the verbal root is inserted as a modifier of v_{CAUSE}, whereas it is the PP that denotes the actual result (i.e. *get the eggs into the vase by breaking*).

(22) a. The cook **cracked** the eggs into the glass. (Levin and Rappaport Hovav 1995: 60)
b. Daphne **shelled** the peas onto the table. (Levin and Rappaport Hovav 1995: 60)
c. He **broke** the walnuts into the bowl. (Goldberg 1991: 376)

(23) John **broke** the eggs into the bowl. (≈ get the eggs into the bowl by breaking)



- The present accounts makes a number of **welcome predictions**:

1 (In)transitive complex events of change of state (where the verb encodes a result state) can only combine with **path PPs or APs**, but never both.

(24) a. *John **broke** the eggs into the bowl open.
b. He **broke** the eggs into the bowl.
c. He **broke** the eggs open.

(25) a. ??The eggs **broke** open into the bowl.
b. They **broke** into the bowl.
c. They **broke** open.

(26) a. ??The chocolate **melted** out of the box into the cup.
b. It **melted** into the cup.
c. It **melted** out of the box.

2 Simplex events (where the verb encodes a manner of action; *hammer the metal flat*) can only combine with **path PPs or APs**, but never both.

(27) a. *Tam **laughed** himself silly faint.
b. He **laughed** himself silly.
c. He **laughed** himself faint.

(28) a. ??John **sneezed** the napkin off the table into a case.
b. He **sneezed** it off the table.
c. He **sneezed** it into a case.

(29) a. ??Sam **hammered** the metal flat into the ground.
b. She **hammered** it flat.
c. She **hammered** it into the ground.

3 Conclusion and open questions

- In this talk, I have argued that there can be **two result states per clause**. In addition, **two result states can be predicated of the same entity**.
- I have proposed that there is **a restriction on the architecture of (sub)event structure** insofar as there can only be **one overt result predicate per clause**.
- **Result verbs** can appear with result phrases that denote distinct result states but in this case the roots of result verbs are inserted as **modifiers of little *v***, and the result phrase denotes the actual result.
- In a similar vein, the examples in (8)-(11) suppose a problem for **ontological-type classifications of roots**, such as the one in Rappaport Hovav and Levin (2010), as well as the one in Alexiadou et al. (2015).
- This is because Rappaport Hovav and Levin argue that there are **two general root ontologies**, i.e. manner and result. **Manner roots** are always inserted as **modifiers** of the ACT predicate, as they are claimed to encode a (manner of) action, whereas **result roots** are always inserted as **arguments** of the BECOME predicate, as they encode a (result) state.
- Such approaches fail to capture the fact that **the same root** can appear in **different syntactic configurations**, i.e. as an adjunct/modifier and as an argument (further see Mateu and Acedo-Matellán 2012; Acedo-Matellán and Mateu 2014).

OPEN QUESTIONS FOR FUTURE RESEARCH

- The present account predicts that examples such as *I broke the mirror into the garbage pail* should be possible. Yet, Levin and Rappaport Hovav (1995) note that they are not.
- I suggest that such an ungrammaticality is only **apparent and conceptual in nature** as it is not possible to establish **a causal relation** that links the action by the verb and the result by the PPs. As a reviewer points out, such examples are in fact possible if **a clear causal relation** is established, e.g. that breaking the mirror is the intended means in order to get it into the pail (because it is too big).
- Similarly, some **roots** of certain result verbs appear to **disallow manner incorporation**. In other words, they are not found as adjuncts/modifiers of little *v*, and therefore disallow result phrases that introduce distinct result states.

(30) a. *John opened/darkened/blackened + DP + Result XP (Embick 2009: 7)
b. *I thinned the soup tasteless. (Rappaport Hovav 2014: 276)
c. *We dimmed the room empty. (Rappaport Hovav 2008: 23)

- I speculate that **the semantics of the roots** must be **compatible with the syntactic configuration** (what Beavers and Koontz-Garboden 2020 call **root-determined argument realization**, i.e. "roots determine which templates they may occur in owing to the roots' semantics").

- In this vein, drawing on Embick (2009), I propose there are **two classes of result verbs**: those from roots such as $\sqrt{\text{BREAK}}$ which can be inserted as either arguments and event modifiers, and those from roots such as $\sqrt{\text{COOL}}$ where coercion into event modifiers is not possible (they are always arguments).

- Recall that Beavers and Koontz-Garboden (2020) call the former **result roots** and the latter **property concept roots**: only result roots introduce entailments of change as they require that the state they denote be the result of a change.

(31) a. $[\![\sqrt{\text{BREAK}}]\!] = \lambda x \lambda s[\mathit{broken'}(x,\ s) \wedge \exists e'[\mathit{become'}(e', s)]]$
b. $[\![\sqrt{\text{COOL}}]\!] = \lambda x \lambda s[\mathit{cool'}(x,\ s)]$

- **Result roots** (e.g. $\sqrt{\text{BREAK}}$) are thus predicates of states with eventive properties, as they require that the state they denote be the result of a change. This class of roots are prime candidates for being arguments, as they are **predicates of states**, but can also be merged as adjuncts/modifiers of little v due to their **eventive properties** (= predicates of states with eventive properties).

- **Property concept roots** (e.g. $\sqrt{\text{OPEN}}$) do not introduce templatic meanings and are therefore prime candidates for being **complements** of v as they denote simple states.

- **Manner roots** (e.g. $\sqrt{\text{POUND}}$) are **predicates of events**: they denote actions, and are therefore prime candidates for being event modifiers. In other words, as they denote actions, they frequently appear as modifying a causing subevent (e.g. *hammer the metal flat*) and rarely as arguments.

(32) $[\![\sqrt{\text{POUND}}]\!] = \lambda x \lambda e[\mathit{pound'}(x,\ e)]$

- **Result roots** can thus be event modifiers, contra Rappaport Hovav and Levin (2010)/Alexiadou et al. (2015), but their frequency as modifiers is lower than roots that are predicates of events. I take them to be cases of coercion: the **eventive properties of result roots** allow them to be coerced into event modifiers.

- I suggest that **property concept roots** are barred from being event modifiers as they denote **pure (simple) states**, and therefore coercion into event modifier is not possible (the root is (completely) stative with no eventive properties).[4]

- BKG suggest that result roots always seem to be inserted as complements. Here, I have provided evidence that shows that result roots can also be inserted as modifiers of an event.

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[4] I am grateful to an anonymous reviewer for pointing out this difference in the two types of roots and its importance for the current work.

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