Resultatives and the architecture of event structure

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1. Introduction

The term *resultatives*, or more specifically what Halliday (1967) first called "resultative attributes", refer to those constructions in which a result state is generally brought about by the action denoted by the verb (see Green 1972; Dowty 1979; Randall 1983; Simpson 1983; Hoekstra 1988; Nedjalkov 1988; Carrier & Randall 1992; Levin & Rappaport Hovav 1995; Washio 1997; Wunderlich 1997; Rappaport Hovav & Levin 2001; Broccias 2004; Embick 2004; Goldberg & Jackendoff 2004; Kratzer 2005; Wechsler 2005; Mateu 2012, i.a.). The result state is typically expressed by adjective (1-a) or prepositional phrases (1-b), but also by adverbs (1-c) and noun phrases (1-d). In resultative constructions, thus, the verb and the result phrase combine and form a complex predicate that can be (roughly) paraphrased as *x causes y to become z by doing w*, e.g. (1-a) can be paraphrased as John caused the table to become clean by wiping.

- (1) a. John wiped the table clean.
 - b. The toddler broke the vase into pieces.
 - c. I broke a piece off.
 - d. I painted the car a pale shade of yellow. (Simpson 1983: 142)

An important restriction regarding resultative constructions relates to the claim that there can only be one result state predicated in a single clause (Goldberg 1991, 1995; Tenny 1987, 1994; Levin & Rappaport Hovav 1995; Tortora 1998; Rappaport Hovav 2008, 2014). This restriction is apparently supported by the fact that two distinct result states in a single clause are not possible, e.g. *John wiped the table clean dry (cf. John wiped the table clean/dry). In this respect, 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 (e.g. John died in 3 minutes/#for 3 minutes), or through the use of a result phrase (e.g. John wiped the table clean in 3 minutes/#for 3 minutes). In a similar vein, Goldberg (1991: 368) argues that "if an argument x refers to a physical object, then more than one distinct path [= a result state, JA] cannot be predicated of x within a single clause." Although this restriction has been formulated in different ways by different authors, e.g., the Single Delimiting Constraint by Tenny (1994), the Unique Path Constraint by Goldberg (1991), the Further Specification Constraint by Tortora (1998) or the Single Development Constraint by Matsumoto (2006), they all boil down to restricting the number of distinct result states that can be predicated of an entity in a single clause.

In the present paper, I provide naturally-occurring data that challenge such a widely-accepted restriction on resultative constructions. More specifically, I focus on so-called result verbs, i.e. verbs encoding changes of state and location (e.g. *break*, *smash*, *freeze* etc., see Rappaport Hovav & Levin 2010), and the types of result phrases they combine with. Contra Rappaport Hovav & Levin (2010), I

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show that result verbs can combine with result phrases denoting distinct result states than the one encoded by the result verb. Consequently, this shows that semantically two result states can be predicated of the same entity in a single clause—the result state encoded by the verb and the one denoted by the result phrase—contra Tenny (1987), Goldberg (1991), Levin & Rappaport Hovav (1995), among others. 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, i.e. structurally there can only be one overt predicate denoting a result state (either a change of state or location) in a single clause. In more formal terms, adopting a neoconstructionist approach to argument/event structure, I propose that little ν can select for a predicate denoting a change of state (e.g. an Adjective Phrase (AP)) or a change of location (e.g. a Prepositional Phrase (PP)), but never both in the same event structure.

The present paper is structured as follows. In Section 2, I provide a brief overview of the widely-accepted restriction regarding the number of result states in resultative constructions. In Section 3, I lay out the analysis of the data under discussion and I show that the current proposal makes some welcome predictions as well as accounting for some challenging data for previous approaches. Section 4 concludes the present paper.

2. The Unique Path Constraint

The Unique Path Constraint (hereafter, UPC) by Goldberg (1991), as defined in (2), is possibly the most well-known constraint when it comes to the alleged (grammatical) restriction regarding the number of result states that can be predicated in a single clause.

(2) Unique Path Constraint: if an argument X refers to a physical object, then more than one distinct path [= result state, JA] cannot be predicated of X within a single clause. (Goldberg 1991: 368)

Such a grammatical restriction can be illustrated by the following examples, argued to be ungrammatical on the basis of the UPC, i.e. due to the fact that there are two result phrases denoting distinct result states—a change of state (e.g. *black and blue* (3-a)) and a change of location (e.g. *out of the room* (3-a)) being predicated in the same clause.

- (3) 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)

Concomitantly, verbs that encode a change of state or location, i.e. so-called result verbs (see Rappaport Hovav & Levin 2010), are argued to disallow result phrases that introduce distinct result states than the one encoded by the verb (see also Rappaport Hovav 2008, 2014). For instance, the following examples are claimed to be ungrammatical since the verbs encode either a change of location (e.g. *fall*) or a change of state (e.g. *break*), whereas the result phrases denote a distinct result state than the one encoded by the verb. Thus, the examples in (4) are also ruled out on the basis of the UPC, insofar as the result verb and the result phrase denote two distinct result states predicated of the same entity.¹

- (4) 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)

However, there are some examples that apparently violate such a grammatical restriction as they involve combinations of result verbs and PPs denoting a distinct result state, i.e. a change of location, as illustrated in (5).

¹ It has been argued that result verbs do permit result phrases but only if the result phrase further specifies the result state encoded by the verb, as in *John froze the soup solid* or *John arrived in Barcelona*. In this case, there is only one 'actual' result state and the restriction on the number of result states is not violated (see Tortora 1998; Rappaport Hovav & Levin 2010). Such combinations of result verbs and result phrases will not be taken into consideration in the present paper insofar as the result phrases do not constitute a distinct result state and therefore do not violate the UPC.

- (5) a. The cook cracked the eggs into the glass. (Levin & Rappaport Hovav 1995: 60)
 - b. Daphne shelled the peas onto the table. (Levin & 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 of result states that can be predicated of a single entity. As a matter of fact, Levin & Rappaport Hovav (1995) themselves suggest that such examples are possible since the two distinct result states are predicated of distinct entities, e.g. in (5-a) the eggshells break, whereas the contents move, which suggests that "the restriction [= one result state per clause, JA] may be that only one change per entity may be expressed in a single clause." (Levin & Rappaport Hovav 1990: 60). Drawing on Levin & Rappaport Hovav's observation, Beavers & Koontz-Garboden (2017) argue that two distinct result states are possible if they are predicated of distinct entities, as in *The skiers* skied the trail clean of snow, where the entity denoted by the subject (i.e. The skiers) undergo the change of location encoded by the verb, whereas the entities denoted by the object (i.e. the trail) undergo the change of state denoted by the result phrase. Similarly, in Ausensi (to appearb) (see also Ausensi 2019), I explicitly argued in favor of a more nuanced view of this alleged restriction and proposed what I called the 'One Scalar Change per Entity Constraint'—where a scalar change is understood as a result state (see Rappaport Hovav & Levin 2010)—namely two scalar changes can be predicated in the same clause as long as they are predicated of distinct entities. However, this more nuanced view also runs into problems, since, as Goldberg & Jackendoff (2004) point out, there appear to be examples of result verbs and PPs where the two distinct result states (i.e. a change of state encoded by the verb and a change of location denoted by the PP) are predicated of the same entity, e.g. The chocolate melted out of the box.²

In the present paper, drawing on Goldberg & Jackendoff (2004), I provide naturally-occurring examples of result verbs and path PPs (i.e. PPs denoting changes of location) (6)-(7), as well as result verbs combined with APs (8)-(9) in which the result state that the PPs and APs denote is distinct from the one by the verb.³

- (6) 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)
- (7) a. Jackfish cleaned the mud out of the car. (COCA)
 - b. They [...] broke the branches off the winterdry limbs. (COCA)
- (8) 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.⁴ (COCA)
- (9) a. The ceiling split open. (COCA)
 - b. The dog tore free. (Basilico 2012: 95)

Drawing on such data, I note that semantically there can be more than one distinct result state in a single clause, as well as more than one result state predicated of the same entity, contra Goldberg (1991), Levin & Rappaport Hovav (1995), Beavers & Koontz-Garboden (2017), Ausensi (2019, to appearb), among others. Concomitantly, I show that result verbs can indeed combine with result phrases denoting a distinct result state than the one encoded by the verb, contra Rappaport Hovav (2008, 2014) and Rappaport Hovav & Levin (2010).

² In Ausensi (to appearb), I am aware of such an example and suggest, following Yasuhara (2013), that such an example would not constitute a counterexample to the One Scalar Change per Entity Constraint 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 in (6)-(9).

³ The examples in this paper are extracted from *Google Books* (GBooks), *Corpus of Contemporary American English* (COCA) and *Corpus of Web-Based Global English* (GloWbE).

⁴ I am grateful to Josep M. Fontana for providing these data to me and for their relevance for the present work.

3. Deconstructing resultatives

Before laying out the analysis of the data under discussion, it is necessary to provide a brief overview of the theory of argument/event structure entertained in the present paper. In this respect, I assume that verb meanings consist of an event structure that decomposes into so-called event templates, defining temporal and causal structure, and roots, providing real-world details about the event (see Rappaport Hovav & Levin 1998; Borer 2003; Ramchand 2008; Alexiadou et al. 2015, *i.a.*). More specifically, I adopt a neoconstructionist approach to argument/event structure (in the spirit of Harley & Noyer 2000; Embick 2004; Harley 2005; Alexiadou et al. 2015), whereby verbs are created in the syntax by merging roots and functional heads (further see Hale & Keyser, 1993, 1997, 2002; Marantz 1997; Folli & Harley 2005; Mateu & Acedo-Matellán 2012). In addition, following Mateu (2002), Embick (2004), McIntyre (2004), Harley (2005), Mateu & Acedo-Matellán (2012), Acedo-Matellán & Mateu (2014), I assume that roots are structurally interpreted as manner or result depending on the position they occupy in the event structure, i.e. roots are interpreted as manner when merged as modifiers/adjuncts and as result when merged as complements of *v*.

It is important to note that under such neoconstructionist approaches to argument/event structure, the meanings roots and templates introduce are assumed to be mutually exclusive. In this respect, Embick (2009) (see also Arad 2005; Borer 2005; Mateu & Acedo-Matellán 2012; Dunbar & Wellwood 2016) argues that roots never introduce templatic meanings such as change, insofar such meanings are introduced by functional heads (e.g. ν_{BECOME}) in the syntax. Embick (2009) calls such a division of labor between roots and event templates the Bifurcation Thesis of Roots. In the present paper, following Beavers & Koontz-Garboden (2020), Ausensi (to appeara), Ausensi et al. (2020), I assume that some classes of roots introduce templatic meanings such as change or intentionality, contra neoconstructionist theories of event structure. More specifically, what Beavers and Koontz-Garboden (2020) call result roots (e.g. $\sqrt{\text{BREAK}}$), in contrast to what they call property concept roots (e.g. $\sqrt{\text{COOL}}$), inherently comprise as part of their entailments meanings that neoconstructionist approaches assume to be part of templatic meanings introduced by projections such as ν_{BECOME} in the syntax. The different semantic denotations for these two classes of roots are given below (from Beavers & Koontz-Garboden 2020).

(10) a.
$$\llbracket \sqrt{\text{BREAK}} \rrbracket = \lambda x \lambda s [broken'(x, s) \land \exists e'[become'(e', s)]]$$

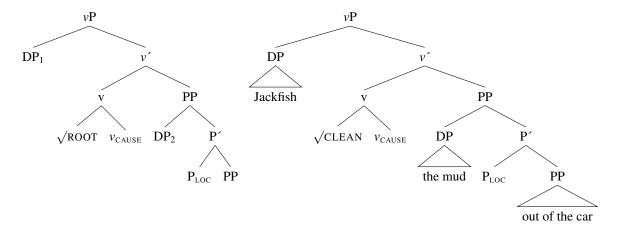
b. $\llbracket \sqrt{\text{COOL}} \rrbracket = \lambda x \lambda s [cool'(x, s)]$

Having laid out the theory of argument/event structure entertained, 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, namely a vP or an aP denoting a change of state, or a path PP, denoting a change of location. This is due to the fact that little v selects for one complement, i.e. either a predicate denoting a change of state (e.g. an AP) or a change of location (e.g. a path PP). As I note in Section 3.1, the current proposal makes some welcome predictions, and it accounts for some challenging data for previous approaches. I start first by analyzing the transitive instances of the data under discussion, as previously illustrated by (7)-(8); additional examples are provided next.

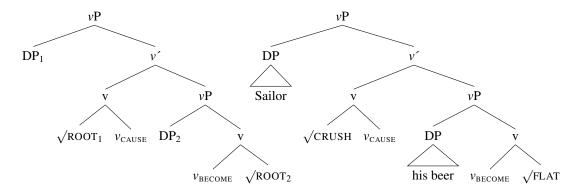
- (11) a. We blasted the tops off mountains. (COCA)
 - b. A couple of monks broke the corpse loose from the deck. (COCA)
- (12) a. With a few slices of her claws, she tore him free. (GBooks)
 - b. All-news channels are now splitting the niche smaller and smaller. (GloWbE)

I propose that such transitive variants of the constructions under discussion are cases of so-called transitive complex events (McIntyre 2004; Embick 2004; Mateu 2012; Acedo-Matellán & Mateu 2014), where the verbal root merges as a modifier to v, as it describes—while encoding a result state—the manner with which the causer brings about a result state. The result state, however, is denoted by a result phrase, not by the verb itself (e.g. *John got the eggs into the vase by breaking*). In this case, I propose that little v head can only select for a PP, with P_{LOC} as its head (Hale & Keyser 1993, 2002; Harley 2003), denoting a change of location (13) or for a vP (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.

- (13) a. DP_1 verb DP_2 path PP.
 - b. Jackfish cleaned the mud out of the car. (\approx get the mud out of the car by cleaning)



- (14) a. DP_1 verb DP_2 AP.
 - b. Sailor crushed his beer flat. (\approx cause the beer to become flat by crushing)

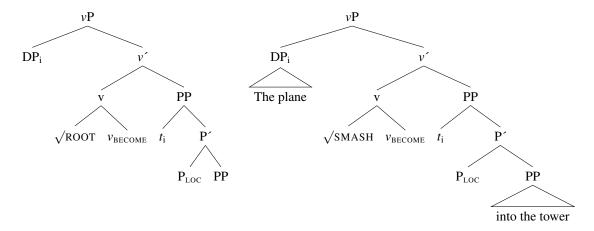


Regarding the intransitive instances of the data under discussion, as previously illustrated by (6) and (9), and further illustrated by the additional examples below, I propose that they are cases of intransitive complex events of change of state, where the verbal root also merges as a modifier to v_{BECOME} . As is the case with transitive complex events, the verbal roots, while encoding a result state, also describe the manner with which a theme achieves a result state, denoted by a result phrase (e.g. *The plane got into the tower by smashing*).

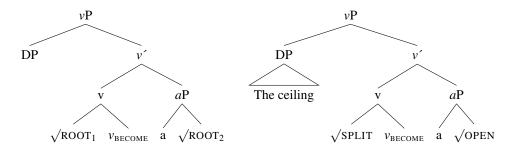
- (15) a. The snow melted off the lower part of the Range. (COCA)
 - b. Half the potatoes burned into the pan. (GloWbE)
- (16) a. The boxes hit the roof of the reach truck, glass bottles broke open and soaked the worker in olive oil. (COCA)
 - b. Secure everything that might be blown around or torn loose. (COCA)

In this case, I propose that the little v head can only select for a path PP (17), as in transitive complex events, describing a change of location, or for an aP, in which a second root merges with a, describing a change of state (18) (cf. Embick 2004). The two possible structures are given below, with examples for each.

- (17) a. DP verb path PP.
 - b. The plane smashed into the tower. (\approx get into the tower by smashing)



- (18) a. DP verb AP.
 - b. The ceiling split open. (\approx become open by splitting)



In short, I propose that in the constructions at stake, the verbal roots of result verbs, while semantically encoding a result state (as per Rappaport Hovav & Levin 2010), merge as modifiers of v describing a manner (of action) that brings about a result state, denoted by result phrases, i.e. PPs/APs.

3.1. Welcome predictions

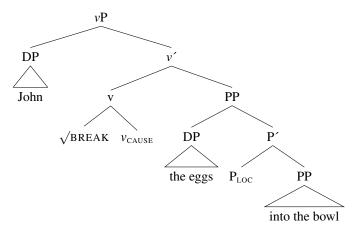
The current proposal provides a natural explanation for data that have challenged previous approaches. Regarding the examples in (3), repeated below as (19), such data are naturally accounted for in the present account since they contain two overt realizations of the same predicate, and are therefore predicted to be ungrammatical by the present approach. Put differently, there are two overt result predicates, e.g. an AP and a path PP (19-a) or two APs (19-b), which has been argued not to be grammatically possible, insofar as little ν selects for one result state predicate as its complement.

- (19) 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)

The challenging data for previous approaches in (5), repeated below as (20), are also naturally accounted for in the present analysis, insofar as the verbal roots merge as modifiers of v_{CAUSE} , whereas it is the path PP that denotes the actual result (i.e. *get the eggs into the vase by breaking*), as illustrated in (21).

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

(21) John broke the eggs into the bowl. (\approx get the eggs into the bowl by breaking)



Lastly, the present account makes a number of welcome predictions. First, it predicts that (in)transitive complex events—where the verb encodes a result state (e.g. *break*)—can only combine with either a path PP or an AP, but never both at the same time. As shown by the data below, such a prediction appears to be borne out.

- (22) a. *John broke the eggs into the bowl open.
 - b. John broke the eggs into the bowl.
 - c. John broke the eggs open.
- (23) a. *The eggs broke open into the bowl.
 - b. The eggs broke into the bowl.
 - c. The eggs broke open.
- (24) a. *The chocolate melted out of the box into the cup.
 - b. The chocolate melted into the cup.
 - c. The chocolate melted out of the box.

Second, the present approach further predicts that events where the verb encodes a manner of action (e.g. *hammer*, *wipe*, *push*, see Rappaport Hovav & Levin 2010), as in *hammer the metal flat*, can only combine with path PPs or APs, but never both. In this case, the verbal root, e.g. $\sqrt{\text{HAMMER}}$, also merges as a modifier to little ν , which selects for one result state predicate.

- (25) a. *Tam laughed himself silly faint.
 - b. Tam laughed himself silly.
 - c. Tam laughed himself faint.
- (26) a. *John sneezed the napkin off the table into a case.
 - b. John sneezed the napkin off the table.
 - c. John sneezed the napkin into a case.
- (27) a. *Sam hammered the metal flat into the ground.
 - b. Sam hammered the metal flat.
 - c. Sam hammered the metal into the ground.

Third, assuming that result roots have the semantic denotation as in (10-a) predicts that such a class of roots always introduce entailments of change regardless of structure. In other words, result roots inherently comprise as part of their meaning entailments of change, as Beavers & Koontz-Garboden (2020) argue, and are therefore predicted to entail change regardless of structure. As I show below, this prediction is borne out, since even when result roots are structurally interpreted as manner—when they merge as modifiers of *v*—change entailments cannot be disembodied from their meaning (similar to what Rappaport Hovav (2017: 96) notes that result verbs still keep their truth-conditional content as result roots in manner structures).

- (28) a. We blasted the tops off mountains (#but nothing was blasted).
 - b. With a few slices of her claws, she tore him free (#but nothing was torn).
- (29) a. Half the potatoes burned into the pan (#but nothing was burned).
 - b. Glass bottles broke open (#but nothing was broken).

This fact, however, is left unexplained in analyses that assume that roots do not have semantic content that is grammatically relevant (e.g. Borer 2003, 2005; Acquaviva 2008, 2014; Mateu & Acedo-Matellán 2012).

Lastly, a caveat is in place. Goldberg (1991: 371) provides some examples that apparently contain two overt result predicates, i.e. an AP and a PP, contra the current proposal.

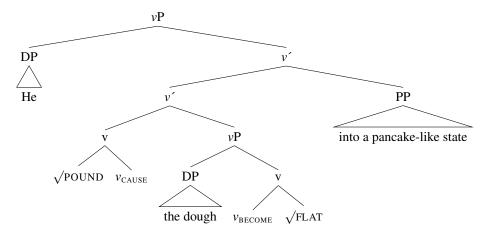
- (30) a. He pounded the dough flat into a pancake-like state.
 - b. The liquid froze solid into a crusty mass.

It is important to note that in such examples the PPs do not actually denote a distinct result state than the one denoted by the AP. In other words, the PP in these cases is a property PP as it denotes a change of state—not a change of location—that is a further specification of the change of state denoted by the AP. More importantly, however, remember that I have proposed that little ν can only select for one complement, and in these cases, the property PPs do not appear to be complements, but rather adjuncts, evidenced by the ordering restriction they display (further see Matushansky et al. 2012).

- (31) a. *He pounded the dough into a pancake-like state flat.
 - b. *The liquid froze into a crusty mass solid.

In other words, in these cases, there is only one complement being selected for, namely the AP, and the property PPs are adjuncts that denote a result state that is a further specification of the change of state denoted by the APs, as illustrated below.

(32) He pounded the dough flat into a pancake-like state.



In short, the present account does not predict that such examples are not possible, since the PP—a property PP, not a path PP—is an adjunct denoting a result state that further specifies the result state denoted by the complement, i.e. the AP.

4. Conclusion

In the present paper, I have proposed that there is a syntactic restriction on the architecture of (sub)event structure, i.e. structurally there can only be one overt result predicate per event structure. I have argued that this is due to the fact that little ν can only select for one predicate denoting a result state as its complement. In other words, I have proposed that little ν can select for a predicate denoting a change of state (e.g. an AP) or a change of location (e.g. a path PP), but never both in the same event structure.

In addition, I have shown that semantically there can be two result states, as well as two result states predicated of the same entity, namely when result verbs combine with result phrases that denote a distinct result state than the one encoded by the verb. In these cases, I have proposed that the roots of result verbs merge as modifiers of v, as they describe the manner that brings about the result state, denoted by the result phrase.

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