Arguments for Pseudo-Resultative Predicates*†

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Abstract

This paper addresses the compositionality puzzle presented by a class of 'pseudo-resultative' predicates, such as *tight* in the sentence *She braided her hair tight*. The analysis proposed reveals that the modification involved also provides insight into the nature of the lexical roots of verbs and their role in compositional semantics. Pseudo-resultative predicates superficially resemble resultative secondary predicates and resultative adverbs. However, it is shown that they do not modify any 'word' in the syntax. Rather, these predicates modify the root of the verb in a configuration which is licensed by the semantic type of the root and the structure of root creation verbs. The modification of such roots provides evidence that they are syntactically active, as proposed in the framework of Distributed Morphology (Halle and Marantz 1993; Marantz 1997; Arad 2003). It is shown that the roots are syntactically well-behaved and can be modified just like other 'larger' constituents. Syntactic parallels between the root creation verbs which license pseudo-resultative predicates and other structures further provide evidence for a syntactic decomposition of these verbs whereby the object is related to the root in a prepositional structure in a manner reminiscent of proposals for other classes of verbs in Hale and Keyser (1993, 2002).

1 Introduction

The bolded predicates in (1) and (2) at first glance appear to be semantically and syntactically parallel:

(1)   Janet braided her hair **tight**.
(2)   Rhoda hammered the metal **flat**.

However, while resultative predicates such as *flat* in (2) modify the direct object of the verb, the final predicate *tight* in (1) does not. That is, while the metal becomes flat as a result of Rhoda's hammering it, Janet's hair does not become tight as a result of her braiding it. Rather, what becomes tight is the braid which is created by the braiding. However, there is no overt 'braid' DP in the syntax for the adjective *tight* to modify. Thus, these sentences present a puzzle for the syntax/semantics interface — what argument are these modifiers modifying?

Although resultative predicates as in (2) have been much studied (Dowty 1979; Simpson 1983; Kayne 1985; Hoekstra 1988; Carrier and Randall 1992; Levin and Rappaport-Hovav 1995; Kratzer 2005), cases like those in (1) remain relatively uninvestigated. Some have described such cases as 'adverbial' (Washio 1997; Mateu 2000), while Kratzer (2005) has proposed that an even broader range of apparent resultatives

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are in fact adverbial. Geuder (2000) analyzes a semantically related set of adverbs as behaving syntactically as predicates of events, yet semantically as modifiers of pragmatically-introduced individual arguments.

In this paper, I show that predicates such as *tight* in (1) are not resultatives, nor are they 'adverbial' in the sense of being predicates of events. Rather, these 'pseudo-resultative' adjectives modify a created individual, along the lines of the proposal of Geuder (2000) for resultative adverbs. However, I propose that, in contrast with resultative adverbs as analyzed by Geuder, the individual argument modified by pseudo-resultatives is in fact syntactically active and denoted by the lexical root of the verb. This type of verbal root modification is semantically restricted to root creation verbs, a class of verbs which entail the creation of an entity denoted by the root of the verb, as delineated in more detail in section 4.1. I propose a semantic and syntactic decomposition of this class of verbs in order to provide an account for the pseudo-resultative modification which is compatible with a strong interpretation of compositionality, according to which all semantic rules correspond to steps in the syntactic derivation, and all semantic elements correspond to elements in the syntax. The necessity of such decomposition provides support for the type of syntactic decomposition of apparently simplex verbs proposed in the work of Hale and Keyser (1993, 2002), Pesetsky (1995) and Marantz (1997). The analysis presented shows that the semantic type of roots is crucial in accounting for pseudo-resultative modification, and thus provides elucidation for the theory of category-neutral roots in the derivation of words within the framework of Distributed Morphology (Halle and Marantz 1993), as proposed in Marantz (1997) and Arad (2003).

In section 2, I will lay out the compositionality problem posed by pseudo-resultative predicates, and show that they cannot be assimilated to resultatives or resultative adverbs from a semantic perspective. In section 3 I will show that the same is true from a morpho-syntactic perspective. In section 4, I present a proposal for the compositional semantics of pseudo-resultatives and the class of verbs that they occur with, root creation verbs. Then in section 5 I discuss the consequences of the analysis for related data and show how the predictions made are borne out cross-linguistically before concluding in section 6.

2   The Puzzling Semantics of Pseudo-Resultatives

The sentence-final adjectival predicates in (3) all pattern with *tight* in (3a) in that they receive a result-oriented interpretation but do not modify the direct object of the verb:

(3)   a.   Mary braided her hair tight.
      b.   Mary tied her shoelaces tight.
      c.   Mary piled the cushions high.
      d.   Mary chopped the parsley fine.
      e.   Mary sliced the bread thin.
      f.   Mary ground the coffee beans fine.

The puzzle of what these adjectival modifiers modify, either syntactically or semantically, has not been addressed in depth in the literature. Such predicates have previously been described as 'adverbial' in Washio (1997), Mateu (2000), and Kratzer (2005), to distinguish them from resultative predicates. However, these predicates were not the main object of inquiry in any of these studies. Geuder (2000) presents an account for modifiers which he calls 'resultative adverbs' which are semantically similar to those in (3), but differ from them in obligatorily bearing the *-ly* morpheme, as illustrated in (4):

(4)   Resultative Adverbs:
      a.   They decorated the room **beautifully**.
      b.   She dressed **elegantly**.
      c.   They loaded the cart **heavily**.

In the remainder of this section, I will present arguments that the predicates in (3) are in fact semantically distinct from resultatives, as suggested by earlier literature. I will further argue that they are semantically distinct from the resultative adverbs discussed by Geuder as well. It will be shown that the semantic analyses for predicates which are superficially similar to pseudo-resultatives cannot be extended.

2.1 Pseudo-Resultatives are not DP Modifiers

Since adjectives of the type found in (3) are most standardly considered to be predicates of individuals, one might assume that the pseudo-resultative is a modifier of the individual-denoting object DP. Other cases where secondary predicates are argued to modify the object DPs that they follow are object depictives (5) and canonical resultatives (6):

(5) Object Depictives:
     a. i.   Mary hammered the metal$_i$hot$_i$. $\rightarrow$
        ii.   The metal was hot.
     b. i.   Mary cooked the meat$_i$raw$_i$. $\rightarrow$
        ii.   The meat was raw.

(6) Resultatives:
     a. i.   Mary hammered the metal$_i$flat$_i$. $\rightarrow$
        ii.   The metal is/became flat.
     b. i.   Mary cooked the meat$_i$black$_i$. $\rightarrow$
        ii.   The meat is/became black.

Pseudo-resultative predicates appear superficially similar to these types of secondary predicates. However, the entailments triggered by such predicates are distinct. The object depictives in (5) modify the direct object such that the property they denote must hold of that object during the event; in (5a.i), the metal must be hot when the hammering event begins. It is clear that pseudo-resultatives do not contribute depictive-like semantics, as the sentences in (3) do not entail that the state denoted by the adjective holds at the beginning of the event, as shown in (7). Their interpretation is rather closer to that of resultatives. Resultatives modify the state of the object at the end of the event, so that (6a.i) entails that the metal is flat at the end of the event, as a result of that event. In considering examples from Romance languages similar to those in (3), Napoli (1992) proposes they are resultatives. However, as observed by Washio (1997) for similar data, the following entailments do not hold of the sentences in (3), as they would for sentences with resultatives:

(7)   a.   Mary braided her hair tight. $\nrightarrow$ Mary's hair was/is/became tight.
     b.   Mary tied her shoelaces tight. $\nrightarrow$ Her shoelaces were/are/became tight.
     c.   Mary piled the cushions high. $\nrightarrow$ The cushions were/are/became high.
     d.   Mary chopped the parsley fine. $\nrightarrow$ The parsley was/is/became fine.
     e.   Mary sliced the bread thin. $\nrightarrow$ The bread was/is/became thin.
     f.   Mary ground the coffee beans fine. $\nrightarrow$ The coffee beans were/are/became fine.

In some cases, such as (7e), a resultative reading is possible, but it is truth-conditionally distinct from the pseudo-resultative reading. The contrast between readings can be brought out better by substituting 'loaf of bread' for 'bread,' as in (8):

(8)   She sliced the loaf of bread thin.

On a resultative reading of (8), the loaf of bread becomes thin as a result of the event, for example in a situation where so many slices have been made from the loaf that the loaf itself has become thin. There is no entailment with respect to the thinness of the slices. On the pseudo-resultative reading, a thin slice or thin slices of bread have been created. The loaf itself could have been very wide initially, and may remain wide, as 'thin' modifies the slices, not the total quantity of bread or loaf.

Further, in the case of both resultatives and depictives, the adjective can be interpreted as a predicate of individuals which modifies the noun in the object DP; it is intuitively clear what the world has to be like in order for metal to be hot, or flat. Yet the pseudo-resultative predicates in (3) do not generally share this property. In many cases the adjective used as a pseudo-resultative is not an appropriate modifier for the relevant entity in any syntactic environment, as shown in (9):[1]

(9) a. ? Her hair was tight. / ? her tight hair
     b. ? The cushions were high. / ? the high cushions
     c. # The parsley was fine. / # the fine parsley
     d. # The bread was thin. / # the thin bread
     e. # The coffee beans were fine. / # fine coffee beans

These data show that pseudo-resultatives are not modifiers of the predicate of individuals denoted by the object DP, and thus we must look elsewhere for the argument that they semantically modify.

2.2 Pseudo-Resultatives are not Predicates of Events

Another constituent that would in principle be available for modification is the event denoted by the verb or verb phrase. Pseudo-resultatives have previously been described as 'adverbial' (Washio 1997; Mateu 2000; Kratzer 2005). Washio (1997) suggests that these 'spurious resultatives,' as he calls them, are adverbial, but does not explore the syntactic and semantic consequences of such an analysis. Kratzer (2005) argues that the only predicates which are truly 'resultative' are those found in small clauses with optionally intransitive verbs, and that apparent resultatives found with obligatorily transitive verbs are thus of a different class and 'parsed as adverbs.'

These views are in part motivated by the fact that the same predicates that occur as adjectival pseudo-resultatives can sometimes occur with *-ly* morphology, as shown in (10) (although only some speakers accept the adverb form in post-verbal position as in (10b)):

(10) a.   Mary's hair is **tightly** braided.
      b. % Mary braided her hair **tightly**.

These examples seem parallel to the resultative adverbs discussed by Geuder (2000):

(11) a.   They decorated the room **beautifully**.
      b.   She dressed **elegantly**.
      c.   They loaded the cart **heavily**.

In this section, I will present Geuder's arguments that resultative adverbs are not predicates of events like manner adverbs, and show that these extend to pseudo-resultative predicates. However, I will further argue in sections 2.3 and 3.2, that pseudo-resultatives with adjectival morphology are ultimately distinct from resultative adverbs as well. In section 3.3 I will argue that the cases in (10) are in fact resultative adverbs despite their semantic similarity to pseudo-resultatives.

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[1]Throughout the paper, '?' is used to indicate semantic ill-formedness, '%' for across-speaker variation in judgments, '#' for availability only of an irrelevant reading, and '*' for ungrammaticality.

In the neo-Davidsonian tradition of event semantics (Davidson 1967; Parsons 1990), both verbs and verb modifiers such as manner adverbs are taken to be predicates of events, such that a phrase as in (12a) would have the semantics in (12b):

(12) a. run quickly
      b. run(e) & quick(e)

The interpretation of both the verb and the manner adverb are as predicates of the same event. Thus, if the event is existentially quantified over, (12b) can be paraphrased as 'there is an event which consisted of running and was quick.' Among other advantages, this analysis of manner adverbs captures the fact that (13) entails (14):

(13)   The dog ran quickly.
(14)   The dog ran.

The same type of entailments do hold for pseudo-resultative predicates, as seen by the fact that (15) also entails (16). However, I will argue that these entailments do not arise in the same way as those found with manner adverbs.

(15)   She braided her hair tight.
(16)   She braided her hair.

Geuder (2000) shows that even resultative adverbs, which always exhibit -*ly* morphology in English, are semantically distinct from manner adverbs and are not simply predicates of events.[2] For one, the kind of entailments available for manner adverbs in (17) do not extend to resultative adverbs as shown in (18):[3]

(17)   The dog ran quickly. → The running event was quick.
(18)   They decorated the room beautifully. ↛ The decorating event was beautiful.

These entailments are not appropriate for pseudo-resultatives either, as shown in (19):

(19)   She braided her hair tight. ↛ The braiding event was tight.

Further, Geuder shows that resultative adverbs are not felicitous with manner paraphrases (21b), in contrast with manner adverbs (20b):

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[2]Ultimately Geuder does treat these adverbs as compositionally functioning as predicates of events, as will be discussed in section 2.3.

[3] Geuder (2000) also considers cases like those in (i), for which he considers *wide* and *tight* to be adverbs, even though they lack adverb morphology.

(i) a. I opened the door wide.
     b. I shut the door tight.

Despite the fact that these predicates are morphologically adjectival, I will not consider these cases here. Note that these are both adjective-derived inchoative verbs, and that these forms of *wide* and *tight* are also possible as modifiers of these adjectives in non-verbal contexts:

(ii) a. The door is (wide) open (wide).
      b. The door is (tight) shut (tight).

The examples in (i) may be more similar to true resultatives where the resultative predicate has conflated with *v* as a manner component. For example, (ii.a) may be closer to sentences like 'I pushed the door wide open.' Alternatively, these cases may be parallel with pseudo-resultative modification, as proposed in Levinson (2007) for similar verbs in Japanese. Further research is necessary to tease apart these two hypotheses.

(20) Manner Paraphrase of Manner Adverb:
  a. The police carelessly arrested Fred.
  b. The police arrested Fred in a careless manner.

(21) Manner Paraphrase of Resultative Adverb:
  a. They decorated the room beautifully.
  b. # They decorated the room in a beautiful manner.

The same is true of pseudo-resultative adjectives:

(22) Manner Paraphrase of Pseudo-Resultative:
  a. Mary braided her hair tight.
  b. ? Mary braided her hair in a tight manner.

We can conclude from these data that pseudo-resultative predicates are not interpreted as predicates of events.

2.3 Pseudo-Resultatives are not Implicit Object Modifiers

Although pseudo-resultatives are not predicates of events like manner adverbs, another possible approach to these predicates would be to treat them as resultative adverbs. Geuder (2000) analyzes resultative adverbs with an aim towards accounting for the relation between predicates such as *beautiful* in contexts where they seem to be 'adjectival' predicates of individuals, and those where they appear to be event modifiers with adverb morphology yet are still oriented in some way to an individual. One might try to collapse pseudo-resultatives into this account as predicates which share this behavior and yet persist in their adjectival morphology in adverbial contexts. In this section Geuder's proposal for resultative adverbs will be detailed and it will be shown that ultimately this analysis cannot account for pseudo-resultative predicates.

For resultative adverbs, Geuder proposes that, in the compositional semantics, they are predicates of events, but that ultimately they are oriented towards an individual, and thus receive an interpretation like that found in other adjectival contexts. The individual that these particular predicates are oriented towards is one that is created as a result of the event. The modification of this resultant individual is the source of their result-oriented interpretation.

On Geuder's account, this individual is not realized directly by any constituent in the syntax, but is accessed as part of the semantic contribution of the verb. Geuder observes that resultative adverbs occur with verbs that have related result nominalizations. He presents this as evidence that these verbs contribute a result that is semantically accessible for modification:

(23) a. They decorated the room beautifully. ▷ beautiful decoration
  b. She dressed elegantly. ▷ elegant dress
  c. They loaded the cart heavily. ▷ heavy load
  d. She wrapped the gift nicely. ▷ nice wrapping

Geuder calls all such verbs 'implicit creation verbs,'[4] because he argues that they all make salient a created individual which is not explicit in the argument structure of the verb. What is important for Geuder is that

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[4]Explicit creation verbs are those where the created individual is realized as a DP argument, such as in (i):

(i) a. Mary built a house.
  b. Mary baked a cake.

The same roots which give rise to implicit creation verbs (really root creation verbs as will soon be argued) often derive explicit creation verbs as well:

such verbs provide a salient function for the Predicate Transfer (Nunberg 1995) operation that he argues underlies the interpretation of resultative adverbs. This extra-syntactic rule maps the event denoted by the verb to a pragmatically salient individual, which is the individual then picked up for modification. The operation of Predicate Transfer is defined by Nunberg as in (24), with the condition in (25):

(24) $\lambda P\, \lambda y\, [\, \exists x_{domh}: h(x)=y\, \&\, P(x)\,]$

(25)   Condition on predicate transfer (Nunberg 1995:112): Let $\mathcal{P}$ and $\mathcal{P}'$ be sets of properties that are related by a salient transfer function $g_t: \mathcal{P} \to \mathcal{P}'$. Then if F is a predicate that denotes a property $P \in \mathcal{P}$, there is also a predicate F′, spelt like F, that denotes the property P′, where $P' = g_t(P)$.

The function 'h' in (24) is to be specified pragmatically. Geuder suggests that in the case of implicit creation verbs like *load*, this function is supplied by a part-whole relation between the created individual (y) and the meaning of the verb as a whole (x).

Thus to account for the meaning of *heavily* in (26), we apply the Predicate Transfer operation, which gives (27). If this element combines with the verb which denotes a predicate of events, then the result would be (28). The individual which is asserted to exist and is an argument of the function 'h' is the load created by the event, which, according to Geuder, is made pragmatically salient by a part-whole relation between a load and an event of loading:

(26)   She loaded the cart heavily.

(27) $\lambda e\, [\, \exists x_{domh}: h(x)=e\, \&\, heavy(x)\,]$

(28) $\lambda e\, [\, loading(e)\, \&\, theme(e,\text{the cart})\, \&\, \exists x_{domh}: h(x)=e\, \&\, heavy(x)]$

Any verb, or even context, which makes pragmatically salient an individual which stands in a part-whole relation to an event should thus license a resultative adverb. Geuder uses the availability of result nominalizations in (23) above as evidence for presence of such a salient individual with those verbs.

This class of implicit creation verbs would seem to accommodate at least some of the verbs which license pseudo-resultatives discussed above, such as *braid*, *pile* and *slice*, since these can form result nominalizations:

(29)   a.   She braided her hair tight. ▷ tight braid
         b.   She piled the pillows high. ▷ high pile
         c.   She sliced the bread thin. ▷ thin slice

Crucially however, this class cannot be the defining class for the licensing of pseudo-resultative adjectives, since implicit creation verbs do not all license modifiers lacking adverb morphology. That is, if we took the class of implicit creation verbs to be the class which licenses pseudo-resultatives, we would incorrectly predict the grammaticality of the following sentences:

(30)   a.   * They decorated the room beautiful.
         b.   * She dressed elegant.
         c.   * They loaded the cart heavy.
         d.   * She wrapped the gift nice.

(ii)   a.   Mary braided a rope.
         b.   Mary sliced (Bill) a piece of cake.

However, as the root does not denote the created individual in explicit creation contexts, these uses will not be relevant to the discussion in this section. The contrasts predicted between these different creation verb classes will be discussed in section 5.

This shows that only some implicit creation verbs license pseudo-resultatives, and thus the relevant verb class is not the same as that which licenses resultative adverbs. Therefore the availability of a salient created individual is not enough to license pseudo-resultatives. In section 4, I will propose instead that pseudo-resultatives modify a syntactically accessible argument which denotes a created individual, the root of root creation verbs. First, however, I will show in the next section that this novel analysis is motivated not only on semantic grounds, but on morpho-syntactic grounds as well.

3 The Puzzling Morpho-Syntax of Pseudo-Resultatives

3.1 Pseudo-Resultatives are not Resultatives

With regards to category and word order, sentences with pseudo-resultatives such as (31) and those with resultatives (32) appear to be the same:

(31)   Janet braided her hair **tight**.
(32)   Rhoda hammered the metal **flat**.

In the previous section, it was argued that these predicates are semantically distinct. In this section, I will provide evidence that these predicates are morpho-syntactically distinct across languages as well.

3.1.1 The Morphology of Pseudo-Resultatives

One way in which the morpho-syntactic differences between resultatives and pseudo-resultatives are evidenced is in morphological differences between the two types of predicates within languages. This cannot be seen in English, since there is no case or agreement marking on adjectives. However, such contrasts can be observed in other languages such as Finnish and Norwegian.

In Finnish, adjectival and nominal elements bear case morphology. These case markers functionally seem to express similar relations as prepositions in languages such as English, such as spatial relations. Resultative predicates of different types in Finnish are all marked with translative case, as in (33):

(33)   Finnish:

    a.   Mari   joi   teekannu-n tyhjä-ksi.
        Mari.NOM drank teapot-ACC empty-TRANSL

        'Mari drank the teapot empty.'

    b.   Mari   hakkasi   metalli-n   litteä-ksi.
        Mari.NOM hammered-ACC metal-ACC flat-TRANS

        'Mari hammered the metal flat.'

    c.   Mari   nauroi   itsensä kähëä-ksi.
        Mari.NOM laughed herself hoarse-TRANS

        'Mari laughed herself hoarse.'

    d.   Joki   jäätyi kiinteä-ksi.
        river.NOM froze solid-TRANS

        'The river froze solid.'

    e.   Tuuli   jäädy-tti   joe-n   kiinteä-ksi.
        wind.NOM freeze-CAUS river-ACC solid-TRANS

        'The wind froze the river solid.'

Translative case is a non-spatial case in Finnish. Fong (2001:2–3) provides the following examples and describes translative case as occurring with verbs of change of state as in (34), where it marks the outcome of the change, and causative change of state verbs (35), where it marks the result state:

(34) a. Toini   tuli   sairaa-ksi.
        Toini-NOM become-PST.3S ill-TRANS
        'Toini became ill.'

     b. Hän muuttu-i   touka-sta   perhose-ksi.
        s/he change-PST.3S caterpillar-ELA butterfly-TRANS
        'S/he changed from a caterpillar into a butterfly.'

(35) a. Taikuri   muutt-i   perhose-n   touka-ksi.
        magician-N change-PST.3S butterfly-ACC caterpillar-TRANS
        'The magician changed a/the butterfly into a caterpillar.'

     b. Taikuri   muutt-i   elefanti-n   pienemmä-ksi.
        magician-N change-PST.3S elephant-ACC small-TRANS
        'The magician made (lit. 'changed') a/the elephant small.'

Kracht (2002) describes the translative as the 'cofinal' variant of the 'static' essive case. That is, the essive case is used for static events such as in (36):

(36) Toini   on   sairaa-na.
     Toini-N be.3S ill-ESS
     'Toini is ill.'

The translative is similarly used to mark properties, but the entailment is that the property holds at the end of the event, i.e., the state is cofinal with the event, rather than being static, and holding for the duration of an event.

Crucially, in examples where the secondary predicate would receive a pseudo-resultative interpretation like those in (37), translative case is not possible:

(37) a. * Mari leti-tt-i   hiuksensa   tiuka-ksi.
          Mari braid-CAUS-PAST hair-ACC.POSS tight-TRANS

     b. * Jussi sitoi kengännauhansa   tiuko-i-ksi.
          Jussi tied shoelaces-ACC.POSS tight-PL-TRANS

     c. * Mari kasasi tyynyt korke-i-ksi.
          Mari piled pillows high-PL-TRANS

These examples semantically fall into the class of pseudo-resultatives, since the predicate would not be modifying the direct object as the result of the event. Some of these sentences can be formulated with an adjectival predicate; however the adjective must be marked with illative, rather than translative, case:[5]

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[5]The example in (37c) cannot be formulated with illative case:

(i)   * Mari kasasi tyynyt korkea-an.
        Mari piled pillows high-ILL
        'Mari piled the pillows high.'

As in English, the adverb is not possible either:

(ii) * Mari kasasi tyynyt korkea-sti.
        Mari piled pillows high-ADV

(38)   a.   Mari leti-tt-i   hiuksensa   tiukka-**an**.
                  Mari braid-CAUS-PAST hair-ACC.POSS tight-ILL

                  'Mari braided her hair tight.'

          b.   Mari sitoi kengännauhansa   tiukka-**an**.
                  Mari tied shoelaces-ACC.POSS tight-ILL

                  'Mari tied her shoelaces tight.'

According to Kracht (2002), illative case is a locative (spatial) case which is the cofinal variant of the static inessive case. Inessive case marks locations which an entity is in for the duration of an event, such as in (39).

(39)   a.   Toini   on   talo-ssa
                  Toini-N be.3S house-INE

                  'Toini is in the house.'

Illative is used when the entity is in a location at the end of an event, or in more metaphorical 'spatial' contexts. Karlsson (1999) gives the following examples of both uses:

(40)   a.   Isä   ajaa   auton   autotalliin.
                  father drives car.ACC garage.ILL

                  'Father drives the car into the garage.'

          b.   Hän pani avaimen lukkoon.
                  s/he put   key.ACC lock.ILL

                  'He put the key into the lock.'

          c.   Käteen   tuli   haava.
                  hand.ILL came wound

                  'The hand was wounded.' (lit: 'Into the hand came a wound.')

The presence of this distinct illative marking on pseudo-resultatives, as opposed to translative marking in resultatives, provides morphological support for a syntactic contrast between resultatives and pseudo-resultatives in Finnish.[6] It will be shown in section 5.4.3 how the illative marking comes about as a consequence of the syntax of pseudo-resultatives and the verbs that they occur with.

         'Mari piled the pillows high.'

It is not clear why an illative-marked adjective is not possible in (i). Nevertheless, the lack of availability of translative case in this and other cases supports the conclusions drawn above regarding English and the contrasts between resultatives and pseudo-resultatives.

     [6]Some of the examples that are possible as pseudo-resultatives in English occur only with translative case morphology in Finnish, rather than the expected illative:

(i)   a.   Mari viipal-o-i   leivä-n   ohue-ksi.
                Mari slice-CAUS-PAST bread-ACC thin-TRANS

                'Mari sliced the bread thin.'

        b.   Mari silppusi persilja-n   hieno-ksi.
                Mari chopped parsley-ACC fine-TRANS

                'Mari chopped the parsley fine.'

Thus it seems that illative-marked pseudo-resultative predicates in Finnish are more restricted than pseudo-resultatives in English. This may be due to a difference in the specifics of the verbs and/or adjectives and the grammatical realization of these concepts in Finnish vs. English.

A contrast between the morphology of resultative predicates and pseudo-resultative predicates can also be found in Norwegian. In Norwegian, resultative predicates are not marked with any special case. However, they do exhibit adjectival agreement, or concord, with the argument that they modify, as shown in (41).

(41) a. Marit drakk flaskene   tomm-e.
        Marit drank bottle-DEF.PL empty-PL
        'Marit drank the bottles empty.'

     b. Marit banket   dem flat-e.
        Marit hammered them flat-PL
        'Marit hammered them flat.'

Adjectives in Norwegian show two agreement 'paradigms,' the 'definite' paradigm within the DP in prenominal position, and the 'indefinite' paradigm in postnominal and predicative positions (Kester 1996). The *-e* suffix marks the plural agreement (which is the same for all genders), and cannot be replaced in these examples by the 'default,' singular neuter marker *-t*:

(42) a. * Marit drakk flaskene   tomm-t.
          Marit drank bottle-DEF.PL empty-N.SG
          'Marit drank the bottles empty.'

     b. * Marit banket   dem flat-t.
          Marit hammered them flat-N.SG
          'Marit hammered them flat.'

In the case of pseudo-resultatives, no concord is found. Instead there is default singular neuter agreement, no matter the phi-features of any DPs in the sentence, as shown in (43). In order to illustrate this, all of the objects given have phi-features other than singular neuter, so that such morphology must indicate the default:[7]

(43) a. Marit flettet krøllene   sine stramm*-e/-t.
        Marit braided curls-DEF.PL REFL tight-PL/-N.SG
        'Marit braided her curls tight.'

     b. Marit knøt skolissene   sine hard*-e/-t.
        Marit tied shoelace-DEF.PL REFL hard-PL/-N.SG
        'Marit tied her shoelaces tight.'

     c. Marit stablet putene   høy*-e/-t.
        Marit piled cushions-DEF.PL high-PL/-N.SG
        'Marit piled the cushions high.'

This lack of agreement shows a clear contrast in Norwegian between resultative predicates and pseudo-resultative predicates.[8]

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[7]Due to the lack of adverb morphology equivalent to *-ly* in Norwegian, it is not trivial to say whether these forms are parallel to morphological adjectives or adverbs in English. However, see section 3.3 for more on this issue with respect to English.

[8]As an anonymous reviewer points out, although Hebrew lacks canonical resultatives, it does have pseudo-resultatives which exhibit default agreement like Norwegian:

(i) Taxanti   et hagargirim dak.
     grind.pst-1sg acc the.seeds-pl thin-sg
     'I ground the seeds fine.'

There are some sentences in English which are ambiguous between resultative and pseudo-resultative readings, as was discussed in reference to (8) above. As predicted, this ambiguity does not occur when there is a morphological distinction between the resultative and pseudo-resultative as in Norwegian. This contrast also allows for the construction of the minimal pair in (44). In these examples, (44a) with zero agreement on the adjective can only have the resultative interpretation, whereas only a pseudo-resultative interpretation is available with the default neuter agreement that marks pseudo-resultatives as in (44b).

(44) a. Marit skjærte kaka   tynn-∅.
          Marit cut   cake-DEF.F thin-M/F.SG
          'Marit cut the cake thin.' (resultative — i.e., the entire cake is made thin)

      b. Marit skjærte kaka   tyn-t.
          Marit cut   cake-DEF.F thin-NEUT.SG
          'Marit cut the cake into thin slices.' (pseudo-resultative)

This morphological contrast allows for a disambiguation between resultative and pseudo-resultative interpretations of the predicate, where both might be possible, and supports a syntactic distinction between these meanings.

3.1.2 Cross-linguistic Availability of Pseudo-Resultatives

Further evidence for the syntactic differences between resultatives and pseudo-resultatives can be found in the fact that they have different distributions cross-linguistically. As discussed by Mateu (2000), Romance languages such as Catalan lack canonical resultatives (45), but, as shown in (46), they do have pseudo-resultatives:[9]

(45) a. * El cambrer fregà els plats   secs.
            the waiter   wiped the dishes dry-PL
            'The waiter wiped the dishes dry.'

      b. * El gos bordà els pollastres desperts.
            the dog barked the chickens   awake-PL
            'The dog barked the chickens awake.'

      c. * El riu es   congelà sòlid.
            the river ES-REFL froze   solid-SG
            'The river froze solid.'

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[9]Romance languages do seem to permit a limited range of resultatives. Also possible in Catalan are examples with the explicit creation verb, 'sew':

(i) La meva filla   va cosir la faldilla   estreta.
     the my   daughter   sewed the skirt-F.SG tight-F.SG
     'My daughter sewed the skirt tight.'

Napoli (1992:ex.108b) cites such an example from Italian, though in Italian the lack of agreement makes it less clear that the predicate is adjectival:

(ii) Mia figlia   ha cucito la gonna (troppo) stretta.
     my daughter has sewn the skirt (too)   tight
     'My daughter sewed the skirt (too) tight.'

The verb 'sew' in these environments is not a root creation verb, since the object, 'the skirt,' is not reconfigured as a result of the event, but rather is created. Thus 'sew' here is an explicit creation verb. As discussed in section 5.1, pseudo-resultatives are not predicted to occur with explicit creation verbs.

(46) a.   M'   he   lligat els cordons de les sabates (ben) estrets.
           me-DAT have-1st tied   the laces   of the shoes   (very) tight-PL
           'I tied the laces of my shoes very tight.'

      b.   Talla-les menudes.
           cut-them fine-PL
           'Cut them fine (i.e., into fine pieces).'

This kind of contrast is also noted in discussions of other Romance languages, such as in Napoli's (1992:exx.73 & 104) examples in (47), and for Greek by Horrocks and Stavrou (2003:exx.11d & 21a) as in (48):

(47) a.   * Gianna ha martellato il metallo piatto.
             'Gianni hammered the metal flat.'
      b.   Quel macellaio taglia le carni sottili.
             'That butcher cuts the meats thin.'

(48) a.   * 'htipise   ti lama'rina   'isja
             beat-3sg-pfve the (sheet)metal flat/straight
             'beat the metal flat'
      b.   'ekopse   to kre'miði le'pto
             cut-3sg-pfve the onion   thin
             'cut the onion thin'

Mateu (2000) attributes the contrast between languages without resultatives and those with them to the fact that the former are 'verb-framed' in the sense of Talmy (1991), while the latter are 'satellite-framed.' The verb-framed nature of Romance languages prevents a necessary conflation operation. If this conflation operation, or some other syntactic property absent from Catalan, is not necessary to license pseudo-resultative predicates, this provides further support for the claim that resultatives and pseudo-resultatives are syntactically distinct.

The agreement seen on the pseudo-resultative predicates in Catalan in (46) is surprising in the context of the Norwegian data above. In Catalan, adjectival agreement with the object DP was possible with pseudo-resultatives despite the lack of semantic predication. This contrast will be addressed in the context of the present proposal in section 4.6.2.

Having shown that pseudo-resultatives are syntactically distinct from resultatives, in the next section I will show that these predicates are also syntactically distinct from resultative adverbs.

3.2   Pseudo-Resultatives are not Resultative Adverbs

As discussed above, predicates which are semantically similar to pseudo-resultatives sometimes occur with *-ly* morphology in English:

(49) a.   Mary's hair is **tightly** braided.
      b. % Mary braided her hair **tightly**.

Further, there are other semantically similar predicates called resultative adverbs by Geuder (2000) that obligatorily bear the *-ly* morpheme:

(50) a.   They decorated the room **beautifully**.
      b.   She dressed **elegantly**.
      c.   They loaded the cart **heavily**.

These facts might lead one to believe that pseudo-resultatives are in fact syntactically adverbs, despite the fact that they are not semantically predicates of events (as was shown in section 2.2). However, in this section I will defend what I take to be the null hypothesis — that pseudo-resultatives, which bear adjective morphology, are in fact syntactically adjectives. I will first show that the arguments made by Geuder (2000) for the categorial status of resultative adverbs do not extend to the pseudo-resultatives being considered here and then present further data in support of the adjectival status of these predicates.

3.2.1 Coordination with Pseudo-Resultatives

Geuder (2000) analyzes resultative adverbs as being predicates of events in the compositional semantics, distinguishing them from manner adverbs only with a semantic rule. If we were to extend Geuder's account to the adjectival predicates considered here, they would be predicted to pattern syntactically with adverbial predicates of events such as manner adverbs. In this section I will show that the primary evidence from coordination that Geuder uses to support his syntactic analysis of resultative adverbs does not extend to the data considered here.

Geuder's key argument that resultative adverbs are adverbs in the syntax is that they can be syntactically coordinated with manner adverbs, as in his example in (51):

(51)   to grind the beans quickly and finely

However, this argument does not extend to the cases under consideration lacking adverb morphology, since it is not possible to coordinate a manner adverb with -ly morphology and a pseudo-resultative predicate in the same way:

(52)   a.   * Mary braided her hair quickly and tight.
        b.   * Mary braided her hair tight and quickly.

The argument might appear to be saved if one tries to coordinate pseudo-resultatives with adverbs that lack -ly morphology; some speakers do accept the sentences in (53):

(53)   a.   % Mary braided her hair quick and tight.
        b.   % Mary braided her hair fast and tight.

However, the use of such data to argue for a syntactic analysis of pseudo-resultatives as adverbs is immediately called into question by the fact that the speakers who accept these sentences also accept similar sentences with resultatives, which are not analyzed as adverbs:

(54)   % She hammered the metal quick and flat.

The interpretation of the predicates *quick* and *fast* in these contexts does not seem to be that of a manner adverb of the same type as in (51), and thus their status as manner adverbs should be questioned. The interpretation is rather an intensifying one, similar to that in (55):

(55)   He braided her hair good and tight.

Another peculiar property of such coordinations is that reversing the order of the predicates results in ungrammaticality, which is unexpected if the relevant predicates were simply two coordinated elements with the same syntactic status:

(56)   a.   * Mary braided her hair tight and quick.
        b.   * Mary braided her hair tight and fast.

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That there is something special about these cases is further supported by the fact that the same speakers do not accept such coordination with other pseudo-resultative predicates:

(57) a. * Mary piled the cushions quick and high.
      b. * Mary chopped the parsley quick and fine.
      c. * Mary sliced the bread quick and thin.
      d. * Mary ground the coffee beans quick and fine.

If we look to Finnish, where, for some speakers, illative case is also possible on predicates like *nopea*, 'quick,' such coordination of the two illative predicates is also impossible:

(58) * Mari leti-tt-i   hiuksensa   nopea-an ja tiukka-an.
        Mari braid-CAUS-PAST hair-ACC.POSS quick-ILL and tight-ILL
        'Mari braided her hair quick and tight.'

Thus, it does not appear that one can construct an argument for the adverb status of pseudo-resultatives from coordination data as Geuder does for resultative adverbs. This leaves a lack of any such evidence for the adverb status of pseudo-resultatives, and thus no reason to abandon the null hypothesis that predicates with adjective morphology are in fact adjectives. This view will be further defended in the following sections.

3.2.2 Pseudo-Resultative Adjectival Morphology

There is cross-linguistic evidence showing that pseudo-resultatives pattern morphologically with adjectives, not adverbs. Although one might claim that the adverb morphology is 'droppable' in English, and thus the bare status of adjectives does not constitute reliable proof for adjectival status, in languages such as Catalan and Finnish, pseudo-resultative predicates bear distinctly adjectival morphology.

Mateu (2000) observes that the Catalan pseudo-resultatives previously discussed in section 3.1.2, which he calls spurious resultatives following Washio (1997), exhibit obligatory adjectival agreement on the predicate:

(59) a. M'   he   lligat els cordons de les sabates (ben) estrets.
          me-dat have-1st tied   the laces   of the shoes   (very) tight-PL
          'I tied the laces of my shoes very tight.'
      b. Talla-les menudes.
          cut-them fine-PL
          'Cut them fine (i.e., into fine pieces).'

In these examples, the pseudo-resultative predicates bear plural marking, which is a mark of agreement with the direct object. Such agreement occurs in Catalan on both attributive and predicative adjectives, as seen in the examples from Wheeler et al. (1999:77) in (60):

(60) a. la   meva estimada muller
          the-F my-F dear-F   wife-F
          'my dear wife'
      b. Aquelles   taronges   no s'on pas madures.
          those-F.PL oranges-F.PL   are not ripe-F.PL
          'Those oranges are not ripe.'

This agreement is distinct from the adverbial affix *-ment* found on adjective-derived adverbs, which do not show agreement with any DP in the sentence, illustrated with data from Wheeler et al. (1999:222) in (61):

(61)   a.   lliure 'free' → lliurement 'freely'
       b.   automàtic 'automatic' → automàticament 'automatically'

Since adverbial morphology in Catalan is overtly expressed and distinct from adjectival morphology, one cannot claim that pseudo-resultative predicates with adjectival morphology are simply adverbs with omitted adverbial morphology.

   A similar argument can be constructed based on Finnish, where adverbs and adjectives bear distinct suffixal morphology of a different kind. Finnish does not have grammatical gender, but adverbs have a -*sti* suffix (62).[10]

(62)   Mari juoksi hitaa-sti.
       Mari ran   slow-ADV
       'Mari ran slowly.'

   However, with pseudo-resultatives, there is an overt illative case marker as in (63), previously discussed in section 3.1.1:

(63)   Mari leti-tt-i   hiuksensa   tiukka-**an**.
       Mari braid-CAUS-PAST hair-ACC.POSS tight-ILL
       'Mari braided her hair tight.'

Spatial case markers such as the illative in Finnish are found on nominal and adjectival elements, but not on adverbs. This provides further evidence for the adjectival status of pseudo-resultatives cross-linguistically.

   As in English, Finnish allows some predicates with adverb morphology which are semantically similar to pseudo-resultatives:

(64)   Mari leti-tt-i   hiuksensa   tiuka-**sti**.
       Mari braid-CAUS-PAST hair-ACC.POSS tight-ADV
       'Mari braided her hair tightly.'

The question that then arises is what it means for both options to be possible, and what the relation is between the adjectival and adverbial forms. This will be addressed in section 3.3.

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[10]Some speakers accept illative case marking also in cases like (i), where the illative-marked element seems to receive a manner adverb interpretation:

(i)   % Mari juoksi nopea-an.
         Mari ran   quick-ILL
         'Mari ran quick.'
(ii)   Mari juoksi nopea-sti.
         Mari ran   quick-ADV
         'Mari ran quickly.'

However, illative case marking is not generally available for manner adverbs:

(iii)   * Mari juoksi hitaa-seen.
           Mari ran   slow-ILL
           'Mari ran slow.'

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3.3 Adverbial Imposters

It has been seen that predicates that are semantically similar to pseudo-resultative predicates are sometimes found with adverbial morphology. In the previous section, I argued against one previously proposed account for this phenomenon which suggests that pseudo-resultatives are in fact syntactically equivalent to adverbs, but occur in adjectival form due to omission of the *-ly* morpheme. It was argued instead that pseudo-resultative predicates are truly adjectives. This leaves us with the question of what the relationship between these adjectival and adverbial forms might be. I suggest that the apparent dual behavior of some predicates as both pseudo-resultative adjectives and adverbs is due to the fact that the same or similar semantics may be achieved via different routes. That is, cases such as (65) involve resultative adverbs, **not** pseudo-resultative adjectives, and should be analyzed along with that class of predicates as in Geuder (2000).

(65)   a.   Mary's hair is **tightly** braided.
        b.   % Mary braided her hair **tightly**.

This seems to be a necessary conclusion from the data presented in section 2.3, repeated here in (66), which show that environments which license resultative adverbs do not necessarily license adjectival forms which could be pseudo-resultative:

(66)   a.   * They decorated the room beautiful.
        b.   * She dressed elegant.
        c.   * They loaded the cart heavy.

The contrast can also be seen in the other direction, as in the examples in (67), where the environment licenses the adjectival form, but not the adverbial one:

(67)   a.   She piled the cushions high.
        b.   * She piled the cushions highly.
        c.   * the highly piled cushions

The adverb form *highly* does not seem possible with a resultative adverb interpretation. This is not due to a lack of a form *highly*, since this form occurs as an intensifier in examples like those in (68):

(68)   a.   She was a highly esteemed author.
        b.   It is highly unlikely that he will arrive on time.

In section 3.2.2 it was also shown that the contrasts can be found in Finnish, since the adjectival and adverbial forms are not always possible in the same contexts.

     The picture that emerges from these data shows that there are two distinct classes of verbs, those that occur with pseudo-resultative adjectives and those that occur with resultative adverbs. While some verbs might belong to both classes, and thus there is some overlap between them, the crucial conclusion is that they do not pattern wholly as one class. The contrasts between the two classes of verbs will be seen to follow from the analysis presented below, whereby pseudo-resultative predicates can only combine with the narrowly-defined class of root creation verbs, in contrast with resultative adverbs, which seem to combine with the class of implicit creation verbs as defined by Geuder (2000). The analysis of pseudo-resultatives presented in the following sections will give the sentences containing them similar entailments to those predicted by Geuder's (2000) analysis of resultative adverbs. However, in the case of pseudo-resultatives, these entailments will be achieved by syntactic, rather than pragmatic, modification. This will be argued to follow from the additional modification possibilities introduced by the class of verbs that license pseudo-resultatives, root creation verbs.

4 The Compositional Semantics of Root Creation Verbs and Pseudo-Resultative Modification

It was shown in the previous sections that pseudo-resultatives form a class of modifiers that is both syntactically and semantically distinct from resultatives and resultative adverbs. While the meaning of pseudo-resultatives is similar to that of resultative adverbs, these modifiers have different distributions. In this section, I will propose a way to account for pseudo-resultative modification that captures their similarity in meaning to resultative adverbs while also capturing their different distribution.

As discussed in section 2.3, Geuder (2000) proposes that the resultative adverbs modify 'created individuals' which are accessible due to a pragmatic operation of Predicate Transfer. They have a result-oriented interpretation because the predicate of individuals that they modify is created by the event, and thus a result of the event. I propose that pseudo-resultatives also modify created individuals, but with these adjectival predicates the modification takes place without any special pragmatic operations. Instead, with a particular class of verbs which I call 'root creation verbs,' there is an element which denotes a created individual accessible in the syntax.[11]

More specifically, the entailments that need to be captured are illustrated in (69):

(69) Entailments of Root Creation Verbs with Pseudo-Resultatives:
    a.   Mary braided her hair tight. → A tight braid was created.[12]
    b.   Mary tied her shoelaces tight. → A tight 'tying'/bow was created.
    c.   Mary piled the cushions high. → A high pile was created.
    d.   Mary chopped the parsley fine. → Fine 'pieces' were created.
    e.   Mary sliced the bread thin. → A thin slice was created.
    f.   Mary ground the coffee beans fine. → Fine coffee grounds were created.

Crucially, the creation entailment is possible even in the absence of the pseudo-resultative, and thus is contributed by the verb itself somehow:

(70) Entailments of Root Creation Verbs:
    a.   Mary braided her hair. → A braid was created.
    b.   Mary tied her shoelaces. → A 'tying'/bow was created.
    c.   Mary piled the cushions. → A pile was created.
    d.   Mary chopped the parsley. → Pieces were created.
    e.   Mary sliced the bread. → A slice was created.
    f.   Mary ground the coffee beans. → Coffee grounds were created.

My proposal is that for the examples in (69), the pseudo-resultative modifies a constituent which denotes a set of individuals, for (69a) a set of braids, giving a meaning equivalent to 'tight braid.' The result-oriented interpretation of the modifier arises because the constituent it modifies is interpreted as an individual created by the event. What is needed to allow for this compositional analysis of pseudo-resultatives is the presence of a constituent which denotes a set of individuals in the syntax. This is precisely the kind of constituent

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[11]In Levinson (2007) I used Geuder's term 'implicit creation verbs,' and proposed a revision to his definition of the class such that it could capture the class of verbs which license pseudo-resultative predicates. Here I use the new term 'root creation verbs' to highlight the need for two distinct verb classes — 'implicit creation verbs' as defined by Geuder which license resultative adverbs, and 'root creation verbs' as defined here which license pseudo-resultative predicates.

[12]The entailment is that at least one braid was created, not that exactly one braid was created. Thus the sentence is compatible with multiple braids being created as well. The same applies for all of the examples, except that I have indicated the plural for the entailments of *chop* and *grind*. Independently of the interpretation of pseudo-resultatives, it does not seem compatible with the nature of chopping and grinding events to create a single entity, at least on a token rather than type interpretation.

provided by syntactic accounts of lexical decomposition in the tradition of Hale and Keyser (1993, 2002). I propose along these lines that a particular class of verbs, root creation verbs, have a syntactic decomposition which allows for modification of a constituent with the necessary semantic properties to give rise to a pseudo-resultative modification. The proposed structure for such verbs is in (71), using *braid* as an example, where the arrows represent word-building movement:[13]

(71)
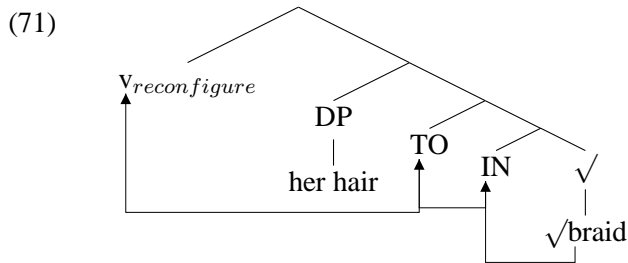
The motivations for and details of this analysis will be presented throughout the remainder of this section. However, at an intuitive level, this structure can for now be understood as drawing a parallel between the two sentences in (72):

(72)   a.   She braided her hair.
       b.   She made her hair into a braid.

Given such a structure, the proposal is that pseudo-resultative modification involves modification of the root, such that movement of the root to higher heads 'strands' the modifier:

(73)
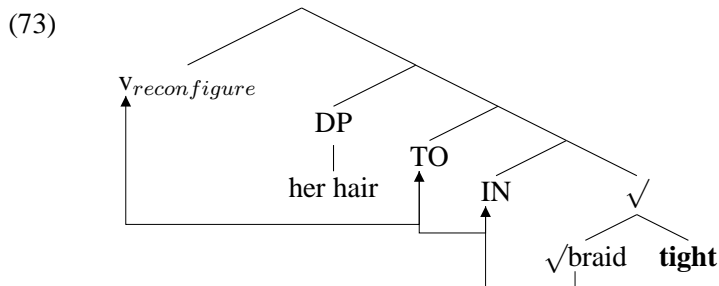
Syntactic decomposition of the verb to the root level provides a constituent that is 'not yet' a verb which the pseudo-resultative adjective can modify. A crucial implication of this analysis is that the root must be of a semantic type that can be modified by an adjectival element. I propose that this root, though neutral with respect to traditional syntactic categories like N and V, has a semantic type of <e,t>, where *e* is the type of entities and *t* the type of truth values, giving a set of individuals. In this particular example, the root would denote the set of braids. The pseudo-resultative modifier can then be treated straightforwardly as an intersective modifier, also of type <e,t>, as in (74):

(74) $\lambda x.\text{braid}(x)$ & $\text{tight}(x)$

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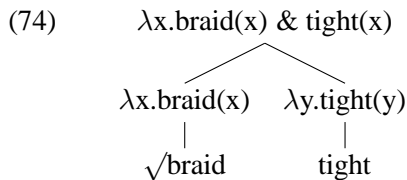
[13]It is not crucial to the present account whether this word-building is actually done by movement or some other kind of conflation operation. All of the structures presented however would be compatible with a head-movement analysis.

Within this proposal, the restriction of pseudo-resultatives to this particular class of verbs is due to the combined requirement for a root of type <e,t> and a root which will be interpreted as a created individual based on its role within the composition of the event. In the following sections the compositional semantics of root creation verbs and their modification by pseudo-resultatives will be outlined in more detail.

4.1 Defining Root Creation Verbs

As discussed above, root creation verbs as in (75) entail the creation of an entity, but that entity is not expressed by an argument of the verb:

(75)   a.   Mary braided her hair.
        b.   She tied her shoelaces.
        c.   Mary piled the cushions.
        d.   She chopped the parsley.
        e.   She sliced the bread.
        f.   She ground the coffee beans.

I will focus on these examples of root creation verbs, but some other verbs which can receive a similar interpretation in English include *powder*, *heap*, *dice*, *cube*, *knot*, *loop*, *coil*, *copy*, *pickle*, and *stack*.[14]

So far, it may seem as though these verbs semantically fall into the class of implicit creation verbs defined by Geuder (2000). However, this class includes verbs such as *decorate* and *dress*, which do not license adjectival pseudo-resultative modification, as was shown in section 2.3.

The class of verbs which does license pseudo-resultatives, which I call root creation verbs, coincides to a great extent with those classified as 'goal' verbs by Clark and Clark (1979), except that they are not all amenable to a denominal analysis. Clark and Clark classify verbs which they consider intuitively denominal based on their relation to paraphrases involving nominal forms. These classifications are not intended to have direct theoretical status, but are descriptive. On Clark and Clark's classification, goal verbs are those for which the verb is derived from a nominal where the nominal names something (the *goal*) which the direct object of the verb (the *source*) becomes. In (75a), the goal would be the braid, and the source would be the hair. This can be compared to the argument structure found with the verb *make*, which represents the source as the direct object and the goal within a prepositional phrase:

(76)   She made her hair into a braid.

Make can also take a goal argument as a direct object and the source within a prepositional phrase:

(77)   She made a braid from her hair.

To distinguish between these different realizations of *make*, I will refer to the former as $make_{reconfigure}$ and the latter as $make_{create}$, where the subscript describes the effect on the direct object of the verb.

Clark and Clark define the class of goal verbs as follows: 'The important characteristic of these verbs is their factivity: The shape, entity, form, or role denoted by the parent noun comes to exist by virtue of the action denoted by the verb' (Clark and Clark 1979:774). Thus by definition all of the verbs in this class will involve an individual and an activity that can bring about the creation of such an entity.

There is some flexibility in the notion of 'source' and the nature of the activity that brings about the creation. In the case of *braid*, the source, such as hair, is arranged in order to create a braid. The same holds for *pile*, *tie*, and *stack*, among others. Verbs like *slice*, however, involve destruction of the source, such as a

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[14]Not all of these verbs will necessarily occur with pseudo-resultative predicates, due to the fact that the range of possible verb-adjective combinations is fairly limited. See section 5.5 for more on this issue.

loaf of bread, in order to create entities such as slices which consist of part of the original source. The verbs *chop* and *grind* are also destructive in this sense. This contrast does not seem to be relevant to the licensing of pseudo-resultative predicates, at least not in English.

Given this definition of root creation verbs, implicit creation verbs like *decorate* and *dress* can be ruled out from the class because they do not have the same creation entailments and do not require a source argument. To decorate does not entail the creation of any 'decorations' per se; rather one can add items to the scene without creating anything new. In the same way, the verb *dress* does not entail the creation of any new entities, only the arrangement of articles of clothing. These contrasts may seem vague, since one can envision dressing as creating an outfit. However, another important contrast between these verbs and the class I am defining as root creation verbs is that the direct objects of *decorate* and *dress* are not 'sources' in the terms of Clark and Clark (1979). Neither verb requires a direct object, and when one is present, it is interpreted as an affected theme, not source. To illustrate this contrast, we can consider how these verbs would be used if they were in fact root creation verbs, rather than implicit creation verbs. *Dress* would fit into the class of root creation verbs only if the articles of clothing that are made into an outfit were realized in the direct object position. For example, it would be able to occur in a sentence such as *She dressed the new clothes*, with the interpretation that the new clothes were made into an outfit. This is not a possible interpretation, however. Similarly, *decorate* as a root creation verb would occur in sentences such as *She decorated the string lights*, where the lights are made into decorations. Again, this is not an available interpretation for the verb. Thus neither verb belongs in the root creation class, which correlates with the fact that they do not license adjectival pseudo-resultative predicates.

Clark and Clark (1979) consider goal verbs to be denominal, however in the next section I will present an updated analysis for root creation verbs as being built from roots which denote goals, rather than from nouns per se.

4.2   The Root

In the previous section, it was argued that root creation verbs correspond to goal verbs, which Clark and Clark (1979) describe as being derived from a noun which stands in a goal relation to the event. In this section, I will integrate this approach into a more recent approach to word derivation, that of Distributed Morphology, where such 'denominal' verbs can be viewed as derived directly from roots, rather than from nouns. It will also be shown that pseudo-resultatives can in turn provide insight into the ontology of such roots.

4.2.1   Roots in Lexical Semantics

There is a strong precedent in the area of lexical semantics for breaking lexical meaning down into two different kinds of semantic primitives. For example, Dowty (1979) discusses the possibility of deriving Vendler's aspectual classes by breaking out basic predicates like CAUSE and DO, in the style of Generative Semantics. The combinations of these predicates can then be correlated with the aspectual patterns of verbs. However, these predicates cannot describe the difference between verbs within an aspectual class, such as the activity verbs *run* and *walk*. This is taken care of by the component of meaning variously called the 'root,' 'semantic content' (Grimshaw 2005 [1993]), or 'constant' (Jackendoff 1990). This notion of the root provides the foundation for work which attempts to bring the combination of a word's root and its structure into the syntax proper, as described in the next section.

4.2.2   Roots in Distributed Morphology

This analysis is set within the framework of Distributed Morphology as laid out in Halle and Marantz (1993), Marantz (1997) and Arad (2003). A foundational aspect of this framework is the 'single engine hypothesis,'

that there is one computational system which generates both words and larger constituents. In this framework, words are not built in the lexicon, but rather in the same fashion as phrasal constituents, in the syntax. Words are not atomic, but are built from *roots* (see also Pesetsky 1995), which constitute the atomic syntactic terminals providing the 'lexical' content. This root is what contributes the verb's 'idiosyncratic,' or conceptual, meaning, in the tradition of the work in lexical semantics cited above. For example, the lexical root is what makes *braid* mean something different from *pile*. In these cases, the difference can be pinned down to a contrast in the kind of entity that is created by the event described by the verb. Thus, to 'braid' is to create a braid or braids, while to 'pile' is to create a pile. These roots are analyzed as lacking traditional categorial specifications like 'verb' or 'noun.' Rather, they seem to 'join' these syntactic categories when they combine with what are considered to be category-specific heads in the syntax.

For example, in Hebrew, roots are consonant clusters which cannot be pronounced on their own. This is illustrated in the table in (78) from Arad (2003:746), which shows the various words that can be formed from the root $\sqrt{sgr}$, all related to the concept of closure. The 'template' column lists various templates for deriving words from roots, where C is a variable ranging over root consonants. Thus combining the root $\sqrt{sgr}$ with the template CaCaC produces the word *sagar*, the verb 'close.' It can be seen that $\sqrt{sgr}$ itself is not specified for any lexical categories such as verb or noun, as there is no basic word form in common. What these words share is only the root. No word in (78) contains any other word in the table, and thus they are not derived from each other.

(78)

	Template	word	gloss
a.	CaCaC (v)	sagar	'close'
b.	hiCCiC (v)	hisgir	'extradite'
c.	hitCaCCeC (v)	histager	'cocoon oneself'
d.	CeCeC (n)	seger	'closure'
e.	CoCCayim (n)	sograyim	'parentheses'
f.	miCCeCet (n)	misgeret	'frame'

All of the words derived from $\sqrt{sgr}$ contain the same root consonants, but different words can be formed from the same root by combination with different heads.

The proposal here is that, in the derivation of a root creation verb such as *braid*, there is a root, in this case $\sqrt{braid}$. This root is embedded within an eventive *v*P, where an event variable is contributed by the presence of an eventive *v* head. At this stage of the derivation, it is not possible for the pseudo-resultative to modify the verb, either syntactically or semantically. However, before the *v* is merged, the category-neutral root bears neither the category 'verb,' nor eventive semantics. Rather, the root contributes the denotation of the entity which is created as a result of the event. I argue that at this point of the derivation the root of the verb is syntactically available for modification by an adjective, and thus for pseudo-resultative modification. The root is also semantically able to compose with the adjective, as in such cases its denotation is that of a predicate of individuals, as will be shown in more detail in section 4.5.

This analysis is different from a denominal analysis in that the availability of such derivations is not dependent upon the root actually being realized as a stand-alone noun in the language in order for it to be used as a root with a predicate of individuals denotation. In Hebrew, we see that verbs derived from roots do not necessarily 'contain' the meaning of a noun derived from the same root. Similarly, in English, the root $\sqrt{chop}$ can be found in both verbal and nominal contexts, yet the noun *chop* is not used to refer to the result of chopping parsley, because the noun *chop* when used in reference to an entity is typically used to refer only to cuts of meat:

(79)   Mary chopped the parsley. ↛ The parsley has been made into chops.

Whether a root of a given type is realized as a particular category in the syntax seems to vary across languages, as can be seen from the fact that the Japanese root equivalent to $\sqrt{braid}$, $\sqrt{yu}$, appears as a verb as

in (80), but does not occur in a nominal context without being embedded in a phrase translated as 'way of braiding' (81):

(80)   Mary-ga   gami-o   yu-u.
            Mary-NOM hair-ACC braid-PAST
            'Mary braided the hair.'

(81)   Yu-i   kata-ga   kata-i.
            braid-i way-NOM tight-A
            'The way of braiding is tight.'

Thus in Japanese there is a root creation verb for braiding, and yet there is no simple noun 'braid.' What this highlights is that the crucial test for the type of the root is not correspondence to a word of another category, as is assumed with a 'denominal' approach to such verbs. Such an approach would lead us to believe that the equivalent to *braid* in Japanese is entirely different from *braid* in English, whereas this is contrary to fact, as argued in Levinson (2007). In order to evaluate the properties of the root, these must be considered within a particular context so that what is being investigated is truly the root rather than the structure it is embedded within.

4.2.3   Recasting Denominals and the Ontology of Roots

There are several other classes of 'denominal' verbs in English classified by Clark and Clark (1979). The main classes (excluding 'miscellaneous' cases) are exemplified in (82):

(82)   a.   Jane blanketed the bed. (Locatum)
        b.   Kenneth kennelled the dog. (Location)
        c.   Julia summered in Paris. (Duration)
        d.   John butchered the cow. (Agent)
        e.   John witnessed the accident. (Experiencer)
        f.   Edward powdered the aspirin. (Goal)
        g.   Edward worded the sentence. (Source)
        h.   John bicycled into town. (Instrument)

The classification of verbs as falling into the broad class of denominals by Clark and Clark (1979) is based on the existence of paraphrases with nouns. However, the directionality assumed in calling such verbs 'denominal' is far from obvious. Thus, verbs as in (83) are not considered denominals by Clark and Clark, despite the fact that they are also zero-related to nouns:

(83)   a.   The professor laughed.
        b.   The boy walked to school.

Intuitively, the relevant contrast is that the verbs in (83) as well as their corresponding nouns seem inherently 'eventive,' while those in (82) seem to basically denote entities, typically associated with nouns. However, this is not a syntactic contrast, but rather a semantic one. If such intuitions are suggestive of anything, it is that the former (82) are derived from elements which denote predicates of individuals, while the latter (83) do not contain predicates of individuals, but are more 'directly' predicates of events. Even this claim requires further substantiation from relevant linguistic contrasts. Without a theory of root types and their role in verbal derivation, if one wanted to argue that *laugh* is in fact derived but *walk* is not, no clear predictions would be made.

Pinker (1989), Jackendoff (1990), and Rappaport Hovav and Levin (1998), among others, provide lexical semantic analyses which present ontological categorizations of root (or 'constant') types which include types such as manner, state, instrument, and place. These types are designed to determine what kind of lexical semantic templates or event structures the roots can be inserted into. They can be used to explain, for example, the difference in possible range of meanings and argument realizations between verbs of externally caused change of state (e.g., *break*) and verbs of surface contact through motion (e.g., *sweep*) as demonstrated in Rappaport Hovav and Levin (1998). Rappaport Hovav and Levin identify the former as being derived from constants which lexicalize results, a kind of state, while the latter lexicalize manner, based on intuitions about basic conceptual meaning. However, this kind of ontology does not make predictions about the possibility of syntactic modification of constants, as these representations belong to a separate lexical semantic component. The objective here is not to explain what it is conceptually about braiding, for example, that allows the root √braid to occur in the environments it does. The aim is instead to identify the formal semantic types of these roots as relevant to the compositional semantics, and to thus identify the correlations between both the argument structure and modification possibilities that can be made based on these lexical properties.

Harley (2005) (a development of Harley 2002) tries to draw concrete predictions from the semantic types of roots as compositionally active participants in the syntax. She argues that at least some 'denominal' verbs are semantically derived from roots which denote 'things,' or entities. Harley does not formalize this claim. However, we can assume that these are predicates of individuals, and using the variable e for entities, or individuals, and t for truth values, such roots would be of type <e,t>. Semantically this set of individuals shares the property denoted by the common noun.

Harley further argues that other verbs, such as those in (84), are derived from roots which denote states:

(84) a. The archaeologist **opened** the sarcophagus.
      b. Sue **cleared** the table.
      c. Jill **flattened** the metal.

Harley proposes that these are all change-of-state verbs which contain a state-denoting root. If we use the variable s for eventualities (a type including both events and states), subscripting with an s for states, such roots would be of type $<s_s,t>$. Further, there are verbs which are derived from eventive roots, as in (85):

(85) a. Sue **danced**.
      b. Sue **hopped**.

Such verbs, if derived from predicates of events, would have roots of type $<s_e,t>$, where the subscript e on s is used to represent the subclass of eventualities which are events (rather than states). Thus we have at least the following three-way division:

(86)   root types

      <e,t> $<s_s,t>$ $<s_e,t>$
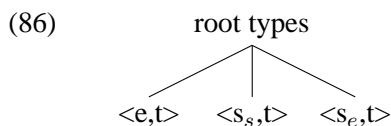
The support for the semantic relevance of these contrasts is based in telicity contrasts. Harley (2005), like Dowty (1979), attempts to derive aktionsart properties of verb phrases from the semantics of verbal roots.[15]

Harley's hypotheses are difficult to test, however, since no independent means of assessing the semantic type of a root are presented. This problem is highlighted by the problem of the verb *spit* discussed in Harley (2005). Harley observes that this verb is problematic, because it seems plausibly individual denoting,

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[15]Harley (2005) does not make an explicit distinction between category-neutral roots and nouns, but generally uses the term 'root' for the lexical component of the verbs.

considering the availability of the noun *spit*. However, the verb patterns contrary to the predictions for verbs derived from individual-denoting roots. Thus Harley concludes that the verb *spit* is after all derived from an event-denoting root. While this may ultimately be the correct analysis, it is clear that intuitions are not sufficient for determining root type. Although Harley's account goes much further than previous accounts in formulating a strong hypothesis about root ontology, it still ultimately relies on vague intuitions in determining root type. Lacking additional correlations, the analysis is limited in its predictive power.

Pseudo-resultatives present the kind of independent evidence needed to confirm that a verb is derived from a predicate of individuals; they allow us to say that a root creation verb like *slice* is derived from a root of type <e,t> not just because it is phonologically identical in some forms to a noun, but because its root can be modified by an adjective which would not compose with, for example, a root of type $<s_e,t>$.

The next few sections will address the question of how this root of type <e,t> comes to ultimately form a verb and select 'verbal' arguments.

4.3 Relation of the Root to the Object DP

In the previous sections, it was argued that the roots of root creation verbs denote predicates of individuals. One might then ask how such roots semantically compose with the apparent 'direct objects' of the verbs they derive. Assuming that the DP denotes an individual, of type *e*, one possibility for composition with the root, of type <e,t>, would be via function application, as in (87):

(87)   braid(her hair)

λx.braid(x)   her hair
    |
  √braid
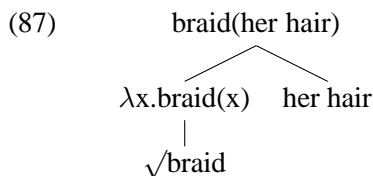
The result of this composition would be a proposition that 'her hair' is a braid. This is not the desired result, as the entailment of the root creation verb *braid* is not that the hair is a braid, but rather that the hair is **in** a braid. Another option which could capture the appropriate entailments is to relate the two elements via one or more additional relational elements, such that they do not compose with each other directly. This is the proposal that I will argue for in this section. The alternative that I propose is that the root is related to the direct object via functional elements which are semantically somewhat like prepositions; the proposed structure appears similar to those proposed in Hale and Keyser (1993, 2002), though it differs from their account in many of the syntactic and semantic details.

The morphological case marking in Finnish that was seen in sections 3.1.1 and 3.2.2 provides insight into the relation between the root and the source argument of root creation verbs. Recall the following data, where we can see that the pseudo-resultative is marking with illative case:

(88)   Mari leti-tt-i   hiukse-nsa   tiukka-**an**.
        Mari braid-CAUS-PAST hair-ACC.POSS tight-ILL
        'Mari braided her hair tight.'

As shown in section 3.1.1, illative is a spatial case in Finnish. It is used in many of the same environments where the preposition *into* is used in English:

(89)   Mari pisti hiukse-nsa   letti-**in**.
        Mari put   hair-ACC.POSS braid-ILL
   'Mari put her hair **into** a braid.'

The presence of the illative case marker on pseudo-resultatives would follow if there is also a spatial relation like that introduced by *into* in English that is present in root creation verbs. That is, the notion that the verb represents a 'goal' suggested by Clark and Clark (1979) is reflected as a spatial relation between the root of the verb and its source argument. So, in sentences like (90), the creation or goal, a braid, is made out of hair, the source:

(90)   The stylist braided her hair.

This relation is similar to the one introduced by the preposition *into* in sentences such as (91):

(91)   The stylist made her hair **into** a braid.

In this case, the complement of the preposition *into*, *a braid*, is the goal, while the specifier of the preposition, *her hair*, is the source. The semantic parallelism between these sentences to be defended in this section is represented in the trees in (92). The preposition *into* in (92a) is broken down into the prepositions *in* and *to*, for reasons to be discussed in the next section. The covert parallels to these that are present within root creation verbs are labelled IN and TO in (92b), with capital letters signifying the non-pronunciation of these elements in this context:

(92)   a.

b.
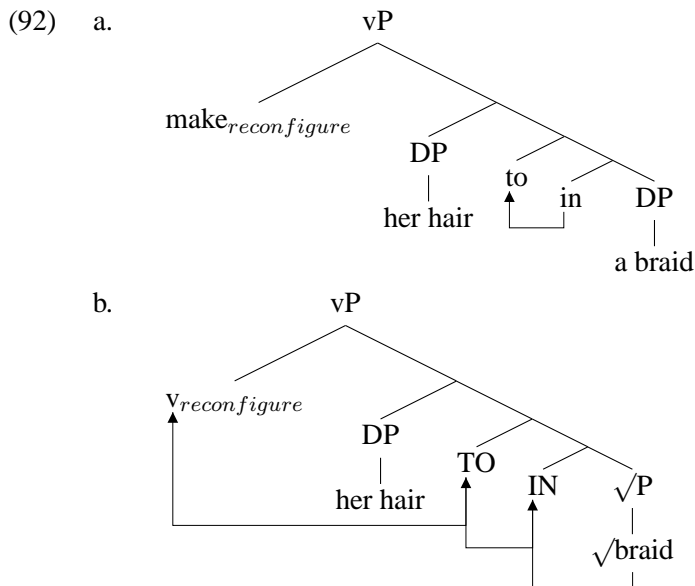
I will argue that, despite surface syntactic differences, the semantic structures underlying both types of sentences are very similar. The essence of the proposal is that root creation verbs differ semantically from sentences like (91) only in the category of the goal 'argument,' the argument type of the localizer elements, *in* and IN, and the denotation of the eventive heads, $make_{reconfigure}$ vs. $v_{reconfigure}$.

4.3.1 Spatial Semantics

One aspect of the preposition *in* as it occurs with $make_{reconfigure}$ is its spatial contribution. On this level, the preposition *in* can be treated as a simple spatial element which relates the two DPs by establishing one (the theme) as the constituting material of the other (the goal). This is a special kind of spatial configuration — it is ultimately not enough that the hair is located in a braid. However, I propose that this difference is not due to the element relating the two DPs, but rather to the verb that occurs with that element, which I return to in the next section. So, in (93), *into* is purely spatial because it occurs with a purely spatial verb. However, the relation between the DPs in (94) is one where the goal is constituted by the theme, because the verb is not a purely spatial verb.

26

(93)   She put the fleece into the cabinet.

(94)   She made the fleece into a scarf.

Since the source describes the material that constitutes the goal, the two are necessarily in the same location. In the terminology of Kracht (2002), *in* specifies the configuration component of the relation between the DPs, called a localizer.[16] *In* can be seen to be used independently in this way in the following examples:

(95)   a.   Her hair is **in** a braid.

     b.   The pillows are **in** a pile.

     c.   The bread is **in** slices.

     d.   The vase is **in** pieces.

I propose that a null element with similar semantics is present in root creation verbs. This element, which I will call IN, differs from *in* in pronunciation and in the syntactic and semantic category of its complement. However, the relation between the arguments of each preposition is the same. *In* is analyzed as being of type $<e,<e,t>>$, taking two individual, type *e* arguments, as represented in the denotation in (96):

(96)   〚 in 〛 (preliminary) = $\lambda x_e \lambda y_e$.y is in x

IN, on the other hand, does not combine first with an individual, but rather a predicate of individuals. In the case of root creation verbs, this predicate of individuals is the root of the verb.

(97)   〚 IN 〛 (preliminary) = $\lambda f_{<e,t>} \lambda y_e \exists x_e$.f(x) & y is in x

According to Kracht (2002), in addition to the configuration component, there is also a 'mode' component to locatives (with or without true spatial meaning), called the modalizer. The mode specifies how the 'mover' moves with respect to the configuration. If the mover is in the configuration at the beginning of the event, the mode is 'co-initial'; if it enters the configuration at the end of the event, the mode is 'cofinal.' If the mover does not change in configuration during the event, then the mode is 'static.' There are also 'transitory' and 'approximative' modes which are not relevant to the discussion here.

To is present when there is a cofinal mode; although the hair in a braiding event does not start out being in a braid, at the end of the event, the braid and the hair share a location, and are thus cofinal. Examples of *to* used cofinally in English are given in (98):

(98)   a.   She ran **to** the store.

     b.   The water changed from hot **to** cold.

Unlike *in*, however, the contribution of *to* might be dependent on the verb. That is, while *to* in English usually co-occurs with events that are 'dynamic' in the sense of Kracht (2002), such that the mover undergoes a change of location or state, this dynamic component may be contributed by the verb, rather than the preposition itself. It is difficult to determine which of these elements contributes the dynamic semantics, and for present purposes I assume that this meaning is interpretable on the *v*, not the modalizer, here realized as a preposition. More specifically, I assume that overt and null *to*/TO are identity functions, or type-theoretically inert elements. Ultimately future work may reveal that these prepositions make a richer contribution to the verb meaning, especially in light of other examples pointed out by an anonymous reviewer, where *to* seems like a more plausible candidate for contributing the 'dynamic' meaning:

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[16]Kracht's (2002) discussion of locative case and prepositions provides a clear means for distinguishing the notions being discussed here on an intuitive level. However, given the basic combinatorial semantics used here for the locative prepositions, the analysis as presented does not rest on, nor truly incorporate, Kracht's formal analysis. It should ultimately be compatible with a variety of approaches to the semantic decomposition of locative expressions such as Ameka (1995) and Zhang (2002).

(99)   The couple waltzed to stage right.

(100)   The plate clattered to the floor.

However, their function for the purposes of this paper is considered to be primarily syntactic, in that they bear uninterpretable features which must be checked by the *v* head. What is most important for the analysis here is that the prepositional constituent is ultimately a predicate of states which can combine with the relevant *v* head, as will be argued for in the following section.

4.3.2   State Argument

The analysis presented above identifies a spatial relation between the root and the object of the verb. Given this analysis so far, the resulting constituent which needs to combine with the eventive *v* head would be a proposition, of type *t*. However, there are several arguments that this constituent is not of type *t*, but also has a stative eventuality argument, and is at least of type <s,t>.

Kracht (2002) argues independently for the presence of an eventuality argument within locative PPs, as a necessity for accounting for the locative semantics itself. For further evidence for the presence of a state variable in this constituent based on *re-* prefixation, see Levinson (2007).

The denotations for *in* and IN revised to represent this state argument are as follows:

(101)   a.   ⟦ in ⟧ = $\lambda x_e \lambda y_e \lambda s_s$.being-in(s,x) & theme(s,y)

       b.   ⟦ IN ⟧ = $\lambda f_{<e,t>} \lambda y_e \lambda s_s \exists x_e$.f(x) & being-in(s,x) & theme(s,y)

4.4   Relation of the Root to the Event

The above composition of the root with a relational functional element and the direct object DP in the derivation of root creation verbs results in a phrase which is of type $<e,<s_s,t>>$, or a predicate of states with an unsaturated individual argument. However, root creation verbs are eventive, not just stative. This eventiveness arises from the combination of the previously detailed building blocks with a verbal or *v* head. The relational small clause containing the root of the verb and the direct object will thus be related to the main event of the sentence. At least some such verbs exhibit causative morphology in languages that have it, such as Finnish, as seen in the following example:

(102)   Mari leti-**tt**-i   hiukse-nsa.
       Mari braid-**CAUS**-PAST hair-ACC.POSS
       'Mari braided her hair.'

However, there is more than causative semantics introduced by the verb, as the complement of the verb is locative, yet the meaning of the verb is not purely spatial, as was discussed above. Rather, the eventive head bears additional meaning, such as that found with make$_{reconfigure}$. Although in some contexts the verb *make* seems like a purely causative verb, as in (103a), *make$_{reconfigure}$* always brings along an entailment of creation (103b).

(103)   a.   She made the waiter wipe the table.

       b.   She made the wood into a table.

The type of creation entailed is one in which the theme is reconfigured into a new entity; thus, in (103b), the table is created from the wood. On the current analysis, the aspect of configuration is accounted for by the semantics of the PP, which denotes the set of states in which the wood is in a table. However, the creation semantics must be added still, since the sentence cannot mean that wood was somehow added to an already

existing table. I will not go into any depth here on the semantics of creation verbs, but will simply represent this requirement as the verb being a predicate of reconfiguration events.

Carrying this over to the *v* in root creation verbs, I propose that this *v* is a 'light' creation verb parallel to $make_{reconfigure}$ as discussed above, which contains causative semantics. The state introduced by the PP is brought into being by an event of creation. The denotation proposed for this *v*, which I will call $v_{reconfigure}$ is in (104):

(104)   ⟦ $v_{reconfigure}$ ⟧ = $\lambda f_{<s,t>} \lambda e_s \exists s_s . f(s)$ & reconfiguration(e) & CAUSE(s,e)

The causative semantics here involve causation of a state (as a subsort of eventualities), rather than a distinct event. This aspect of the $v_{reconfigure}$ head is akin to the causative head proposed for resultatives in Kratzer (2005).

The derivation up through *v*P would proceed as follows:

(105)   a.   She braided her hair.
        b. $\lambda e_s \exists s_s \exists x_e . braid(x)$
                          & being-in(s,x) & theme(s,her hair)
                          & reconfiguration(e) & CAUSE(s,e)

  $\lambda f_{<s,t>} \lambda e_s \exists s_s . f(s)$ $\lambda s_s \exists x_e . braid(x)$ & being-in(s,x)
  & reconfiguration(e) & CAUSE(s,e)   & theme(s,her hair)
                |
           $v_{reconfigure}$

                                    e $\lambda y_e \lambda s_s \exists x_e . braid(x)$
                                    | & being-in(s,x) & theme(s,y)
                                her hair
                                           TO $\lambda y_e \lambda s_s \exists x_e . braid(x)$
                                                     & being-in(s,x) & theme(s,y)

                          $\lambda f_{<e,t>} \lambda y_e \lambda s_s \exists x_e . f(x)$ $\lambda x_e . braid(x)$
                          & being-in(s,x) & theme(s,y) |
                                        | √braid
                                       IN

I follow Kratzer (1996) in positing that the agent is introduced by an independent semantic building block, called *voice*. Pylkkänen (2002) argues that causative *v* heads in English are always 'bundled' with the *voice* head, in that no causative *v* occurs without the introduction of a *voice* head:

(106)   ⟦ voice ⟧ = $\lambda x \lambda e . agent(e,x)$

For root creation verbs, the composition of *voice* would proceed straightforwardly as event identification (Kratzer 1996). The subject will then be merged as the agent of the causing event, as in Pylkkänen (2002).

4.5   Composition of the Root and Pseudo-Resultative

To complete the picture, given the structure for root creation verbs given above, the addition of the pseudo-resultative would be as in (107):

(107)

Semantically, as proposed in section 4, the root and the pseudo-resultative modifier are both of type <e,t> and combine via predicate modification. This results in a constituent that is the same type as the root itself, <e,t>, and thus the composition proceeds in the same manner as when the pseudo-resultative is not present. Syntactically, the root must be the head of the predication structure, such that the syntactic category of the root is not affected by the addition of the adjective. That is, this modification more closely resembles DP-internal adjectival predication, where the addition of an adjective does not affect the syntactic category of the larger DP, than a predication structure such as a small clause. If there were some type of small clause, then the head of that small clause would be of a different category than the root itself and would not be selected by the same heads, such as INTO, which select the root √braid.

To the extent that this modification resembles DP-internal predication, it is in English most like post-nominal, rather than attributive, modification. This can be seen in examples like (108), which show that plural morphology is possible within the post-nominal modifier, but not the prenominal modifier (Sadler and Arnold 1994):

(108)   a.   a three foot/*feet high pile
        b.   a pile three *foot/feet high
        c.   The pile was three *foot/feet high.

(109) shows that the pseudo-resultative patterns in the same way as post-nominal modifiers:[17]

(109)   Mary piled the books three *foot/feet high.

The same is true of other secondary predicates:

(110)   She$_i$entered the school [three *foot/feet tall]$_i$(and left a foot taller).
(111)   They built the tower$_i$[thirty *story/stories high]$_i$.

In this section, it was shown that root creation verbs are semantically complex in a way that is grammatically relevant, since such complexity is necessary to explain the semantic role of pseudo-resultative predicates. It was further argued that the lexical roots of such verbs are predicates of individuals, and are related to the direct object of the verb via relational heads which make spatial and stative contributions to the composition. These arguments are independent of purely intuitive notions of the semantics of such roots, and thus provide methods for evaluating predictions based on root types.

4.6   Morphosyntactic Issues

In this section, it will be shown how the proposal accounts for the morpho-syntactic properties of pseudo-resultatives presented in previous sections.

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[17]I would like to thank Chris Collins for bringing this contrast to my attention.

4.6.1 Root Creation Verbs and Locative Case

As shown in section 3.1.1, Finnish pseudo-resultatives are marked with illative case. This illative case marking relates in this and other contexts to the INTO complex proposed in the structure of root creation verbs. In the Finnish parallel to a sentence with $make_{reconfigure}$, the created object and its modifier are also marked with illative case, just as the English example has an overt instance of the preposition *into*, as seen in (112):

(112) a.   Mari leti-tt-i   hiukse-nsa   tiukka-**an**.
                Mari braid-CAUS-PAST hair-ACC.POSS tight-ILL

                'Mari braided her hair tight.'

      b.   Mari pisti hiukse-nsa   (tiukka-**an**) letti-**in**.
                Mari put   hair-ACC.POSS (tight-ILL) braid-ILL

                'Mari put her hair into a tight braid.'

The illative case marker on the pseudo-resultative predicate would follow if, as proposed, there is a locative structure similar to that in (112b) embedded in the root creation verb. The proposal is that there is a head within this structure that assigns case to the goal argument, namely the head identified as TO in section 4.[18] Even when the head is not conflated into the verb it is null in Finnish. In current minimalist theory, the mechanism for case-assignment is Agree (Chomsky 1995, 2000, 2001). Agree is an operation which establishes a relation between a lexical item and a matching feature within a restricted domain. Matching is defined as a relation established by feature identity between a probe (such as *v*) and a goal (such as the object). The domain is defined as the sister of the probe, and locality as 'closest c-command.' So, a matching pair will agree if the goal is in the sister of the probe and there is no intervening match. A probe will not be able to Agree with a goal across another matching probe. Thus, structural objective case essentially reduces to object agreement, i.e., matching of φ-features between the probe *v* and the DP object results in an Agree relation which also deletes the uninterpretable structural case on the DP. A sketch of this is given in (113):

(113)   Agree

             vP
            / \\
       DP2   vP
             / \\
         v $[\varphi]$ VP
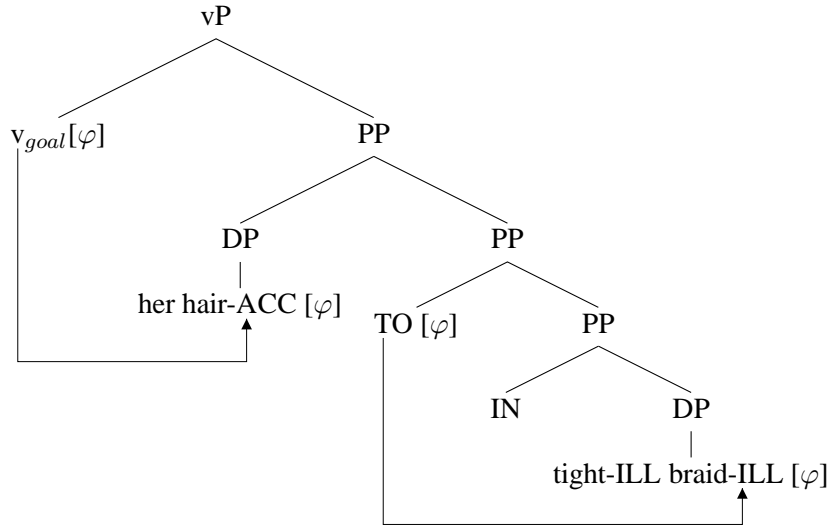   / \\
            V DP1 $[\varphi]$
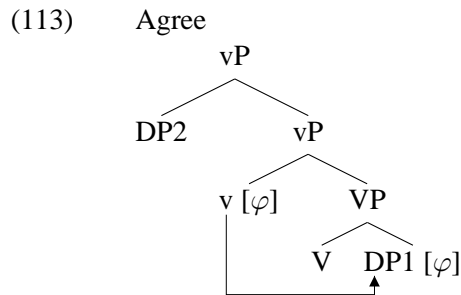
In this diagram, the arrow represents an Agree relation, rather than movement. Because of the Agree relation, DP1 will be assigned structural case.

In the structures relevant here, the case assignment is not done by the *v*, as *v* must assign accusative case to the source argument. Rather it is one of the relational heads that must assign the case. When the goal is realized as a DP, all elements in that DP will exhibit illative case, as in (112b), assuming the Agree relation in (114):
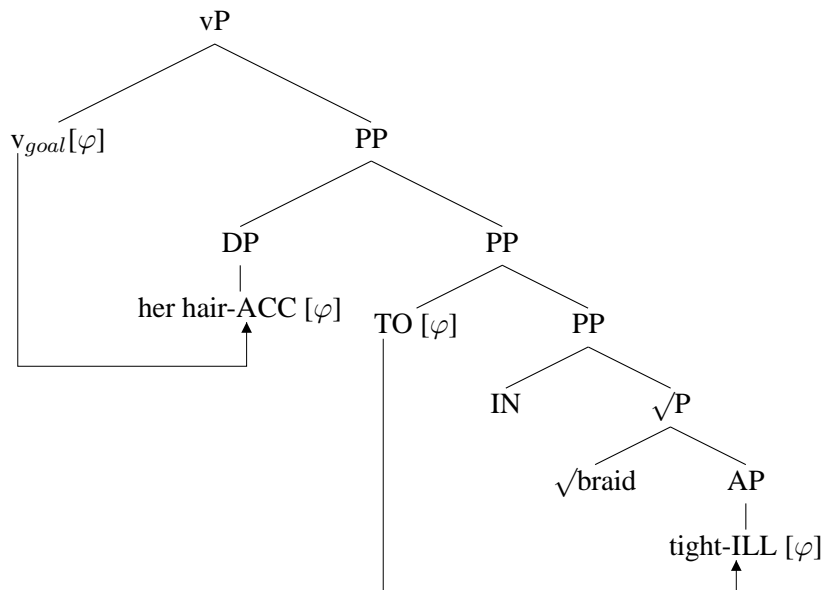
---

[18]The case assigned by the TO head must be somehow influenced by the lower preposition, IN, since the realization of illative case is dependent on both the properties of the localizer and the modalizer. If the localizer were equivalent to English *on*, rather than *in*, the case realized would be allative. I do not at present have a formal syntactic account for this type of compositional case assignment.

(114)

```
                        vP
          ┌──────────────┴──────────────┐
     v_goal[φ]                          PP
        │               ┌────────────────┴────────────┐
        │              DP                             PP
        │               │              ┌──────────────┴──────┐
        │         her hair-ACC [φ]    TO [φ]                 PP
        │                                        ┌────────────┴──────┐
        │                                       IN                  DP
        └─────────────────────────────────────────────────────────  │
                                                          tight-ILL braid-ILL [φ]
```

In the case where the goal is realized by the root, the TO element may agree with the pseudo-resultative AP instead. In Finnish, APs can stand alone as case-marked elements as seen extensively in the data presented here, in contrast with the inability of APs to be the complements of prepositions in English. This case marking must be in some sense optional, since the pseudo-resultative predicate is not an obligatory element, and thus there may be no constituent with overt illative case with root creation verbs. The Agree relation would proceed as in (115):

(115)

```
                        vP
          ┌──────────────┴──────────────┐
     v_goal[φ]                          PP
        │               ┌────────────────┴────────────┐
        │              DP                             PP
        │               │              ┌──────────────┴──────┐
        │         her hair-ACC [φ]    TO [φ]                 PP
        │                                        ┌────────────┴──────┐
        │                                       IN                  √P
        │                                             ┌──────────────┴──────┐
        │                                           √braid                 AP
        └────────────────────────────────────────────────────────────────  │
                                                                    tight-ILL [φ]
```

The presence of this case marking supports the syntactic presence of the spatial relational heads proposed for semantic reasons in section 4.

4.6.2 Agreement

In section 3, it was seen that agreement on pseudo-resultatives was different in Catalan than in Norwegian. There are several possible causes for this contrast. One possibility is that there is an additional semantic restriction on agreement in Norwegian. The prediction would be that one would find other cases of apparent mismatch between agreement and predication in Catalan, but not in Norwegian. Another possibility is that the pseudo-resultative predicates in Norwegian involve a different syntactic analysis, as suggested for

predicates with adverb morphology in English above. The collection of data necessary to determine which of these hypotheses is correct must be left to future work.

The agreement found with Catalan pseudo-resultatives is one case which highlights the syntactic, versus semantic, nature of such agreement. This is because the predicate agrees with the object DP, although that DP is not the subject of the predicate. That is, *estrets*, 'tight' in (59a) agrees with the object *els cordons de les sabates*, 'shoelaces,' although it is not the shoelaces that are tight at the end of the event, but rather the tying of the shoelaces. This syntactic agreement can be represented assuming that the adjective enters the derivation with uninterpretable ϕ-features and must check these against an element with interpretable ϕ-features, along the lines of Chomsky (1995). The object DP is the closest element bearing ϕ-features, since roots do not have them. This agreement relation is represented with an arrow in the tree in (116):

(116)
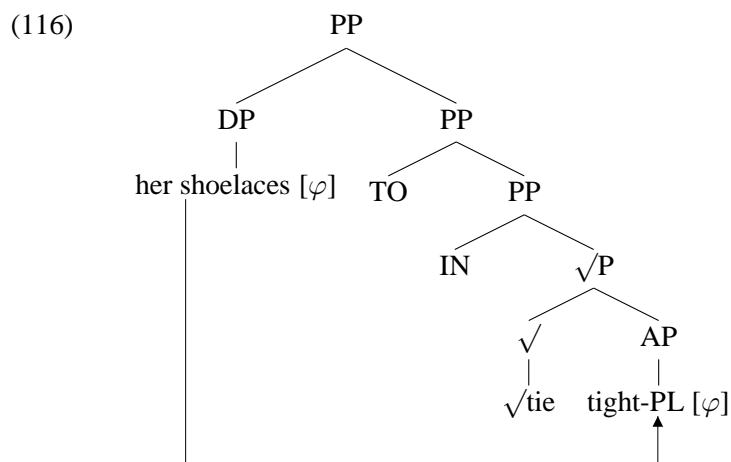
5 Further Predictions

The analysis presented makes further predictions with respect to the availability of pseudo-resultatives and related root modifiers with various verb classes, selection of direct objects, licensing of applicatives and parallels between root creation verbs and syntactically similar structures. These will all be discussed in this section.

5.1 Availability of Pseudo-Resultatives

The same roots that form root creation verbs sometimes can also form explicit creation verbs, characterized as 'build verbs' in Levin (1993), where the goal is realized as a direct object and the source argument is optionally realized in a PP:

(117)   She braided a necklace (out of wire). (i.e., a necklace was created by braiding)

In the terms of Rappaport Hovav and Levin (1998), in the context of root creation verbs, the root could be described as lexicalizing the result, while in explicit creation verb contexts, the root lexicalizes manner.

The root creation verb *braid* seems very amenable to this explicit creation reading, while other root creation verbs like *chop* and *pile* do not:

(118)   # She chopped a piece of carrot. (intended reading: a piece of carrot was created by chopping)
(119)   # She piled a tower of pillows. (intended reading: a tower of pillows was created by piling)

Conversely, verbs that can have explicit creation readings do not necessarily have root creation readings, as with *build*. In example (120), the object used is intended to force a root creation, rather than explicit creation, reading:
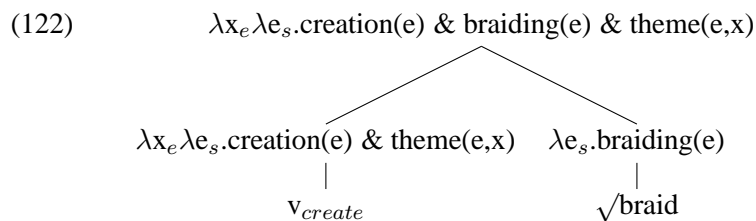
(120)   # She built the wood. (intended reading: the wood was reconfigured into a building)

Based on these data, we can see that these two verb classes are independent, but some roots like $\sqrt{}$braid are realized in both classes. From the lexical semantic perspective of Rappaport Hovav and Levin (1998), $\sqrt{}$braid then appears to behave like the example of *cut*, in that it is ambiguous between manner and result lexicalizations. In terms of formal semantic type, what these facts indicate is that $\sqrt{}$braid is ambiguous between two types. When the root is found in an explicit creation verb context, it cannot be of type <e,t> as was proposed for root creation verbs above.

　　Marantz (2005) proposes that explicit creation verbs have the structure in (121):

(121)　　　　　　　　vP
　　　　　　　　　／　＼
　　　　　　　v　　　a necklace
　　　　　／＼
　　　　v　$\sqrt{}$braid
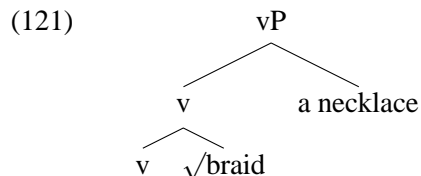
He suggests that the root in such cases is a manner modifier, of the sort also proposed by Harley (2005). We can arrive at this interpretation compositionally if the root of explicit creation verbs is a predicate of events, rather than a predicate of individuals. It can then combine with a variant of *v* I will call v_{create}, and the event-predicate root $\sqrt{}$braid can combine via event identification (Kratzer 1996), as in (122):

(122)　　　　　　$\lambda x_e \lambda e_s$.creation(e) & braiding(e) & theme(e,x)
　　　　　　　　　　／￣￣￣＼
　　$\lambda x_e \lambda e_s$.creation(e) & theme(e,x)　　λe_s.braiding(e)
　　　　　　　|　　　　　　　　　　|
　　　　　v_{create}　　　　　　　$\sqrt{}$braid

Although this mode of composition is different from that by which predicates of events combine with manner adverbs, the result is equivalent, in that both the root and v_{create} come to take the same event as an argument. The difference is that here the resulting expression has an open individual argument slot.

　　The realization of the root in this type of structure is dependent upon its range of possible denotations. The proposal is that the roots of explicit creation verbs denote predicates of events (of type $<s_e,t>$), and thus are able to combine with the relevant *v* heads directly, rather than via a relational structure. I represent the relevant *v* head as v_{create}, aligning it with *make$_{create}$*. V_{create} must be of $<e,<s_e,t>>$, since it takes a DP complement, and thus requires an individual argument.

　　This means that roots like $\sqrt{}$bake and $\sqrt{}$build are of type $<s_e,t>$, $\sqrt{}$chop and $\sqrt{}$pile are type <e,t>, and roots like $\sqrt{}$braid can be either of type <e,t> or $<s_e,t>$. However, the proposal is not that there is homophony between two roots in this case, but that one root is able to have more than one associated denotation, giving 'allosemy.' This would be parallel to the ability of one root to have multiple allomorphs. As with allomorphy, it is language specific what denotations are associated with which roots. Thus in English, $\sqrt{}$braid can denote either a predicate of type <e,t>, or $<s_e,t>$, while in another language, only one of these denotations might be available. The available denotations would determine the possible environments for insertion of the root.[19]

---

[19]Ultimately the range of possible denotations for a given root must be constrained by the 'encyclopedic' entry associated with the root, such that the root $\sqrt{}$braid in English can have a formal denotation of predicate of individuals or predicate of events, but the root must remain linked with the encyclopedic notion of braids/braiding such that $\sqrt{}$braid cannot denote, for example, a set of piles.

Crucially, in any given derivation, only one interpretation for the root is available. This predicts that the differences in interpretation that correspond to the differences in root type should have further consequences for the argument structure of these verbs.

Pseudo-resultatives are interpreted as they are because they are modifiers of type <e,t> roots that are embedded in root creation structures. If there is no such structure, then pseudo-resultatives are predicted to be unavailable. Thus pseudo-resultatives should be possible on the root creation verb reading of *braid*, but not on the explicit creation reading. In order to test this prediction, it is best to consider a language such as Finnish which morphologically distinguishes pseudo-resultatives from resultatives. The root √braid is possible in both root and explicit creation contexts in Finnish, just as in English. At first it would appear that the prediction is not borne out, since examples like the following are accepted, where the verb would seem to have an explicit creation verb and the secondary predicate bears illative case:

(123)   Mari leti-tt-i   leti-n   tiukka-an.
         Mari braid-CAUS-PAST braid-ACC tight-ILL
         'Mari braided the braid tight.'

However, it is possible that speakers accepting such sentences construe the verb as a root creation verb here, even though the object is biased towards an explicit creation reading. That is, speakers could interpret this sentence as similar in meaning to 'Mari made the braid into a tight(er) braid,' such that the object does not refer to a newly created object, but instead the individual which is reconfigured into a tighter braid. That this combination of verb and object is ambiguous between a root creation and explicit creation reading is supported by the fact that a translative-marked resultative is also possible (124), in contrast with the case where the object was 'hair' and the reading was unambiguously one of root creation (125):
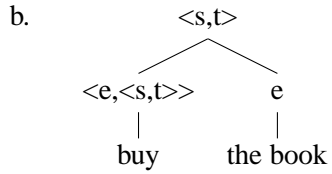
(124)   Mari leti-tt-i   leti-n   tiuka-ksi.
         Mari braid-CAUS-PAST braid-ACC tight-TRANS
         'Mari braided the braid tight.'
(125)   * Mari leti-tt-i   hiuksensa   tiuka-ksi.
         Mari braid-CAUS-PAST hair-ACC.POSS tight-TRANS
         Intended: 'Mari braided the hair tight.'

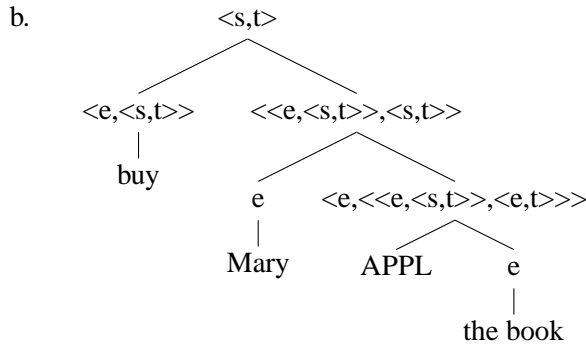## 5.2 Availability of Applicatives

Another predicted contrast between root creation and explicit creation verbs is with respect to 'licensing' an applicative argument, or 'second object.' Root creation verbs, and thus pseudo-resultatives, are predicted to be in complementary distribution with low applicative arguments, since the interpretation of the event and its arguments are not amenable to the addition of the possession relation introduced by the applicative head.

According to the analysis of the double object construction in English as in Pylkkänen (2002) (whereby recipient DPs are 'low applicatives'), applicative phrases are merged in the usual position of the direct object, such as the position of *the book* in (127b). The low applicative head, APPL, takes three arguments: two individual arguments (type *e*) and then a function of type <e,<s,t>>, as in (128b). The full type of APPL is <e, <e,<<e,<s,t>>,<e,t>>>>), as expanded in (126) from Pylkkänen (2002:22).

(126)   Low-APPL-TO (Recipient applicative):
         $\lambda x \lambda y \lambda f_{<e,<s,t>>} \lambda e.f(e,x)$ & theme(e,x) & to-the-possession(x,y)
(127)   a.   I bought the book.

b.
$$\langle s,t\rangle$$

$$\langle e,\langle s,t\rangle\rangle \qquad e$$

buy　　the book

(128)　a.　I bought Mary the book.

b.
$$\langle s,t\rangle$$

$$\langle e,\langle s,t\rangle\rangle \qquad \langle\langle e,\langle s,t\rangle\rangle,\langle s,t\rangle\rangle$$

buy

$$e \qquad \langle e,\langle\langle e,\langle s,t\rangle\rangle,\langle e,t\rangle\rangle\rangle$$

Mary　　APPL　　e

the book

The APPL head establishes a possession relation between its DP arguments, such that the first argument comes to be in the possession of the second.

Given the current analysis, the only position where the APPL head could semantically compose in a root creation context is as in (129):

(129)

Mary

APPL　the string　　TO　　IN　　√
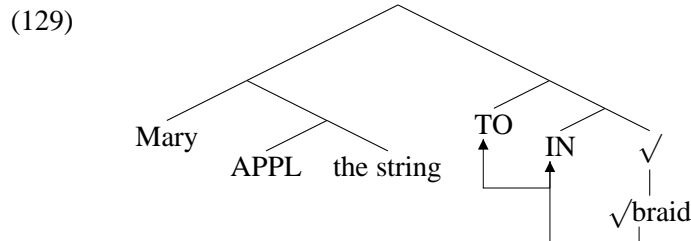
√braid

However, such a sentence would be semantically anomalous, because, given the semantics of APPL, it would have to entail that the agent transferred the string to Mary's possession by an event of making that string into a braid. The transfer of possession of the **source** is not compatible with the interpretation of the event as changing the location to the first argument of the locative preposition. The entity that might plausibly be transferred is denoted by the root. However, this element cannot be an argument of the APPL head because it is of type <e,t>, not *e*. Even if the root were of type *e*, merger of APPL and a second 'possessor' argument would not give the right type element to then combine with the IN head. Thus the only way the APPL head could combine with a root creation verb would lead to a semantically anomalous interpretation.

This is in contrast with explicit creation verbs where the root is a manner modifier. Explicit creation verbs should 'license' applicative arguments in the general case, as in (130):

(130)

Mary

APPL　a necklace
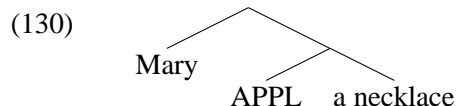
Here the interpretation would be that the necklace is transferred to Mary's possession by an event of creating that necklace, which is semantically well-formed.

That this predicted contrast is borne out can be seen in English in the following examples:

(131)　a.　? I braided Mary the string (tight).

b. ? I chopped Mary the parsley (fine).

(132) a. I braided Mary a necklace.

b. I built Mary a house.

The same contrast is found more robustly in Finnish:

(133)   * Hän leti-tti   minu-lle   minu-n   tukka-ni.
         s/he braid-CAUS.PST 1SG-ALL 1SG-GEN hair-POSS1SG

         'She braided me my hair.' (root creation reading)

(134)   Hän leti-tti   minu-lle   pullapitko-n.
         s/he braid-CAUS.PST 1SG-ALL braided.bread-ACC

         'She braided me a braided bread.'(explicit creation reading)

5.3 Obligatory Arguments

A further prediction of the analysis of root and explicit creation verbs is that the former will obligatorily take a direct object, while the latter are (in a sense) optionally transitive. This is due to the fact that root creation verbs cannot be derived without the prepositional structure that introduces the source argument. However, any explicit creation verb, being derived from a predicate of events, is predicted to have a 'sibling' activity verb which differs from it only in containing a v which does not select for an individual argument, which I will mark as $v_{activity}$ as in (135):

(135) λe_s.activity(e) & baking(e)

        $v_{activity}$ $\sqrt{}$bake

This prediction appears to be borne out. Levin (1993) notes that many activity verbs, including 'build verbs,' participate in the Unspecified Object Alternation, and thus occur without an overt direct object. It can be seen from the examples in (136) that explicit creation verbs (or rather the activity verbs derived from the same root) do not require direct objects:

(136) a. The chef baked all day.

b. The workers were building for days.

This is in contrast with root creation verbs, which are obligatorily transitive. This is simple to show with verbs like *pile*, which are built from roots that, as discussed in section 5.1, only denote predicates of individuals:

(137)   * She piled (all day).

This fact is slightly harder to show for verbs derived from 'allosemous' roots, because one must control for the root creation reading in the absence of an object. This can be done by using the pseudo-resultative, which will otherwise only be possible if the root is of type <e,t>. When the pseudo-resultative is present, omitting the direct object is ungrammatical:

(138) a. * She braided tight (all day).

b. * She chopped fine (all day).

This fact is also reflected in Finnish:

(139)   * Mari leti-tt-i   tiukka-**an**.
         Mari braid-CAUS-PAST tight-ILL

         'Mari braided tight.'

5.4 Parallels with Overt Syntax

The syntactic proposal here makes sentences such as (140) very much like sentences such as (141):

(140)   She braided her hair (tight).
(141)   She made her hair into a (tight) braid.

(141) is essentially a less syntactically conflated version of a sentence with a root creation verb, with an overt *into* instead of IN and TO and the same source and goal arguments. With root creation verbs, the goal merges with *v*, but in (141), *v* is spelled out as *make* and the goal is realized as a DP argument. These similarities predict further syntactic and morphological parallels between sentences with root creation verbs and those in (141), as opposed to other paraphrases such as in (142), which are more similar to explicit creation verbs:

(142)   She made a (tight) braid out of her hair.

In this section I will show how this prediction is borne out, and also show that sentences like (142) pattern similarly with explicit creation verbs.

5.4.1 Obligatory Arguments

The structure for verbs like *make*$_{reconfigure}$ given above in section 4.3 predicts that, just like root creation verbs, the verb *make* should require a direct object. This is due to the fact that the preposition in both structures requires two arguments, a source and a goal, whether the preposition itself is overt or covert. This prediction is borne out, as can be seen in (143). As was already shown in section 5.3, *braid* is obligatorily transitive on the relevant root creation reading. In these cases, the goal argument is realized within the verb, and the source as the direct object. In the case of *make* in the relevant usage, or *put*, both required arguments must be realized as DPs.

(143)   a.   I braided #(her hair).
          b.   I put/made *(her hair) into a braid.

     Neither *make*$_{create}$ with a created individual object nor *braid* as an explicit creation verb require an overt source argument, again showing that these pattern differently from reconfiguration verbs:

(144)   I made a braid (with her hair).
(145)   I braided a necklace (out of wire).

     While *make*$_{reconfigure}$ takes an obligatory prepositional small clause argument containing two related arguments, *make*$_{create}$ takes an obligatory goal argument and an optional source argument:

(146)   I made$_{reconfigure}$ *(the string) *(into a braid).
(147)   I made$_{create}$ *(a braid) (from her hair).

5.4.2 Availability of Applicatives

The same obligatory small clause complement that leads to the requirement of a direct object with *make*$_{reconfigure}$ also leads to the incompatibility with applicatives seen with root creation verbs, in contrast with *make*$_{create}$ which only has one obligatory DP argument.

(148)   a.   * I braided Mary the string. (where the string is the source, or object being braided)
          b.   * I made Mary the string into a braid.
(149)   a.   I braided Mary a necklace. (where the necklace is a created entity)
          b.   I made Mary a braid from her hair.

5.4.3 Finnish Illative Case

Another parallel between root creation verbs and verbs like $make_{reconfigure}$ can be seen in Finnish. As shown in section 3.1.1, Finnish pseudo-resultatives are marked with illative case. This illative case marking relates in this and other contexts to the IN and TO heads proposed in the structure of root creation verbs. In the Finnish parallel to (141), the created object and its modifier are also marked with illative case, just as the English example has an overt instance of the preposition *into*, as seen in (150):

(150) a.   Mari leti-tt-i   hiukse-nsa   tiukka-**an**.
                Mari braid-CAUS-PAST hair-ACC.POSS tight-ILL

                'Mari braided her hair tight.'

      b.   Mari pisti hiukse-nsa   (tiukka-**an**) letti-**in**.
                Mari put   hair-3SG.POSS (tight-ILL) braid-ILL

                'Mari put her hair into a tight braid.'

This supports the hypothesis that sentences like (150a) are derived from an underlying structure that is very similar to that in (150b).

5.5 Root Modifier Stranding

Another prediction made by the present account is that root modification should be more generally available. This brings us to the question posed by Kiparsky (1997) for syntactic accounts of lexical decomposition, of why sentences like (151) are not possible:

(151)   * She saddled the horse Western.

That is, if the roots of verbs are syntactically active, why can't they be modified and 'stranded' such that (151) has the structure in (152)?

(152)
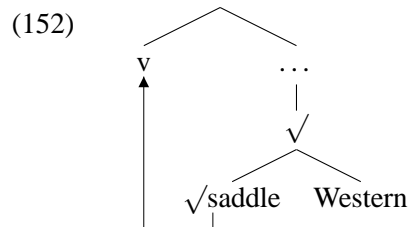
    I have shown evidence here that such structures do exist, in the case of pseudo-resultatives. Pylkkänen (2002:93) also proposes that root modification is possible in the examples in (153), originally from Tenny (2000:304,ex.37). She suggests that the bolded predicates modify the roots of the causative-inchoative verbs before the addition of a CAUSE head:

(153) a.   John closed the door **partway**.
      b.   John **partly** closed the door.
      c.   Roger **half** filled the glass.
      d.   Roger filled the glass **halfway**.
      e.   Nicolas **mostly** filled the glass.

The roots of these verbs would not be predicates of individuals, and are not interpreted as results, so the modifier is not a pseudo-resultative. However, their scope suggests that they are modifiers of a state embedded in the event, rather than the causing event, and thus these appear to be another breed of root modifier, here modifying a root which denotes a predicate of stative eventualities.

However, the mystery remains that root modifiers are not possible, or at least not yet attested, with locatum verbs like *saddle*. It is clear that no resultative-like semantics would be possible in a sentence such as (151), since there is no created individual to be modified. However, there is no a priori reason that a depictive-like interpretation should not be possible, especially if we use a stage-level predicate such as *wet*, which cannot receive this interpretation either, though it otherwise is a possible depictive predicate:

(154)   # She saddled$_i$ the horse wet$_i$.

This is a puzzle regarding the source of the semantic restrictions on root modification which remains to be solved.[20] In these stranding cases, it may be that the restriction is not on the modification itself, but on the possibility of stranding the adjective when the root merges with the *v* head. Note that it is possible to form a nonce compound verb from *saddle* and a modifier:

(155)   She Western-saddled the horse.

If such a compound is derived from modification of the root, then this means that root modification is possible, but stranding of the modifier is what is semantically restricted to certain verb types, including root creation verbs.

However, there are still other semantic restrictions which remain to be explained that cannot receive such an explanation, due to their close parallelism to attested pseudo-resultative examples:

(156)   a.   # She braided her hair thick.
         b.   # She piled the pillows wide.

This restrictedness of possible pseudo-resultative adjective/verb pairs is reminiscent of the constraints on resultatives noted in Wechsler (2005), although it is not the same constraints at work. We ultimately need a more fine-grained semantic analysis which would rule such combinations out — making explicit reference to the semantics of 'material rearrangement' or something of the kind. These restrictions that surface in conflated but not non-conflated structures may also relate to the restrictions on concealed causatives discussed in Bittner (1999).

6   Conclusion

In this paper, it has been shown that the compositionality puzzle posed by pseudo-resultative modifiers can be accounted for with an analysis which maintains a strong interpretation of compositionality, whereby all semantic constituents and rules have a correspondence with the syntax. This was done by analyzing pseudo-resultative predicates as modifiers of the lexical roots of root creation verbs, which denote predicates of individuals. In order to provide such an account, it was necessary to recognize the syntactic complexity of verbs, such that the root of the verb is a syntactic constituent accessible for modification. This result

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[20]Geuder (2000:80) observes a similar restriction in the domain of adverbs such that adverbs cannot in general modify the base of what he describes as zero-derived denominal verbs:

(i)   ?? to water the plants coldly (with cold water)
(ii)   ?? to label the bottles greenly (put green labels on them)
(iii) ?? to shelve the books woodenly (on a wooden shelf)
(iv)   ?? to bottle the whisky bulbously (in bulbous bottles)

In terms of Geuder's analysis, this is explained by the fact that adverbs generally don't directly modify the base of such verbs, but rather they are oriented to individuals by Predicate Transfer. Thus such examples will be ruled out if one can rule out Predicate Transfer operations which would give rise to the relevant interpretations. However, in the case of pseudo-resultatives, since it is argued here that they are syntactic root modifiers, any such restrictions should be syntactic or semantic, not pragmatic.

is consistent with the findings about verb structure reported in Marantz (1997), Arad (2003), and Harley (2005), but takes this work a step further in demonstrating the necessity of associating roots with formal semantic types in order to capture phenomena like pseudo-resultative modification and the properties that have been seen to correlate with it. Future work in this vein will hopefully be able to shed light on a variety of apparent puzzles for compositionality which find a solution in recognizing the syntactic and semantic import of roots.

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