Two sources of scalarity within the verb phrase*

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April 2011

Abstract In this paper I argue for two distinct sources of scalarity within the verb phrase, focusing specifically on VPs headed by incremental theme verbs. First, there is a quantity scale associated with the presence of an incremental theme argument. The scale structure of the quantity scale is crucially related to the part structure of the theme argument, and is the source of observed telicity effects. I argue that the quantity scale is not lexically encoded in the verb, but is derived from the part structure of the nominal argument via a functional morpheme. This morpheme is often silent in English, but in certain cases has an overt realization as partitive *of*. Second, there is a quality, or prototypicality, scale associated with the lexical entry of the verb itself. This type of scale is related to the different dimensions upon which events are classified by the verbs that name them. I argue that two distinct readings of the the proportional modifier *half* in English provide evidence for these two sources of scalarity within VP. The analysis is couched within a framework for aspectual composition that adopts the formal properties of scales and degrees that have become standard in recent work on gradable predicates.

1 Scalarity and the verb phrase

Over the past decade or so, several proposals have been put forth for scalar approaches to aspectual composition and telicity (Hay et al., 1999; Piñón, 2000, 2005, 2008; Caudal and Nicolas, 2005; Beavers, 2008; Kennedy and Levin, 2008; Stensrud, 2009). Many of these approaches begin with the observation that event descriptions display certain characteristics that are akin to those found in the domain of scalar and degree semantics, which thus far has mainly been pursued in the study of gradable adjectives and comparatives.

*To appear in Arsenijević, Boban, Berit Gehrke, and Rafael Marín (eds.), *Subatomic Semantics of Event Predicates*. I would like to thank Chris Kennedy for detailed and thought-provoking discussions on this topic over the past months. This work has also greatly benefited from discussions with Peter Alrenga, Itamar Francez and Beth Levin, as well as audiences at the 35th Berkeley Linguistics Society Meeting, Semantics Workshop of the American Midwest and Prairies 2009 in Chicago, the University of Göttingen, SALT XX in Vancouver, and the Workshop on Subatomic Semantics of Event Predicates in Barcelona. All remaining errors and oversights are my responsibility.

For instance, Hay et al. (1999) and Kennedy and Levin (2008) captialize on the fact that degree achievement verbs are derived from gradable adjectives and use insights from the properties of scale structure to derive the variable telicity effects that had previously been problematic under traditional accounts of aspectual structure and telicity. Meanwhile, Caudal and Nicolas (2005) and Piñón (2005, 2008) begin with the observation that proportional modifiers such as *half*, *partway* and *completely* that have played an important role in diagnosing scalar structure also occur as event modifiers, and use this fact as the starting point of their analyses.

One question that has not been adequately addressed is how event descriptions come to be associated with scales and degrees in the first place. Hay et al. (1999) and Kennedy and Levin (2008) argue that degree achievement verbs are endowed with a degree argument, which seems plausible since these verbs are derived from gradable adjectives. Kennedy and Levin (2008) argue that their account can be extended to at least incremental theme verbs, but do not provide a concrete proposal as to how this can be done. Piñón (2005, 2008) assumes without much argument that for other aspectual classes, in particular incremental theme verbs, a degree argument is associated with the verb itself, either originating from the lexicon or via a type-shifting rule. Rappaport-Hovav (2008) meanwhile provides arguments that scales are lexicalized in only certain classes of verbs, and that crucially incremental theme verbs do not themselves lexicalize quantity scales, contra Piñón. Finally, Beavers (2008) claims that scales can be determined by lexical, contextual and pragmatic factors, but does not go into detail about the formal mechanisms of associating degrees with event descriptions.

In this paper, I argue for two distinct sources of scalarity within the verb phrase, focusing specifically on VPs headed by incremental theme verbs. First, I claim that there is a quantity scale that is associated with the presence, and more specifically the quantity, of an incremental theme argument. The structure of this quantity scale is crucially related to the part structure, in particular the boundedness, of the nominal argument. Second, there is a quality, or prototypicality, scale associated with the lexical entry of the verb itself, related to the different dimensions upon which events are classified by the verbs that name them. I argue that two distinct readings for the proportional modifier *half* provide evidence for these two sources of scalarity. Specifically, a sentence like (1) has two readings.

(1) John half ate the apple.

On one reading, which I will call the EVENTIVE reading, *half* measures out the event of eating the apple by tracking in the quantity of apple parts that are eaten. On the second reading, which I will call the EVALUATIVE reading, *half* names the degree to which the event represents a prototypical eating event. I integrate these two types of scales into a greater theory of aspectual composition with degrees, using properties of scale structure that have figured prominently in the analysis of gradable predicates.

In section 2, I go into more detail about the characteristics of these two readings of *half* and especially their distinct behavior with respect to aspect and telicity. Section 3 contains an outline of the semantic properties of scales and degrees that are relevant for the degree-based account of aspectual composition developed in this paper. In section 4 I detail the mechanics of integrating a quantity scale into the aspectual composition, where I argue that a functional head relates the quantity of the incremental theme argument with a scale that can be targeted by eventive *half*. Then in section 5 I provide arguments that the verb itself can be associated with a quality scale that can be targeted by evaluative *half*. Crosslinguistic support for the separate treatment of the eventive and evaluative readings is given in section 6, which also concludes.

In addition to the agenda outlined above, this study of scales and gradability within the domain of events will lead us into a discussion of verb meaning more generally. In particular, I will argue that incremental theme verbs do not lexicalize a quantity scale (following Rappaport-Hovav, 2008), but do lexicalize a quality, or prototypicality, scale. Furthermore, I will argue that incremental theme verbs are simple activity predicates that do not directly select for their internal theme argument; rather the incremental theme is introduced syntactically by a functional head, analogous to analyses where the external agent is introduced by a little v head (e.g. Kratzer, 1996, 2003).

2 Eventive and evaluative uses of *half*

As we have seen from example (1) there are two relevant readings for *half* that are at issue. In this section I go into more detail about the differences between the two readings, and in particular their interaction with aspect and telicity.

2.1 Two readings

While the account presented in this paper is meant to be general enough to extend to the entire class of proportional modifiers, for the most part I focus our attention on the modifier *half* in English. This is because English *half* most clearly demonstrates a two-way split in its distribution and behavior that is key to understanding the nature of the two sources of scalarity within the verb phrase that are at issue. The crucial contrast to be explored in this paper is that between the EVENTIVE and EVALUATIVE uses of *half*, as defined in (2).

(2) a. **Eventive use**: names the proportion of an event that is complete
    b. **Evaluative use**: makes a comment about the degree to which the event described represents a prototypical event of that type

The fact that proportional modifiers have an eventive use that measures out the extent to which an event is complete has been discussed fairly widely in the literature (see

for instance Moltmann, 1997; Tenny, 2000; Caudal and Nicolas, 2005; Piñón, 2005, 2008; Bochnak, 2009, 2010). The evaluative use of such modifiers has received much less attention, but has been discussed by Tenny (2000), where it is referred to as a 'messing around' reading.

This contrast between the eventive and evaluative uses of *half* can be seen in the context of a VP headed by an incremental theme verb.[1] For instance, a sentence like (3) displays both readings.

(3) The girls half washed the dishes.

On the eventive reading, (3) is true in a situation where a contextually relevant set of girls completed an event of washing a contextually relevant set of dishes halfway. On its most natural interpretation, this reading describes an event where half of the amount of dishes were washed. By contrast, on the evaluative reading, the speaker of (3) makes a claim that the event that took place does not represent a prototypical dish-washing event, i.e., that the girls did not do a very good job of washing the dishes. I claim that the basis of this contrast is that the eventive use of *half* tracks the QUANTITY of the theme argument, while the evaluative reading does not.[2]

To illustrate further that sentences like (3) are indeed ambiguous between an eventive reading and an evaluative one, and to appreciate the differences between these two interpretations, I draw our attention to the following real-world example. It comes from a website[3] where readers post questions to solicit advice from the online community. The ambiguous sentence is in the title of the post, which involves the incremental theme verb *eat*.

(4) Title of post: "What can I do about a fly in my drink? What if I **half ate it**?"

a. EVALUATIVE interpretation: (description given by author of post)

- "Today I got my usual mochalatta chill drink from Cinnabon and as I was about to swallow, felt something solid. I chewed on it and realized it wasn't a piece of ice so I took it out of my mouth and it was a half chewed up fly!!! I was so grossed out and now I have an upset stomach. What are all the things I can do in this situation? Like can I sue them or something?"

b. EVENTIVE interpretation:

[1] For the purposes of this paper I focus on incremental theme verbs, though many of the behaviors discussed here are also exhibited by change of state verbs. As noted by Tenny (2000), the distinction between incremental theme verbs and change of state verbs can sometimes be blurry, as in the case of verbs like *fill* or *melt*.

[2] A reviewer correctly points out that (3) also displays a distributive reading, which is true if half of every dish is washed. This amounts to a sub-case of the eventive reading, since it is still the quantity of dishes (or rather the quantity of surface area of each dish) that is at issue.

[3] Yahoo Answers: http://answers.yahoo.com/question/index?qid=20080723194852AAdXOe8; retrieved March 1, 2010; emphasis added

- Reply A: "you're [sic] upset stomach is probably more due to thinking about what you bit on and swallowed, than actually caused by the half fly in your stomach."
- Reply B: "You should go ahead and eat the other half. My mom always said 'Finish what you start"'

From the description given following the question, it is clear that the author of the post assigns the evaluative interpretation to *half* in the VP "half ate [the fly]." She describes how she chewed on the fly, but didn't actually swallow, and furthermore spit it out of her mouth. Indeed, this is not a prototypical eating event, and this reading of *half* does not track the quantity of the incremental theme argument, since none of the parts of the fly were actually consumed. Meanwhile, the authors of two replies clearly ascribe the eventive interpretation to *half*. Both authors make reference to parts of fly-matter eaten (despite the author's description of spitting it out before swallowing), showing that this reading of *half* does track the quantity of the incremental theme argument.

In the following subsection, I show that the availability of these two readings corresponds with aspectual properties of the VPs in which *half* appears.

2.2 *Half* and aspect

The eventive use of *half* is restricted to VPs where the incremental theme argument is quantized, while the evaluative use has no such restriction. For instance, all the sentences in (5) allow both the eventive and evaluative interpretations, while those in (6) have only the evaluative reading.

(5) ✓eventive / ✓evaluative
   a. Alana half ate a stack of pancakes.
   b. Michael half swam around the lake.
   c. Jim half pushed the cart to the store.
   d. Ann half sang the opera.

(6) * eventive / ✓evaluative
   a. Alana half ate pancakes.
   b. Michael half swam.
   c. Jim half pushed the cart.
   d. Ann half sang.

Furthermore, note that the availability of the eventive reading corresponds with the availability of a telic interpretation of the sentences. Specifically, those sentences in (5) allow both the eventive and evaluative readings of *half* under their telic interpretations, but also have atelic readings where only evaluative *half* is possible. Conversely, those in (6) have

only atelic interpretations and only license the evaluative reading of *half*. That these correspondences hold can be shown by using the *in an hour/for an hour* adverbial tests for telicity, as in (7).

(7) a. Alana half ate a stack of pancakes in an hour. (telic; eventive or evaluative)
b. Alana half ate a stack of pancakes for an hour. (atelic; evaluative only)
c. Alana half ate pancakes for an hour / ??in an hour. (atelic; evaluative only)

The unifying thread connecting the eventive reading of *half* and the availability of a telic reading is the notion of quantized nominal reference. The connection between telicity and quantization of the incremental theme argument is well-known (see Mittwoch 1982; Dowty 1991; Tenny 1994, among others), and has been formalized in the work of Krifka (1989, 1992) via the OBJECT-EVENT HOMOMORPHISM. Under this theory, there is a homomorphic relation between the internal structure of an event e and the part structure of an event participant x so long as they stand in a particular thematic relation with each other. Specifically, this homomorphism subsumes a mapping to objects and a mapping to events as formalized in (8).

(8) a. MAPPING TO OBJECTS:
$\forall R[\textit{MAP-O}(R) \leftrightarrow \forall e, e', x[R(e, x) \wedge e' \leq e \rightarrow \exists x'[x' \leq x \wedge R(e', x')]]]$
b. MAPPING TO EVENTS:
$\forall R[\textit{MAP-E}(R) \leftrightarrow \forall e, x, x'[R(e, x) \wedge x' \leq x \rightarrow \exists e'[e' \leq e \wedge R(e', x')]]]$

Mapping to objects states that for each sub-event e' of event e with participant x, there is a sub-participant x' that stands in the relation R to e'. Mapping to events states that for every sub-part x' of participant x in an event e, there is a sub-event e' that stands in the relation R to x'. In particular, the incremental theme relation is such a relation R for which the object-event homomorphism holds.

The object-event homomorphism derives the fact that quantized incremental themes correspond to telic events, while non-quantized (cumulative) incremental themes yield atelic events. Take, for example, the VP *eat three pancakes*, where the incremental theme argument is quantized. A sub-event involves eating a sub-part of three apples, and can thus not count as an event of eating three apples. That is, the event described by the VP *eat three pancakes* does not describe its sub-events. This property corresponds with telicity in this system. Conversely, the VP *eat pancakes* contains a non-quantized incremental theme. A sub-event of eating (some unspecified amount of) pancake-stuff is still an event of eating (some unspecified amount of) pancake-stuff. That is, in this case, the event described by *eat pancakes* does hold of sub-events, and thereby the event described by this VP is atelic. This formalization also neatly captures a conceptual similarity between telic eventualities and quantized nominal reference on one hand, and atelic eventualities and cumulative nominal reference on the other. This is because cumulative nominal reference can be applied to an entity x and also its sub-parts, which is not the case for quantized

nominal reference. More generally, boundedness of the incremental theme argument (or path) corresponds with boundedness of the event.

Returning to *half*, it appears then that the eventive use has the effect of measuring out the event by measuring out the quantity of incremental argument. That is, there is a sense in which the sentences in (5) on their eventive interpretation can roughly be paraphrased by those in (9).

(9) a. Alana ate half of a stack of pancakes.
b. Michael swam halfway around the lake.
c. Jim pushed the cart halfway to the store.
d. Ann sang half of the opera.

Note that in the paraphrases in (9a) and (9d), the incremental theme argument appears embedded in a partitive structure. Meanwhile in (9b) and (9c), it is more natural to use *halfway* rather than *half*. While both *half* and *halfway* have the effect of measuring out the event relative to an internal argument, *halfway* is preferred in contexts where it is a path that is being measured. In cases where *half* and *halfway* are both acceptable, the use of *halfway* has the effect of imposing a path-like structure on the theme argument. Consider the contrast in (10).[4]

(10) a. Keelin half read the book.
b. Keelin read the book halfway.

Both sentences entail that half of the book was read, meaning that both *half* and *halfway* measure out the event by measuring the quantity of the theme involved in the event. However, the use of *halfway* in (10b) imposes a path-like structure on the theme, such that (10b) seems to make a stronger claim than (10a). Whereas (10a) can be true if Keelin read any half of the pages in the book in any order, (10b) seems to require that she started at the beginning and read consecutive pages up to the halfway point. While I concede that the contexts of use for *half* and *halfway* are slightly different, going forward I focus mainly on *half* and treat *halfway* as a synonymous variant.

Thus, the eventive use of *half* plays a role in measuring out the event, specifically by identifying the proportion or quantity of the incremental theme argument that is involved in the event. In this respect, eventive *half* correlates with quantization of the incremental theme, which explains why it co-occurs with a telic interpretation of the VP. The evaluative use, by contrast, has no such effect. This is clear from the fact that the evaluative use is felicitous in contexts where there is no incremental theme argument to measure (*cf.* (6b-6d)). In fact, as we have seen, the evaluative use is the only interpretation available in these cases. Evaluative *half* is, in a sense, unmarked for telicity, since it can occur in both telic and atelic contexts.

[4]Thanks to Anita Mittwoch for pointing out this minimal pair to me.

2.3 Looking ahead

Proportional modifiers have also received attention in the literature as modifiers of gradable adjectives as in (11) (see for example Cruse, 1986; Kennedy and McNally, 2005).

(11) The glass is partially/half/mostly/completely full.

Because of their distribution as modifiers of both adjectives and VPs, certain authors have recently used evidence from proportional modification as a starting point to developing a degree-based analysis of aspectual composition, notably Caudal and Nicolas (2005) and Piñón (2005, 2008). I too follow this path in unifying degree semantics with aspect in the case of VPs headed by incremental theme verbs. In the next section, I outline the formal analysis of the semantics of scales and degrees, and point out the crucial properties of scale structure upon which my theory of aspectual composition will be built.

More generally, a scalar account of aspect and events has been recently pursued in the literature. In such accounts, progress of an event corresponds with movement along a scale (Krifka, 1998; Wechsler, 2005; Beavers, 2008). Thus, boundedness of a scale yields a bounded (telic) event, where the scale at issue corresponds with a (change in a) property of an event participant (see also Hay et al., 1999; Filip, 2008; Kennedy and Levin, 2008; Stensrud, 2009).

3 The semantics of scales and degrees

In this section I review the relevant properties of scales and degrees that will be essential in my analysis of *half* and the interactions between aspect and scale structure. Of particular interest will be the distinction between open and closed scales (see also Fleischhauer, this volume), as well as scales based on the quantity of a nominal argument.

3.1 Formal properties of scales and degrees

In this section I outline the semantics of scales and degrees, and detail the formal properties of scales that will be relevant for developing a degree-based analysis of aspectual composition. The discussion here is largely based on the analysis of gradable adjectives and their modifiers by Kennedy and McNally (2005) (henceforth K&M). Following K&M and others (e.g. Rotstein and Winter, 2004), I take scales to consist of three components: a set of degrees, a dimension, and an ordering relation. For our purposes, the most important aspect of scale structure is the set of degrees, and specifically whether a scale includes upper and lower bounds. Through a detailed study of the behavior of modifiers of gradable adjectives, K&M conclude that it is linguistically relevant whether an adjective lexicalizes an upper bound, lower bound, both, or neither. Scales that include both upper and lower bounds are said to be fully CLOSED; those that include neither are said to be OPEN; while those that include only an upper or lower bound are upper and lower

closed, respectively. K&M take as a diagnostic for scale boundedness whether antonym pairs with the same scale accept modifiers that make reference to maximal bounds.

(12) a. Fully closed:
The room is 100% full/empty.

b. Upper closed:
This product is 100% pure/??impure.

c. Lower closed:
That author is completely ??famous/unknown.

d. Fully open:
Her brother is completely ??tall/??short.

As previously mentioned, the proportional modifiers that we are interested in here, including *half*, not only appear as VP modifiers, but can also modify gradable adjectives. However, their distribution with gradable adjectives is restricted, and in particular these modifiers are sensitive to the scale structure of the predicate they modify. Note that *half* is perfectly grammatical in (13) as a modifier of *full* and *open*, while in (14), *half* is infelicitous modifying *tall* or *old*.

(13) a. The glass is half full.

b. The door is half open.

(14) ??Taylor is half tall/old.

K&M claim that the contrast in acceptability between (13) and (14) is due to the different scale structures of the adjectives involved. On one hand, *full* and *open* are associated with fully closed scales, while on the other hand, *tall* and *old* are associated with open scales. The reader can verify that *half* is likewise infelicitous with upper closed and lower closed scales.

From a purely intuitive point of view, the fact that *half* should only be felicitous with fully closed scales makes sense. The function of *half* is to select a midpoint, equidistant from a minimum and maximum value. Without either a minimum or maximum value, the operation of finding a midpoint fails.

Within this framework, gradable predicates are of semantic type $\langle d, et\rangle$.[5] That is, they are endowed with an open degree argument that must be saturated before they can be used as regular predicates of individuals. Degree modifiers are able to fulfill the role of providing the degree argument with a value. In the case of *half*, this value is the midpoint of a fully closed scale. The denotation of *half* can be given as in (15), where S_G is the scale associated with a gradable predicate G.

[5]Throughout this paper, in addition to the standard types e for individuals and t for truth values, I also use d for the type of degrees and s for the type of events.

(15) $[\![\textit{half}]\!] = \lambda G \lambda x.G(x)(\mathbf{mid}(S_G))$

The notation $\mathbf{mid}(S_G)$ is shorthand for a function that calculates the midpoint between the maximum and minimum values of a scale. That is, since $\mathbf{mid}(S_G)$ requires both a maximum and minimum value of the relevant scale, *half* will only be compatible with gradable predicates that have fully closed scales. Given (15) and the meaning of *full* in (16), the meaning of *half full* can be derived as in (17).

(16) $[\![\textit{full}]\!] = \lambda d \lambda y.\mathbf{full}(y) = d$

(17) $[\![\textit{half}]\!]([\![\textit{full}]\!])$
$= \lambda G \lambda x.G(x)(\mathbf{mid}(S_G))[\lambda d \lambda y.\mathbf{full}(y) = d]$
$= \lambda x.[\lambda d \lambda y.\mathbf{full}(y) = d](\mathbf{mid}(S_{\textit{full}}))$
$= \lambda x.\mathbf{full}(x) = \mathbf{mid}(S_{\textit{full}})$

The result of (17) is a predicate of individuals that is true if the degree to which x holds the property of being full is half, i.e., the midpoint on the scale of *full*. In the absence of a degree modifier, a null degree morpheme *pos* values the degree argument of the gradable predicate based on a contextual standard of comparison. For adjectives with upper-closed scales, including the adjectives that accept modification by *half*, *pos* returns the maximal value on the scale as the contextual standard. This follows from a principle of Interpretive Economy (Kennedy, 2007). This null morpheme will come to play a role in the degree-based account of aspectual composition to follow.

3.2 Quantity-based scales and nominal part structure

Under the account presented so far, the scale targeted by *half* and other degree modifiers is part of the adjective meaning. That is, gradable adjectives lexicalize scales and degree arguments. These lexicalized scales typically involve some kind of property, such as being full, tall, old, etc. However, in many cases, the type of scale targeted by *half* is related to the QUANTITY of the individual that the adjective is predicated of. Consider the sentences in (18), each of which is ambiguous.

(18) a. The meat is half cooked.
b. The glasses are half full.

The ambiguity stems from the availability of two distinct scales that can be targeted by *half*. On one reading of (18a), *half* is targeting the scale that is lexically encoded in the deverbal adjective *cooked* - the cooked-ness scale. On this reading, the sentence is true if the degree to which the meat is cooked is half. There is also a second reading, where *half* is targeting a quantity-based scale that is based on the part structure of the nominal argument. On this reading, the sentence is true if the proportion of meat that is cooked is half. Similarly, (18b) could be true if all the glasses in the contextually relevant set are

full to the degree corresponding with the midpoint of the fullness scale, or if half of the glasses are full and the other half are not.

Noticing that this type of ambiguity is pervasive among gradable adjectives, Kennedy and McNally (2010) propose that many gradable adjectives can encode both a quality (property) scale and a quantity scale. The distinction between the two readings becomes especially clear when the adjective is modified by proportional scalar modifiers like *half*. Importantly though, the structure of the quantity-based scale made available for modification is crucially linked to the part structure of the nominal argument. In particular, the quantity-based reading for *half* requires a bounded nominal argument to measure. Note that this reading of *half* is unavailable when the nominal argument is a bare mass noun or bare plural, as in (19).

(19) a. ??Meat is half cooked.
b. ??Glasses are half full.

This behavior of *half* in the adjectival case parallels that of the eventive use of *half* as discussed in the previous section. That is, this use of *half* requires a bounded nominal argument upon which a fully closed scale structure can be based. Bare mass nouns and bare plurals denote unbounded quantities, i.e., they are an instance of non-quantized nominal reference, meaning they correspond with open scales.

What is important here is that nominal part structure crucially correlates with scale structure. That is, a bounded, quantized nominal argument corresponds with a fully closed scale, which is required for the successful application of *half*. This use of *half* in the adjectival case also corresponds with a partitive-like meaning, whereby the modifier identifies the proportion of the parts of the nominal to which the adjective applies.

4 The eventive reading

In this section I go into detail about how to account for the eventive use of *half* within a framework that incorporates degree semantics into aspectual composition. Recall what needs to be accounted for: first, that eventive *half* targets a quantity-based scale that is related to the nominal part structure of the incremental theme argument; second, that the use of eventive *half* correlates with telic readings of the VP; and third, that *half* targets fully closed scales only (these last two points being closely related). While the main goal of this section is to account for the contribution of *half* within the proposed framework of aspectual composition, in order to arrive at the final analysis we will be faced with the question of the lexical semantics and argument structure of incremental theme verbs more generally. Previewing the final outcome, it will be shown that incremental theme verbs are simple activity predicates that neither lexicalize a degree argument nor directly select for their internal argument.

4.1 Degrees, aspect and the incremental theme

As we have seen in the previous section, *half* can be analyzed as a degree term that is a function from gradable predicates of semantic type $\langle d, et\rangle$ to predicates of type $\langle e, t\rangle$. In the case of quantity-based scales, *half* has the function of measuring out the quantity of the individual to which the property named by the adjective is ascribed. As shown in section 2, the eventive use of *half* has the function of measuring out the event described. Thus, to extend the degree-based analysis to events and aspectual composition, it seems we need to allow at least some event descriptions to be construed as gradable predicates as well. That is, given that the function of proportional modifiers such as *half* is to supply a value to an open degree argument, it seems that we need to allow that VPs headed by incremental theme verbs be of semantic type $\langle d, st\rangle$ (where s is the type of events).

Some previous attempts to integrate degrees into aspectual composition have used the above reasoning as their guiding intuition and have tried to implement it in different ways. Piñón (2000, 2005) assumes that incremental theme verbs do not lexicalize a degree argument, but undergo a type shift to add a degree argument to their denotation. This move makes available an open degree argument that can be targeted by degree modifiers, including *half*. This type of implementation, however, runs the risk of overgeneration, which means that the type-shifting mechanism needs to be constrained to occur only with certain classes of verbs. Thus, such an analysis needs to stipulate which verb classes can be subject to this type shift. This problem is circumvented in a later analysis by Piñón (2008), where it is proposed that incremental theme verbs are themselves endowed with a degree argument from the lexicon.[6]

A problem with both these types of accounts is that there is evidence against having an open degree argument in the verb itself or at the VP level.[7] Rappaport-Hovav (2008) gives an overview of the types of scales that are aspectually relevant and which of those can be lexicalized in the meanings of verbs. In the case of VPs headed by incremental theme verbs, the relevant type of scale is what she calls a volume/extent scale (what we have been calling a 'quantity-based' scale). She argues that extent scales are not actually lexicalized in incremental theme verbs, since they can appear with a wide variety of resultatives.

(20) a. Larissa steamed the clothes dry/clean/stiff.
b. Cinderella scrubbed her knees sore/the dirt off the table/the table clean.

Since resultatives have the function of introducing their own scale or specifying a scale lexicalized in the verb (Levin and Rappaport-Hovav, 1995; Wechsler, 2005), and given the

[6]Caudal and Nicolas (2005) also formalize a degree-based analysis of aspectual composition, but appear to be non-committal as to where the degree argument comes from, i.e., whether it is associated with the verb from the lexicon or whether it is the result of a type-shifting mechanism.

[7]The argumentation in this section is an expanded version of that found in Bochnak (2010).

constraint against specifying multiple scales within a single VP (Levin and Rappaport-Hovav, 1995), the fact that all the resultatives in (20) are felicitous leads to the conclusion that the verbs themselves do not lexicalize a scale. Note that this behavior contrasts with verbs that do lexicalize a scale, where a resultative can only be used to specify that scale, not introduce a new one.

(21) a. Jerome froze the ice cream solid/??clean.
b. ??We dimmed the room empty.

Another piece of evidence comes from argument realization properties of incremental theme verbs. Transitive verbs that lexically encode a scale require that their patient be the entity that undergoes the scalar change denoted by the scale, and furthermore require these objects to be realized syntactically. Incremental theme verbs do not show this behavior and can appear intransitively.

(22) Last night we cooled *(the room with the air conditioner).

(23) Last night we ate/read/scrubbed.

Given this evidence, Rappaport-Hovav concludes that incremental theme verbs do not themselves lexicalize scalar meaning. Rather, the scale at issue in these cases is provided by the referent of the incremental theme argument itself. I take this one step further and claim that is evidence against the presence of a degree argument that tracks the quantity-based scale in the denotation of the verb itself. This means that eventive *half* does not combine directly with the verb, since the latter is not of the right semantic type.[8]

In addition, there is also evidence for a lack of an open degree argument at the VP level as well. Specifically, as shown by Gawron (2007), VPs headed by incremental theme verbs do not accept the full range of degree morphology that would otherwise be expected if there was in fact an open degree argument at this level.

(24) a. i. ??Tim wrote the paper more than Tommy did.
ii. ??Tim more wrote the paper than Tommy did.
b. ??Tim wrote the paper too much.
c. ??Tim wrote the paper so much that Tommy barely did anything at all.

Indeed, the set of proportional modifiers that measure out events (and also the intensifier *really*) are among the few degree terms that actually appear to be able to modify VPs headed by incremental theme verbs. In order to get the intended readings for the sentences in (24) (i.e., readings based on the quantity scale derived from the part structure of the theme argument), the degree morphology must appear embedded within the VP, closer to the incremental theme argument itself.

[8] I also take this as evidence against a type-shifting analysis *a la* Piñón (2000, 2005), since such an account misses the generalization that the scale at issue is crucially related to the incremental theme argument, and thus it is unclear how this scale could be 'passed up' to the verb.

(25) a. Tim wrote more of the paper than Tommy did.
b. Tim wrote too much of the paper.
c. Tim wrote so much of the paper that Tommy barely did anything at all.

Therefore degree morphology is possible, just not at the VP level. Notice also that in all the sentences in (25), there is the obligatory insertion of *of* when degree morphology is present.

Given this evidence, I conclude that there is no open degree argument on the verb itself or at the VP level. But then we are left with a puzzle as to why *half* appears to be a VP modifier if there is no degree argument at this level for it to target. In what follows, I propose an analysis whereby all the action of the degree semantics is internal to the VP. As such, we will be able to capture the fact that the quantity scale is directly related to the incremental theme argument, and also the fact that degree semantics more generally occurs embedded within the VP, with no open degree argument at the VP level.[9]

4.2 Deriving the eventive reading

Let us recap what we have learned so far: eventive *half* is a degree term that targets a quantity-based scale; incremental theme verbs do not themselves lexicalize a quantity scale; there is evidence against having an open degree argument at the VP level; and other degree morphology appears embedded within the VP, and is accompanied by *of*-insertion. In addition, we know that the quantity-based scale is related to the referent of the incremental theme argument. Thus, it appears what we need is a way for the part structure of the nominal to be mapped onto a quantity scale that can be targeted by *half* (or other degree terms as in (25)).

My proposal is that the mapping between nominal part structure and the quantity scale is due to the presence of a functional head which I will call μ (for *measure*). This function takes an incremental theme nominal and returns a gradable event description that is true of an event whose theme is the parts of the nominal argument, the quantity of which is equal to a degree d.

(26) $[\![\mu]\!] = \lambda x \lambda d \lambda e. \exists y [y \leq x \wedge \textbf{theme}(e)(y) \wedge \textbf{quantity}(y) = d]$

The inclusion of the QUANTITY predicate within μ underscores the fact that it is not simply the incremental theme argument in and of itself that is responsible for the scale at issue, but rather a *property of* the incremental theme, namely its quantity. That is, event measurement, and thereby (a)telicity, tracks a physical property of the affected argument (see also Hay et al. 1999 and Stensrud 2009 for similar discussion). Also embedded within the meaning of μ is a partitive semantics (Ladusaw, 1982).[10] In effect, it is the parts of the

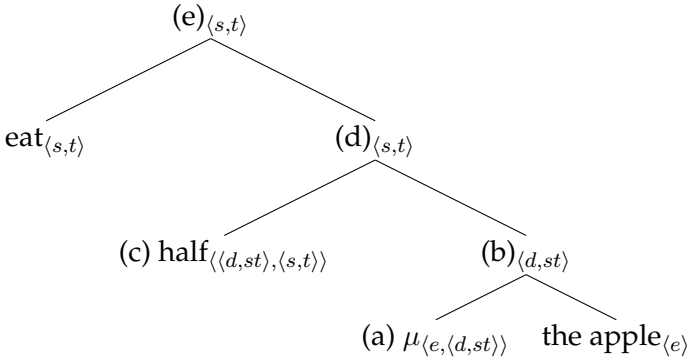
[9] Such an account is similar in spirit to the one presented in Stensrud (2009), whereby telicity is derived by measure-of-change function embedded within the VP.

[10] This is a slight modification of the analysis of μ in Bochnak (2010).

nominal that constitute the incremental theme argument. This has two desirable consequences. First, it captures the fact that eventive *half* measures out the event by measuring out the quantity of the theme argument involved in the event. Recall that sentences with eventive *half* can be roughly paraphrased using actual partitives as in (9); this intuitive connection to the partitive construction is thereby captured in (26). Second, the mandatory presence of *of* in other quantity-based degree constructions as in (25) can be explained if this *of* is actually an overt spell-out of μ in these cases.

A sample derivation of the VP *half eat the apple* is given as in (27). First, μ combines with the theme argument, resulting in a gradable property of events. Next, *half* merges to saturate the open degree argument, and the resulting event description combines with the verb by event identification/conjunction (*cf.* Kratzer, 1996; Stensrud, 2009).

(27)



a. $[\![\mu]\!] = \lambda x \lambda d \lambda e.\exists y[y \leq x \wedge \textbf{theme}(e)(y) \wedge \textbf{quantity}(y) = d]$
b. $[\![\mu$ the apple $]\!] = \lambda d \lambda e.\exists y[y \leq$ *the.apple* $\wedge \textbf{theme}(e)(y) \wedge \textbf{quantity}(y) = d]$
c. $[\![$ *half* $]\!] = \lambda G \lambda e.G(e)(\textbf{mid}(S_G))$
d. $[\![$ *half* μ *the apple* $]\!] = \lambda e.\exists y[y \leq$ *the.apple* $\wedge \textbf{theme}(e)(y) \wedge \textbf{quantity}(y) = \textbf{mid}(S_{apple}))]$
e. $[\![$ *eat half* μ *the apple* $]\!] = \lambda e.\textbf{eat}(e) \wedge \exists y[y \leq$ *the.apple* $\wedge \textbf{theme}(e)(y) \wedge \textbf{quantity}(y) = \textbf{mid}(S_{apple}))]$

The result is an event description that is true of an event e that is an eating, and whose theme is the parts of *the apple* whose quantity is equal to half. All that is needed to account for the data is a spell-out rule that says when *half* or other proportional modifiers combine with μ, those modifiers move to a position above the verb to arrive at the correct word order (i.e., *half eat the apple*), and μ is unpronounced, whereas for other degree constructions, the degree word stays in situ, and μ is spelled out as *of*, which nicely captures the data from Gawron in (25).[11]

[11] As for the distributive reading mentioned above, I tentatively propose that some form of a generalized distributivity operator may apply to μ (see **?**). The application of such an operator would be vacuous in the case where the theme is a singular individual, but would result in a distributive reading over a plural theme argument as in (3).

Under the analysis presented here, the function μ mediates between the part structure of the incremental theme argument and the quantity scale targeted by degree morphology. In addition, μ also syntactically introduces the incremental theme argument, since it is not directly selected for by the verb. This essentially puts μ on par with the agentive v head that introduces the agent of an event (Kratzer, 1996, 2003). That is, both are functional heads that syntactically introduce and assign thematic roles to a verb's arguments. Specifically, μ introduces the verb's internal argument and assigns the theme role, while v introduces the verb's external argument and assigns the role of agent to that argument. What this means is that under the analysis advocated here, the syntax and semantics of event predicates headed by incremental theme verbs is fully Neo-Davidsonian, in that the verb does not even select for its internal argument. On one hand, Kratzer (1996, 2003) has argued against such an approach, and specifically that themes must be selected by their verbs, so my claim that the internal argument is also introduced by a functional head is not uncontroversial. On the other hand, there are also arguments that have been raised that incremental theme verbs do not directly select for their themes.[12]

Rappaport-Hovav (2008) provides at least three pieces of evidence pointing to the conclusion that incremental theme verbs do not show a strong attachment to their direct object. First, these verbs can be used intransitively as in (28).

(28) All last night Cinderella scrubbed/ate/read/drank/wiped and wiped.

Second, as already shown, incremental theme verbs can appear with resultatives (*cf.* (20)). In certain cases, these resultatives may include nominals that appear to be objects, but are clearly not selected by the verb itself.

(29) Cinderella scrubbed her knees sore/the dirt off the table.

Third, these verbs can appear with *out-* prefixation, in which case the object is not an incremental theme.

(30) Cinderella out-scrubbed/out-ate/out-read/out-drank/out-wiped her step-sisters.

Rappaport-Hovav takes these facts as evidence that incremental theme verbs denote simple activity predicates that do not directly select for their theme argument.

Furthermore, a recent challenge to Kratzer's claim that internal and external arguments be treated differently in the syntax and semantics comes from Williams (2009). According to Williams, evidence from resultatives in Mandarin reveals that agent and theme roles show certain interpretational parallels that would not be expected under an analysis that treats them in two different ways, i.e., with the theme selected by the verb and the agent introduced by a functional head. This idea is captured in the present analysis whereby both internal and external arguments are introduced via functional material. I

[12]Once again, much of this argumentation is borrowed from Bochnak (2010).

take the set of evidence briefly outlined here to indicate that the analysis advocated in this paper involving μ is at the very least a plausible one.

The analysis presented here not only accounts for the acceptability of eventive *half* with quantized incremental themes, but can also explain its unacceptability with non-quantized, cumulative incremental themes, and why we get default telic readings with quantized themes, and atelic readings with cumulative ones, in the absence of a degree modifier. First, as was shown in section 2, eventive *half* is only felicitous with a bounded incremental theme argument, but cannot occur with (unbounded) bare plurals or mass nouns, or when there is no theme argument present at all (*cf.* (6)). These facts receive a principled explanation under the analysis proposed here. When a bare plural or mass noun combines with μ, the resulting set of degrees corresponds to an open scale. This explains why eventive *half* cannot occur in these cases - it requires a fully closed scale over which to operate. In the case where no incremental theme argument is present at all (i.e., in intransitive uses of incremental theme verbs), no quantity scale is available for modification in the first place, explaining why eventive *half* cannot occur in such contexts either.

Second, the degree-based account also explains why telic readings of incremental theme VPs with quantized themes are most natural, while only atelic readings are possible with cumulative theme arguments. For concreteness, let us consider the sentences in (31).

(31) a. Cathy ate the apple. (telic reading preferred)
b. Cathy ate apples/applesauce. (atelic reading only)

Under the analysis presented here, the incremental theme arguments in both these sentences are introduced by μ, with the result being a gradable property of events.[13] I propose that in cases such as those in (31) where there is no overt degree morpheme present, that a silent degree morpheme *pos* applies and supplies the degree argument with a contextual standard, parallel with the adjectival case (*cf.* the discussion in section 3).[14] In the case of (31a), the quantized theme argument introduces a fully closed scale when it combines with μ. Recall that in the case of adjectives with fully closed scales, the effect of *pos* is to supply the degree argument with the maximal value of the scale, resulting in a default maximal interpretation. The situation is parallel when *pos* applies to the fully closed scale in (31a), resulting in the default maximal, telic interpretation. By contrast, the scale at issue in (31b) is an open scale, and *pos* simply returns a contextual value for the degree argument. This value cannot be a maximal one since the scale is an open scale. In this case, the application of *pos* yields a vague interpretation of the sentence based on a contextual standard, meaning that the quantity of apple-matter or applesauce is unspecified,

[13] Since μ takes as its first argument an individual of type e, this analysis assumes that bare nominals as in (31b) must be kind-denoting individuals (see Chierchia, 1998).

[14] Also see similar proposals for a *pos* morpheme for events in Piñón (2005, 2008); Kennedy and Levin (2008) and Stensrud (2009).

and therefore only an atelic reading is possible. This behavior follows directly from the degree-based analysis advocated here, and from the more general principles of the semantics of scales and degrees as presented in section 3, and is indeed a welcome consequence.

5 The evaluative reading

Our attention now turns to what I have been calling the evaluative use of *half*. Recall that this use of *half* has very different aspectual properties from the eventive use. Specifically, this reading is available in both telic and atelic contexts, as shown in (32). Importantly, this reading of *half* does not track the quantity of the incremental theme argument, in contrast with the eventive reading discussed in the previous section. Therefore, evaluative *half* can appear with a quantized incremental theme argument as in (32a), with a cumulative incremental theme as in (32b), and even with intransitive uses of incremental theme verbs, where there is no nominal to measure at all, as in (32c).

(32) a. Cathy half ate the apple. (telic or atelic interpretations)
b. Cathy half ate applesauce. (atelic interpretation only)
c. Cathy half ate. (atelic interpretation only)

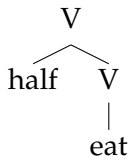
Further evidence that evaluative *half* does not measure out events comes from the fact that it can appear with predicates that are argued to lack internal event structure. The following examples come from Tenny (2000), where the verbs *know*, *hear* and *like* are argued to lack what she calls a *core event*.

(33) a. Billy half knew the truth, but didn't want to admit it to himself.
b. Jimmy half heard the Beethoven Quartet, while he was thinking of what he would tell his boss.
c. Sue half liked the answer she received.

Rather, this use of *half* makes an evaluative statement that the event performed was not a prototypical event of the type named by the predicate. As seen from the examples in (33), this reading is not restricted to incremental theme verbs, but more generally across verb classes.[15] I argue that evaluative *half* combines directly with the verb to create a compound verb with a meaning of *half* V. The syntax of *half eat* on the evaluative reading is given in (34).

[15] A reviewer wonders whether an agent must have control over the event in order to license the evaluative reading. While it is true that the evaluative reading for *half* seems marginal with unaccusative verbs like *fall* or *die*, which do not select an agent argument, the examples in (33) don't seem to involve agent control and yet still allow the evaluative reading of *half*.

(34)



Given what we have said so far about *half* as a degree modifier, this suggests that the verb to which evaluative *half* attaches should be gradable, i.e., of semantic type $\langle d, st \rangle$. Meanwhile, in the previous section I argued that incremental theme verbs are crucially not gradable predicates. However, the arguments in that case were against incremental theme verbs lexicalizing a quantity scale, and as we have just seen, evaluative *half* plays no role in measuring quantities. In what follows, I argue that these verbs may indeed be gradable on the relevant quality-based interpretation, and that it is precisely this type of scale that is targeted by evaluative *half*.

As pointed out by Rappaport-Hovav (2008), incremental theme verbs describe complex changes, in that there are many dimensions along which we evaluate what "counts" as an event of the type named by the verb. For example, a verb like *wash* is associated with a wide range of criteria for classifying such events, such as the amount of soap used, the force and thoroughness of scrubbing, etc. Each of these criteria are themselves gradable properties associated with their own scales. I suggest, then, that evaluative *half* may target one or more of these properties in order to indicate that the event performed was not performed well. Which specific property that is at issue is a matter of context. For instance, in the example in (4) above involving *half eat*, there are at least two dimensions of eating that are at issue: chewing and swallowing. In this case, the speaker uses *half eat* to describe a non-prototypical eating event where a fly is chewed on, but not swallowed.

While evaluative *half* appears to be acceptable with a wider range of verbs compared with eventive *half* (*cf.* uses in (33) with non incremental theme verbs), its distribution is not completely free. For instance, many speakers find the sentences in (35) to be marginal on the evaluative reading (note that the eventive readings here are fine).[16]

(35) a. ??Larry half opened the door.
b. ??Elaine half melted the candle.

I suggest that these verbs do not have the sufficient richness of dimensions that are necessary for a verb to have the type of scale that can be targeted by evaluative *half*. Unlike verbs such as *wash* that are associated with multiple dimensions that can be used to classify events of a certain type, verbs like *open* and *melt* describe events that involve a change in a single attribute. Either Larry opened the door, or he didn't; either Elaine did some-

[16]Tenny (2000) finds these uses of evaluative *half* to be acceptable, though many speakers I have consulted with find them odd. An evaluative-like reading with these verbs seems more natural with the modifier *sort of*.

thing that caused the candle to melt, or she didn't - there is no in-between. That is, there is no complex scale whose midpoint can be picked out by evaluative *half*.[17]

As we have already seen, incremental theme verbs freely accept *out-* prefixation, as shown again in (36). Of relevance here is that the effect of *out-* prefixation in these cases describes a scenario where the speaker is evaluating who performed better at an event of the type named by the verb.

(36) Cinderella out-scrubbed/out-ate/out-read/out-drank/out-wiped her step-sisters.

Thus, (36) states that Cinderella did a better job at scrubbing, eating, etc., than her step-sisters. That is, the speaker is evaluating who performed an action better, indicating that these verbs do indeed lexicalize an evaluative scale for this use. Granted, for some of these verbs, especially *eat* and *drink*, the most natural reading seems to be one where Cinderella ate or drank more of something, which appears to undermine the claim that this use is not quantity-based. In such cases, though, it just happens to be that we usually evaluate the quality of eating and drinking events based on the quantity consumed. Thus, it is still an evaluative scale at issue in these cases, where the quality of the event is evaluated based on how much was eaten. Note that the verbs in (35) where evaluative *half* is marginal also do not readily accept *out-* prefixation to yield a verb with this evaluative competition reading.

(37) a. ??Larry out-opened Elaine.
b. ??Elaine out-melted Larry.

More convincing evidence for the scalarity of these verbs comes from the fact that there is at least one other construction in English that seems to target the same scale. The relevant construction is contrastive focus reduplication (CR), as discussed by Ghomeshi et al. (2004), also called 'doubles' or 'clones' by Horn (1993). CR consists of copying a word in order to put into focus a more prototypical instance of the reduplicated element. As shown by Ghomeshi et al., CR is used to specify a prototypical instance of the item being reduplicated, in contrast to other potentially looser meanings. A looser instance of the verb is exactly the type of meaning we get when *half* combines directly with the verb in its evaluative use, and this looser meaning can be contrasted quite naturally with a more prototypical instance of an event, as in (38).

(38) Larissa only half-washed the dishes, she didn't wash-wash them.

[17] A reviewer points out that (35a) accepts adverbial modification by *powerfully*, which suggests that the verb may be associated with an intensity scale, thereby undermining the idea that such verbs lack a richness of dimensions to license the evaluative reading of *half*. However, the use of adverbs like *powerfully* do not indicate that the verb *lexicalizes* an intensity scale no more than other modifiers that describe manner such as *with both hands* or *by blowing really hard* indicate that the verb lexicalizes a number-of-hands-used scale or an amount-of-blowing scale. Correspondingly, these verbs are not classified as manner verbs, meaning that they do not involve complex changes as argued by **?**.

Ghomeshi et al. argue that the effect of CR is one of set-shrinking, in that the possible range of appropriate instantiations of a property is reduced to only the most prototypical ones. This sets up the contrast between prototypical and non-prototypical extensions of the properties involved. However, an alternative way of thinking about the semantic effect of CR would be to say that verbs are associated with a scale that measures the degree to which an action performed is a prototypical instance of the action named by the verb. Then we can say that CR makes reference to the maximal endpoint of that scale, i.e., the most prototypical instance of that property. That is, the availability of CR not only shows that these verbs can be associated with evaluative, quality-based scales, but also that such scales are indeed closed scales, which is exactly the type of scale structure required by *half* on its other uses as well. Evaluative *half* picks out the midpoint of this quality-based scale when it combines with verbs that are associated with such scales. Thus, we can maintain a uniform semantics for *half* across its uses, in that it always picks out the midpoint of a fully closed scale.

Further evidence that evaluative *half*, *out-* prefixation and CR all operate over the same scale is the fact that they cannot co-occur, as shown in (39) (note that (39b) improves on the eventive reading of *half*).

(39) a. ??Larissa half out-washed Cathy.
b. ??Larissa half wash-washed the dishes.
c. ??Larissa out-wash-washed Cathy.

All these operations target the same scale associated with the verb, and therefore cannot co-occur. A remaining puzzle, however, is why this type of evaluative scale does not accept a wider range of degree morphology that we see in adjectival contexts, or quantity scale contexts as we saw in section 4.

Recapping, the evaluative use of *half* targets a quality scale (or prototypicality scale) that is associated with the verb itself. This explains why this use of *half* can appear in both telic and atelic contexts: telicity is a property of the VP, and is crucially related to the quantization of the incremental theme argument, if present. This means that incremental theme verbs themselves are not inherently telic or atelic; rather, telicity is compositional. The application of evaluative *half* occurs at the verb level, creating a new verb with the same aspectual properties as the base verb, i.e., unmarked with respect to telicity.

In the absence of an overt degree modifier, I propose that a null verbal *pos* morpheme supplies the degree argument with a contextual standard. Since, as I have argued, the scale at issue is fully closed, the resulting interpretation is a maximal one, as expected. That is, the interpretation of the verb *eat* without any degree modifiers is one of a prototypical event of eating.

6 Crosslinguistic support and conclusions

In this paper, I described and accounted for two distinct sources of scalarity that are present within verb phrases headed by incremental theme verbs. Two distinct uses of the modifier *half* diagnose the differences in behavior of these scales. First, the eventive use of *half* is used to measure out an event by measuring out the quantity of the incremental theme that participates in the event. The quantity-based scale that is at issue for this reading is derived by combining an incremental theme argument with a functional head μ, which maps the part structure of the nominal onto a scale and makes available a degree argument for modification. Bounded incremental theme arguments correspond with fully closed scales, which explains both why eventive *half* can only occur when there is a bounded theme argument present and why this reading correlates with a telic interpretation of the VP. I also proposed that partitive *of* is an overt instantiation of μ where other types of degree morphology targeting a quantity scale appear within the verb phrase. Second, the evaluative use of *half* targets a quality-based scale that is associated with the verb itself. This scale is present in verbs that are associated with multiple dimensions that classify prototypical instances of the set of events named by the verbs. The quality-based scales are fully closed scales, which is why they can be targeted by *half*. Both the quantity and quality scales were shown to display behaviors parallel with scales found in the domain of gradable adjectives, particularly with respect to the interpretation of *pos* in the absence of overt degree morphology.

Thus, with respect to the main research question of this paper - where do scales come from within the verb phrase - we see that quantity-based scales are not lexicalized in verb meaning, but rather are derived via the presence of an incremental theme argument, while quality-based scales are lexicalized in verb meaning. This conclusion also relates to the secondary issue addressed here, namely the question of what is lexically encoded in verb meaning. With respect to this question, I argued not only that incremental theme verbs lexically encode a degree argument associated with a quality-based scale (and crucially not a quantity-based scale), but also that these verbs do not directly select for their incremental theme argument. Rather, this argument is introduced by a functional head μ, parallel with the external agent argument that is syntactically introduced by the v head. This means that incremental theme verbs at their core are intransitive activity predicates.

I argued that the two readings associated with *half* reflect distinct derivational histories, despite identical surface forms in English. The result was that I was required to make recourse to a spell-out rule that moved eventive *half* from the position within the VP close to the theme argument where I claimed it occurred at LF to the position left of the verb where it is pronounced in English, which seemingly makes the analysis a bit costly. Crosslinguistic evidence, however, indicates that such an account is indeed on the right track. For instance in European Portuguese, the eventive reading *half* indeed occurs when *meia* 'half' is embedded within the VP, next to the nominal whose quantity it measures (Patricia Amaral, p.c.).

(40) Ele comeu **meia** maçã.
he eat.PAST.3SG half apple
'He half ate the apple.' (eventive reading only)

The evaluative reading of *half* is not available in (42). Furthermore, in Greek, we see that *miso* 'half' can appear both embedded within the verb phrase or to the left of the verb (Anastasia Giannakidou, p.c.), and that this surface variation corresponds with the eventive/evaluative distinction, as predicted by the present analysis.

(41) a. Efage **miso** milo.
eat.PAST.3SG half apple
'He half ate an apple.' (eventive reading only)

b. **Miso**-efage ena milo.
half-eat.PAST.3SG DET apple
'He half ate an apple.' (evaluative reading only)

Thus in Greek, eventive *half* in (41a) is pronounced in the position where it is generated at LF, embedded within the VP closer to the incremental theme argument. Meanwhile, evaluative *half* in (41b) appears in a compound verb form. Thus, in these languages, there is evidence that eventive *half* is indeed generated within the VP, close to the nominal argument whose quantity it measures, making a similar analysis for English plausible as well. Finally, evidence from German shows that the eventive/evaluative distinction may be encoded in two distinct lexical items. This is shown in (42), where *zur Hälfte* corresponds with the eventive reading, while *halbwegs* corresponds with the evaluative reading.[18]

(42) a. Ich habe das Zimmer **zur Hälfte** aufgeräumt.
I have the room half cleaned.up
'I half cleaned up the room.' (eventive reading only)

b. Ich habe das Zimmer **halbwegs** aufgeräumt.
I have the room half cleaned.up
'I half cleaned up the room.' (evaluative reading only)

Thus, whereas English uses a single lexical item to express both the eventive and evaluative readings, German distinguishes these readings using two lexical items, an interesting point of crosslinguistic variation that further supports the analysis presented in this paper.

Finally, this paper has underscored the link between nominal part structure and scale structure in the case of eventive *half*. This connection is found not only in the quantity-based scales associated with incremental theme VPs, but also more generally with gradable adjectives as shown in section 3, and in prior work I have suggested that the very

[18]Thanks to a reviewer for pointing out this contrast, and to Eva Csipak for providing judgements on the sentences in (42).

same mapping between nominal part structure and quantity scales is at work in partitives as well (Bochnak, 2010). In a sense then, there is an analog of partitivity found within the structure of incremental theme VPs, which is sometimes found overtly in the cases where μ is instantiated as *of* in English. This suggests that the mapping from part structure to scale structure is a fairly general semantic mechanism that is at work in these diverse syntactic environments. Future research should work towards further describing and explaining the nature of this mechanism, which I have begun to explore in this paper.

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