ON THE LICENSING OF CAUSATIVES OF DIRECTED MOTION: WALTZING MATILDA ALL OVER*

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Abstract. This paper focuses on one famous example of an alternation that has been supposed to depend on telicity, the causative manner-of-motion alternation in English *John ran the dog *(to the park)*. One standard approach has taken telicity to be central to the possibility of causative formation. We argue here that although telicity *can* be a property of these constructions, it is not *necessary* for the formation of a motion causative in English. Rather, what licenses the alternation is the availability of a specific syntactic structure, containing a small clause, interacting with non-telicity-related semantic restrictions imposed by verb meanings.

1. Introduction

Since Talmy (1975) and Jackendoff (1976), the relationship between the semantics and the syntax of directed-motion constructions has been a central focus of studies of argument structure. These constructions are a locus of important cross-linguistic variation (Talmy's 1985, 1991 satellite-framed vs. verb-framed languages), and they seem to show a causal connection between syntax and semantics, although theorists disagree about which is cause and which is effect. The differences between the availability of directed-motion constructions in languages like English and languages like Italian are clearly related to broader properties of the interface in these languages. The productivity of such constructions seems to correlate with the availability of resultatives and verb-particle constructions, as well as with differences in the inventory of lexical items in these languages: the prevalence of manner-of-motion verbs in English (*swagger*, *wriggle*) vs. that of verbs of inherently-directed motion in Italian (*entrare* 'enter', *uscire* 'exit') (Talmy 1985, Napoli 1992, Pustejovsky 1993, Levin & Rappaport-Hovav 1995, Slobin 1996, Snyder & Stromswold 1997, Higginbotham 2000, Mateu 2001, Svenonius & Ramchand 2002, Papafragou et al. 2002, Finkbeiner & Nicol 2003, among many others), as well as the availability of Path-denoting prepositions like *to* and *into* in English, and their absence in Italian (Folli & Ramchand 2005, Folli 2001).

Because of the clear syntactic and semantic relationship between directed-motion constructions and resultatives, most theorists have treated

them as two manifestations of the same underlying phenomenon. For instance, in the semantic realm, both resultatives such as *Bill painted the cart red* and directed-motion constructions such as *The cart rolled into the store* license inferences about the final state of the object *cart*. In the former, the proposition *The cart is red* is entailed, while in the latter *The cart is in the store* is similarly entailed. (See section 4.3 for discussion of the failure of *into the store* as a predicate in **The cart is into the store* with the copula.)

We can see the syntactic reflex of their similarity, on the other hand, realized in auxiliary choice, as in the Dutch examples in (1):

(1) a. Jan   is/*heeft in de sloot gesprongen.
       John is/*has   in the ditch jumped.
       'John jumped in the ditch.' [on the resultative interpretation]
    b. De deur is/*heeft open gezwaaid.
       the door is/*has   open swung
       'The door swung open.'

We will consider two of the hypotheses in the literature concerning the construction of resultatives in languages like English.[1] One, typified by Jackendoff (1990), Rappaport-Hovav & Levin (1999), Wechsler (2005), holds that the constraints on resultative formation are mainly lexical, stated at lexical-conceptual structure (LCS), and that linking rules governing the mapping from LCS to syntax account for syntactic restrictions on the construction. The second approach argues that the formation of resultatives is a syntactic process. There are two primary versions of this approach. One proposes that there is a functional projection which licenses objects and interprets them as the undergoer of a change of state. In such an approach, the functional projection is necessary for telicity to arise (Tenny 1987, Travis 1994, van Hout 1996, Ritter & Rosen 1998, Borer 1998, Sanz 2000). In the other type of syntactic account, these constructions are formed when a resultative secondary predicate appears in the syntactic structure. The consequent structural change forces a reinterpretation of some argument of the main verb as the subject of the lower predication (or introduces an unselected argument to serve this function), and a change-of-state interpretation follows naturally via compositionality. Such an approach is advocated by, for example, Chomsky (1981), Stowell (1983), Hoekstra (1984), Kayne (1985), among many others.[2]

We will adduce evidence in favor of the small-clause approach by looking at causatives of directed-motion constructions like those in (2),

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[1] A third well-known family of analyses treats such constructions as instances of "complex predicates" in a particular sense: the verb and the secondary predicate together project a complex object-taking predicate. Such an analysis is adoped by DiSciullo & Williams (1987) and Neeleman (1994), among many others.

[2] See Ramchand (2001) and Ramchand & Svenonius (2002) for an account which includes a special ResultP functional projection to introduce the small clause, but which semantically works essentially like the small clause hypothesis of Hoekstra & Mulder (1991).

and show that the semantic factors which restrict their formation involve animacy and event-object and event-path homomorphisms.

(2) a. John waltzed Matilda across the floor.
    b. Mary jumped the horse over the fence.

We argue, with many others, that semantic telicity is not the determining factor in the formation of such causatives. These constructions are typically telic, which has led many to the assumption that telicity is always associated with them. We present evidence in section 2 showing that endpoint telicity is not in fact a requirement for their formation (with Aske 1989, Levin & Rappaport 1995, Jackendoff 1990, Borer 2002). We also show that endpoint telicity may arise in different structures (as shown by Ramchand 2001), and may be affected by apparently semantic or pragmatic factors, with Hay et al. (1999) and Borer (2005). Hence there is no two-way requirement: telicity need not be represented by a unique syntactic structure, and resultative structures need not be telic.

In section 4, we argue instead that the crucial ingredient which allows the formation of causatives of directed motion constructions is the small-clause configuration, no matter whether the event denoted is telic or atelic. Crucially, the proposed approach can allow this dissociation between telicity and directed-motion constructions. Both the semantic approaches based on telicity, and the first type of syntactic approach, which entails a necessary connection between structure and a telic interpretation, have not accounted for the range of data we discuss.

Although we advocate a syntactic account of the formation of causatives of directed motion constructions, we also come to the conclusion that semantic factors other than telicity are at work in restricting which types of verbs and arguments may co-occur in these constructions in English. The small-clause analysis, restricted by animacy and homomorphism effects, allows a division of labor between semantics and syntax that results in a sufficiently fine-grained analysis to account for the full range of data, which neither the purely semantic nor syntactic approaches have captured on their own.

2. Telicity and resultatives

In studies of argument projection, it has been argued that certain syntactic structures have a particular semantic correlate. The discussion focuses on the relationship between the telos of a given event and the syntactic structure used to refer to that event. It is well-known that events can unfold in different ways along the timeline. They can be homogenous, continuing for an arbitrarily long amount of time; they may be punctual, occupying a simple minimal point on the timeline; and crucially they may also involve a process of change, which may or may not lead to an inevitable conclusion. It is this latter type of event which will concern us here.

In the linguistic literature, events are broken down into idealized sub-parts, usually called sub-events. For example, change-of-state events are made up of a process of change, followed by an endpoint (*telos*) (Dowty 1979, Pustejovsky 1993, Kratzer 1996, Higginbotham 1997, von Stechow 1995, Krifka 1998, among many others). Other types of events do not contain a telic sub-event, and the presence or absence of such a sub-event has been argued to have direct consequences for the syntax.

For many of those who take a syntactic perspective on this relationship, it is assumed that endpoint sub-events are directly represented by the projection of a particular functional superstructure (Travis 1994, van Hout 1996, Borer 1998, Ritter & Rosen 1998, among others). For those who take the lexical-semantic perspective, the relationship between endpoints and syntax is the result of the lexical specification of the verbal semantics being enforced in the syntax via linking rules which allow connections between particular semantic elements and particular syntactic structures. (Levin & Rappaport-Hovav 1995 for example.)

Directed-motion constructions and their causative alternants have been discussed extensively in the literature (see, e.g. Hoekstra (1984), Jackendoff (1990)). Verbs of motion may not take a direct object, as shown in (3):[3]

(3) a. John waltzed (*Matilda).
    b. John walked (*Matilda).
    c. John ran (*the dog).
    d. John jumped (*the horse).

It has been noticed (Hoekstra & Mulder 1990, Levin & Rappaport Hovav 1995:111 and many since) that these structures containing objects may be rescued by adding a goal PP, whose presence creates grammatical structures denoting events which are both causative and telic:[4]

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[3] As noted by a reviewer, certain unergative manner-of-motion verbs can take objects without an accompanying PP. Many such cases (as in *jump the fence*) involve a Path-denoting direct object (Jackendoff 1992: 47, Tenny 1995), and are not causatives of the type we are interested in here (see, however (Ramchand 2001: 23) for a treatment of all Incremental Theme verbs, including creation and consumption verbs as taking this kind of Path argument). The causative interpretations in question here involve a Theme object which is undergoing motion of some kind, and it is this type of object which has been claimed to be ungrammatical without a Goal/Path-denoting PP. We assume that certain strongly idiomatized cases of genuine causatives without Goal/Path PPs, such as *walk the dog*, have acquired a separate resultative meaning ('relieve the dog'), or have an understood generic Path PP ('jump the horse'). We assume (with most of the literature, see discussion in the text) that the productive causativization process requires a PP.

[4] The fact that causatives of directed motion constructions are analyzed as necessarily telic by some authors is a corollary of a proposed dependence of unaccusativity on telicity, since only unaccusative predicates can be causativized. For example, Arad (1998), van Hout (2004: 61), Borer (2004: 295) among many others, have proposed that telicity is crucial to unaccusativity. The present analysis treats the correlation between unaccusativity and telicity in the same way that it treats the correlation between causative resultatives and telicity, unaccusatives syntactically being simply agentless resultatives.

(4) a. John waltzed Matilda into the bedroom in 5/#for 5 minutes.
 b. John walked Matilda to his new flat in 20/#for 20 minutes.
 c. John ran the dog over the bridge in 20/#for 20 seconds.
 d. John jumped the horse across the ditch in a flash/#for 2 seconds.

The possibility of modifying these verb phrases with an *in-an-X* adverbial shows that the events are delimited (Vendler 1967). Consequently, as mentioned above, both the syntactic and semantic approaches to the interface have taken telicity to be central to the possibility of causative formation with these predicates.[5] Consider, however, the examples in (5):

(5) a. John waltzed Matilda around and around the room for hours.
 b. John walked Mary along the river all afternoon.
 c. John ran the dog up and down the path for hours.
 d. John jumped the horse back and forth across the ditch
  for 30 minutes.

The interesting thing in these examples is that although the causative is grammatical, the PP which licenses it does not delimit the event. The adjunction of the *for-an-hour* adverbial shows that the events in these VPs are in fact atelic. We will concentrate on investigating the properties of this data set, drawing the conclusion that the relationship between telicity and these causative change-of-state constructions is more coincidental than causal.[6] We argue that the crucial licensing factor is a particular structural configuration involving a subject and a predicate. However, the predicate may or may not specify a final state for the object.[7]

   Causativized manner-of-motion verbs with goal PPs have been of long-standing interest, because they shed light on the nature of selection, causativization and the thematic properties of arguments: agentivity, affectedness, and so on. Normally the internal argument of a causative structure (*Mary hammered the metal flat*) undergoes a change of state and as a consequence has few or no agentive properties, but in these types of

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[5] Many other syntactic reflexes of a change in the telicity of an event have been observed cross-linguistically. See for example Borer & Grodzinsky (1986) for possessor datives in Hebrew, Kiparsky (1998), for partitive/accusative alternations in Finnish and Svenonius (2002) for case alternations in Icelandic, among others.

[6] See Abusch (1986), Pustejovsky (1991), Levin & Rappoport-Hovav (1999), and Van Valin & Lapolla (1997) for other arguments in favour of a distinction between causation and telicity.

[7] The structural treatment we propose for these constructions, following Hoekstra & Mulder (1990), is the same as that for small-clause resultatives, whether unaccusative (as in 'The vase broke apart') or causative (as in 'John broke the vase apart'). In the literature, the term 'resultative' implies the existence of a telic result state predicated of the Theme argument. In the present account, however, we use the term to refer to any change-of-state predicate with the 'resultative' small-clause structure, whether telic or atelic. See also discussion in section 4.3.

motion construction there is often an interesting combination of agentivity and affectedness on the part of the direct object.[8] They are consequently less flexible than run-of-the-mill causatives, and have important implications for theories of the syntax/semantics interface. We will discuss these related issues in section 5.

3.   Non-structural sources of telicty, non-endpoint types of telicity

In this section, we first exhibit a case discussed in the literature where a change in the telicity of an event type is not correlated with a change in syntactic structure, in support of the position that that telicity is not an essentially syntactic property. We also consider different varieties of telicity discussed by Borer (2005: 134), where the usual tests for telic structures do not indicate the cessation of the event; rather, they refer to a type of 'threshold'.[9] We conclude, with Borer, that the notion of "endpoint" so frequently referred to must be discarded in favor of a considerably more fluid conception of linguistically relevant sub-event.[10]

3.1.   Context induced telicity

It has been shown elsewhere that telicity can also be created by effects due to contextual cues. For example, as discussed in Hay, Kennedy & Levin (1999), there is a class of verbs called "degree achievements" (Abusch 1985, 1986), exemplified by *lengthen, widen, cool, dry* etc. which are problematic for aspectual classifications because they alternate between telic and atelic behavior (*the soup cooled in five minutes/for five minutes*). (See also Levin & Rappaport-Hovav 1995: 172 for similar arguments). Hay et al. (1999) argue that what is crucial for the aspectual classification of these verbs as telic or atelic is whether the degree of change—what they call the 'difference value'—associated with the meaning of the adjectival base can be interpreted as bounded or unbounded. In the former case, when the difference value can be interpreted as bounded we have a telic predicate, while in the latter, when the difference value is unbounded, we have an atelic verb. In essence, the argument is that 'the variable aspectual behavior of many degree achievements can be explained in terms of the relation between event structure and the scalar structure of

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[8] Levin & Rappaport-Hovav (1995:110) call these intransitive/transitive alternations 'causative pairs' rather than 'causatives' precisely because of the possibility of agentive properties of the internal argument (properties which Dowty (1991) catalogues as "Proto-Agent" properties).

[9] For discussion of the relationship between 'threshold'-type verbal telicity and the semantics of gradable deverbal adjectives, see Kennedy & McNally (2005).

[10] Levin & Rappaport-Hovav (1999) make a similar point: the choices made in lexicalizing an event in one way or another have less to do with the actual evolution of the flux of events in the real world than with the speaker's conceptualization of them.

gradable properties' (Hay et al. 1999, p. 3). In many cases, the difference value is provided by linguistic material, for example by a measure phrase (*the lake cooled 4 degrees*), or by adverbial modifiers (*The clothes dried completely* (telic) vs. *The independent counsel broadened the investigation slightly* (atelic)).[11]

The interesting thing for us here is that the bounded versus unbounded nature of the property involved in the deadjectival verb can sometimes be determined by contextual cues. For example, consider the difference between (6a–b) below.

(6) a. John lengthened a rope (*in 2 minutes/for 2 minutes).
   b. The tailor lengthened a pair of trousers (in 2 minutes/for 2 minutes).

The difference in event type here is not the result of any syntactic change in the structures involved. Rather, the telicity in (6b) results from world knowledge; there is no conventional length for ropes, but there is a salient conventional length for trousers (as long as the leg of the owner).[12] When that length is achieved, the event is over. In Hay et al.'s terms, here what is relevant is not the scalar structure of the adjectival base, but rather the conversational implicature relative to trousers length. The important aspect of their treatment for us is the lack of any necessary implication between telicity and a particular syntactic structure.[13]

3.2. *Threshold vs. endpoint telicity*

Most approaches to the event-structure/argument-structure correspondence have assumed that the simple notion of 'telicity' is transparent, because the fundamental aspectual nature of an Accomplishment involves the notion of a result achieved, after which the event ceases. Formalizing a connection between "result" and "endpoint", then, has seemed a very natural step (as in the work of Travis 1994, van Hout 1996, Borer 1998, Ritter and Rosen 1998, among others). There are, however, cases where the correlation doesn't hold.

Consider the following standard examples of supposedly telic events, delimited by Goal PPs, discussed in Folli (2001):

(7) a. John walked around the corner.
   b. The boat floated under the bridge.

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[11] The examples in brackets are taken from Hay et al. (1999: 8).

[12] Of course, if one is in a context where there is a conventional length for ropes, then the 'trousers' interpretation discussed here is available for (5a) as well.

[13] As noted by a reviewer, Ramchand (2001: 54) also explicitly allows telicity to arise in the absence of the functional projection (RP) which in her framework is normally associated with it, in examples involving creation and consumption verbs.

The telic interpretation for a sentence such as *the boat floated under the bridge* can (and often does) carry the implication that the boat got to the other side of the bridge, so that the sentence could be paraphrased as *the boat floated until it went under the bridge and then beyond*. If the notion of telicity that was relevant here involved an "endpoint", however, we would expect the sentence simply to have the interpretation *the boat floated until it got under the bridge* (with the presupposition that then it stopped there).[14] In such sentences, we can call the PP's contribution the *threshold* of the event: here, as well as above, it is not the presence of an endpoint per se which is relevant for the directed-motion interpretation.

Borer (2005: 149–154) argues extensively that 'endpoint' is not an adequate characterization of the contribution of the result predicate in resultatives generally. Rather, endpoint telicity is only a special sub-case of the overall phenomenon, in which any sufficiently distinct transition can give rise to a telic interpretation, even one which is intermediate within the event as a whole. 'Telicity does not predict co-finality, or, for that matter, co-initiality. It suffices that there be some sub-part of an event with a property P which is not, itself, P… If, however, some intermediate point within the event should turn out to be sufficiently well-differentiated from the rest of the event, in involving, specifically, the (sub-)culmination of some sub-event, we predict the emergence of a telic reading without co-finality' (Borer 2005: 148). She cites examples like the following:

(8) a. Kim ate more than enough meat (non-P defined by *enough*).
    b. Robin read at least 3 books (non-P defined by *3 books*).
    c. We filled the room with smoke[15] (non-P defined by *full of smoke*).

Here, there are thresholds but not endpoints. We have emphasized that endpoint telicity is only a particular case of a general phenomenon of 'threshold' telicity, where there is a transition from not-P to P, but that transition does not necessarily demarcate the endpoint of the event.

3.3. *Telicity-inducing functional projections*

As noted above, according to one particular syntax-driven approach to resultatives and the measuring-out phenomenon, the telicity of a phrase is constructed by a particular functional projection. This FP goes by various names: Inner Aspect (Travis 1994), AgrO (van Hout 1996), AspQP (Borer 1998), EventP (Sanz 2000), but the crucial thing is that all versions of this projection contain features which must be checked by an

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[14] Notice that this is in fact one interpretation that this kind of sentence can have in Italian, where constructional threshold telicity doesn't seem to be a combinatorial possibility.
[15] See Schein (2002).

object in its specifier position. This is intended to enforce the event/
object-homomorphism requirement (Krifka 1998) — Tenny (1994)'s
"Measuring-Out" effect, typical of these structures where the object is
often an Incremental Theme.

Borer's threshold telicity, as well as Hay et al.'s pragmatically induced
telicity, are problematic for such approaches. A [+telic] feature intro-
duced by the syntax should not be sensitive to the contextual effects
imposed by the choice of object and overall situation, as in the *lengthen
the trousers* case. Further, there is no clear way to encode non-endpoint
telicity: such approaches employ a compositional semantics which entails
that the object is necessarily an entity which undergoes a change to a
finished result state, thereby 'measuring-out'. For this reason, the *more
than enough meat* and *fill the room with smoke* examples are not easily
treated by the semantics usually proposed for a telic functional
projection. The insight is that telicity emerges in the context of a counter,
and it is absent in the absence of a counter (Borer 2004), where by
'counter' Borer refers to whatever is projected in and therefore assigns
value to the quantity phrase. In other words, the availability of a precise
quantity is what is crucial for the formation of a telic interpretation. This
hypothesis leads Borer to suggest that the relevant functional node in her
system, AspQ, does not attend to telicity *per se* but rather to quantity.[16]

It seems to us that none of these approaches, Borer's included, can
explain the object-introducing effects of unbounded, non-quantized PPs
such as *around and around* in the atelic directed-motion causatives we are
considering here. The telic FP-type approach generally explains the
introduction of an unselected object in examples like *Bill laughed himself
to death* or *John waltzed Matilda across the floor* by saying that the telic
FP is responsible for licensing an additional object argument, precisely to
do the measuring-out for these [+telic] expressions. Our paradigm in (5)
above, however, shows that the object-introducing effect is created by the
addition of a PP, no matter whether that addition creates a telic or atelic
event.

3.4. *Wechsler 2001, 2005: Linking, closed scales and resultatives*

Despite the inadequacy of accounts which propose a necessary and
complete connection between object licensing and telicity for motion
verbs, there is one type of construction where the correlation does seem
to be as complete as advertised. This is the case of adjectival resultatives
formed on transitive verbs: the "selected-object resultatives" discussed by

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[16] Crucially, for Borer now the difference between English type languages and Slavic type
languages lies in the absence of marking for AspQ in the former, which in turn explains the
fact that in English the realisation of the object in the specifier of such a projection is
obligatory in quantity events (i.e. thereby giving Verkuyl's generalization).

Rappaport-Hovav & Levin (1999) and Wechsler (2001, 2005), among many others.

Resultatives can be formed both on verbs which select for a direct object and on verbs which do not:

(9) a. John swept the floor.
    b. John swept the floor clean.
    c. John shouted (*himself).
    d. John shouted himself hoarse.
    e. John swept the broom apart.
    f. *John swept the broom.

In (9a), we see that the verb *sweep* allows a direct object; (9b) is a resultative formed on this construction. (9c) shows that *shout* is ungrammatical with a direct object, but may allow a direct object with a resultative adjectival, as in (9d). That is, *sweep* is a verb which subcategorizes for a direct object, *shout* is not.[17] Notice, however, that *sweep* in (9e) has an unsubcategorized object (one cannot sweep a broom). What is at issue, therefore, is not transitivity, but the actual properties required of subcategorized objects by the verb.

In resultatives with subcategorized objects, Rappaport-Hovav & Levin and Wechsler have shown that the resultative adjective must be bounded, i.e. it must encode a definite telos:

(10) a. Mary wiped the table clean.
    b. #?Mary wiped the table dirty.

Wechsler, in particular, argues that it is the boundedness of the adjectival predicate (what he calls closed-scale gradable adjectives), not the syntactic presence of an object, that is essential for resultative formation. In (10a) above, *clean* is a closed-scale adjective, because 'clean' in its typical use represents an absolute endpoint: when all the dirt is removed, the object can't get any cleaner. In (10b), however, *dirty* is an open-scale adjective: something can get arbitrarily dirty; there is no typical necessary endpoint of dirtiness where something can't get any dirtier.[18]

These cases do exhibit exactly the syntax/semantics difference between endpoint and threshold telicity that we argued above was not relevant for other examples. The fact that it isn't relevant in other examples, we argued, posed a problem for syntax-based treatments which appeal to a telicity-inducing functional projection.

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[17] We are, of course, using "subcategorize" here as a purely descriptive term; we do not necessarily wish to imply commitment to an architecture which involves lexical argument structure or subcategorization frames at this point.

[18] See also Hay (1998) for a similar classification of predicates into closed-range adjectives (i.e., adjectives associated with a scale with a maximal value) and open-range adjectives (i.e., adjectives for which it is not possible to identify a maximal value).

Wechsler argues for a semantically-based account according to which a linking rule allows resultative formation with these verbs if and only if the correct type of closed-scale adjective is predicated of the selected object. When a resultative is formed on a subcategorized argument, an *event-object homomorphism*, in the sense of Krifka (1992), is imposed.[19] Consequently, a resultative may not be formed on a subcategorized argument with an open-scale adjective, since the appropriate homomorphism cannot be imposed with such an adjective. (When the object is not selected by the verb, on the other hand, the homomorphism not imposed.) Wechsler's account has the attractive property of predicting the ungrammaticality of (10b) above. He takes the predictive power of this approach to be a strong argument in favor of lexical-semantic approaches to the syntax/semantic interface problem in general.

Since lexical selection, rather than syntactic position, is the crucial factor for Wechsler, it follows that similar restrictions should hold of resultative-type predications formed on surface subjects, as long as the subjects are subcategorized for. Such an account allows for a monostratal syntax, since all the relevant factors are encoded in the lexical-semantic representation of the elements involved. He adduces examples like the following:

(11) a. *We danced tired.
     b. *The coach trained us tired.
     c.   We danced ourselves tired.
     d.   John danced into the room.

One standard approach to explaining the ungrammaticality of (11a) is based on the claim that resultatives require an (underlying) object, no matter whether selected or unselected (e.g. the Direct Object Restriction of Levin & Rappaport 1995). Such an approach cannot help with (11b), however, since an object is present but the resultative is still bad. Wechsler's account, however, proposed that the problem with understanding *danced tired* as a resultative[20] is not that it is lacking an object, but rather that *tired* is an open-scale adjective, and therefore unbounded. On this account, (11b), *trained us tired*, is bad for the same reason—accounted for in the same way as *wipe the table dirty* in (10b) above: *us* is subcategorized for and hence requires a closed-scale adjective, but *tired* is not such an adjective. On the other hand, Wechsler's closed-scale restriction applies only to resultatives formed on subcategorized

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[19] Beavers (2002, 2005) also argues for a Krifka-style approach to the event-object homomorphism in resultatives, showing that gradable result predicates can compose with durative verbs to create durative resultative events, while non-gradable result predicates can only create punctual resultative events.

[20] Of course, *We danced tired* is well-formed as a depictive, meaning that we were tired during the dancing, but understanding it as resultative, where tiredness is an effect of the dancing, is not grammatical.

arguments, (11c) is grammatical because *ourselves* is not a true object of *dance* and hence is not subject to the event-theme homomorphism restriction.

Wechsler advocates the same type of approach to account for the fact that the resultative manner-of-motion construction in (11d), *John danced into the room*, is well-formed. *Into the room* is a closed-scale PP and hence is predicted to be grammatical when predicated of a selected argument like the subject of *dance*. Wechsler, like most researchers who have considered these constructions, treats manner-of-motion constructions as resultatives, and hence assumes they should be subject to the same type of constraints.

Wechsler's account hinges on the notion of selection, rather than syntactic position. Resultatives formed on selected arguments, whether they are subjects or objects, must be formed with closed-scale predicates. However, this cannot be the whole story. Wechsler's closed-scale/open-scale contrast applies equally well to prepositions and adjectives. *Along, around* and *towards*, for instance, are prepositions which produce an atelic interpretation of a motion event. They have no maximal bound, hence are open-scale, like *tired*. On the other hand, *to, into*, and *across* produce a telic event, according to our tests below, and hence are closed-scale. Consider the examples in (12), with closed-scale prepositions, and (13), with open-scale ones:

(12) a. John walked to the river   #for 3 hours/in 3 hours.
     b. Mary pushed the cart into N.Y. #for 3 hours/in 3 hours.
     c. Sue danced across the room   #for 3 hours/in 3 hours.

(13) a. John walked along the river
        for 3 hours/#in 3 hours.
     b. Mary pushed the cart towards N.Y.
        for 3 hours/#in 3 hours.
     c. Sue danced around and around the room
        for 3 hours/#in 3 hours.[21]

Wechsler could obviously account for the examples in (12), as the predicate is closed-scale and the NP is an argument of the verb. On the other hand, he would predict that the examples in (13) should be ungrammatical because the NP of which the result is predicated is subcategorized for by the main verb, and the result PP is open-scale. Because the subject NP is selected, Wechsler's account predicts that an event-argument homomorphism should be imposed (as in *We danced tired), and that the result predicate

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[21] Notice that the preposition *around* is ambiguous between an atelic and telic interpretation. On the former, it simply means continuously, in a circular way. When telic, it means that a complete circuit of something, with a beginning and an endpoint, has occurred (John walked around the house in five minutes/for five minutes). To disambiguate these two senses here, we use *around and around*, which is purely atelic.

should therefore be a bounded one. It is not, yet these examples are perfectly well-formed. While Wechsler's conclusions may account for the constraints on the formation of adjectival resultatives with subcategorized objects, the account does not make the right predictions for PP resultatives in manner-of-motion constructions.

3.5. *Summary so far*

We have presented evidence that, for motion verbs, telicity and resultative structures are not necessarily correlated. Causatives of motion verbs are possible with atelic PPs, which shows that causativization—i.e. the introduction of an extra object argument—does not correlate with telicity. This constitutes a strong argument against the family of analyses inspired by Tenny's (1987) observation concerning the relationship between telicity and transitivity.

We have also seen that an account relying only on a combination of selection of the subject of result and the closed or open scalar properties of the secondary predicate cannot account for the distribution of these manner-of-motion constructions, which seem to be immune to the closed-scale restriction proposed by Wechsler (2001, 2005). We now turn to a closer investigation of the crucial atelic causatives of manner of motion that are our focus here.

4. A structural approach to Path PPs

4.1. *Path PPs are arguments, not adjuncts*

One might attempt to argue that the open-scale PPs in (13) above are not in the VP-internal resultative position, but rather are locative adjuncts. Below we show that in the cases in (13) above, the open-scale PP is a complement of the verb and not an adjunct (see also the tests provided for Norwegian by Tungseth 2004). Consider the contrasts in (14):

(14) a.   Sue danced around the bathroom at the party.
     b.   #Sue danced at the party around the bathroom.
     c.   Sue danced at the party in the bathroom.
     d.   Sue danced in the bathroom at the party.

Switching the order of two locative PPs, both of which modify a dancing event, in (14c–d) does not affect grammaticality. However, reversing the order of a locative and an open-scale Path PP in (14a–b) severely degrades the sentence, indicating that the Path PP is in the VP-internal resultative position rather than an adjunct position.

Similarly, temporal adverbials can normally be interchanged with locative adjuncts, as seen in (15a–c) below. However, with these atelic Path PPs, the order is fixed, as seen in (15b–d):

(15) a. Sue danced at the party for hours/for hours at the party.
    b. Sue danced around the room for hours/#for hours around the room.
    c. John pushed the cart at the state fair for hours/for hours at the state fair.
    d. John pushed the cart towards New York for hours/#for hours towards N.Y.

Another relevant test for constituency is *do-so* VP elision. Elements which are adjoined to the VP normally may occur outside the domain of *do-so*, as illustrated in (16a) for a locative PP. On the other hand, VP-internal PPs, as in the ditransitive case in (16b), may not be excluded from elision, because they are structurally part of the VP being elided. The crucial example for us is (16c), where the atelic Path PP is clearly part of the elision domain:

(16) a. Mary kissed John in the park and Sue did so in the bedroom.
    b. *Sue gave a book to John and Mary did so to Bill.
    c. *John pushed a cart towards N.Y. and Bill did so towards Washington.

According to the test in (16c), the open-scale PP here must be within the VP, and hence cannot be an adjunct.[22]

    Another test which can distinguish argument from adjunct PPs is discussed in Zubizarreta & Oh (2004:62 n. 7). There is a well-known asymmetry between weak-island extraction from arguments vs. that from adjuncts, as shown in (17):

(17) a. *When$_i$ do you wonder whether Snow White will eat an apple t_i ?
    b. ?What$_i$ do you wonder whether Snow White will eat t_i on Thursday?

---

[22] We thank a reviewer for noting that the effects with ordering and *do-so* elision in causatives go in the same direction as for the intransitive cases we consider in the text above, as we would predict:

  i.   John danced Mary around the room for hours.
  ii. ??John danced Mary for hours around the room.

The reviewer notes that when the object is selected by the verb, as in (15d), the effects are somewhat weaker than when it isn't:

  iii. Mary drove the car towards New York for hours.
  iv. ?Mary drove the car for hours towards New York.

The weaker effect here, we think, has to do with the well-formedness of the string *Mary drove the car* in (iv), which is a completely interpretable structure, as compared to the ill-formedness of the same substring *John danced Mary* in (ii); in the latter, the hearer immediately knows to expect a secondary predicate to licence the unselected object, and can give an 'ungrammatical' judgment as soon as the temporal adverbial *for hours* is encountered, while in the former, the grammatical parse of *Mary drove the car for hours* is not problematic until the postposed Path PP is encountered at the end of the sentence.

A similar asymmetry shows up between extracted Path PPs and adjunct Location PPs, as shown in (18), suggesting that the former are arguments:

(18) a. *[At which party]$_i$ do you wonder whether Sue will dance t_i?
 b. ?[To which house]$_i$ do you wonder whether Sue will walk t_i?

The telicity of the Path PP does not change its argumental nature in such a test:

(19) ?[Towards which tree]$_i$ do you wonder whether Sue will walk t_i?

Finally, Bresnan (1992) notes that locative inversion is possible for verbs of motion with Path PPs but not Location PPs in these constructions, as shown in (20). This is presumably because locative inversion is movement to an A-position, and hence should be good for arguments but not adjuncts:

(20) a. *At the party danced a smiling girl.
 b. Into the room danced a smiling girl.

Locative inversion is similarly possible with atelic Path PPs:

(21) Around the room danced a smiling girl.

We can confirm the resultative nature of the atelic PP in the equivalent construction in Italian by considering auxiliary selection facts. As discussed for Dutch above, whenever a verb of motion followed by a PP alternates between a locative and a directed-motion reading, the auxiliary selected in the perfective changes from the *avere* 'have' to *essere* 'be', corresponding to an unergative vs. an unaccusative structure. In (22), changing the auxiliary correlates with a change in the interpretation of the PP, from locative adjunct in (22a) to closed-scale Goal endpoint in (22b). This is confirmed by the standard telicity tests (see Folli 2001 for further discussion):

(22) a. Gianni ha corso nel bosco per ore/#in un minuto.
    John has run in the woods for hours/in one minute.
 b. Gianni é corso nel bosco in un minuto/#per ore.
    John is run into the woods in a minute/in one minute.

Crucially, changing the preposition from a closed-scale, endpoint-locating one like *in* 'into' to an open-scale, path-denoting preposition like *verso* 'towards' still results in *essere* being selected as the auxiliary, again confirming that these atelic Path PPs are argumental in the same way as their telic counterparts:[23]

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[23] Of course, because *correre*, 'run', is an unergative verb, its normal auxiliary, when no PP is present, is *avere*, 'have':

 i. Gianni ha/*è corso.

The change in auxiliary required with atelic Path PPs like *verso*, 'towards', show that the constraints on auxiliary selection do not depend on the existence of a telic result state for the subject of the resultative predication. We conclude, with most of the literature, that constraints on auxiliary selection are structural, and are a good diagnostic for unaccusativity.

(23) a. Gianni é corso verso   il   bosco.
       John   is run   towards the woods
       'John ran towards the woods.'
    b. Gianni é scivolato in   direzione della pianta.
       John   is slid   in.the direction of.the tree
       'John slid in the direction of the tree.'

The same constellation of facts is true in Dutch:

(24) a. Jan is in het bos   gerend.
       Jan is in the woods run
       'Jan ran into the woods.'
    b. Jan heeft in het bos   gerend.
       Jan has   in the woods run
       'Jan ran in the woods.'
    c. Jan is naar   het bos   gerend.
       Jan is towards the woods run
       'Jan ran towards the woods.'

Finally, we note that there is a small class of English manner-of-motion verbs which select for a directional PP, and may not occur in an unergative, PP-less frame.[24] Consider the examples in (25) below:

(25) a.   The car careened around the track.
     b. #The car careened.
     c.   The car hurtled down the road.
     d. #The car hurtled.

These verbs actually require a directional PP, confirming that open-scale PPs can be arguments in the canonical sense.

   We therefore conclude that the structural position of the open-scale PP in the examples above is not that of an adjunct, but rather the usual VP-internal position of a PP that specifies a Path argument.

   Structure is then the crucial factor in allowing an unaccusative or causative of a manner of motion verb, not the telicity of the prepositional phrase involved. In the next section, we argue that the secondary predication introduced by the small clause involves a measuring out of the event denoted by the vP (Tenny 1987), and the content of P head simply determines whether measuring-out results in a bounded, telic event or an unbounded, atelic event.[25]

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[24] Thanks to Erin O'Bryan for drawing these examples to our attention.

[25] Zubizarreta & Oh (2004) use 'bounded' to mean something like 'scalar', 'gradable', equating it to Krifka's notion of non-divisive reference, thus distinguishing 'bounded' from 'telic'. We use 'bounded' as equivalent to 'telic' here and would use 'gradable' or 'scalar' for Z&O's 'bounded'. The difference between telic and atelic prepositions here is essentially equivalent to Kennedy's (1999) distinction between closed-scale and open-scale gradable adjectives. See section 4.3 below for further discussion.

4.2. *Path PPs form small clauses*

So far, we have seen that when we add an argument PP to a manner-of-motion construction, we see a change in syntactic behavior independently of whether the PP is telic or atelic, as shown by the facts concerning auxiliary selection, locative inversion, extraction, etc. detailed above. Another syntactic change is the licensing of a causative alternant when a PP is added to these verbs in English: the addition of the PP allows the introduction of an additional argument. As we have seen, open-scale PPs allow the formation of causative structures on these verbs just as well as the closed-scale ones do:

(26) a. John waltzed Matilda around and around the room for 3/#in 3 hours.
b. John walked Mary towards her car for 3/#in 3 hours.
c. John ran his dog along the canal for 3/#in 3 hours.

We argue that the fact that the open-scale PP works as well as a closed-scale one for causativization shows that the structural change is what is important in these cases, not telicity. Hence, a syntactic account of the formation of these structures is necessary. We adopt the proposals of Hoekstra (1984 et seq.), according to which the PP forms a predicative small clause with the Theme. This small clause may be embedded under either an unaccusative or causative light verb, thus explaining both the auxiliary selection and causativization facts.

(27) a. John walked to/towards his flat.
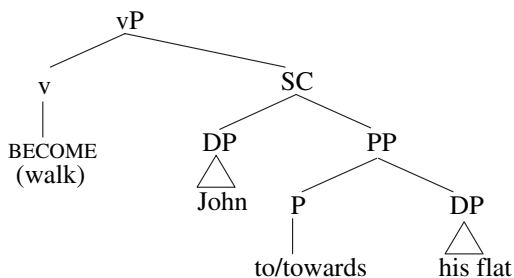
b. John walked Mary to/towards his flat.
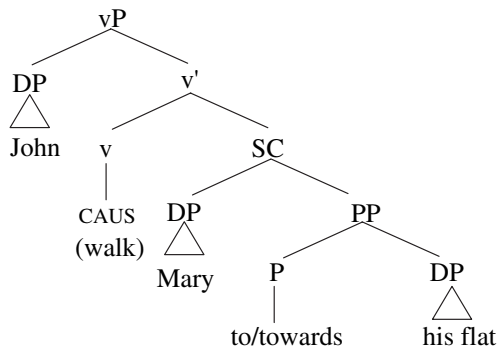
If the SC structure is all that is responsible for the change in argument structure, i.e. for the availability of an extra slot for the Theme argument, then we can understand why telicity need not arise here. Both *to* and *towards* give the same structural effect, independent of their semantics.

The notion of *telos* plays no role in licensing the alternation. The alternation is structural, and consequently it arises with both kinds of PPs. The semantic telicity or lack thereof of the whole construction is the compositional result of the semantics of the particular lexical items involved.[26] Compare, for instance, the two examples below, both involving the same small clause complement:

(28) a. Mary drove [SC John crazy].
    b. Mary considers [SC John crazy].

The first, of course, is resultative, while the second is simply stative; the difference is not structural, but results from the semantics of the matrix verbs: *consider* is stative, therefore it does not provide the necessary transitional element involved in a resultative event, while *drive* is eventive and can furnish the transitional portion of the resultative event (see Beavers 2005 for discussion of the relationship between the durativity of the verb and the (non-)gradability of the adjectival result state).

The structural basis of the analysis, of course, explains the auxiliary alternation facts mentioned earlier in Dutch and, for those intransitive verbs which allow an argument PP, in Italian (ex. (23–24) above). The unaccusative structure, illustrated in (28a) above, forces the selection of the *to be* auxiliary, as argued by Hoekstra.

It is worth noting that dissociation between auxiliary selection and telicity holds not only for these motion + PP constructions, but for the whole class of degree achievement verbs mentioned above, as shown by the following examples (Folli 2001 among others. See footnote 4 for discussion and references).

(29) a. La temperatura è diminuita   per ore.
        the temperature is diminished for hours
        'The temperature decreased for hours.'
    b. L'inflazione è aumentata per mesi.
        the.inflation is increased   for months
        'Inflation has increased for months.'

It is clear, then, that in general, telicity is not directly involved in auxiliary choice. On the other hand, it is well known that auxiliary selection is a sensitive test for an unaccusative syntactic structure (Rizzi 1982, Burzio 1986, and many others); our analysis of motion verbs with both kinds of PPs predicts the auxiliary selection facts we observe.

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[26] This is also true in Ramchand's approach, see fn. 13 above.

4.3. *Path PPs as predicates*

We have argued for a treatment of manner-of-motion constructions that is structurally identical to the small-clause treatment of more typical resultative constructions with adjectival result predicates, as in *Mary hammered the metal flat* or *John ran himself tired*. In this treatment, the Path PP, whether telic or atelic, is the predicate of the small clause, expressing a property of its subject. This approach provides a natural account of the well-known cross-linguistic correlation between the availability of resultatives and directed manner-of-motion constructions. However, they have some properties which distinguish them from adjectival resultatives, whose provenance is not obvious on the present analysis.

   As noted by two reviewers, it is not intuitively obvious that the subject of a small clause predication with an atelic Path PP is in a result state at the end of the event denoted by the vP. After *John ran around the room for hours*, John might easily be standing on the exact point from which he started, and cannot be said to be "around the room" in any sense. Consequently, it may seem peculiar to group these predications with standard adjectival resultatives such as *Mary hammered the metal flat*, in which the metal is in a result state being flat at the end of the event.

   This observation can be related to a peculiar property of English Path PPs in general, which denote extended locations (whether or not they are bounded or unbounded Paths): they may not be used predicatively with stative or copular verbs (30), or as locative adjuncts with verbs which resist coercion to a motion interpretation (31), (Svenonius 2004):

(30) a. *John is into the room.
     b. *The paper lay to the table.
     c. *Sue remained towards the woods.
     d. *Mary considered Bill around the room.

(31) *The paper burned into the basket *(where it's burning* in *the basket)*.

To express these extended locations as predicates with these types of verbs, a different preposition must be used in English (for discussion, see Beavers 2002):

(32) a. John is in the room.
     b. The paper is on the table.
     c. Sue remained near the woods.
     d. Mary considered Bill in the room.
     e. The paper burned in the basket.

The generalization is that Path PPs can only occur as predicates when motion is involved (see Higginbotham 2000, van Riemsdijk 2002).

Interestingly, they are acceptable as predicates with copular verbs in the narrative present tense, e.g. in a sports commentary:

(33) a. The halfback is into the end zone!
   b. The runners are now around the turn and into the home stretch.

The narrative present tense allows a suspension of the normal extended-present interpretation which forces a habitual reading on eventive verbs in a neutral context with this tense in English (see e.g. Krifka et al. 1995). When the extended-present interpretation is suspended, we see that these Path PPs are acceptable as predicates with the copula, when describing a moment in a motion event.

   Similarly, these PPs are acceptable with the copula in the present perfect:

(34) a. John has been to France.
   b. Mary has been around and around the world.
   c. Sue has been into the Uffizi.

We conclude that the failure of these PPs to behave as neutral location predicates has to do with the interaction of their extended-location semantics and the temporal structure of stative verbs, and not with any general ban on such PPs as predicates.[27]

   A reviewer points out a second interesting difference between the unbounded Path PPs we discuss here and the class of open-scale gradable adjectives with which we have compared them in section 3.4 above. The open-scale adjectives can produce a telic event when they are used to form a resultative, as shown in (35) (recall that they may only do so with an unselected object):

(35) We danced ourselves tired in just 30 minutes/#for 30 minutes.

Our open-scale PPs, on the other hand, never license a telic interpretation:

(36) John danced Matilda around and around the room for
   30 minutes/# in 30 minutes

Despite the possibility of *in*-modification in examples like (35), Wechsler (2001: 14) argues that these resultatives are in fact atelic on the basis of the imperfective entailment test, giving the following examples:

(37) a. We were yelling ourselves hoarse. → We yelled ourselves hoarse.
   b. We were worrying ourselves sick. → We worried ourselves sick.
   c. We were laughing ourselves silly. → We laughed ourselves silly.

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[27] Interestingly, the Path preposition *past* seems to allow stative predication uses quite generally, referring to a deictic path defined with respect to the locus of conversation, as in *The store is past the hospital.*

Moreover, when these resultatives with open-scale adjectives are used with endpoint modifiers like *completely*, he notes that the interpretation of the adverb is as an intensifier, not as an endpoint-marker, as shown by the possibility of a comparative:

(38) a. I ate myself completely sick, but Sue is even sicker.
　　 b. John yelled himself completely hoarse, but Sue is even hoarser.
　　 c. #Mary hammered the metal completely flat, but Sue's metal
　　　　　 is even flatter.

Finally, notice that different open-scale adjective resultatives produce different results with the classic *in/for X time* adverbial test. We saw above that *tired* gives a telic resultative, but in (39), it can be seen that *silly* and *sick* produce resultatives that are fine on an atelic interpretation, and somewhat odd on a telic one:

(39) a. We worried ourselves sick for 30 minutes/??in 30 minutes.
　　 b. We laughed ourselves silly for 30 minutes/??in 30 minutes.

Our unbounded Path PPs always produce manner-of-motion constructions which are atelic, as confirmed by imperfectivity entailments:

(40) a. John is running towards the woods →
　　　　 John ran towards the woods.
　　 b. Sue is wandering along the path →
　　　　 Sue wandered along the path.

We have asserted above that the semantic content of the lexical items involved in the small clause will compose with the verb to produce the event-structure interpretation of the overall event, in particular, that bounded (closed-scale) predicates will produce telic events and unbounded (open-scale) predicates will produce atelic ones. While this seems to be clear-cut for the prepositional predicates which we consider, it is evidently less so for the adjectival predicates. We leave this interesting problem for future research.

4.4. *Summary*

We have presented a structural analysis of motion resultatives in which the introduction of a small clause into the syntactic structure makes available an alternation which otherwise is not licensed by the selectional properties of the verb.

　We have shown that telicity is not relevant in licensing these structures. Nonetheless, their formation is not entirely free. For instance, in causatives of manner of motion constructions, there seems to be intentionality requirement on the subject of the verb of motion, as can be seen in (41) below:

(41) a. #Anxiety ran Mary to her house.
    b. #Elation danced John around the room.
    c. #The call from the hospital rushed John out the door.

This intentionality requirement on agents of causative motion resultatives has been noted in the literature by Cruse (1972) and Reinhart (1991), as cited in Levin & Rappoport-Hovav (1995:112). Why are Causes ineligible as the subject of these constructions? We turn to a consideration of the constraints on the creation of causatives of manner of motion constructions next.

5.   Lexical semantic effects and the solution to the agentivity puzzle

We have argued above that the syntax licenses the resultative structure in a causative of a manner of motion construction, by making a small clause available. Though we adopt a syntax-based approach to these alternations, it is clear that the lexical semantics of the items involved constrain the particular interpretations which are available. In some cases, these constraints work to produce a grammatical but uninterpretable sentence. We argue that these constraints show the effects of well-studied semantic properties such as agency, external and internal causation, and paths.

   In particular, we will now argue the lexical semantic properties of the manner of motion verb root determine how the agentivity of the subject interacts with the unfolding of the event denoted by the Small Clause. Below, we offer some evidence bearing on this issue which suggests that a cotemporaneity requirement on the causing event and the Path event interacts with the agency of the subject to constrain the available range of alternations.[28]

   Agentivity is a long-standing puzzle in motion constructions. Particularly mysterious is the sense of 'double' agentivity which they entail, in the typical case. Not only is the external argument walking in the causative *John walked Mary home*, but so is the Theme — we have an 'accompanying action' requirement. In the unaccusative version, *Mary walked home*, "Mary", the Theme, is also a walker—an Agent of walking—despite the unaccusative syntax. The presence of two apparent 'agents' in the causative has been central to discussions of the construction since Jackendoff (1990) and many others, including Levin & Rappaport-Hovav (1999).[29]

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[28] Levin & Rappoport-Hovav (1999) argue for a notion of 'complex' vs 'simple' events that enforces a similar notion to what we are calling the cotemporaneity requirement; that of 'temporal dependence' between the two sub-events in a resultative construction. We will make use of this notion below.

[29] The analyses of Kenny (1963), Van Valin (1990) and Croft (1991), among others, explicitly treat the unaccusative versions as causatives, with a null reflexive argument. Levin & Rappoport-Hovav (1999) argue convincingly against such an approach, demonstrating many key differences between 'fake reflexive' causative motion verbs and 'bare XP' ones like the unaccusatives here. See below.

We argue that the double-agent effect is the result of a combination of two independent semantic factors which may be differentially associated with verb meanings: an agentivity/intentionality requirement which may be imposed by the lexical semantics of the verb root, and the possibility that the verb meaning presupposes the existence of a Path argument. These two semantic properties define a four-way paradigm of manner verb classes, each of which behaves differently in causatives of motion verbs. We will show that the intentionality requirement in the causative is independent of the 'accompanying action' requirement. The sensation that the two requirements correlate is a side effect of the fact that, in the canonical cases like *run* and *walk*, both properties are present in the verb.[30]

5.1. *The four manner-of-motion verb classes*

Verbs which can appear with a directional PP fall into four distinct categories defined by their Agent and Path implications. We've provided examples of each of the four types in Table 1.

The classification of verbs like *walk, run, swim, whistle, hiss* and *sing* as requiring an Agent should be uncontroversial. Similarly, it is clear that *roll, float, slide, shudder* and *tremble* can be accomplished by non-intentional entities (e.g. *The tree shuddered when the axe struck it*). It may be more difficult to justify the Path implication associated with *walk, run, swim, roll, float* and *slide* but not with the others, since all of the verbs here can occur with a directional PP denoting a Path, as illustrated in (28):

(42) a. Mary walked to the store.
     b. The log rolled along the beach.[31]
     c. The bullet whistled through the window.
     d. The train shuddered into the station.

All of these verbs can be used intransitively to describe a manner of motion event with a Path-specifying PP. How can we detect the difference between a verb which implies the existence of a Path and one which

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[30] For a discussion of these effects within a Hale & Keyser framework, see Mateu (2001).

[31] Of course, when the subject of *roll* is animate, the rolling event still may be intentional, as in *John rolled down the hill on purpose*. To confirm this, we give Italian examples which show that both *rotolare* 'roll', and the unaccusative verb *cadere*, 'fall', continue to exhibit the characteristic *essere*, 'be,' auxiliary selection typical of unaccusatives even when the subject is clearly performing the action on purpose:

  i. Gianni é caduto/*ha caduto apposta.
     John is fallen/has fallen on purpose.
  ii. Gianni é rotolato/*ha rotolato giù apposta.
     John is rolled/has rolled down on purpose.

It is worth noting that *walk* does not allow a Causer subject; walking must be done intentionally, even when it appears in an unaccusative frame.

Table 1.

	+ Path	− Path
+ Agent	walk, run, swim	whistle, hiss, sing
− Agent	roll, float, slide	shudder, tremble

doesn't, if the structures of (42a–d) are identical, all involving an unaccusative small clause? A test which confirms the different properties of these verbs can be seen in the following extraction data, modeled on that in Folli (2001):[32]

(43) a. How far did Sue walk?
     b. How far did the log roll?
     c. *How far did the bullet whistle?
     d. *How far did the train shudder?

The contrast between (43a–b) on the one hand, and (43c–d) on the other, confirms the difference we propose above. The verbs *walk* and *roll* presuppose a Path argument, while the verbs *whistle* and *shudder* do not. The fact that this semantic information is missing from *whistle* and *shudder* affects the interpretability of these verbs when a trace instead of a full measure phrase is in the position of the predicate of the SC. Essentially, although the measure phrase is in the same structural location in (42a–d), *walk* and *roll* bear an inherent lexical-semantic relationship to it, while *whistle* and *shudder* do not. Any Path PP that appears with these latter verbs is purely structurally licensed. The measure phrase in examples like (43a–b) with verbs like *walk* and *roll* is D-linked, in the terms of Pesetsky (1987), allowing reconstruction and interpretation of the questioned degree phrase.

Given that all four classes of verbs can appear in the unaccusative manner of motion syntax, our structural account so far predicts that they should all be causativizable. In fact, each of the four classes behaves distinctly in the causative syntax, bolstering the case for the importance of the two lexical semantic features that define the classes.

5.2. *Causatives of the four classes of motion verbs*

Let's consider each of these motion verbs in a causative syntax in turn, paying attention to whether the causing event and the caused event must occur cotemporaneously, and whether the subject may be non-intentional. Intentionality, of course, is expected to interact with the verb's

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[32] Tenny (1994) claims that path-selecting verbs can occur with spatial measure-phrase direct objects such as *40 feet*, while non-path selecting ones are worse with them. We use the extracted versions here because the judgments are sharper than when the measure-phrase is in situ.

agentive properties. By *cotemporaneous*, we refer to the temporal identity of the causing event and the caused event—in the case of manner of motion verbs, the temporal identity of the causing event and the event of motion along a Path. Levin & Rappaport-Hovav (1999) observe that some, but not all. causative manner-of-motion constructions require cotemporaneity. When there is a cotemporaneous requirement on a given causative, we refer to this as the *accompanied-action* requirement. We show that this requirement interacts with the Path property of the verb. When both Agent and Path properties are present in the same verb, the intersection of the requirements they impose creates a unique pattern of behavior.

To begin, let us consider the causative possibilities for a non-Path, non-Agent verb like *shudder*:

(44) a. *The wind shuddered the cart across the parking lot.
             [−intentional], [+accompanying]
      b. *Bill shuddered the shopping cart across the parking lot.
          (e.g. by giving it a hard push).
             [+intentional], [−accompanying]
      c. *Bill shuddered the cart across the parking lot.
             [+intentional], [+accompanying]

There is no well-formed causative of this verb, whether the external argument is non-intentional and accompanying the motion, as in (44a), intentional and not accompanying the motion, as in (44b), or intentional and accompanying the motion, as in (44c).

What about a verb that is [+Agent], [−Path], like *whistle*?

(45) a. *The teakettle whistled Mary into the kitchen.
             [−intentional], [+accompanying]
      b.   Mary whistled Rover to her side.
             [+intentional], [−accompanying]
      c. *Mary whistled Rover down the path.
           (where both Mary and Rover are going down the path)
             [+intentional], [+accompanying]

Here, the only well-formed causative is the case where the whistling is intentional but doesn't accompany the motion, as in (45b) (Mary's whistling will normally stop long before Rover arrives at her side). When the whistling is non-intentional and accompanying the motion, as in (45a), the causative is odd, and when the whistling is intentional and accompanying the motion, as in (45c), the causative is also odd (see Levin & Rappoport-Hovav 1999).

When a verb is [−Agent], [+Path] like *roll*, a different pattern appears:

(46) a. The tide rolled the log up the beach.
             [−intentional], [+accompanying]

  b. Bill rolled the ball to the toddler.
        [+intentional], [−accompanying]
  c. Bill rolled the tire along the street.
      (where he's rolling with it down the hill)
        [+intentional], [+accompanying]

Here, the causative is well formed when there is accompanying motion and a non-intentional subject (as in (46a), where the tide must itself also go up the beach), when there is an intentional subject but no accompanying motion (as in 46b), and when there is both (as in 46c). We especially wish to call attention to the fact that the accompanying-motion reading is *necessary* when the external argument is inanimate, i.e. non-intentional; when it is animate, the accompanying-motion reading is optional.

   Finally, consider the [+Agent], [+Path] verb *walk* in these configurations:

(47) a. *The wind walked the dog into the house.
            [−intentional], [+accompanying]
     b. *John walked the child onto the stage.
            [+intentional], [−accompanying]
         (e.g. he mimed walking confidently in the wings and then the child was encouraged and walked onstage herself).
     c. Mary walked John to his house.
            [+intentional], [+accompanying]

The subject of *walk* must be an Agent and the causing action that the agent does must also be cotemporaneous with the Theme's traveling along the Path. It isn't necessarily the case that the agent's action has to be an instance of the motion described by the verb, but the agent's action, whatever it is, must be cotemporaneous with the motion event: it cannot be temporally dissociated from it. Consider the examples in (48):

(48) a. The boy jumped the action figure across the table.
     b. Sue ran the car into the wall.
     c. John danced the puppet across the stage.
     d. Mary walked the bookshelf across the room.

In (48a), the boy is not himself jumping; in (48b), Sue is not running, in (48c), John is not dancing, and in (48d) Mary's action of laboriously moving the bookcase forward one corner at a time would not normally be described as 'walking'.

   From the above, one might conclude that the internal Theme argument is the one that must be behaving in the manner specified by the manner-of-motion verb root. This is not the case, however, as noted by Ritter & Rosen (1998). Consider the examples in (49):

Table 2.

Verb class	Status of Causer argument		
	−intent, +accomp	+intent, −accomp	+intent, +accomp
−Path, −Agent (*shudder*)	*	*	*
−Path, +Agent (*whistle*)	*	✔	*
+Path, +Agent (*walk*)	*	*	✔
+Path, −Agent (*roll*)	✔	✔	✔

(49) a. John ran the package to the office.
     b. Mary walked the bicycle to the shop.

Here, it's the subject which is doing the manner of motion, and the traveling Theme object is merely along for the ride.

In both types of cases, however, the causing event and the motion event overlap totally: the hand-movements of the boy overlap with the jumping motion of the action figure across the table, Sue directing the car overlaps with the car traveling to the wall, John manipulating the puppet strings overlaps with the puppet's dancing motion, and Mary manipulating the shelf overlaps with the shelf's walking motion. Similarly, in the examples in (49), John's running overlaps with the movement of the package to the office, and Mary's walking overlaps with the movement of the bicycle to the shop. These all exhibit the property of accompanied action.

Table 2 summarizes the results of our tests for each class of verbs in the causative construction.

As Table 2 shows, when a verb specifies neither an Agent nor a Path, a causative cannot be formed (**Bill shuddered the cart across the parking lot*). When a verb implies just an Agent, but not a Path, a causative may be formed with an intentional subject but not a non-intentional one; there is no accompanied-action requirement (*Mary/*The teakettle whistled Rover down the path*). When a verb requires the existence of both an Agent and a Path, the causative must have an intentional subject, and there is an accompanied-action requirement.[33] Most interestingly, when a

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[33] The Path-relatedness of the constraint on accompanied-action readings exhibited here is crucially different from the selected-object constraint or cotemporaneity described by Levin & Rappaport-Hovav (1999). There, they discuss verbs that do not select Paths or objects, like *wiggle*, and contrast them with verbs that select objects but not Paths, like *wipe*. Here, none of the verbs under consideration selects an object. The cotemporaneity requirement we observe here, then, does not relate to object-selection, but rather Path-selection.

verb implies a Path but not an Agent, causatives may be formed with intentional or non-intentional subjects.

In the next section, we elaborate further on the relationships summarized in Table 2.

5.3.   *Manner-Path and Manner-Cause cotemporaneity*

In unaccusative manner-of-motion constructions, the verb root, which is inserted in the v° position, functions as a manner modifier of the motion event: 'roll' in sentences like *The ball rolled under the table*, describes the manner in which the motion along the Path is accomplished.
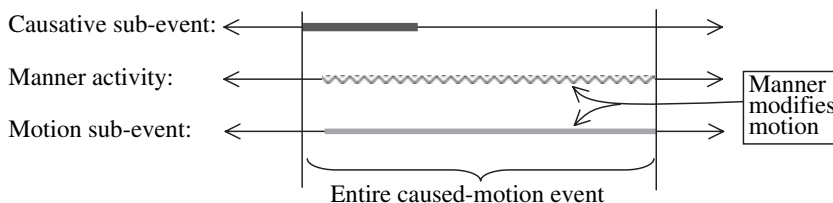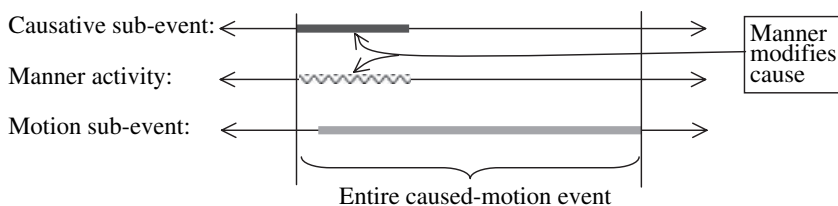
In causatives of manner-of-motion constructions, on the other hand, there are two events which the manner element can modify: the motion event (as in the unaccusative case) and also the causing event. The following examples with *roll* and *whistle*, repeated from above, illustrate this distinction:

(50) a. John rolled the ball to the toddler.
    b. Mary whistled Rover to her side.

In (50a), *roll* is modifying the manner in which the ball moves, not the manner of the causing action which John is executing—he didn't cause the ball to move by rolling; more likely he gave it a push. In (50b), on the other hand, *whistle* is modifying the manner in which Mary executed the causing action, not the manner in which the dog moves—the dog is not moving by whistling; more likely it's running or walking.

Our claim is that manner elements can be felicitously inserted into the v° of the causative motion structure when they can be interpreted as modifiers of either the causative sub-event or the motion sub-event. If a verb root has a [+ Agent] or [+ Path] specification, that guarantees that it will be able to be interpreted as such a modifier: [+ Agent] verbs like *whistle* can modify the causing sub-event, while [+ Path] verbs like *roll* can modify the motion sub-event. We have seen above that verbs which involve neither an Agent nor a Path in their lexical semantics, such as *shudder*, are uninterpretable as manner elements in the motion-causative construction. This is because *shudder* can be related neither to the causation sub-event (because it has no [+ Agent] specification), nor to the motion sub-event (because it has no [+ Path] specification).

When a verb is inserted as a motion modifier, as *roll* is in the example above, a *Manner-Path Cotemporaneity* effect emerges. That is, the manner activity which modifies the motion event continues throughout that motion event. The motion event is measured-out by the Path argument, whether bounded or unbounded. Consequently, when the verb is a motion modifier, the manner activity denoted by the verb extends for the entirety of the Path-traversal event.

(51) a. Manner-Path Cotemporaneity, [+Path] verb (*roll*)

Causative sub-event: ⟵————————————————————⟶

Manner activity: ⟵~~~~~~~~~~~~~~~~~~~~⟶ | Manner modifies motion |

Motion sub-event: ⟵————————————————————⟶

Entire caused-motion event

b. Manner-Cause Cotemporaneity, [+Agent] verb (*whistle*)

Causative sub-event: ⟵————————————————————⟶ | Manner modifies cause |

Manner activity: ⟵~~~~~~~~~~~⟶

Motion sub-event: ⟵————————————————————⟶

Entire caused-motion event

On the other hand, when the verb is inserted as a modifier of the causative sub-event, the manner activity denoted by the verb root need only last as long as the causative sub-event lasts—there is a *Manner-Cause Cotemporaneity effect*. This is the case with *whistle*, above. The causative sub-event may entirely precede the motion event (if the dog does not react right away), or may overlap for part or all of the motion sub-event. There is no Manner-Path cotemporaneity requirement in such cases.

The interaction of [+Agent] and [+Path] verbs manner modification with the causative and motion sub-events is represented graphically in (51). In (51a) we see that the line indicating the manner activity overlaps entirely with the line indicating the motion sub-event but not with the line indicating the causative sub-event, i.e. the initiation sub-part of the event. In (51b) on the other hand the manner activity line is shorter because with verbs like *whistle* the manner modifies precisely that, the causative sub-event.

### 5.4. *The Accompanied-Action requirement: Cause-Path Cotemporaneity*

We have seen above that [+Agent, +Path] verbs like *walk* or *jump* can express the manner of the motion sub-event of the Theme, as in (52a,b) below, or the manner of the causative sub-event of the Agent, as in (52c,d) below, or the manner of both the causative and motion sub-events (52e) (examples repeated from above).

(52) a. The jockey galloped the horse past the barn.
    b. The boy jumped the action figure across the table.
    c. John ran the package to the office.
    d. Mary walked the bicycle to the shop.
    e. John waltzed Matilda around and around the room.

Unsurprisingly, when the manner element is modifying the motion sub-event, as in (52a,b,e,) the manner activity extends over the whole duration of the motion sub-event. More surprisingly, this is also the case when the manner element is modifying the causative sub-event, as in (52c,d)—even if only the Agent is executing the manner activity, that activity must extend over the entire motion sub-event as well as the causation sub-event. Most interestingly of all, no matter whether the manner element is modifying the causative sub-event or the motion sub-event, *these two sub-events must be cotemporaneous*. That is, with these verbs, the causative event (whatever it is) and the motion event (whatever it is), are subject to a cotemporaneity effect. This is illustrated graphically for the three manner-modification possibilities below, where we see a first case of manner modifying the motion sub-event (in (53a) the manner activity line extends for the entire length of the line indicating the motion sub-event), a second case of manner activity modifying the causative sub-event (in (53b) the manner line extends for the entire length of the causative sub-event) and a third case in in (53c) where the manner component modifies both the motion sub-event and the causative sub-event. Notice that with these verbs the line indicating the causative sub-event and the one indicating the motion event are of the same length because causation and motion are cotemporanous.

(53) a. Manner-Motion Modification, 3-way cotemporaneity
   *The jockey galloped the horse past the barn.*

Causative sub-event:
Manner activity: Manner modifies motion
Motion sub-event:

Entire caused-motion event
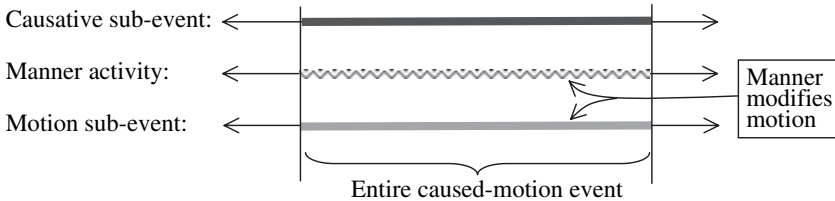
   b. Manner-Cause modification, 3-way cotemporaneity
      Mary walked the bicycle to the shop.

Causative sub-event: Mann modifies cause
Manner activity:
Motion sub-event:

Entire caused-motion event
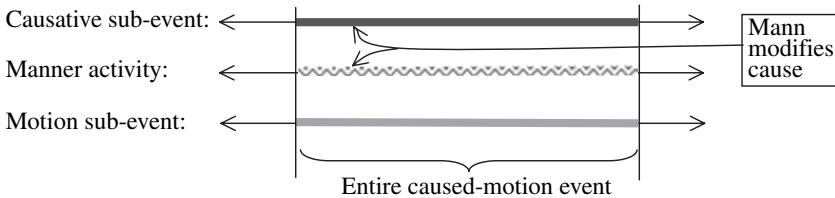
c. Manner-Cause and Manner-Path modification
   John waltzed Matilda around the room.

Entire caused-motion event
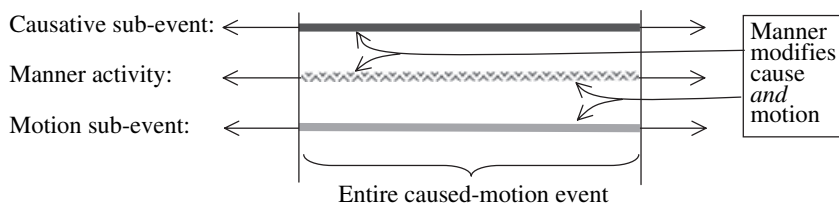
That is, whenever the manner verbal semantics is both [+Agent] and [+Path], the cotemporaneity effect extends both to the causative event and to the motion event, even if the manner modification applies only to one or the other. This is what produces the accompanied-action requirement. When the verbal semantics involve both an Agent and a Path, even if the causative action is not itself an instance of the manner activity, it must accompany the manner activity for the duration of the motion event. Similarly, even if the motion action is not itself an instance of the manner activity, it must be coextensive with the duration of the causation event.

   Certain questions remain. For instance, we have seen that *roll* is acceptable in the causative syntax by virtue of its [+Path] specification, and, because it lacks a [+Agent] specification. For the same reason, there is no requirement that the causing event and the motion event be cotemporaneous in the usual case. However, we think it's worth noting that there is one situation in which a cotemporaneity effect with a *roll* causative seems to appear between the causing and motion events: when the external argument is not a true Agent, but rather a (non-intentional) Cause:

(54) The tide rolled the log up the beach.

Here, in our estimation, the causing action of the tide must continue until the log is at its final resting place on the beach, that is, there is a Cause-Path cotemporaneity effect here. We do not have a theoretical explanation for this effect, though see Folli & Harley (2004) for some discussion of similar cases with verbs of consumption.

6. Conclusion

In this paper, we showed that the usual analysis of the causal connection between endpoint telicity and the availability of a causative alternation for motion verbs is incorrect. The notion of telicity as an "endpoint" of an event is not relevant for all cases. Rather, we argue that it is a specific syntactic configuration which licenses the additional argument necessary in the causative construction. We adopt the Small Clause hypothesis with

no telicity requirement on the part of the secondary predicate. This allows an account of the familiar range of unaccusative diagnostics in the intransitive versions of these constructions, as in Hoekstra (1984).

Although we espouse a structural account of the argument structure properties of these constructions, there are a number of reasons to think that other semantic or Encyclopedic properties do affect the potential of certain types of verbs to modify the structure. In particular, we addressed the 'accompanying action' and 'agentivity' interpretations which often are entailed by motion verbs in these syntactic configurations. We offered an account which places the responsibility for these restrictions on semantic (or Encyclopedic) knowledge about the meanings of these verbs and their selectional properties. We argue that the constellation of interpretive facts concerning these verbs can be neatly accounted for if there is an manner-path cotemporaneity requirement imposed when the verb root itself requires a Path argument.

A natural question which arises, then, is what the implications of this kind of lexical-semantic restriction are for syntactic approaches to argument structure. Our view, like that of Marantz (1997), is that the syntax makes structures available which the semantics must interpret. Therefore, there can be such a thing as a restriction on an alternation which arises simply because the semantics of the component parts do not integrate in an Encyclopedically acceptable scenario (compare #*Colorless green ideas* or #*John's growth of tomatoes*). These restrictions themselves are not unstructured; rather, they crucially depend on notions such as animacy, path, and internal causation, which are well-known as building blocks of conceptual structure.

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