# Resultatives Under the 'Event-Argument Homomorphism'

# Model of  Telicity

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This paper presents a novel semantic analysis of the English resultative construction that crucially models telicity (aspectual boundedness) in terms of the event-argument homomorphism model (Krifka, 1998, inter alia) rather than the commonly assumed result state model (Dowty, 1979).  This assumption, together with recent insights on the semantics of scalar adjectives (Hay et al., 1999; Kennedy, 1999; Kennedy and McNally, 1999), leads us to an explanation for a myriad of facts.  Corpus data from Boas (2000) strongly support our conclusions.

The central idea of this analysis is that resultatives involve an abstract 'path' argument corresponding to degrees along the scale denoted by the resultative predicate. This approach is broadly consonant with conclusions reached independently in other recent work.  This independent evidence includes the cross-linguistic parallels between resultatives and locative paths observed by Beck and Snyder (2001); Vanden Wyngaerd's

(2001) observations on Dutch and English; and Beavers' (2002) formal analysis of

resultative PP's.  However, comparison with those works will not be undertaken here.


**I. Introduction.**

English resultatives are secondary predicates indicating the result of the action described

by the primary predicate.  The predicate *flat* in sentence (1) is a resultative because the

sentence entails that the metal became flat as a result of the hammering.  (In contrast,

depictives like *The chairman came to the meeting drunk*  don't entail a result.  This paper

does not deal with depictives).


(1)     Resultative (predicate in italics; its subject underlined):

        John hammered the metal *flat*.

        =>'John hammered the metal; as a result, the metal became flat.'


(2)     Depictive:

        The chairman came to the meeting *drunk*.

        'The chairman was drunk when he came to the meeting.'


There are three types of observations to be addressed.

Observation 1. Massive lexical variation.

First, there is massive variation in acceptability depending on the particular words appearing in the construction.

(3)     a. wipe <u>the table</u> *clean / dry / *dirty / *wet*

b. hammer <u>the metal</u> *flat/ smooth/ into the ground / *beautiful/ *safe/ *tubular*.

c. <u>The puddle</u> froze *solid/ *slippery/ *dangerous*.

Some examples sound bad even where the meaning is clear and paraphrasable as we did above: 'Mary wiped the table; as a result the table became wet' makes perfect sense, but it is still odd to say *Mary wiped the table wet*, while 'Mary wiped the table dry' is fine (see 3a). As we'll see, corpus data strongly support these judgments.

While many researchers have noted this variation, to my knowledge no one has yet offered an explanation for the particular contrasts found. The following quote is typical:

'Research on this problem (Green, 1972) has uncovered no general principle which predicts this difference in acceptability, and I take this as a good indication that this

construction is a kind of lexicalized compound verb, though one which typically

appears as a discontinuous constituent.' (Dowty, 1979:303)

Indeed, the observed contrasts would seem to defy any conceivable logic. Nevertheless,

an explanation will be offered below, based on a crucial semantic difference between

adjectives like *wet/dirty* versus *dry/clean* (see 3a).

Observation 2. AP versus PP resultatives.

Similarly, the distribution of PP versus AP resultatives, as in ex. (4), has often

been noted but never yielded to analysis or explanation.

(4)     a. The rabbits had apparently been battered {*dead / to death }.

        b. He and a confederate shot the miller {dead / to death}.

Boas (2000:261-262) concludes, for example, that 'The distribution of *dead* versus *to*

*death* clearly shows that particular types of verbs are conventionally associated with

specific types of resultative phrases.'

Observation 3. The putative 'Direct Object Restriction' (DOR).

A further claim is that the resultative predicate must be predicated of a 'deep' object (see, inter alia, Levin and Rappaport-Hovav, 1995; Simpson, 1983). Unlike the first two observations, for which the explanation, if any, might be expected to be semantic in nature, the third observation concerns syntax instead— or so it is claimed. Since Simpson's groundbreaking 1983 paper, it has been claimed that a resultative predicate must be predicated of a 'deep object': the object of a transitive (5a), or the subject of an unaccusative (5b), but not the subject of an unergative (5c).   Most strikingly, the latter example can be saved by inserting a so-called 'fake reflexive' (5d), apparently dooming any possibility of a semantic account, and instead suggesting a structural, syntactic requirement, the 'Direct Object Restriction' or DOR.  However, I will argue that the explanation turns out to be semantic after all.


 (5)	a. John hammered <u>the metal</u> *flat*.	(transitive)

	b. <u>The water</u> froze *solid*.	(unaccusative)

	c. *<u>The dog</u> barked *hoarse*.	(*unergative)

	d. The dog barked <u>itself</u> *hoarse*.	('fake reflexive')


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What is going on in (5d)? Since this will play an important role later on, let's look at it in more detail. (5d) is an example of an Exceptional Case-Marking (ECM) resultative (cp. Subject-to-object raising). Resultatives fall into two classes, exactly analogous to Control constructions (*John persuaded Mary to sing*) and ECM constructions (*John expected Mary to sing*), respectively. In the former type the predication subject for the secondary predicate is a semantic argument of the verb, while in the latter it is not. For example in *wipe the table clean* , 'the table' is a semantic argument of 'wipe', while in *Mary ran the soles off her shoes*, 'the soles' is not an argument of 'run', as shown by the fact that it fails to entail that *Mary ran the soles*.

(6) Two types of resultative (Dowty 1979; Carrier and Randall, 1992; Simpson, 1983):

Type 1: Control resultative: resultative phrase whose predication subject is a semantic argument of the matrix verb.

He wiped the table *clean*. => He wiped the table.

The water froze *solid*. => The water froze.

Type 2: ECM ('exceptional case-marking') resultative: resultative phrase whose predication subject is NOT a semantic argument of the matrix verb.

The dog barked <u>itself</u> *hoarse*.          ≠> *The dog barked itself.

Mary ran <u>the soles</u> *off her shoes*.          ≠> *Mary ran the soles.

Simpson argued for the DOR on the basis of the data in (7), which are similar to (5):  as

Simpson pointed out, 'sick' and 'tired' cannot be predicated of the underlying subjects in

(7a) and (7b).

(7)      Simpson 1983 argued for DOR:

a. *<u>I</u> ate the food *sick*.  (p. 144)

b. *<u>I</u> danced/laughed/jogged/walked/worked  *tired*.  (ex. 15, p. 145)

c. I ate <u>myself</u> *sick*. (ex. 20b, p. 145)

d. I danced <u>myself</u> *tired*. (ex. 17, p. 145)

But a look at further data suggests that there is something wrong with this story.

Foreshadowing the discussion below, it turns out that *sick* and *tired* can't be resultative

predicates on *any* semantic arguments, whether subject or object, as illustrated in (8):

(8)     a. *I fed <u>the cat</u> *sick*.

        b. *The coach trained <u>us</u> *tired*.

Conversely, as we'll see later, some adjectives actually can be predicated of an underlying subject, as long as the semantic conditions are right.   The real division underlying the contrast between (7a,b) and (7c,d) is not between deep subject and deep object, but between argument and non-argument.

        The goal of this paper is to explain all three observations above on the basis of a single, unified line of reasoning.

**II. The Origins of Telicity.**

        If there is any aspect of resultatives that is completely uncontroversial, it is that they are telic: they describe events with a definite endpoint.  In the Vendler classification, we would say that they are accomplishments or achievements.  This is illustrated by the standard tests in (9) and (10).  The perfective entailment follows for the atelic sentence *John hammered the metal* , but the addition of the resultative renders the sentence telic, so the entailment no longer follows:  *John is hammering the metal flat* does not entail that *John hammered the metal flat*.  The time adverbial facts in (c) and (d) confirm this.  (10)

shows similar facts for an ECM resultative, although as we'll see later, not all ECM

resultatives are really telic. But the constraint applies very strongly to Control

resultatives.


(9)     a. John is hammering the metal.

                => John has hammered the metal. (atelic)

        b. John is hammering the metal flat.

                ≠> John has hammered the metal flat. (telic)

        c. John hammered the metal (for an hour / *in an hour).

        d. John hammered the metal flat (*for an hour / in an hour).


(10)    a. John is drinking.

                => John has drunk. (atelic)

        b. John is drinking himself to death.

                ≠> John has drunk himself to death. (telic)

        c. John drank (for an hour / *in an hour).

        d. John drank himself to death (*for a year / in a year).

Our starting premise is that telicity is a constructional feature of resultatives. It is a requirement placed on the output of the semantic composition of the sentence.

The crucial issue is the mechanism by which telicity is generated. How exactly does it come about that the addition of a resultative secondary predicate makes a sentence telic?

Most treatments of resultatives, going back at least to Dowty 1979, embrace the 'result state' model of telicity, according to which the endpoint of an event is defined in terms of the attainment of a certain result state. Thus the logical decomposition of the sentence includes a representation of that result state. For example, in 'Mary shakes John awake', as analyzed by Dowty, the result state is one in which John is awake.

(11)    a. Mary shakes John awake.

        b. [shake'($m,j$) CAUSE BECOME awake'($j$)]

Most previous aspectual treatments of resultatives embrace the result state model (Dowty 1979, Pustejovsky 1991, Rappaport-Hovav and Levin 1998, Rapoport 1999, inter alia).

Instead I will assume an alternative model, most elaborately developed in the work of Manfred Krifka (Krifka, 1987, 1992, 1998; Tenny 1994; Jackendoff 1996; Ramchand 1997; inter alia). (As we will see later, the result state model is not rejected

entirely. It remains appropriate for some constructions, possibly even for some ECM

resultatives.) An event and a participant in that event are both modeled in terms of their

mereology or part structure. Relationships between events and arguments can then be

discerned. To take the classic example pointed out originally by H. J. Verkuyl, (12)a is

atelic while (12)b is telic.


(12)    a. John drank wine (for an hour) / (*in an hour).

        b. John drank a glass of wine (*for an hour) / (in an hour).


This can be explained by the observation that parts of the wine-drinking event correspond

to parts of the volume of wine. Because of this homomorphism between wine and wine-

drinking, quantification is transferred from the nominal to the verbal domain. When the

volume of wine is *quantized*, that is, when it is a definite amount, such as *a glass of wine*,

the event similarly becomes quantized, hence telic. When the volume of wine is

*cumulative*, or indefinite, then the event is atelic.

Let us use the term *affected theme* for the argument of the verb from which

quantification can be transferred. Thus the affected theme for the verb *drink* is the

'drinkee' argument, instantiated by wine or a glass of wine in (12). In the case of the

verb *drink*, the relevant property of this affected theme participant is its physical volume:

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the volume of wine remaining in the glass diminishes as the event unfolds, and when that volume equals zero the event ends.  This property, volume in this particular case, normally must be scalar.  The scale along which this property is measured with be called the *property scale* or *path*.

In the case of *wine*, this property scale lacks any inherent bound, while in the case of *a glass of wine*, the bound is reached when the volume of wine in the glass reaches zero.  Thus a telic event requires three things: an affected theme, a property scale, and a bound, related as follows (cp. Krifka 1998):


(13)    Some **property** of the **affected theme** argument changes by degrees along a **scale**

         due to the action described by the verb, until it reaches a **bound**.


There are two further requirements for telicity:

1. The telic event and the path must be (a) homomorphic (parts of the event must correspond to parts of the path and vice versa) and (b) coextensive (the event must begin when the affected theme is at the start of the path and end when the affected theme reaches the end of the path).

2. The affected theme must be an argument of the event-denoting predicate.

Physical volume is only one of many possible property scales or paths that exhibit this sort of homomorphic relation to an event. More examples are shown in (14) (adapted from Hay et al 1999):

(14)  <u>example</u>                  <u>scale (X = affected theme arg.)</u>

     drink a glass of wine    volume of X consumed

     eat a sandwich           volume of X consumed

     write a letter           amount of X in existence

     cool the soup            temperature of X

     dim the lights           brightness of X

     read a letter            amount of X that has been read

     walk to school           distance traversed by X

     hike the Ridge Trail     distance traversed by X

In each case the affected theme argument changes by degrees along a scale that is homomorphic to the event. In addition, a basic property of paths is that they are coextensive with the event: the event begins and ends where the path begins and ends, respectively. If the scale has an definite bound or endpoint, then the event is telic.

The central proposal of this paper is simply that, in the case of resultatives, *the property scale is expressed by the resultative predicate*. This immediately leads to two predictions:

**Prediction 1.** When the resultative's predication subject is an argument of the verb (i.e. in a control resultative), homomorphism and coextension between property scale and event are required.

**Prediction 2.** When the resultative's predication subject is <u>not</u> an argument of the verb (i.e. in an ECM resultative), homomorphism and coextension between property scale and event are *not* required.

Prediction 1 is discussed in Section IV; Prediction 2 is discussed in Section VI.

**III. Semantics of adjectives.**

Next we need to focus on the semantics of adjectives. There are two types, gradable adjectives which accept degree modifiers and comparatives, such as *long, flat* or *tall*, and nongradable ones, which reject degree modifiers and comparatives, like *dead, triangular,* or *invited* (cp. Klein, 1980; McConnell-Ginet, 1973).

(15)    a. Gradable adjectives:

very/quite/extremely  {long/flat/expensive/straight/full/dull}

longer, flatter, more expensive, straighter, fuller, duller

b. Non-gradable adjectives:

??very/quite/extremely {dead/triangular/invited/sold}

??more dead/triangular/invited/sold

A gradable adjective is interpreted with respect to a *standard*. *Michael Jordan is tall* means that Jordan's height is greater than some contextually determined standard, for example with respect to basketball players, or people as a whole (Kennedy, 1999, inter alia).

Some gradable adjectives, called *closed-scale* adjectives, supply an inherent lexical standard that serves as a default. Consider *full, empty, straight*, and *dry*. When drying a towel there is a point at which it simply can get no dryer: the towel contains no water whatsoever. This maximum serves as the default standard, which applies when a contextually-given standard does not preempt it. In contrast, *open-scale* adjectives like *tall, long, wide, short,* and *cool* lack inherent maxima, hence must rely on context for their standards (Kennedy and McNally 1999, Hay et al 1999). One test for closed- versus open-scale is the appropriateness of modifiers like *totally* or *completely*:[1]

(16)    a. completely full/ empty/ straight/ dry        (closed-scale)

        b. ?? completely long/ wide/ short/ cool        (open-scale)

In addition to the closed-scale adjectives with maximal endpoints, there are also some closed-scale adjectives with *minimal* endpoints, such as *wet* and *dirty*. Consider *dirty*. As you begin to move up the dirtiness scale from zero dirt, you immediately reach a positive value. Thus by the inherent standard, any amount of dirt, no matter how small, qualifies something as dirty. But unless the speaker is, for example, an unscrupulous landlord refusing to return a cleaning deposit on the basis of an infinitesimal grain of dirt in one room of an apartment, the minimal inherent standard is ignored and a more

reasonable contextual standard normally prevails. Similarly, a towel with a few molecules of water does not normally qualify as *wet*. So these minimal endpoint adjectives can be considered as *de facto open-scale* adjectives.

Minimal endpoint adjectives pattern with open-scale adjectives rather than (maximal endpoint) closed-scale adjectives with respect to an interesting property noted by Hay et al (1999). Hay et al studied de-adjectival 'degree achievement' verbs like *straighten, flatten, cool$_V$*, etc. They point out that this adjective-to-verb derivation yields a telic verb if the root adjective is closed-scale, while yielding an atelic verb if the root adjective is open-scale (or yielding a telic verb, if context supplies a bound). Hence *straight* is (maximal endpoint) closed-scale, so *straighten* is telic; but *cool$_A$* is open-scale, so *cool$_V$* is atelic, as shown by the imperfective entailment test:

(17)    a. They are straightening the rope. $\neq$> They have straightened the rope.

        b. They are cooling the soup. => They have cooled the soup.

Interestingly, a minimal endpoint adjective such as *wet* patterns with open-scale rather than (maximal endpoint) closed-scale adjectives:

        c. John is wetting the towel.   => John has wetted the towel.

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Summarizing, adjectives fall into two broad semantic classes, gradable and non-gradable. Gradable adjectives subdivide into closed-scale and open-scale adjectives. Closed-scale adjectives further divide into maximal endpoint and minimal endpoint adjectives. Because the endpoint is infinitesimally low for minimal endpoint adjectives, they behave in many respects as de facto open scale adjectives. This typology of adjective types is summarized in Figure 1.

[FIGURE 1 ABOUT HERE]

**IV. The scalar structure of resultative predicates.**

Returning now to resultatives: because of the homomorphism between the property scale and the event, the telicity of the event directly depends on the scalar structure of the adjective— that is, whether it is closed- or open-scale. And because of the coextension requirement, the duration of the event must be appropriate to the scale as well. Specifically, we will discuss three possible situations that are predicted to yield a telic sentence:

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Type I. The verb is durative (expresses an event that is extended in time); the resultative

predicate is a gradable, maximal endpoint closed-scale adjective.

Type II. The verb is punctual; the resultative predicate is a non-gradable adjective.

Type III. The resultative predicate is a path PP (*to* or *into*) whose object NP specifies the

bound.  (The verb is normally durative, unless the path is very short.)


These three types will be exemplified in turn.


Type I. Verb is durative; resultative is a gradable, closed-scale adjective.

Consider first a standard example:


(18)    Mary hammered the metal flat.


The verb *hammer* is durative, and the adjective *flat* is gradable and closed-scale

(maximum endpoint):  there is a point at which metal becomes so flat that it can get no

flatter.  The telic bound on the event expressed by (18) is provided by the closed-scale

maximal endpoint adjective.

The graph in Figure 2 depicts a sample 'hammering-flat' scenario. Time is represented by the horizontal x-axis, while the flatness of the metal is plotted on the y-axis.

[FIGURE 2 ABOUT HERE]

As the event progresses, for a time the metal becomes flatter; then the hammer blows become ineffective and the relative flatness does not change; then the metal actually becomes less flat (perhaps one part of the metal springs up when the other part is hit); and finally it attains flatness, at which point the event ends. This illustrates the point that the mapping between time and the property scale is rather unconstrained. What is crucial is just that the property scale have an inherent maximum which serves to provide an endpoint for the event.

Now consider the following puzzling contrasts, noted by Green (1972) but heretofore unexplained:[2]

(19)    He wiped it clean / dry / smooth / *damp / *dirty / *stained / *wet.

(Green, 1972, ex. 6b/7b)

The adjectives *clean, dry,* and *smooth* are all maximal endpoint closed-scale adjectives, which thus provide suitable bounds for the event. In contrast, the adjectives *damp, dirty, stained,* and *wet* are minimal endpoint adjectives— what I have called de facto open-scale adjectives. Their inherent standards are too low to be useful, so contextual standards normally prevail. But inherent standards are needed in order to serve as suitable telic bounds. Since resultative constructions must be telic, these sentences fail.

Corpus data strongly support this contrast. Boas (2000) collected thousands of resultatives from the British National Corpus and other sources (COBUILD Bank of English, dictionaries, use-net groups, and websites). He found 77 examples using the resultative predicate *dry*, and none with *wet.* Of course we need to be cautious about drawing conclusions from comparisons of this kind, since it could be the case that people just write about drying things more often than wetting things. But the appearance of 12 *make*-causatives (e.g., *make my hair wet*) with the adjective *wet* clearly shows that the notion of making things wet was in fact expressed, but that the resultative construction was systematically avoided.[3] Following is the distribution of verbs appearing with *dry* in this corpus:

(20)  **occurrences of resultative *dry* total 77***, distributed among verbs as follows: suck

(16 occurrences), bleed (7), towel (6), wipe (6), rub (6), boil (5), pat (5), drink (5),

milk (3), squeeze (3), hug (2), run (2), drain (2), blow, brush, cry, dab, drip, eat, scrub, weep (1 each).

Example:  The sun has obviously boiled their brains dry — 'Elemental Forces' is a work of warped hippy ideals and punky ferocity that occasionally slips into a groove of plotted madness.

(21)    **occurrences of resultative *wet***:  none.  (12 *make*-causatives; see footnote 3)

Similarly, the Boas corpus contains 102 occurrences of resultative *clean* and none of *dirty*, despite dirtying actions being expressed 33 times with *get*-causatives and 8 times with *make*-causatives.

(22)    **Clean: 102 occurrences**: wipe (41), wash (11),  sweep (10), scrub (9), rub (6), lick (6), scrape (5), rinse (3), suck (3), scour (2), pare (2), whip, wag, swab, polish, pick (1 each)

(23)    **Dirty: none.** (33 *get*-causatives, 8 *make*-causatives)

Thus these corpus data strikingly confirm the facts reported by Green and others on the basis of introspective judgments.

Type II. Verb is punctual; resultative is a non-gradable adjective.

The second predicted type involves verbs in construction with the nongradable AP resulative *dead*. Tragically, the Boas corpus includes many, many examples of victims being *shot dead, cut dead, killed dead*, and so on.  The verbs almost always denote punctual events:  *shoot, cut, kill*, etc.

(24)    **Dead**: 429 occurrences: shoot (408), cut (11), kill (9), strike (8), stop (6), knock

(3), flatten, kick, smite (1 each)

Example:  At another mill, the Fox mill, he and a confederate shot the miller dead, injured the miller's wife and maid, then made them fry some eggs in fat.

The adjective *dead* is a standard example of a non-gradable adjective (example from Kennedy 1999: 41):

(25)    a. ??Nixon is extremely dead.

b. ??Nixon is more dead than Reagan.

Due to the requirement that the event and the change undergone by the affected theme be coextensive, the verb in a resultative construction with a nongradable adjective must be punctual: *shoot the miller dead* versus *\*bore the students dead*.

Figure 3 depicts a punctual event with non-gradable adjective. Since the transition between states is virtually instantaneous, the resulting graph is essentially a step-function. Hence the event itself must be conceptualized as non-durative or at least very short.

[FIGURE 3 ABOUT HERE]

Type III. Verb is durative, resultative is a path PP whose object NP specifies the bound.

Contrast *dead* with the goal-PP *to death*. The resultative PP *to death* denotes a path whose endpoint is death. More generally, and not just in the context of resultatives, to-PP paths can be long or short, hence appear with durative verbs (*walk to NP*) and punctual verbs (*give it to NP*). Thus *to death* works with either durative verbs (26a) or punctual verbs (26b), as in these corpus examples:

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(26)     a. The rabbits had apparently been battered {*dead / to death }.

b. He and a confederate shot the miller {dead / to death}.

Many of the verbs in the Boas corpus occurring with resultative *to death* are durative, that
is, extended in time.    However, some are not:  there were 11 occurrences of *shoot to
death*, for example.    There is nothing to rule this out, since a path can be very short.
Perhaps for markedness reasons, there is a tendency for to select *dead* over *to death* when
possible.

(27)     **To death**: 547 occurrences[4]: <u>stab</u> (114), beat (74), batter (39), frighten (34), crush

(25), scare (24), burn (18), torture (16), drink (15), starve (15), bludgeon (12),

hack (12), <u>shoot</u> (11), kick (11), club (9), bore (8), knife (8), choke (8) … (many,

many other verbs)

Example: Park Manager Paul Weston said the rabbits had apparently been <u>battered to</u>

<u>death</u>.

An analysis of all the adjectives tabulated by Boas reveals a striking pattern.[5]

Table I shows open-scale adjectives from Boas (2000, Appendix A), including the two

minimal endpoint or de facto open scale ones. Table II shows closed-scale adjectives.

[TABLE I ABOUT HERE]

[TABLE II ABOUT HERE]

Comparing the first columns of the two tables reveals a very striking contrast: closed-

scale resultatives are common, while open-scale resultatives are virtually non-existent,

replaced instead by the *make*-causative strategy. This strongly confirms the present

analysis.

**V. Semantic composition versus interpretation.**

An interesting implication of our account is that boundedness must be part of the

lexicosemantic structure of the resultative adjective. That is, the adjective must have an

inherent bound; a bound provided by pragmatic context is insufficient. In that regard the

semantic composition of the adjective with the resultative clause differs from the primary

predication in (28a) and instead resembles the attempt at modification in (28b).

(28)    a. Michael Jordan is tall.

        b. #completely tall; #totally tall

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As explained above, (28a) is interpreted to mean that Jordan's height meets or exceeds some contextual standard of tallness. But such a contextual standard will not save modifiers like *completely* or *totally*, as shown in (28b). Instead these modifiers apparently require an adjective with an inherent lexical bound. Like these modifiers, the resultatives construction requires an adjective with an inherent bound, presumably as a condition on semantic composition of the sentence.

A rough Head-Driven Phrase Structure Grammar analysis is sketched in Figures 4 and 5, where CONTENT is the field for semantic content (cp. semantic structure, logical form, etc.). The lexical rule in Figure 4 adds an AP to the list of complements (COMPS) in the verb's subcategorization frame. Crucially, the AP must provide an inherent lexical scale and an endpoint (BOUND). Figure 5 shows the resultative verb produced when this rule is applied to the verb *hammer*.


[FIGURES 4 and 5 ABOUT HERE]


Note that it is not sentence telicity *per se* that this construction requires. Atelic resultatives are possible, for example, in sentences with iterative aspect:

(29)    John hammered metal/cans flat (for an hour / (#)in an hour).

This shows that the boundedness requirement applies 'before' sentence aspect is calculated.  Boundedness is a condition on the lexical semantic structure of the words involved, not on the final interpretation of the sentence.

**VI. ECM resultatives**.

Now let us consider Exceptional Case-Marking resultatives such as (5) or (7) above.  Recall that by definition, in ECM resultatives *the predication subject is not an argument of the verb*. As noted already at the end of Section II above, the fact that the predication subject for ECM resultatives is not part of the argument structure of the verb means that no homomorphism or coextensiveness requirement obtains.  This is illustrated by example (30).

(30)    We laughed the speaker off the stage.

The verb-denoted main event, namely our laughter, and the change along the property scale (or 'path'), namely the speaker's exit from the stage— are not necessarily coextensive.   Nor do ECM resultative constructions evince the strict homomorphism

between the main event and the change along the property scale that we found to be characteristic of control resultatives. Levin and Rappaport-Hovav (1999) note that in contrast to control resultatives, ECM resultatives allow for the main and result events to receive independent temporal modification:

(31)    Peter quickly read himself into an inferiority complex, after a few slow deliberate readings of his classmates' theses. (from Levin and Rappaport-Hovav, 1999)

Levin and Rappaport-Hovav argue that control resultatives involve a tighter fusion of the events than do ECM resultatives— a similar point to the one being made here, although modeled differently and supported by different types of evidence.

An examination of the Boas corpus reveals that open-scale adjectives strongly resist appearing in control resultatives, but do appear occasionally in ECM resultatives (see *hoarse* and *sick* in Table III).

[TABLE III ABOUT HERE]

The *completely* test confirms that these adjectives are open-scale: to the extent that one can say *completely hoarse/sick/*etc., the modifier means something like 'very', as shown

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by the fact that the following is not contradictory: *I am completely sick, but Susan is even sicker* (see footnote 1). We predict that resultatives formed with such adjectives will be atelic, which appears to be confirmed by the imperfective entailment test:[6]

(32)    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.

While the exact aspectual conditions on ECM resultatives are not known, it is clear that they are considerably freer than control resultatives. For some ECM resultatives, the result state model of telicity (Dowty 1979, i.a.) is appropriate. For others, the resultative functions as an intensifier (e.g. 32). The tight restrictions following from the event-argument homomorphism need not apply to ECM resultatives, for the simple reason that by definition the predication subject for the ECM resultative predicate is not an argument of the event-denoting verb. This has important consequences for the putative Direct Object Restriction, as we will see in the next section.

## VII. The Direct Object Restriction (DOR), revisited.

Years of study of thematic roles have shown that affected themes tend to be objects rather than subjects, when the verb is transitive (cp. the Proto-Patient role of Dowty 1991; the placement of affected themes at or near the bottom of most proposed thematic hierarchies; and so on). Call this correlation the *theme-object tendency*. From the theme-object tendency alone it follows that resultatives *tend* to be predicated of objects. Is there, in addition, a structural syntactic constraint that is responsible for the DOR in resultatives? Strong evidence against a further structural constraint is that *exceptions to the theme-object tendency are also exceptions to the DOR.* First, all unergative motion verbs are exceptions, as noted by Levin and Rappaport-Hovav (L&R; 1995):

(33)　a. She danced/swam *free of her captors*. (L&R p. 186)

　　　b. However, if fire is an immediate danger, you must jump *clear of the vehicle*.

　　　　[State of Illinois, *Rules of the Road*; cited in L&R p. 186)

　　　c. The driver and the fireman had jumped *clear* before the crash. [*Thomas the*

　　　　　*Tank Engine*]

Second, there are even some *transitive* verbs with affected theme subjects. If conditions

are right, these allow resultative predicates (Wechsler, 1997):


(34)     a. <u>The wise men</u> followed the star *out of Bethlehem.*

         b. <u>The sailors</u> managed to catch a breeze and ride it *clear of the rocks*.

         c. <u>He</u> followed Lassie *free of his captors*.


This shows clearly that to the extent that the DOR holds, it is epiphenomenal— it is just

a side-effect of argument mapping generalizations. The DOR qua syntactic constraint

would seem to be dead.

         However, the alternative of a 'Theme Restriction' (cp. Van Valin 1990:254ff)

alone cannot explain this contrast (as noted by Bresnan and Zaenen 1990, who cite

Rappaport and Levin):


(34)     a. *We danced tired.

         b. We danced ourselves tired.


But now we have the answer: (34a) is unacceptable because *tired* is an open-scale

adjective, hence inappropriate for a control resultative. In contrast, (34b) is acceptable

because as an ECM resultative it lacks the aspectual requirements following from the event-argument homomorphism. Thus the predicate *tired* is just as infelicitous with an object as a subject— if that object is an argument of the verb:

(35)    *The coach trained <u>us</u> *tired*.   (=8b)

In sum, the fact that resultative predication subjects tend to be 'deep' objects follows from the semantics of the construction, together with the independent generalization that affected themes tend to be objects. The contrast between control resultatives and 'fake reflexive' resultatives do not weaken this conclusion, because they receive an independent explanation.

**VIII. Summary and conclusion.**

The premise that (control) resultative constructions are telic, understood under the event-argument homomorphism model, explains three classes of empirical observations: (i) lexical variation with respect to the aspectual type of the verb and the scalar semantics of the resultative adjective; (ii) selection of PP vs. AP resultatives; and (iii) the generalization regarding possible predication subjects previously adduced in support of the DOR. See Beavers 2002 for a formal semantic analysis along the lines proposed

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here; and see Wechsler and Noh 2001 for an application of this approach to Korean resultatives.

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**Tables.**

**Table I.  Open-scale adjectives** (found in Boas 2000, Appx. A)

|  | **Resultatives** | *make*-**causatives** |
|---|---|---|
| **Famous** | 0 | 37 |
| **Fat** | 0 | 5 |
| **Ill** | 0 | 65 |
| **Sleepy** | 0 | 19 |
| **Sore** | 1 | 11 |
| **Tired** | 0 | 18 |
| **Dirty*** | 0 | 8 (+33 *get*-causatives) |
| **Wet*** | 0 | 12 |

*Minimal endpoint ('de facto open scale') adjectives

**Table II. Closed-scale adjectives** (found in Boas 2000, Appx. A)

|  | **Resultatives** | *make*-**causatives** |
|---|---|---|
| **Clean** | 102 | 6 |
| **Dry** | 77 | 8 |
| **Flat** | 34 | 1 |
| **Full** | 35 | 1 |
| **Open** | 395 | 1 |
| **Red** | 11 | 4 |
| **Shut** | 207 | 0 |
| **Smooth** | 5 | 12 |
| **Solid** | 3 | 2 |

**Table III.  Open-scale adjectives**

|  | Control | ECM | Misc. |
|---|---|---|---|
| **Insane** | 0 | 0 | 23 subcat. by *drive*; 1 subcat. by *send*; 1 *make*-causative |
| **Safe** | 0 | 0 | 67 *make*-causatives |
| **Mad** | 0 | 0 | 108 subcat. by *drive*; 5 subcat. by *send*; 35 *make*-causatives |
| **Hoarse** | 0 | 9 | 1 *make*-causative |
| **Sick** | 1 | 12 | 136 *make*-causatives |

FOOTNOTES

[1] Kennedy and McNally (1999, fn. 1) note  that the *completely*-test is complicated by the fact that *completely* sometimes appears with open-scale adjectives, with the meaning 'very'.  They point out that entailments differ, making (i) but not (ii) contradictory:

    (i) #The line is completely straight, but it could be straighter.

    (ii) I'm completely uninterested in finances, but Bob is even less interested.

[2] Goldberg's (1995:195ff) 'End-of-scale constraint' on resultative adjectives, which I became aware of only after completing this work, broadly prefigures the present observations.  However,  it does not invoke the crucial typology of adjective semantics on which the present account relies.  Goldberg claims that most of the adjectives allowed in the resultative construction are non-gradable— a claim which is inconsistent with our findings.

[3] Boas included examples with *make* and *get* (e.g. …*make it dry and warm*) among his resultatives, but they are lexical causatives.  They lack the entailments of resultatives: *John made his hair wet* entails neither that *John made his hair* (as would be expected for a control resultative) nor that *\*John made* (as would be expected for an ECM resultative). I also omit occasional misclassified examples.

Not including 44 occurrences of the idiom *put to death* (≠ 'make dead by putting')

[5] Boas searched his corpus for occurrences of 50 specific resultative phrases (adjectives,

PPs, and particles).

[6] If *hoarse* is interpreted literally, then *yell ourselves hoarse* becomes telic, the entailment

in (32a) no longer holds, and the following becomes contradictory: *#I am completely*

*hoarse,but Susan is even hoarser.*