

On Resultative Predicates and Clauses: Parallels Between Korean and English

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1. Introduction.

It is now widely, if not universally, accepted that the mental representation of linguistic meaning is *structured* according to grammatical principles.¹ There are many variants on this basic idea of a structured meaning, with names like *argument structure*, *event structure*, *lexical conceptual structure*, and *logical form*. Let us assume that the various parts of a discourse (words, constructions, etc.) contribute their meanings incrementally to compose such a structure. This structure, together with the utterance context, determines the appropriate semantic interpretation. A crucial question, one aspect of which we address in this paper, is how syntactic form relates to semantic structure. What syntactic domain corresponds to a semantic structure of a given type?

To make this question clearer, let us focus on a specific problem. There appears to be considerable empirical evidence that certain predicates (the so-called *telic* ones) contain within their semantic structures an argument position for the result state (or perhaps result event) of the event denoted by the predicate. The sentence *Mary opened the window* entails that Mary's actions caused it to be the case that 'the window is open.' Hence 'the window is open' is the *result state* for this sentence. The specific claim is that this result state is an implicit argument of the predicate *open*. Indeed, there is quite a bit of linguistic evidence for this view. For example, various sorts of adverbial modifiers can pick out just the result state for modification. Some of these are summarized in (1) (see Dowty, 1979).

- (1) Linguistic reference to result states.
 - a. The restorative prefix *re-* adds the presupposition that the result state previously obtained:
The satellite reentered the atmosphere.
(presupposes that the satellite was previously within the atmosphere.)

¹We wish to thank Prof. Jee-Hong Kim for his extensive and helpful comments on many aspects of this work.

- b. The reversative prefix *un-* swaps the initial and result states:
John untied his shoes.
- c. Durative modifiers can sometimes take scope over just the result state:
John went to Hawaii for two weeks.
Let's open the window for a few minutes.
- d. Adverbials like *again* are ambiguous:
John opened the door again.
 - (i) presupposes it was open before (result only)
 - (ii) presupposes John opened it before (whole action)

Based on such evidence, we will assume here that the result state is an argument, and also provide further evidence for this view below.

In light of this, consider now these two alternative expressions of roughly the same 'resultative' notion, in (2)a and (2)b:

- (2) a. John hammered the metal flat.
- b. John hammered the metal_i; consequently, the metal_i/it_i became flat.
- c. John hammered the metal; consequently, the neighbors woke up.

While (2)a and (2)b have similar interpretations, we argue below that they have rather different semantic structures (this difference is neutralized by the interpretation function). Specifically, the result state argument role for *hammer* is filled by the state 'the metal is flat' in (2)a, but not in (2)b. Sentence (2)b gives rise to two distinct event structures for the two clauses; the clause following the semi-colon is linked to the one preceding it through anaphora and not through argument-filling. (2)c illustrates that the clausal construction does not require coreferential NP's. In this case pragmatic inference links the clauses; we normally infer, for example, that the neighbors are somewhere within earshot of John's hammering.

This distinction between two means of linking events, through argument-filling and linking clauses, turns out to have important consequences. In this paper we first look at English resultative constructions and explain their basic features on the basis of this distinction (essentially following Wechsler, 1997b). A third type of resultative construction, the 'ECM' type, occupies a sort of middle ground, sharing some properties of each. We then compare resultative constructions in English and Korean, arguing that Korean sentences such as (3)a and b are analogous to (2)a and b/c respectively: in the former cases a secondary predicate fills an argument position of the main verb, while in the latter two clauses are linked.

- (3) a. Mary-nun kumsok-ul napcakha-key twutulki-ess-ta.
 Mary-TOP metal-ACC flat-COMP hammer-PAST-DEC
 'Mary hammered the metal flat.'
- b. Tom-un [pal-i aphu-key] talli-ess-ta.
 Tom-TOP feet-NOM hurt-COMP run-PAST-DEC
 'Tom ran until his feet hurt.'

Apparent differences between the two languages (Kim and Maling, 1997) arise when English resultatives of one type are compared to Korean resultatives of the other type. But when the same types are compared across languages, the apparent differences disappear.

2. Predicative versus clausal resultatives in English.

2.1. Resultative types and selectional restrictions

Consider a situation in which two events have occurred, one of them the result of the other. English provides three basic types of syntactic construction to convey such a situation. First, the causing and resulting events can each be conveyed by its own clause, either with separate sentences as in (4)a; or a subordinate adjunct result clause, as in (4)b-e; or the main clause can express the result event and the subordinate clause can express the causing event, as in (4)f.

(4) Resultative clauses

- a. John hammered the metal; consequently, the metal became flat.
 b. John hammered the metal, resulting in the metal becoming flat.
 c. John hammered the metal, thereby flattening it.
 d. John hammered the metal until it was flat.
 e. John hammered the metal, causing it to flatten.
 f. John flattened the metal by hammering it.

...etc.

A second type of syntactic construction is the secondary predicate, as in (5):

(5) Resultative secondary predicates

- a. John hammered the metal *flat*.
 b. The puddle froze *solid*.
 c. Robert ran *clear of the fire*.

For example in (5)a the secondary predicate *flat* is predicated of the NP *the metal*. (I adopt the convention of italicizing the resultative phrase and underlining its predication

subject.) The term *resultative construction* is sometimes reserved for this second, predicative, variety. The defining characteristic of this construction is that a semantic argument of the matrix verb is the predication subject for the secondary predicate. In this case the NP *the metal* fills the ‘hammered’ role of the matrix verb *hammer*; and this NP is the predication subject for *flat*.

The third variety of English resultative construction we will call *Exceptional Case-Marking (ECM)* resultatives (also called *unergative* or *intransitive* resultatives). Some examples follow:

(6) ECM resultatives

- a. The joggers ran themselves *exhausted*.
- b. We laughed ourselves *silly*.
- c. We yelled ourselves *hoarse*.
- d. The joggers ran their Nikes *threadbare*.
- e. We laughed the speaker *off the stage*.
- f. You’re eating yourself *to death!*
(topic on Jerry Springer TV show)
- g. How to think yourself *healthy*.
(from the cover of a ‘natural healing’ magazine)
- h. Mary ran the soles *off her shoes*.

The hallmark of the ECM resultative is that the predication subject for the resultative (underlined in (6)) is not a semantic argument of the matrix verb. For example, in (6)h, *the soles* doesn’t get a theta-role from *run*. Indeed, it cannot appear as a complement of *run* except in the resultative construction: **Mary ran the soles*. In other words, these constructions are instances of the English ECM (also known as small clause or subject-to-object raising) construction more often exemplified by *We expected her to win*, *We consider her intelligent*, etc. This property of these resultatives is widely recognized. Simpson (1983) drew this same connection between these resultatives and (other) ECM verbs; see Carrier and Randall (1992), inter alia, for substantial further evidence.

Hence while ECM and secondary predicate resultatives look somewhat similar on the surface, they differ in this crucial respect: in the predicate variety, an argument is ‘shared’ between the matrix and result predicates (e.g. in (5) ‘the metal’ is a semantic argument of both ‘hammer’ and ‘flat’); while in the ECM variety there is no argument-sharing. In that respect ECM resultatives resemble the clausal type in (4), both of them contradistinct from secondary predicates. With respect to the syntax, ECM resultatives are simply parasitic upon an English construction type of very broad applicability, namely the ECM construction. It has long been observed that the thematic structure of

the ECM construction is parallel to that of a subordinate clause, resulting in paraphrases such as (7). The same applies to the ECM and clausal resultatives in (8):

- (7) a. We believe Mary to be intelligent.
b. We believe that Mary is intelligent.
- (8) a. The joggers ran their Nikes threadbare.
b. The joggers ran until their Nikes were threadbare.

Summarizing, there is a theoretical divide: on one side is the predicative resultative, which involves semantic argument-sharing; on the other side are the clausal and ECM types, which do not involve argument-sharing.

With this theoretical background, let us now turn to an empirical generalization which cuts along the same divide. Resultative secondary predicates have an important semantic property which ECM and clausal resultatives do not share. In the case of secondary predicates, the matrix verbs are notoriously picky about the semantic class of the result phrase (inter alia, Green, 1972 and Dowty 1979, p. 219ff; Wechsler, 1997b). A few examples are given in (9).

- (9) a. Sally painted the door *red/ a pale shade of red/ ?sticky/ *beautiful/ *noticeable*.
b. John hammered the metal *flat/ smooth/ (?)shiny/ into the ground / *beautiful / *safe*.

Hammering something normally is intended to change either its location (*into the ground*) or its shape and/or texture (*flat/ smooth/ shiny*) (9)b, and so the verb *hammer* selects for result properties of these kinds. Subjective properties like *beautiful* or *safe* are generally poor in this construction. This close tie between verb and resultative predicate prompted Dowty (1979) and others to analyze this construction as a sort of complex lexical predicate (e.g. *hammer-flat*).

Now let us attempt to add resultative predicates to some intransitive verbs:

- (10) a. Robert ran *clear of the fire/free of the car/to the store/*exhausted*.
b. *John laughed *silly/off his chair*.
c. *We yelled *hoarse*.

The verb *run* selects locative results (*clear of the fire, free of the car*) and rejects other properties such as *exhausted* (10)a. As for *laugh* and *yell*, there are apparently no result types selected by these verbs. The semantic sortal selection observed in all of these cases should not be too surprising: running is (normally) conceived as a means of changing

location, and so locative results are the most natural. But there are no normal or inherent results connected with such activities as laughing or yelling, and so these verbs disallow any resultative predicates at all, as far as we know.

In (11) we see a few more intransitive verbs. The verb *freeze* selects solidity as its result, but not subjective properties like slipperiness or dangerousness (11)a. The verb *roll* specifies that its result must be a location (position):

- (11) a. The puddle froze *solid/ *slippery/ *dangerous*.
b. The ball rolled *down the hill/into the room/clear of the car/ *wet*.
c. The gate rolled *into the wall/ open/ shut/ *squeaky*.

In (11)b, even if we imagine the ball rolls through a puddle, we still can't use *wet*. In (11)c, even if we imagine the gate loses its grease from rolling and becomes squeaky, the predicate *squeaky* is still bad.

Resultative clauses, in contrast, are not semantically constrained by the causing verb:

- (12) a. John hammered the metal; consequently, the metal became shiny.
b. John made the metal safe by hammering it.
c. The ball rolled, thereby becoming wet.
d. The gate rolled until it became squeaky.
...etc.

The clausal resultative allows virtually any relationship between the two events, constrained only by general pragmatic considerations. They are not semantically restricted by the verb in the 'causing' clause, but instead allow all sorts of accidental or contingent states as endpoints, as in *We laughed until the tears ran down our cheeks*.

ECM resultatives pattern with the clausal and not the predicative variety with respect to semantic selection (see also Wechsler, 1997b). ECM resultatives lack the semantic restrictions which are characteristic of the predicative type. This is demonstrated most vividly by comparing 'minimal pairs' like the unacceptable (10)c (**We yelled hoarse*) and (6)c (*We yelled ourselves hoarse*). We suggested above that the verb *yell* refuses to select any sort of resultative predicate at all; but the ECM variety is not subject to this restriction. Similarly, (10)a above shows that *run* selects a result predicate indicating some change of location of the runner participant, but the ECM resultatives in (6)a, d, and h ignore this selectional restriction. Instead the result can be the runner's exhaustion (6)a, or the threadbare condition (6)d or solelessness (6)h of her shoes. While ECM resultatives are partly conventionalized and many examples do not

sound acceptable to speakers, the patterns of acceptability do not form natural (semantic) classes in the way we observed for the predicative type.

As observed already by Wechsler (1997b), the fact just noted— that verbs can semantically select for the type of relation expressed by a resultative secondary predicate, but not the relation expressed by a clause or ECM resultative— explains the patterns of acceptability which have in the past been attributed instead to a special syntactic stipulation, the Direct Object Restriction or DOR (Bresnan and Zaenen, 1990; Levin and Rappaport-Hovav, 1995; Simpson, 1983).² According to the DOR a resultative phrase must be predicated of an underlying object. On that view intransitives like (11) are assumed to be so-called ‘unaccusative’ verbs, whose subjects are underlying objects, while intransitives like (10) are ‘unergative’ verbs, whose subjects are underlying subjects. Hence the DOR would predict the former make better predication subjects than the latter. Acceptable ‘unergative’ resultatives like the locatives in (10)a have been recognized as problematic for the DOR and handled through special lexical rules to transform unergatives into unaccusatives (Levin and Rappaport-Hovav, 1995: 202). These problems vanish on the present view. In addition, there are some cases in which the subject of a transitive can serve as predication subject for the resultative (from Wechsler, 1997b, p. 313, ex. 15):³

- (13) a. The wise men followed the star *out of Bethlehem*.
b. The sailors managed to catch a breeze and ride it *clear of the rocks*.

Such examples are clearly inconsistent with the DOR. See Wechsler (1997b) for further discussion of the DOR.

How are we to explain the fact that verbs can semantically select for the type of relation expressed by a resultative secondary predicate, but not the relation expressed by

²As far as we know Simpson 1983 was the first to make this observation: "...the controller of the resultative attributes...is underlyingly an OBJECT." (Simpson 1983:144). Bresnan and Zaenen (1990) posit 'intrinsic classifications' of arguments instead of deep grammatical relations, but the restriction they seek to explain is empirically identical to the DOR. They show it can be captured monotonically, without changing grammatical relations. The present paper takes the more radical position that the resultative construction does not provide evidence for any intrinsic classification of arguments at all— except in the semantics.

³Some readers may question whether these are resultative constructions at all. Wechsler 1997a argues on the basis of anaphoric binding facts that locatives expressions like the italicized ones in (13) are secondary predicates. Since they have the result interpretation, they are resultative predicates. Levin and Rappaport-Hovav 1995 also consider examples of this kind to be resultatives.

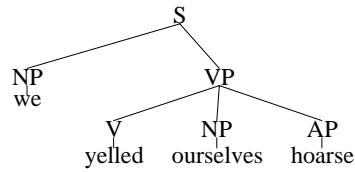
a clause or ECM resultative? The short answer is that we can explain this fact by assuming that secondary predicates are (optional) arguments while the other two types are not (see (1) above for a summary of evidence for argumenthood of the result state). The clausal resultatives are adjuncts or separate sentences, hence are unselected. As for the ECM type, we argue below that the NP and predicate following the verb (e.g. *their Nikes* and *threadbare* in (6)d) are technically complements of the verb. But they are added to the subcategorization frame of the verb through a productive rule over which particular verbs exert no control. This view is formalized in the next subsection, essentially following Wechsler (1997b).

Still this leaves the question of why verbs subcategorize (and hence select semantic properties) only for resultative secondary predicates but not resultative clauses or ECM constructions. We believe that the relevant property of secondary predication is that it involves argument-sharing: some participant is shared between the matrix and result events. To put it differently, the secondary predicate indicates a property of one of the main verb's arguments. This means that the result is closely integrated with the causing event. An eventive verb denotes some event involving the verb's arguments as participants, often implying specific changes to one or more participant: *the water froze* entails that the water became solid; *John painted the door* entails that the door became covered with paint; and so on. If a verb meaning often involves an *implicit* change to one of its arguments, it stands to reason that the grammar should provide a verb with the means for the *explicit* expression of a change to one of its arguments. Specifically, the grammar provides for the augmentation of the verb's subcategorization frame to include a phrase expressing a result state which involves one of the verb's arguments. This augmentation process is described in the next subsection.

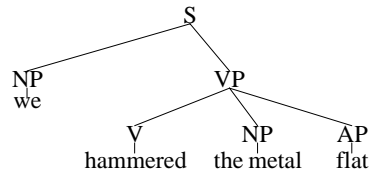
2.2. Analysis

In this section we sketch a formal analysis in the framework of Head-Driven Phrase Structure Grammar (Pollard and Sag, 1994), although the specific framework is not crucial. While ECM resultatives parallel *clausal* resultatives with respect to thematic structure and hence semantic sortal restrictions, ECM and *predicative* resultatives are similar in their superficial syntactic structure and mechanisms of semantic composition. As noted just above, we assume the ECM construction, like a transitive predicative resultative, is a flat structure where the verb, post-verbal ('raised') NP, and secondary predicate are all sisters:

(14) a. ECM



b. transitive



In their basic (minimal) lexical valence specifications, *yell* takes only a subject and no complements, while *hammer* takes a subject and an object. Following Wechsler (1997b), a postverbal predicative AP complement may be added to any verb's valence specification by a general default rule. The semantic content of the AP fills the result state argument (BECOME) in the semantic representation of the verb. This rule is responsible for resultative secondary predicates with all verbs, whether intransitive, transitive (as in (14)b), or ECM (as in (14)a). This approach has important consequences, as we will see.

Let us look a bit more closely at how the subcategorization frame of the main verb is augmented. A lexical entry for the verb *hammer* is given in (15). There are two main fields, CATEGORY for syntactic information and CONTENT for semantic information. Within CATEGORY, the verb's SUBCAT(egorization) feature takes as its value a list of the verb's dependents, namely a subject NP (the first item in the list) and an object NP (the second item). (In current HPSG the SUBCAT list is split into two lists, one for the subject and one for the remaining complements. The older SUBCAT is used here for simplicity.) The subscripts on the NP's are structure-shared with values in the (semantic) CONTENT field, indicating that the subject and object NP's fill the HAMMERER and HAMMEREER roles respectively.

$$(15) \quad \textit{hammer}: \left[\begin{array}{l} \text{CATEGORY} \parallel \text{SUBCAT} \langle \text{NP}_i, \text{NP}_j \rangle \\ \text{CONTENT} \left[\begin{array}{l} \text{RELATION} \left[\begin{array}{l} \textit{hammer-rel} \\ \text{HAMMERER } i \\ \text{HAMMEREER } j \end{array} \right] \\ \text{BECOME} \left(\left[\begin{array}{l} \textit{shape-rel} \vee \textit{location-rel} \\ \text{THEME } j \end{array} \right] \right) \end{array} \right] \end{array} \right]$$

The value of the semantic feature BECOME encodes the result state, if any. The sharing of the tag 'j' between the values of HAMMEREER and BECOME|THEME indicates that the result state consists of some shape or location property obtaining for the HAMMEREER argument. The parentheses around the value for BECOME indicate that the result state specification is optional. This represents the two key facts that (i) one can

simply hammer something without bringing about any result; and (ii) if there is a result then it will involve the shape or position of the hammered thing.

It is sometimes said that the resultative must be predicated of the ‘affected theme’ argument of the matrix verb. In the present system we may define an ‘affected theme’ as an argument of the verb which is coindexed with some argument of the result state (here, the THEME argument). Hence in this case the HAMMEREE argument is an ‘affected theme.’

An optional lexical rule allows one to append an AP argument to the end of any verb’s SUBCAT list. The AP’s CONTENT is unified with the verb’s BECOME value (the colon following ‘AP’ abbreviates the CONTENT attribute). Applied to *hammer*, this yields (16).

$$(16) \left[\begin{array}{l} \text{CATEGORY||SUBCAT} \langle \text{NP}_i, \text{NP}_j, \text{AP}:\underline{\text{I}} \rangle \\ \text{CONTENT} \left[\begin{array}{l} \text{RELATION} \left[\begin{array}{l} \textit{hammer-rel} \\ \text{HAMMERER } i \\ \text{HAMMEREE } j \end{array} \right] \\ \text{BECOME } \underline{\text{I}} \left[\begin{array}{l} \textit{shape-rel} \vee \textit{location-rel} \\ \text{THEME } j \end{array} \right] \end{array} \right] \end{array} \right]$$

There are various ways one might go about removing the stipulative character of this lexical rule by deriving it from more general principles. For example, suppose the SUBCAT list is radically underspecified, allowing any number of items of any category to be appended to the basic list. This would be constrained by a principle analogous to GB’s theta-criterion or LFG’s function-argument biuniqueness principle, which would dictate that SUBCAT list items must be interpreted with respect to CONTENT features (modulo expletives and raised items). Since the semantic type of the BECOME value is always specified as a state, a state-denoting AP is, in effect, licensed by the BECOME value. We will not pursue this approach further here.

Now consider the derivation of *John hammered the metal flat*. The lexical sign for *flat* is given in (17).

$$(17) \left[\begin{array}{l} \text{CATEGORY||SUBCAT} \langle \text{NP}_i \rangle \\ \text{CONTENT} \left[\begin{array}{l} \textit{flat-rel} \\ \text{THEME } i \end{array} \right] \end{array} \right]$$

Since *flat-rel* is a subsort of *shape-rel*, these two AVM’s will successfully unify. The subject of *flat* is indicated by NP_i in the SUBCAT list in (17). The index value for

THEME unifies with the value supplied by the verb, with the result that the ‘hammered’ index and the adjective’s subject index are token-identical. This captures the fact that the verb’s object ‘thematically controls’ the resultative predicate, in the sense that this control relation is determined at the level of lexical semantics, without reference to grammatical relations or phrase structure.

Notice that the verb’s lexical sign tells us two things about its result state: (i) the semantic class for the result relation (here a *shape-rel* or a *location-rel*); and (ii) the thematic control relation, that is, the fact that it is the ‘hammered’ participant which undergoes the stated change. The assumption that these two specifications tend to go together— i.e. if a verb specifies one then it specifies both— captures the above generalization that secondary predicates (but not ECM or clauses) are semantically selected by the matrix verb.

Intransitive clauses such as *The puddle froze solid* work exactly the same as the transitive example above, except that the predication subject for the secondary predicate is necessarily the matrix subject, since there is no object. From the meaning of the verb *freeze* we can infer that the thing which freezes changes to a solid state. This is captured by the following lexical sign for *freeze*:

$$(18) \left[\begin{array}{l} \text{CATEGORY||SUBCAT} \langle \text{NP}_i \rangle \\ \text{CONTENT} \left[\begin{array}{l} \text{RELATION} \left[\begin{array}{l} \textit{freeze-rel} \\ \text{THEME } i \end{array} \right] \\ \text{BECOME} \left[\begin{array}{l} \textit{solid-rel} \\ \text{THEME } i \end{array} \right] \end{array} \right] \end{array} \right]$$

After the resultative AP has been appended to its subcategorization list, just as in the previous example, the lexical sign for *freeze* is as follows:

$$(19) \left[\begin{array}{l} \text{CATEGORY||SUBCAT} \langle \text{NP}_i, \text{AP}:[\mathbb{1}] \rangle \\ \text{CONTENT} \left[\begin{array}{l} \text{RELATION} \left[\begin{array}{l} \textit{freeze-rel} \\ \text{THEME } i \end{array} \right] \\ \text{BECOME} [\mathbb{1}] \left[\begin{array}{l} \textit{solid-rel} \\ \text{THEME } i \end{array} \right] \end{array} \right] \end{array} \right]$$

Since the word *solid* denotes the *solid-rel* relation, the AP *solid* can fill the position of the AP complement specified by this verb. Through the coindexation shown, the subject of this predicative AP is identified with the verb’s subject (another instance of ‘thematic control’).

On the present analysis it makes no difference whether we are considering a so-called unaccusative verb like *freeze* or a so-called unergative like *run*. Take the verb *run*. Running can have a result state (*He ran to the store*) or not (*He ran in place; He ran all morning*). If it has a result state, then that state must be locative in nature. Hence the verb *run*, like *hammer*, has an optional result state specification:

$$(20) \quad run: \quad \left[\begin{array}{l} \text{CATEGORY||SUBCAT} \langle NP_i \rangle \\ \text{CONTENT} \left[\begin{array}{l} \text{RELATION} \left[\begin{array}{l} run-rel \\ RUNNER \ i \end{array} \right] \\ \text{BECOME} \left(\left[\begin{array}{l} location-rel \\ LOCATUM \ i \end{array} \right] \right) \end{array} \right] \end{array} \right]$$

To derive *Robert ran clear of the fire*, we take the variant of *run* which has the result state specification shown. The AP is added to the SUBCAT list just as in the previous examples. The predication subject for the AP *clear of the fire* is identified through thematic control, just as in the previous examples.

Now consider ECM resultatives like *We ran our Nikes threadbare*. To form this sentence, we want the variant of *run* without the restriction on the BECOME value. The AP is added by a lexical rule, as above. The result so far is as follows:

$$(21) \quad run: \quad \left[\begin{array}{l} \text{CATEGORY||SUBCAT} \langle NP_i, AP[\text{SUBCAT}\langle NP \rangle]:\boxed{2} \rangle \\ \text{CONTENT} \left[\begin{array}{l} \text{RELATION} \left[\begin{array}{l} run-rel \\ RUNNER \ i \end{array} \right] \\ \text{BECOME} \ \boxed{2} \end{array} \right] \end{array} \right]$$

As above, the AP is unsaturated (predicative), that is, it is still ‘looking for’ its subject. However, in this case there is no thematic control indicated by the verb. In short, there is no means for identifying the subject of the AP. For example, consider what happens if we attempt to form **John ran exhausted* using the verb in (21). There is no sortal restriction for the result state, so this is not a problem. But now the AP has no local controller. This violates a general constraint for English dictating that non-VP predicate complements must be locally controlled (Bresnan, 1982:380, Wechsler 1997b:318):

- (22) a. The counselor recommended [PRO_{plural} living together].
 b. *John considers [PRO_{plural} happy together].

(PRO is shown here for expository purposes only. Actually we do not assume that PRO is structurally present in control structures.) English lacks ‘optional control’ for adjective

phrase complements, in contrast to the situation found in verb phrases such as the one in (22)a. As a consequence the AP *exhausted* cannot be a complement of *run*.

However, lexical signs like (21) can be used through another means. An independent ‘raising’ rule, perhaps responsible for all ECM constructions (including those with *believe*, *expect*, etc.), adds an NP to serve as the subject of an open (predicative) complement if and only if that complement lacks a predication subject (applied to *consider* in (22)b it would yield a verb as basis for, e.g. *John considers the kids happy together*). This rule adds a second NP complement for *run*:

$$(23) \quad \textit{run}: \left[\begin{array}{l} \text{CATEGORY|SUBCAT} \langle \text{NP}, \boxed{1}\text{NP}, \text{AP}[\text{SUBCAT}(\boxed{1})]:\boxed{2} \rangle \\ \text{CONTENT} \left[\begin{array}{l} \text{RELATION} \left[\begin{array}{l} \textit{run-rel} \\ \text{RUNNER } i \end{array} \right] \\ \text{BECOME } \boxed{2} \end{array} \right] \end{array} \right]$$

The variant of the verb *run* in (23) is the basis for *We ran our Nikes threadbare*. Finishing up with the derivation of that sentence, the lexical sign for *threadbare* is given in (24):

$$(24) \quad \textit{threadbare}: \left[\begin{array}{l} \text{CATEGORY|SUBCAT} \langle \text{NP}_i \rangle \\ \text{CONTENT} \left[\begin{array}{l} \textit{threadbare-rel} \\ \text{THEME } i \end{array} \right] \end{array} \right]$$

Since (23) places no semantic sortal restriction on the resultative phrase, the ‘threadbare’ relation is as good as any.

To recapitulate, the first step in deriving predicative and ECM resultatives is the same: a result predicate (an AP) is added to the complement specification of the verb, and its semantic content unifies with the verb’s value for BECOME. After that they diverge: in predicative resultatives the predication relation is ‘hard-wired’ into the verb; but in ECM resultatives it is not. Hence in the latter type the added secondary predicate has no local subject (controller), which then triggers a raising rule. This raising rule provides a new nonsubcategorized NP on the verb’s complement list, to serve as the predication subject for the AP.

Thus we treat predicative and ECM resultatives alike in one respect: in both types the semantic CONTENT of the result expression unifies with the BECOME value of the verb. In other words, semantic composition occurs at the level of the event structure of the verb. Turning now to clausal resultatives, this is not the case. Such clauses are

semantically combined with their causes by the entirely different mechanism of discourse linking. For example, consider (4)a, repeated here:

(25) John hammered the metal; consequently, the metal became flat.

In this case we assume that the semantic content of the clause *the metal became flat* does not unify with the BECOME value of *hammer*. Instead the interpretive links between the cause and result clauses are anaphoric in nature. Specifically, the adverbial complementizer *consequently* is implicitly deictic, meaning roughly “as a consequence of situation *x*”, where *x* is some event or state identifiable from the context (generally from a very recent utterance). In (25) situation *x* is the event of John hammering the metal, which is described in the previous sentence. We will not go into detail about the compositional semantics, but the resulting representation has the following general form:

$$(26) \left[\begin{array}{l} \textit{consequence-relation} \\ \text{CAUSE} \left[\begin{array}{l} \text{"John hammered} \\ \text{the metal}_i \text{"} \end{array} \right] \\ \text{RESULT} \left[\begin{array}{l} \text{"The metal}_i \\ \text{became flat"} \end{array} \right] \end{array} \right]$$

Here “John hammered the metal” abbreviates the semantic content of that sentence. Note that in addition to event-anaphora, clausal resultatives also typically involve coreference relations between participants in the cause and result events. This is indicated in (26) with coindexation.

An important empirical consequence of the approach to resultative secondary predicates given above is that so-called unaccusative (theme-only, anticausative) verbs reject ECM resultatives, as observed by Levin and Rappaport-Hovav (1995):

(27) a. *The ice melted the floor clean.
 b. *The water evaporated the pot dry.

In these examples the notion of result state attainment inheres in the verb’s lexical meaning: e.g. in (27)a, inherent in ice melting is the ice becoming a liquid. The result introduced by the NP-AP sequence (*the floor clean*) clashes with the result state lexically specified by the verb and so the sentence is unacceptable. This explanation essentially follows the insight of Levin and Rappaport-Hovav (1995) and Rappaport-Hovav and Levin (1998), but implements it in a different framework. The present account also automatically rules out fake reflexives as in (28)b:

- (28) a. The river froze solid.
 b. *The river froze itself solid.

Recall the way the non-subcategorized post-verbal NP in the ECM construction is added to the verb's complement list: a 'raising' rule is triggered by the absence of a predication subject for the secondary predicate. But in the case of the resultative with the verb *freeze*, this raising rule will not be triggered because this verb encodes thematic control already, (see (16) above). Indeed, this must be the case in order to license (28)a. In other words, the resultative AP (*solid* in (28)) necessarily already has a subject, as dictated by the lexical semantics of the verb *freeze*. Hence the AP will not be given a second subject through the ECM construction.

As expected, clausal resultatives do not observe this constraint:

- (29) a. The ice melted; consequently the floor became clean.
 b. The water evaporated until the pot became dry.
 c. The river froze, resulting in it becoming solid.

Since the event structures do not unify, nothing blocks resultatives of this kind.

Summarizing this section, the three types of English resultative constructions have been classified with respect to two important features: (i) argument-sharing; and (ii) unification of the result expression's semantic content with the BECOME value of the verb. This is shown in Table I.

	(i) argument-sharing?	(ii) event-structures unify?
Predicate	yes	yes
ECM	no	yes
Clause	no	no

Table I. Properties of English resultative constructions

Furthermore, certain empirical observations were shown to correlate with these theoretical distinctions. Property (i) is associated with idiosyncratic selection by the verb for the semantic class of the result event. Property (ii) is associated with syntactic structure (the result phrase is a complement) and with uniqueness of the result event (the result phrase cannot denote a second result in addition to the result specified by the verb).

3. Types of Korean resultatives

Like English, Korean has both predicative and clausal resultatives:

(30) Predicative Resultatives

- a. Mary-nun kumsok-ul [napcakha-key] twutulki-ess-ta.
Mary-TOP metal-ACC flat-COMP hammer-PAST-DEC
'Mary hammered the metal flat.'
- b. Kim-un meli-lul [ccalp-key] call-ass-ta.
Kim-TOP hair-ACC short-COMP cut-PAST-DEC
'Kim cut hair short.'
- c. Mary-nun thakca-lul [kkaykkusha-key] takk-ass-ta.
Mary-TOP table-ACC clean-COMP wipe-PAST-DEC
'Mary wiped the table clean.'
- d. Mary-nun khong-ul [kalwu-lo] ppah-ass-ta.
Mary-TOP bean-ACC powder-to grind-PAST-DEC
'Mary ground the bean into powder.'

(31) Clausal Resultatives

- a. ku-nun [sinpal-i talh-key] talli-ess-ta.
he-TOP shoes-NOM threadbare-COMP run-PAST-DEC
'He ran (his) shoes threadbare.'
- b. Tom-un [pal-i aphu-key] talli-ess-ta.
Tom-TOP feet-NOM hurt-COMP run-PAST-DEC
'Tom ran until his feet hurt.'
- c. Tom-un [pe-ka aphu-key] mek-ess-ta.
Tom-TOP stomach-NOM hurt-COMP eat-PAST-DEC
'Tom ate until his stomach hurt.'
- d. Sandy-ka koki-lul [ppye-ka humwuleci-key] salm-ass-ta.
Sandy-NOM meat-ACC bone-NOM gelatinous-COMP boil-PAST-DEC
'Sandy boiled the meat (until) the bone became gelatinous.'
(from Kim and Maling, 1997, p. 193)
- e. Tom-un [Mary-ka camtul-key] nolayha-yess-ta.
Tom-TOP Mary-NOM sleep-COMP sing-PAST-DEC
'Tom sang Mary to sleep.'

The crucial difference between the two types is that the bracketed resultative elements in (30) lack subjects, while those in (31) have subjects.

Korean lacks ECM resultatives, as pointed out by Jong-Bok Kim (1993). The nominative case particles in (31) cannot be replaced by accusative:

- (32) *ku-nun [sinpal-ul talh-key] talli-ess-ta. (cp. (31)a)
 he-TOP shoes-ACC threadbare-COMP run-PAST-DEC
 'He ran (his) shoes threadbare.'

The lack of ECM resultatives should not surprise us, since the Korean language lacks the ECM construction more generally. (Korean has a special construction which is sometimes analyzed as ECM (Kim, 1990, *inter alia*), but Wechsler and Lee (1995), Hong (1990), and Song (1994) all show that it is really a type of null operator construction similar to tough-movement, with rather specialized semantics.) Like English, Korean does not have a syntactic construction specific to resultatives, but rather employs the syntactic structures independently available in the language.

The suffixed particle *-key*, glossed as a COMPLEMENTIZER in (30)-(31), functions broadly in Korean to mark various secondary predicates, subordinate clauses, and adverbs, including resultative predicates and clauses. (The functions of *-key* are discussed in Section 4.2 below.) The directional postposition *-(u)lo* 'to' is sometimes possible, as in (30)d.

4. Korean resultative secondary predicates

4.1. Predicates versus pro-dropped clauses.

First we must ascertain that there really is a principled distinction between the bracketed items in (30) and (31) respectively. It is possible that all of these items are actually clauses? This question requires some clarification. Some variants of transformational approaches such as the Principles and Parameters framework have a priori theoretical commitments entailing that all such items must necessarily be clauses. (cp. the Clausal Principle in Culicover, 1997:22).⁴ On such a view, the predicates in (30) would be assumed to be in construction with phonologically null subjects, either PRO (for control) or pro (for null anaphora). In contrast, HPSG countenances neither PRO nor pro as elements occupying phrase structure positions. Instead, the distinction between control ('big PRO') and null anaphora ('small pro') is represented in HPSG as follows.

A controlled structure (corresponding to a GB clause with PRO subject) is unsaturated: an item corresponding to the subject still appears on its SUBCAT list but is not structurally discharged ([SUBCAT <NP>]). Instead that NP is identified with an NP in a higher clause through structure-sharing encoded on the higher predicate (local control or raising) or else interpreted on the basis of discourse context (arbitrary control,

⁴Culicover (1997:22) states the Clausal Principle as follows: 'Any part of a sentence that has a complete propositional interpretation is represented as a clause at some level of syntactic representation.'

optional control, etc.). Unsaturated structures of this type are what we have in mind when we say that the bracketed constituents in (30) above are predicates.

In contrast, clauses with null anaphors (‘small pro’, in GB type theories) as subjects are represented in HPSG as fully saturated clauses. In such cases a subject SUBCAT list item is removed from the SUBCAT list by applying a lexical rule or its equivalent to the verb. Hence, once the verb combines with its complements, the result is a fully saturated clause ([SUBCAT <>]).

Since null anaphora (‘pro-drop’) is common in Korean— for subjects as well as other arguments— we need to ask whether the examples in (30) might just be ordinary clauses with null anaphors as subjects. For example, one might suppose that (30)a has the structure in (33)a (we use the symbol ‘pro’ for perspicuity only; as just noted, no such item appears in the phrase structure in HPSG):

- (33) a. Mary-nun kumsok-ul_i [pro_i napcakha-key] twutulki-ess-ta.
 Mary-TOP metal-ACC flat-COMP hammer-PAST-DEC
 ‘Mary hammered the metal so that it was flat.’
- b. Mary-nun kumsok-ul [kkuth-i napcakha-key] twutulki-ess-ta.
 Mary-TOP metal-ACC edge-NOM flat-COMP hammer-PAST-DEC
 ‘Mary hammered the metal so that the edge was flat.’

In (33)a the subject of ‘flat’ is a null anaphor (‘pro’) taking ‘metal’ as its antecedent. This sentence would then be structurally analogous to (33)b, except that the embedded subject is distinct from the matrix object in the latter case.

However, the ‘pro-drop’ analysis of such examples is implausible because these resultatives differ systematically from uncontroversial cases of pro-drop. Resultatives can be scrambled with respect to the matrix arguments, as in (34). But as (35) illustrates, small pro cannot normally precede its antecedent.

- (34) napcakha-key Mary-nun kumsok-ul twutulki-ess-ta.
 flat-COMP Mary-TOP metal-ACC hammer-PAST-DEC
 ‘Mary hammered the metal flat.’
- (35) a. Chelswu-ka_i [pro_i UFO-lul po-ass-ta-ko] cwucangha-yess-ta.
 Chelswu-NOM UFO-ACC see-PAST-DEC-COMP claim-PAST-DEC
 ‘Chelswu claimed that he(Chelswu) saw a UFO.’
- b. *[pro_i UFO-lul po-ass-ta-ko] Chelswu-ka_i cwucangha-yess-ta
 UFO-ACC see-PAST-DEC-COMP Chelswu-NOM claim-PAST-DEC
 ‘Chelswu claimed that he(Chelswu) saw a UFO.’

- c. Chelswu-ka [Yenghi-ka UFO-lul po-ass-ta-ko]
 Chelswu-NOM Yenghi-NOM UFO-ACC see-PAST-DEC-COMP
 cwucangha-yess-ta.
 claim-PAST-DEC
 ‘Chelswu claimed that Yenghi saw a UFO.’
- d. [Yenghi-ka UFO-lul po-ass-ta-ko] Chelswu-ka
 Yenghi-NOM UFO-ACC see-PAST-DEC-COMP Chelswu-NOM
 cwucangha-yess-ta.
 claim-PAST-DEC
 ‘Chelswu claimed that Yenghi saw a UFO.’

(This contrast was pointed out to us by Prof. Jee-Hong Kim, p.c.) Example (35)b shows a failed attempt to move the pro-dropped clause to the left of the antecedent of pro, namely Chelswu. (35)c and d are included to show that subordinate clauses can otherwise be fronted. Similar facts apply to intransitive subject pro and object pro.

Also it is worth noting that Korean lacks any (overt) pronoun to replace the pro in (33)a; neither a reflexive nor an ordinary pronominal is acceptable.

A final argument against reducing all resultatives to pro-dropped clauses concerns the particle *-torok*, which specifically marks resultatives (as noted above and in Section 4.2 below, *-key* has broader functions). The resultative marker *-torok* can replace the complementizer *-key* in clauses, but not in predicates. Hence corresponding to (30)-(31) above we find the contrast between the unacceptable (36) and acceptable (37):

- (36) Predicative Resultatives
- a. *Mary-nun kumsok-ul napcakha-torok twutulki-ess-ta.
 Mary-TOP metal-ACC flat-RES hammer-PAST-DEC
 ‘Mary hammered the metal flat.’
- b. *Kim-un meli-lul ccalp-torok call-ass-ta.
 Kim-TOP hair-ACC short-RES cut-PAST-DEC
 ‘Kim cut hair short.’
- c. *Mary-nun thakca-lul kkaykkusha-torok takk-ass-ta.
 Mary-TOP table-ACC clean-RES wipe-PAST-DEC
 ‘Mary wiped the table clean.’
- (37) Clausal Resultatives
- a. ku-nun [sinpal-i talh-torok] talli-ess-ta.
 he-TOP shoes-NOM threadbare-RES run-PAST-DEC
 ‘He ran (his) shoes threadbare.’

- b. Tom-un [pal-i aphu-torok] talli-ess-ta.
 Tom-TOP feet-NOM hurt-RES run-PAST-DEC
 ‘Tom ran until his feet hurt.’
- c. Tom-un [pe-ka aphu-torok] mek-ess-ta.
 Tom-TOP stomach-NOM hurt-RES eat-PAST-DEC
 ‘Tom ate until his stomach hurt.’
- d. Tom-un [Mary-ka camtul-torok] nolayha-yess-ta.
 Tom-TOP Mary-NOM sleep-RES sing-PAST-DEC
 ‘Tom sang Mary to sleep.’
- e. Sandy-ka koki-lul [ppye-ka humwuleci-torok] salm-ass-ta.
 Sandy-NOM meat-ACC bone-NOM gelatinous-RES boil-PAST-DEC
 ‘Sandy boiled the meat (until) the bone became gelatinous.’

If pro-drop were freely possible in resultative clauses then we would have no explanation for the contrast between (36) and (37). To put it differently, any analysis of (30) in terms of pro-drop would need to explain why pro-drop cannot occur in the apparently parallel (36). But on the secondary predicate analysis we can simply posit that *-torok* marks clauses (not predicates), while *-key* marks either one. We conclude that the resultative expressions in question are bona fide predicates and not pro-dropped clauses.

4.2. Predicates versus adverbs.

A second possibility to consider is that the purported resultative predicates are really adverbs. The suffix *-key*, glossed as a complementizer in the above examples, is also used to derive adverbs (cp. English *-ly*):

- (38) a. Robin-i Sandy-lul ttukep-key an-ass-ta.
 Robin-NOM Sandy-ACC hot-ADV hug-PAST-DEC
 ‘Robin hugged Sandy passionately (i.e. in a hot manner).’
 (from Kim and Maling, 1997)
- b. ku-nun michi-key solichi-ess-ta.
 he-TOP crazy-ADV shout-PAST-DEC
 ‘He shouted crazily (i.e. in a crazy manner).’

This raises the possibility that the resultatives using *-key* are really adverbs. We argue below that some of the examples in the literature cited as resultative predicates are in fact adverbs, while others are true predicates.

Before turning to that argument, we note that the traditional assumption that *-key* marks adverbs has recently been challenged by Jang (1997). Korean has two purported adverbializing suffixes, *-key* and *-i*, as in this example from Jang (1997, ex. 1):

- (39) a. John-i ppal-i talin-ta.
 b. John-i ppalu-key talin-ta.
 John-NOM fast-ADV run-DEC
 ‘John runs fast.’

Jang argues that *-i* marks adverbs while *-key* marks predicates. However, while he provides convincing evidence that *-i* can mark adverbs but not predicates, and that *-key* can mark predicates, he fails to show that *-key* cannot *also* mark adverbs. But in fact *-key* can do both: *key*-marked items appear in sentences lacking a possible predication subject. For example, (38)b above does not entail that he was crazy, but only that he shouted crazily. To take another example, the following sentence is not contradictory:

- (40) mos senkin manca-ka alumtap-key noleyha-yess-ta.
 ugly man-NOM beautiful-ADV sing-PAST-DEC
 ‘The ugly man sang beautifully.’

Here *alumtapkey* ‘beautifully’ modifies the singing event, and is clearly not predicated of the subject NP *mos senkin mancaka* ‘ugly man’.

With that as background, consider this example from Kim (1993, p. 471):

- (41) kang-i tantanha-key el-ess-ta.
 river-NOM solid-??? freeze-PAST-DEC
 ‘The river froze solid.’

While (41) translates an English sentence involving the resultative predicate *solid*, there is some evidence that the Korean *tantanha-key* in (41) is an adverb. Although (41) entails that the river became solid, it does not necessarily follow that ‘solid’ is predicated of ‘river’. (For example, the English sentence *John did his homework perfectly* entails that John’s homework was perfect, but the adverb *perfectly* is not predicated of the NP *his homework*; *The light shone brightly* entails that the light was bright, but the adverb *brightly* is not predicated of *the light*; and so on.)

First, note that *tantanha-key* can be replaced by the corresponding uncontroversial adverb formed with the *-i* suffix, namely *tantanhi* (*tantanha* + *i*) ‘solidly’:

- (42) kang-i tantanh-i el-ess-ta.
 river-NOM solid-ADV freeze-PAST-DEC
 lit. ‘The river froze solidly.’

In fact some speakers prefer (42) to (41). Second, other clear cases of non-predicates can substitute for ‘solid’, as in the following:

- (43) kang-i yalp-key / twukkep-key el-ess-ta.
 river-NOM thin-ADV / thick-ADV freeze-PAST-DEC
 lit. ‘The river froze thinly / thickly.’

Here the adjectives ‘thin’ and ‘thick’ are clearly not predicated of ‘river’: the sentence does not entail that the river became thin/thick, but rather that the ice did. The freezing event occurred ‘in a thin/thick manner’, so to speak. If Korean allows this type of adverbial modification for ‘thick’ and ‘thin’, then there is no reason to expect it to be disallowed for ‘solid’ in (41).

Further evidence that the *key*-marked item is an adverb is that it can be coordinated with a clear adverbial:

- (44) a. kang-i tantanha-key kuliko ppalli el-ess-ta
 river-NOM solid-ADV and quickly freeze-PAST-DEC
 lit. ‘The river froze solidly and quickly.’
 b. kang-i yalp-key kuliko ppalli el-ess-ta
 river-NOM thin-ADV and quickly freeze-PAST-DEC
 ‘The river froze thinly and quickly.’

In contrast the attempt to coordinate an adverb with a resultative predicate is marginal at best. (45)a has a predicate, (45)b has an adverb, and (45)c is a failed attempt to coordinate the predicate with the adverb:

- (45) a. Kim-un cip-ul ppalkah-key chilha-yess-ta.
 Kim-TOP house-ACC red-COMP paint-PAST-DEC
 ‘Kim painted the house red.’
 b. Kim-un cip-ul wanchenhi chilha-yess-ta.
 Kim-TOP house-ACC completely paint-PAST-DEC
 ‘Kim completely painted the house.’
 c. ??Kim-un cip-ul ppalkah-key kuliko wanchenhi chilha-yess-ta.
 Kim-TOP house-ACC red-COMP and completely paint-PAST-DEC
 (‘Kim painted the house red and completely.’)

This can be explained because it is an attempt to force two incompatible syntactic functions onto a single coordinate structure: the first conjunct would be involved in secondary predication on ‘house’, while the second conjunct would be an adverb modifying the verb phrase. In contrast, in (44) both conjuncts are adverbial.

It remains to be shown that ‘red’ in (45)a is a predicate while ‘completely’ is an adverb. Not surprisingly, ‘red’ cannot be expressed with an *i*-marked adverbial:

- (46) *Kim-un cip-ul ppalkah-i chilha-yess-ta.
 Kim-TOP house-ACC red-ADV paint-PAST-DEC
 (lit. ‘Kim painted the house redly.’)

Moreover, ‘house’ is an appropriate predication subject for *ppalkah* ‘red’, but not for *wanchenhi* ‘complete’:

- (47) cip-i ppalkah-ta / *wanchenha-ta
 house-NOM red-DEC / complete-DEC
 ‘The house is red / *complete.’

In order to serve as a predicate *wanchenha* ‘complete’ requires an event nominal as its predication subject, as in *kyey hoyk-i wanchenha-ta* ‘the project is complete.’ This shows that ‘completely’ in (45) is an adverb and not a predicate.

Of course, without coordination both structures work:

- (48) a. kang-i tantanha-key ppalli el-ess-ta
 river-NOM solid-ADV quickly freeze-PAST-DEC
 ‘The river quickly froze solid.’
 b. Kim-un cip-ul ppalkah-key wanchenhi chilha-ess-ta
 Kim-NOM house-ACC red-COMP completely paint-PAST-DEC
 ‘Kim painted the house red completely.’

In (48)b ‘red’ is a secondary predicate on ‘house’ and ‘completely’ is an adverb modifying a verbal projection (the verb or perhaps the whole VP).

In conclusion, some *key*-marked items are clearly adverbial (even when a resultative sort of meaning seems to be entailed) while others are just as clearly secondary predicates.

4.3. Selectional restrictions on resultative predicates in Korean.

Like English verbs, Korean verbs impose semantic sortal restrictions on their resultative predicates. And as in English, the corresponding Korean clausal resultatives are freer. In (49)a the verb *twutulki* ‘hammer’ rejects the predicate *alumtap-key* ‘beautiful’. But a semantically similar subordinate clause is permitted, as shown in (49)b:

- (49) a. Tom-un kumsok-ul {napcakha / maykkulep / *alumtap}-key
 Tom-TOP metal-ACC {flat / smooth / *beautiful}-COMP
 twutulki-ess-ta.
 hammer-PAST-DEC
 ‘Tom hammered the metal flat / smooth / *beautiful.’
- b. Tom-un kumsok-ul [ticain-i alumtap-key] twutulki-ess-ta.
 Tom-TOP metal-ACC designs-NOM beautiful-COMP hammer-PAST-DEC
 ‘Tom hammered the metal so that the designs (on the metal) were beautiful.’
- (50) a. Tom-un thakca-lul {kkaykkesha / malu / *penciluluha}-key
 Tom-TOP table-ACC {clean / dry / *shiny}-COMP
 takk-ass-ta
 wipe-PAST-DEC
 ‘Tom wiped the table clean /dry / shiny.’
- b. Tom-un thakca-lul [phyomyen-i penciluluha-key] takk-ass-ta
 Tom-TOP table-ACC surface-NOM shine-COMP wipe-PAST-DEC
 ‘Tom wiped the table until the surface was shiny.’

Similar comments apply to (50). The comparison between Korean predicates and clauses is drawn further in Section 5.1 below.

On this topic the work of Ryuichi Washio (1997a; 1997b; 1997c; to appear) should be mentioned. Washio argues that Korean and Japanese place much tighter selectional restrictions on resultative predicates than does English. Specifically, he suggests that Korean and Japanese resultative phrases must have meanings which are closely related to the matrix verb meaning (‘weak resultatives’, in Washio’s terminology) while English also allows those in which ‘the meaning of the verb and the meaning of the adjective are completely independent of each other’ (Washio, 1997c, p. 7) (‘strong resultatives’). On Washio’s view English resultative *predicates* are split between weak and strong, while English *ECM* resultatives are always strong. Note incidently that the observation that selection for predicates is stricter than for ECM is somewhat similar to that of Wechsler (1997b) and Section 2 above, although arrived at independently. Like us, Washio attributes this difference to the fact that predicates are arguments while ECM complements are not. Washio’s idea is to deduce the absence of ECM resultatives in Korean and Japanese from the absence of all strong resultatives in that language.

Washio's claim that Korean and Japanese are significantly stricter than English in selection of resultatives is hard to assess on the basis of the data currently available. In some cases Korean actually appears to be less strict than English, as in (51):

- (51) a. Mary-nun meli-lul {ppalkah / yeppu / *cec}-key mwultuli-ess-ta.
 Mary-TOP hair-ACC {red / pretty / *wet}-COMP dye-PAST-DEC
 'Mary dyed (her) hair red/ pretty / *wet.'
- b. *Mary dyed her hair red/ *pretty / *wet.

Here the predicate *pretty* is disallowed in English, but the corresponding Korean is acceptable. Still, Washio's insights are valuable, and more cross-linguistic lexical comparison needs to be done.

4.4. A further constraint on Korean resultative predicates?

Resultative predicates in Korean are often excluded from agentless (i.e. so-called 'unaccusative') verbs:

- (52) a. *mwul-i malu-key kkulh-ess-ta.
 water-NOM dry-COMP boil-PAST-DEC
 'The water boiled dry.'
- b. *os-i kkaykkuska-key cec-ess-ta
 cloth-NOM clean-COMP wet-PAST-DEC
 'The cloth became wet, causing it to become clean.'
 (lit. 'The cloth wetted clean.')

Note that the English translation in (52)a is perfect. These failed attempts at resultative predication contrast with the acceptable ones in (30) above, all of which have clear agent arguments. When we form causatives from the verb roots in (52), then the sentences become acceptable:

- (53) a. Tom-un mwul-ul malu-key kkulh-i-ess-ta.
 Tom-TOP water-ACC dry-COMP boil-CAUS-PAST-DEC
 'Tom boiled the water dry.'
- b. Swuni-nun os-ul kkaykkushay-ci-key cec-si-ess-ta
 Swuni-TOP cloth-ACC clean-INCH-COMP wet-CAUS-PAST-DEC
 'Swuni soaked the cloth clean.'

The generalization appears to be that resultative predicates can only appear in construction with agentive verbs, that is, verbs with agent arguments. Example (41)

above ('The river froze solid') from (Kim, 1993) is an apparent exception to this generalization, but we argued above that 'solid' is an adverb rather than a predicate in this example.⁵ However, a full treatment of this apparent generalization remains for future research.⁶

5. Korean clausal resultatives.

5.1. The Clause-NP relation in Korean syntax.

While English tends to rely on secondary predication, usually the most natural way to express the resultative meaning in Korean is to use a subordinate clause. Some examples were given in (31) above, repeated here:

- (31) Clausal Resultatives
- a. ku-nun [sinpal-i talh-key] talli-ess-ta.
he-TOP shoes-NOM threadbare-COMP run-PAST-DEC
'He ran (his) shoes threadbare.'
 - b. Tom-un [pal-i aphu-key] talli-ess-ta.
Tom-TOP feet-NOM hurt-COMP run-PAST-DEC
'Tom ran until his feet hurt.'
 - c. Tom-un [pe-ka aphu-key] mek-ess-ta.
Tom-TOP stomach-NOM hurt-COMP eat-PAST-DEC
'Tom ate until his stomach hurt.'
 - d. Sandy-ka koki-lul [ppye-ka humwuleci-key] salm-ass-ta.
Sandy-NOM meat-ACC bone-NOM gelatinous-COMP boil-PAST-DEC
'Sandy boiled the meat (until) the bone became gelatinous.'
(from Kim and Maling, 1997, p. 193)
 - e. Tom-un [Mary-ka camtul-key] nolayha-yess-ta.
Tom-TOP Mary-NOM sleep-COMP sing-PAST-DEC
'Tom sang Mary to sleep.'

Some result clauses may be said to have a 'quasi-predicative' sort of interpretation, in the sense that the clause describes or characterizes one of the matrix participants. Examples are found in (31)a-d, but not (31)e. For example, in (31)b the property of having hurting feet, as expressed by the bracketed result clause, is specifically attributed to Tom. In

⁵It is interesting to note that German also disallows resultative secondary predicates with unaccusative verbs, according to Kaufmann (1995). However, Kaufmann (1995) further reports that the corresponding transitive causatives are also unacceptable in German—unlike the Korean examples in (53) above.

(31)d the property of having a gelatinous bone is attributed to the meat. *Mutatis mutandis* for (31)a and (31)c. Resultatives do not require this type of interpretation, however, as seen by (31)e, where Mary's sleep is not a property of Tom in any sense. This distinction between the quasi-predicative type and the others is drawn by Kim (1993, p. 472), who calls them Type II and Type III, respectively.

While the subordinate clause sometimes focusses on a particular matrix NP argument, it is clear that the syntactic mechanisms responsible for this semantic linkage between subordinate and main clause are entirely different from the ones involved in true predication. As noted above at the end of Section 2, these clausal resultatives are semantically connected to matrix arguments through anaphoric links. Unlike English, the Korean language has at its disposal a type of anaphora we will term *metonymic anaphora*. A metonymic (part-whole) or possession-possessor relation holds between some argument of the result clause ('shoes', 'feet', and 'stomach' in (31)a-c respectively) and some argument of the main clause ('he' and 'Tom'). Note that the English translations contain the word 'his' while no possessive pronoun appears in the Korean.

True predication, by contrast, involves an expression which is missing a structural subject (such an expression is called an *open complement, predicative phrase, etc.*). The verb, adjective, or other predicative word is unsaturated, that is, it has not yet combined with its subject argument. In contrast, the subordinate clauses are fully saturated: the subject and all other arguments determined by the head may be structurally present. The implicit anaphor within the clause need not be (and typically is not) the subject, but rather it is often a possessor of some argument.

Metonymic anaphora is occasionally found in English locutions such as *He hit me on the arm*, where *the arm* lacks the usual possessive pronoun but is nonetheless understood to be mine. But it is highly restricted in English, perhaps only to verbs such as 'hit' where the part entails the whole: 'He hit my arm' entails 'He hit me.' In contrast this process is very robust in Korean. For example it is the basis for the multiple nominative construction which has been much discussed in the literature on Korean case:

- (54) a. Mary-ka [nwun-i phwulu-ta]
 Mary-NOM eye-NOM blue-DEC
 'Mary has blue eyes.'
 lit. 'As for Mary, (her) eyes are blue.'
 (from Lee, 1994, p. 5)

⁶In particular, the so-called HI-passive and CI-passive must be studied in detail to see whether these allow resultatives.

- b. halapeci-kkeyse [yocum kenkang-i mwuchek
grandfather-NOM these.days health-NOM very

coh-u-si-ta].
good-EPEN-HON-DEC

‘Grandfather is very healthy these days.’
lit. ‘As for Grandfather, these days (his) health is very good.’
(from Lee, 1994, p. 23)

In each case we find a structure with a (bracketed) clause and an (underlined) NP, where the clause is interpreted as characterizing or describing the NP’s referent. This type of structure is a common feature of Korean syntax. Lee (1994) refers to this syntactic relation as a special type of ‘predication’, so the clause, for him, is ‘predicated’ of the NP (for him the case marking on the NP is thus a special ‘predication case’); but we will reserve the term predication for its more traditional sense, in which the predicate is unsaturated. In contrast the bracketed clauses in (54) are fully saturated: the head has combined with all of its arguments.

This clause-NP structure turns up in resultatives as a strategy for linking the result clause to the main clause in those instances where the result clause characterizes an argument of the main clause. The type of semantic relation needed for this structure is common for resultatives— that is, some particular matrix participant can typically be seen as affected by the result— but it is not a necessary feature of resultatives, as noted above (cp. (31)e). When the clause-NP relation does apply, one may ask whether there are any special syntactic constraints on which NP in the matrix can be involved. For example, in resultatives with a transitive matrix verb, can the result clause characterize a subject, object, or oblique? The null hypothesis is that there are no such constraints, and in fact we are not aware of any. The NP can be either a subject ((55)a), an object ((31)d above) or an oblique ((55)b,c), as noted by Kim and Maling (1997):

- (55) a. John-i [chim-i malu-key] Mary-lul chingchanha-ss-ta.
John-NOM tongue-NOM dry-COMP Mary-ACC praise-PAST-DEC
‘John praised Mary (until) his tongue became dry.’
- b. [Meli-ka ccwuppyese-key] koymul-i na-eykey takaw-ass-ta.
hair-NOM on.end-COMP monster-NOM I-DAT approach-PAST-DEC
‘A monster approached me (so that) my hair (became) on end.’

- c. Robin-i [tali-ka hwui-key] umsik-ul sang-ey ollyenoh-ass-ta.
 Robin-NOM legs-NOM bent-COMP food-ACC table-DAT pile-PAST-DEC
 ‘Robin piled food on the table (so that its) legs (became) bent.’

(from Kim and Maling, 1997, p. 193-194)

Kim and Maling (1997, p. 194) compare these Korean resultative *clauses* with English resultative *predicates*, and conclude that two constraints apply to English but not Korean: (i) the resultative expression cannot be predicated of an ‘external argument’ (i.e. the Direct Object Restriction, which was argued to be false in Section 2 above and in Wechsler (1997b)); and (ii) the resultative expression cannot be predicated of an oblique. The resultative is construed with an external argument in (55)a and a dative oblique in (55)b,c.

But if instead we compare Korean clauses with English clauses and Korean predicates with English predicates, then the two languages are identical. First consider the restriction against oblique predication subjects. For English this holds for all secondary predicates including both resultatives (56) and depictives (57) (Bresnan, 1982; Williams, 1980).

- (56) a. I presented it to John *dead*
 b. *I presented John with it *dead*.
- (57) a. They pound the metal *flat*
 b. They pound on the metal
 c. *They pound on the metal *flat*

(Wechsler (1997a) further shows that this restriction also applies to various locative PP’s not normally treated as predicates; i.e. the locatum argument cannot be oblique.) If we focus on secondary predicates, Korean resultative predicates are as restricted as their English counterparts. They cannot be predicated of obliques. The complement of the verb *call* ‘cut’ can take an accusative case particle as in (58)a or a postposition as in (58)b. Only the first allows a resultative predicate:

- (58) a. Mary-ka meli-lul (yeppu-key) call-ess-ta
 Mary-TOP hair-ACC pretty-COMP cut-PAST-DEC
 lit. ‘Mary cut (her) hair pretty.’
- b. Mary-ka meli-wyiese (*yeppu-key) call-ess-ta
 Mary-TOP hair-on pretty-COMP cut-PAST-DEC
 lit. ‘Mary cut (her) hair pretty.’

Dative goals are also impossible as predication subjects:

- (59) a. *John-i Mary-eykey senmwul-ul hangpokha-key cwu-ess-ta.
 John-NOM Mary-DAT present-ACC happy-COMP give-PAST-DEC
 ('John gave a present to Mary; as a result Mary was happy.')
- b. *John-i Mary-eykey mwusewun iyaki-lul kkamwulachi-key
 John-NOM Mary-DAT horror story-ACC fainted-COMP
 malhay-ess-ta.
 tell-PAST-DEC
 ('John told a horror story to Mary; as a result, Mary fainted.')
- c. *John-i Mary-eykey man-dalla swuphyo-lul pwuleweha-key
 John-NOM Mary-DAT 10,000-dollar check-ACC jealous-COMP
 poye cwu-ess-ta.
 show give-PAST-DEC
 ('John showed a \$10,000 check to Mary; as a result Mary became
 jealous.')

Following is another type of direct/oblique alternation. When 'metal' is an oblique goal, resultative predication is impossible:

- (60) a. na-nun kumsok-ul napcakha-key twutulki-ess-ta
 I-TOP metal-ACC flat-COMP hammer-PAST-DEC
 'I hammered the metal flat.'
- b. na-nun kumsok-ey (*phenphenha-key) twutulki-ess-ta
 I-TOP metal-at flat-COMP hammer-PAST-DEC
 'I hammered (something on) the metal flat.'

Korean disallows depictive predication on obliques as well:

- (61) a. John-i koki-lul (nal-lo) mek-ess-ta
 John-NOM beef-ACC raw-as eat-PAST-DEC
 'John ate the beef (raw).'
- b. John-i koki-lo (*nal-ilo) mek-ess-ta
 John-NOM beef-with raw-as eat-PAST-DEC
 'John dined on beef (raw).'

Hence Korean and English secondary predicates both observe the same restriction against oblique predication subjects.

Now consider clausal resultatives. English clausal resultatives, like the Korean ones in (55)b,c, can be construed with oblique arguments, as shown by the acceptability of the English translations of the Korean sentences in (55)b,c.

- (62) a. A monster came up to me, so that my hair stood on end.
 b. Robin piled food on the table until its legs bent.

As for the purported restriction against ‘external arguments’, we believe that syntactic classification into ‘internal’ and ‘external’ arguments plays no role in this phenomenon, and instead adopt the semantic account in Wechsler (1997b), sketched in Section 2 above. As outlined in Section 2, the semantic conditions can be explained by assuming a merger of the semantic contents of matrix and result predicate. As far as we can tell, the same conditions apply in Korean. Attempts to predicate on an ‘agent’ argument, whether the subject of a transitive or intransitive verb, fail if the predicate does not meet the verb’s selectional restrictions ((63)b,c are from Kim, 1993):

- (63) a. *Mary-nun appu-key / pikonha-key talli-ess-ta.
 Mary-TOP sick-COMP / tired-COMP run-PAST-DEC
 (lit. ‘Mary ran sick/tired.’; i.e. Mary ran until she became sick/tired.)
 b. *Ku-nun appu-key kichimhay-ess-ta
 he-TOP sick-COMP cough-PAST-DEC
 (lit. ‘He coughed sick.’)
 c. *Ku-nun phikonha-key wus-ess-ta
 he-TOP tired-COMP laugh-PAST-DEC
 (lit. ‘He laughed tired.’)
 d. *ku-nun seongkongha-key / pwuca-lo ilha-ess-ta
 he-TOP success-COMP / rich-RES work-past-dec
 (lit. ‘He worked successful/rich.’)

The only apparent exceptions we have found turn out instead to be adverbs. In (64)a the agent-only (i.e. ‘unergative’) intransitive verb *talli* ‘run’ accepts the adjective *cichi* ‘exhausted’. But the coordination possibilities shown in (64)b-c suggest that it is an adverb and not a predicate:

- (64) a. ku-nun cichi-key talli-ess-ta
 he-TOP exhausted-ADV run-PAST-DEC
 lit. ‘He ran exhausted.’

- b. ku-nun cichi-key kuliko pall-i talli-ess-ta
 he-TOP exhausted-ADV and fast-ADV run-PAST-DEC
 lit. 'He ran exhausted and fast.'
- c. ku-nun pall-i kuliko cichi-key talli-ess-ta
 he-TOP fast-ADV and exhausted-ADV run-PAST-DEC
 lit. 'He ran fast and exhausted.'

Nor is this interpretation of *cichi-key* 'exhausted' specific to the verb 'run'.

- (65) a. ku-nun cichi-key kuliko yelsimhi chwumchwu-ess-ta
 he-TOP exhausted-ADV and hard dance-PAST-DEC
 lit. 'He danced exhausted and hard.'
- b. ku-nun cichi-key kuliko yelsimhi kongpwuha-ess-ta
 he-TOP exhausted-ADV and hard study-PAST-DEC
 lit. 'He studies exhausted and hard.'
- c. ku-nun kunmyenha-key kuliko cichi-key ilha-ess-ta
 he-TOP diligently-ADV and exhausted-ADV work-PAST-DEC
 lit. 'He worked diligently and exhausted.'

In conclusion, the differences between Korean and English resultatives have nothing to do with the DOR and are almost entirely explicable in terms of independently attested differences between the syntactic systems of the two languages. Predicative and clausal resultatives are found in both languages (although the former type is perhaps more prevalent in English), and each type has similar properties across the two languages.

One question which has not been investigated in detail is how the Korean resultative and matrix clauses are semantically composed. Recall the proposal (section 2.2 above) that English ECM resultatives fill the result state (BECOME) argument slot of the matrix verb, while clausal resultatives do not (compare (23) and (26) above). Since Korean clausal resultative constructions do not involve argument-sharing, they could in principle pattern with either English ECM constructions (which fill the BECOME argument) or subordinate clauses (which do not). Kim and Maling (1997) provide some evidence that the Korean clause does fill the BECOME argument. They note the contrast between clausal resultatives of the sort we have been discussing, and a different construction using *-ese* 'so that' (examples from Kim and Maling, 1997, p. 194-195):

- (66) a. *Hoswu-ka [koki-ka cwuk-key] el-ess-ta.
 lake-NOM fish-NOM dead-COMP freeze-PAST-DEC
 ('The lake froze; as a result the fish died.')
- (lit. 'The lake froze the fish dead.')

- b. [Hoswu-ka el-ese] koki-ka cwuk-ess-ta.
lake-NOM freeze-CAUS fish-NOM die-PAST-DEC
'The fish died because the lake froze.'
- c. Hoswu-ka [phyomyen-i tantanha-key] el-ess-ta.
lake-NOM surface-NOM solid-COMP freeze-PAST-DEC
lit. 'The lake froze (its) surface solid.'

Applying the same reasoning used in Section 2.2 we can explain this contrast by assuming that a clausal resultative such as (66)a fills the result state argument of the verb while the adverbial *-ese* clause as in (66)b does not. The verb *el-* 'freeze' has an obligatory result state, namely the frozen state of the theme participant, so (66)c is acceptable but other results such as the death of fish are not. In contrast, the adverbial adjunct marked by *-ese* as in (66)b does not fill the BECOME argument, so it is semantically unrestricted. Hence the Korean contrast in (66) is analogous to the English contrast in (67):

- (67) a. *The lake froze the fish dead. (ECM)
b. The lake froze; consequently the fish died. (clause)

The crucial property of the verb 'freeze' is that its result selection is obligatory and semantically restricted. Many of the verbs in the earlier examples in both English and Korean (e.g. 'yell') allow optional BECOME arguments but place no semantic restrictions on the argument filler. Our tentative proposal then is that Korean clausal resultatives, like English ECM resultatives, involve no argument-sharing but fill the matrix verb's result state argument. However, more data must be investigated before we can reach this conclusion with certainty.

5.2. Noun incorporation.

The illusion of difference between English and Korean resultatives is compounded by a process of noun incorporation which is found in Korean but not English (Noh, 1998). The two sentences in (68) could both be translated as 'He shouted himself hoarse.' (68) uses the bracketed clausal resultative *mok-i aphu-key*. In (68)b we see that *mok* 'throat' and *aphu* 'sick' have formed the compound *mok-aphu* 'hoarse.'

- (68) a. ku-nun [mok-i aphu-key] yoichi-ess-ta
he-TOP throat-NOM sick-COMP shout-PAST-DEC
lit. 'He shouted [(his) throat sick].'

- b. ku-nun mok-aphu-key yoichi-ess-ta
 he-TOP throat-sick-COMP shout-PAST-DEC
 lit. 'He shouted hoarse.'

The form *mok-aphu* in (68)b appears to be a single word, since it lacks the nominative case marker and also has word-like prosody. Also, while an adverb modifying the adjective can intervene between the NP and adjective in the analytic form in (68)a, it cannot do so with the synthetic form in (68)b.

- (69) a. mok-i mopsi aphu-key
 throat-NOM very sick-COMP
 b. *mok-mopsi-aphu
 throat-very-sick

This incorporation process is not fully productive, although many lexicalized examples can be found. Following are more examples:

- (70) a. ku-nun [ttam-i na-key] talli-ess-ta
 he-TOP sweat-NOM come.off-COMP run-PAST-DEC
 'He ran until the sweat came off.'
 b. ku-nun ttam-na-key talli-ess-ta
 he-TOP sweat-come.off-COMP run-PAST-DEC
 'He ran himself sweaty'.
 (71) a. ku-nun [swum-i cha-key] chwumchwu-ess-ta
 he-TOP breath-NOM full-COMP dance-PAST-DEC
 lit. 'He danced (his) breath full.', i.e.
 'He danced himself breathless.'
 b. ku-nun swum-cha-key chwumchwu-ess-ta
 he-TOP breath-full-COMP dance-PAST-DEC
 'He danced himself breathless.'

We assume that the incorporated forms *mokaphu* 'hoarse' (throat+sick), *ttamna* 'sweaty' (sweat+come.off), and *swumcha* 'breathless' (breath+full) are formed in the lexicon. But semantically they resemble the subordinate clauses to which they are clearly related. In other words, these are clausal and not predicative resultatives. The predication is occurring sublexically: for example, in *mok-aphu* the predicate is *aphu* 'sick' and its predication subject is *mok* 'throat'. Hence the compound *mok-aphu-key* is not a predicate but rather a fully saturated one-word subordinate clause, analogous to the analytic variant *mok-i aphu-key*. This explains why examples (68)b, (70)b, and (71)b are acceptable, in contrast to the corresponding English examples:

- (72) a. *He shouted hoarse.
b. *He ran sweaty.
c. *He danced breathless.

As explained in Section 2 above, these English examples are unacceptable because result predicates must be semantically selected by the matrix verb and these do not meet those selectional requirements. (Specifically, ‘shout’ does not select anything at all; ‘ran’ and ‘danced’ both optionally select locative results.) Let us assume for the sake of argument that the same selectional restrictions apply in Korean. Since *mokaphu* ‘hoarse’ (throat+sick), *ttamna* ‘sweaty’ (sweat+come.off), and *swumcha* ‘breathless’ (breath+full) are not predicates but rather clauses, the Korean examples are acceptable, like their English ECM and clausal counterparts: *He shouted himself hoarse*; *He shouted until he was hoarse*; and so on.

6. Conclusion.

In this paper we have contrasted two main mechanisms for linking cause-denoting expressions to result-denoting expressions: secondary predication and anaphora. In predication, the resultative expression is unsaturated, and is interpreted as a property of some argument of the causal clause. Alternatively, the resultative expression can be a fully saturated clause, linked to the cause-denoting clause through pronominal, event, or metonymic anaphora. We have argued that the mechanism of semantic composition differs substantially in the two respective cases. Only in secondary predication are the ‘argument structures’ of the two expressions merged: specifically, the predicate’s semantic content unifies with the value specified by the causing predicate for its result state. From this argument satisfaction follow the semantically based selectional restrictions imposed by the causing verb. The English ECM construction represents a mixture of the predicative and clausal types. Since it parallels the predicative type in its syntactic structure, it also combines with the causal clause through argument structure composition. But since there is no argument-sharing, there are little if any semantic selectional restrictions imposed by the verb. Hence the content supplied by the resultative expression fills the result state argument slot of the verb, but semantic selectional restrictions do not apply.

This analysis has important syntactic consequences. It explains the predication patterns which were previously thought to motivate the Direct Object Restriction (and accounts for the exceptions to the DOR); and it explains why verbs with inherent result states do not allow ECM resultatives. Moreover, drawing this distinction between

predicative and anaphoric composition allows a clearer comparison of the resultative construction across languages. English and Korean turn out to be somewhat more similar than previously thought. The key difference between the two languages is simply that English tends to use secondary predication where Korean prefers clausal subordination. Whatever the explanation for this difference, it is a rather salient and learnable aspect of the respective grammars. On the other hand, the properties of predication and clausal subordination are similar across the two languages. Thus there seems to be no justification for parameterizing syntactic constraints such as the DOR. Such parameter settings would be difficult for speakers to learn.

In closing, we should emphasize that this is a preliminary study only. For example, we have focussed on the properties of secondary predicates which distinguish them from clausal resultatives, but we have not fully investigated whether there may be other restrictions on clausal resultatives. Also this theory must be tested more thoroughly not only on Korean and English but other languages whose resultative constructions appear to differ from those of English (see Kim and Maling (1997) and references cited there on resultatives in several languages). We hope to have provided some new tools for future cross-linguistic comparison.

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