

The author explores the issue onto the agenda:
Predictivity vs. Stipulativity in the Lexicon

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1 Introduction

The question of the structure of the lexicon has become the focus of much linguistic research in recent years. Emphasis has been placed on capturing *generalizations* about the behaviour of words, in terms of e.g. semantic properties and syntactic patterning. Linking theories (Dowty 1991, Davis 1995, *inter alia*), for example, concentrate on identifying principles which govern the surface realization of semantic arguments, and Pustejovsky's Generative Lexicon framework (Pustejovsky 1991, 1995) attempts to explain variations in the interpretation of a word on the basis of systematic interactions between rich lexical semantic structures. It is important to identify regularities where they exist, in order to account for predictivity and systematicity in language use, and to provide a basis for natural language processing systems which efficiently accommodate the flexibility of word use.

However, I will argue in this paper that the capture of syntactic and semantic generalizations about word use must be balanced with the need to accurately reflect individual word usage. That is, *idiosyncrasies* associated with word use must be recorded in the lexicon in addition to any generalizations, in order to explain particular interpretations of a word in specific contexts. I will show that the decision of what information to associate with a word does not solely depend on the identification of rules and exceptions to those rules, but is also influenced by pragmatic reasoning. An important implication of this for lexicon construction is that the interaction of distinct knowledge sources in language understanding can influence what information must be explicitly represented in the lexicon, and the level of generality of lexical regularities.

I will focus on the phenomenon of the *resultative construction* to illustrate why a balance must be struck between stipulative (word-specific) and predictive information in the lexicon, and how context can influence this balance. I will furthermore introduce an analysis of the resultative construction, combining elements of the Construction Grammar approach to resultatives (Goldberg 1995) with pragmatic reasoning, which addresses both the predictivity and the stipulativity of this phenomenon. The approach I follow suggests that an acknowledgement of the influence of lexical conventionalisation and pragmatic reasoning on interpretation can lead to models which provide a fuller account of the resultative data.

2 The Resultative Construction

The resultative construction is composed of a verb plus its arguments and an additional unsubcategory phrase (either an adjective phrase [AP] or a prepositional phrase [PP]) which expresses a result state of the event expressed by the verb. This result state is predicated of one of the verbal arguments, or in some cases of an unsubcategory noun phrase [NP] which is also inserted (1c). Examples of the construction appear in (1).¹ For the purposes of this paper, I will restrict my discussion to what have been called “unergative” resultative constructions, in which a transitive or intransitive verb is followed

¹My annotations: italics indicate an argument of the main verb which is also the subject of the resultative predicate; underlining indicates something that is not an argument of the main verb, but which is the subject of the resultative predicate. Additionally, in what follows I use a ‘*’ to indicate ungrammatical sentences, ‘#’ to indicate pragmatically infelicitous sentences, and ‘?’ to indicate sentences of questionable grammaticality.

by an overt NP and a result phrase.² (Verspoor 1997)

- (1) a. John hammered *the metal* flat.
b. John sneezed the tissue off the table.
c. John laughed himself silly.

2.1 Predictivity of Resultatives

In this section, I will show that instances of the resultative construction display strict uniformity. Their syntactic form does not vary, and there is a clear syntax to semantics mapping associated with the construction, so that verbs appearing in this construction take on a very specific meaning. I will argue below that this meaning cannot follow from purely compositional interpretation, and that this implies that the resultative construction must be considered a special form-meaning pair which must be explicitly licensed in the grammar of a language.³ As such, it reflects a generalization about a particular set of sentences licensed by a language. The existence of this generalization suggests predictivity: any set of words satisfying the syntactic constraints of this construction should be interpretable with the meaning corresponding to the construction.

2.1.1 Syntactic form

One of the most salient properties of the resultative construction is its fixed form. The form, and its associated variations, are summarised in (2).

- (2) **NP_{subject} V NP_{controlled} ResP**
- a. NP_{controlled} is the object of a transitive verb (as in (1a))
b. NP_{controlled} is neither subcategorised by V nor a fake reflexive (as in (1b))
c. NP_{controlled} is a fake reflexive, coindexed with the subject NP_{subject}, and V is an unergative intransitive (as in (1c))

There seem to be no valid instances of this construction which vary from this syntactic pattern (this point is also argued by Jackendoff 1990). The sentences in (3) show that the post-verbal NP must be present in order for the resultative construction to be felicitous, while those in (4) show that for intransitive verbs the presence of the post-verbal NP is normally ungrammatical and uninterpretable. Hence the post-verbal NP and the resultative phrase are co-dependent: one cannot be added to a verb's subcategorisation frame without the other.

- (3) a. *John laughed silly. (cf. *John laughed*)
b. *John hammered flat. (cf. *John hammered*, *John hammered the metal*)
c. *John sneezed off the table. (cf. *John sneezed*)
- (4) a. *John laughed himself.
b. *John sneezed the tissue.

Furthermore, the position of the resultative phrase is fixed relative to adjuncts, as shown by (5)-(6) (assuming readings in which the locational prepositional phrases are verbal modifiers rather than noun modifiers). The resultative phrase can therefore not be accommodated by the same mechanisms as standard adverbial modifiers (as done by Wechsler 1996). Similarly, sentences such as (7a-b) which correspond roughly to the resultative construction yet express that the subject rather than the object undergoes a change, are infelicitous. Sentence (7c) in which the event which resulted in death is phrasal (*drank beer*) is also not grammatical. So even minor variations in the surface form of this construction result in ungrammaticality.

- (5) a. John hammered *the metal* flat in the workshop.
b. *John hammered *the metal* in the workshop flat.

²For a discussion of the “unaccusative” resultative constructions (e.g. *The river froze solid*) and in particular manner of motion verbs in that construction (e.g. *John danced to the window*), please see Verspoor (1997). It is argued there that these instances of the construction are not truly resultative and require a distinct treatment.

³I will avoid cross-linguistic discussion in this paper, concentrating on English resultative construction data.

- c. *John hammered in the workshop *the metal* flat.
- (6)
- a. John laughed himself silly on Saturday evening.
 - b. *John laughed himself on Saturday evening silly.
 - c. *John laughed on Saturday evening himself silly.
- (7)
- a. **John* played (cards) broke.
 - b. **John* drank beer to death. (cf. *John drank himself to death*)
 - c. **John* drank beer himself to death.

2.1.2 Semantics

The consistency of the interpretations assigned to the resultative construction, despite the varying syntactic relations between the verbal head and the other constituents of the sentence as outlined in (2), is also striking. Every variation of the construction, in terms of the syntactic relations between the components and the type of resultative phrase, conveys an essentially equivalent underlying meaning. I summarise these in (8).

- (8)
- a. NP_{controlled} is the object of a transitive verb
 - i. John heated *the water* to boiling. [PP]
John caused the water to be boiling by John heating it.
 - ii. John hammered *the metal* flat. [AP]
John caused the metal to be flat by John hammering it.
 - b. NP_{controlled} is neither subcategorised by V nor a fake reflexive (V intransitive)
 - i. John sneezed the tissue off the table. [PP]
John caused the tissue to be off the table by John sneezing.
 - ii. John ran his Nikes threadbare. [AP]
John caused his Nikes to be threadbare by John running.
 - c. NP_{controlled} is a fake reflexive, coindexed with the subject NP_{subject} (V intransitive)
 - i. John cried himself to sleep. [PP]
John caused himself to be asleep by John crying.
 - ii. John laughed himself sore. [AP]
John caused himself to be sore by John laughing.

In each case, the instantiation of the resultative construction expresses a causative change of state which might be paraphrased as follows:

- (9) NP_{subject} cause NP_{controlled} to be in Result State by NP_{subject} V-ing

The question raised by this semantics is, where does the causative interpretation of resultatives come from? Levin and Rappaport Hovav (1995) suggest that it derives from the change in telicity from a process to an accomplishment which occurs in the interpretation of events expressed as resultatives. I will show, however, that a change of state is not necessarily causative and that telicity is therefore insufficient for explaining the specific interpretation of resultatives. What will become clear is that this interpretation does not seem to follow directly from a compositional analysis of the semantics of the resultative construction, and that it must therefore derive from a fixed form-meaning correspondence.

The inadequacy of a compositional analysis for explaining the interpretation of resultatives becomes evident when resultatives are considered in contrast to directed uses of manner of motion verbs. Let us consider two similar examples. (10) is a directed manner of motion construction and (11) is a change-of-state resultative involving the same verb.

(10) John walked to the store.

(11) John walked his feet sore.

Both of these sentences express a change of state — in (10) of John to the location of the store and in (11) of John's feet to the state of being sore — yet in (10) the change of state is not directly caused by John (it is instead merely an inference following from the association of an endpoint with the walking event), while in (11) it is. This difference is quite subtle, but is more obvious in cases in which the

causation component required in the resultative construction is incompatible with the meaning of the verb, and which are as a result infelicitous.

The problem can be seen clearly in comparison with a set of sentences for a non-agentive verb, as in (12)-(13).

(12) The bottle floated to the bridge.

(13) ??The bottle floated itself broken.

The interpretation of (12) as would be predicted under a compositional analysis assuming that a change of state implies causation is something like *The bottle's floating caused it to be at the bridge*, and that of (13) is *The bottle's floating caused it to be broken*. These two sentences seemingly should be equally felicitous on these interpretations, but are not. I suggest that this is due to the association of different interpretations with these two constructions: (12) actually means *The bottle is at the bridge as a result of it floating* while (13) should mean *The bottle caused itself to be broken by floating*. The resultative construction expresses a relation of causation between the event in the main clause (headed by the verb) and the state expressed by the resultative phrase, in which the subject of the main verb must be interpreted as the *causer*. This is in contrast to other change-of-state constructions which do not express a causative relation.⁴

A verb which instantiates the resultative construction, then, must be compatible with a causative interpretation. As the interpretation of (13) as dictated by the construction is pragmatically incompatible with the specifics of bottles and floating (how can a bottle floating cause breakage?), the sentence as a whole is infelicitous. On the other hand, the interpretation of (11) as *John caused his feet to be sore by (John) walking* is perfectly felicitous. This causation is a necessary component of the meaning of the resultative — if the semantics of a particular verb or verb/argument phrase are incompatible with that meaning, the construction is infelicitous — and does not simply derive in the fact that it expresses a change of state.

It could be argued that what is reflected by this data is not a causativity relation but rather a volitionality constraint which applies to the resultative construction but not to directed manner of motion constructions. The non-volitionality of bottles with respect to floating (13), etc. could then explain the infelicity of these events in the resultative construction. However, consider the data in (14)-(16) below.

(14) John cried himself to sleep.

(15) John laughed tomato soup up his nose.⁵

(16) The ball squashed *the tin* flat.

In (14) and (15), *John* is not volitional with respect to the crying or the laughing (if he were volitional, it should make sense to say *#John accidentally cried/laughed* but it does not) yet he does instigate a change of state to the state expressed in the resultative phrase by being the agent of the event which leads to the change of state and therefore causes the change of state. Similarly in (16) the agent of the main event which causes the change of state is clearly non-volitional, as it is inanimate.

The difference in interpretation between these two kinds of constructions becomes even more clear if we consider a verb which seems to be possible in both the manner of motion construction and the resultative construction, as in (17).⁶

(17) a. The clowns swung apart.

b. The clowns swung themselves apart.

The interpretations of these sentences are closely related, and in fact the meaning of (17a) is entailed by the meaning of (17b). The latter conveys the meaning of the former, with the additional suggestion that the clowns are actively swinging in such a way that they end up apart. That is, (17b) means *The clowns cause themselves to be apart by swinging*, and (17a) simply means *The clowns are apart as a result of their swinging*. Intuitively the resultative construction conveys a certain meaning which the manner of motion sentence does not. The former could be used in a context, such as (18), in which the clowns are not agentive with respect to the swinging, and can therefore not be construed as *causers*, while the latter cannot.

⁴This difference in meaning is also implicit in the analyses Jackendoff (1990, ch. 10) gives of resultative constructions and of manner of motion verbs.

⁵This example is a modified version of a sentence spoken by Henry Thompson at lunch on 17/4/97: "Make me laugh hot tomato soup up my nose and you'll regret it." Thanks to Claire Grover for spotting it and passing it on.

⁶Thanks to Joan Maling for the suggestion of this example.

- (18) The director pulled the puppet strings and
- a. the clowns swung apart.
 - b. #the clowns swung themselves apart.

Consider also the contrast in (19).

- (19) a. The clowns swung over the net.
 b. The clowns swung themselves over the net.

(19a) is highly ambiguous due to the nature of *over*: the PP could be expressing either the location of the swinging event, a point on or the direction of the path along which the swinging occurs, or a result phrase. On the other hand, (19b) is not ambiguous. The PP in that case can only be interpreted as a result phrase.

The element of causation conveyed by the resultative construction cannot be derived solely from the constituents of the sentence: a causative element of meaning arises, seemingly without explanation. The parallel directed manner of motion sentences have essentially the same components as the resultatives — both constructions involve a result state or location being predicated of the referent of a noun phrase, and the structures are similar — yet the meanings of the two constructions differ. As a result, the meaning of the resultative construction does not seem to lend itself to a solely compositional treatment. The explanation which I would like to put forward (following Goldberg 1995) is that this meaning comes directly from the semantics of the *construction* in which the words appear.

2.2 Stipulativity of Resultatives

Despite the consistency of both the syntactic form and the interpretation of resultatives, the resultative construction is actually a highly idiosyncratic phenomenon. Certain resultative phrases occur with great frequency with a range of verbs, suggesting that the sentences in which they appear are examples of a productive phenomenon. However, these examples are in fact instances of semantically restricted conventionalised phrases which constrain the productivity, and reduce the predictivity, of the resultative construction. Consider the data in (20)-(21).

- (20) a. i. He laughed himself to death.
 ii. *He laughed himself dead.
 b. i. He laughed himself to sleep.
 ii. *He laughed himself sleepy/asleep.
 c. i. He laughed himself out of a job.
 ii. *He laughed himself jobless/unemployed.
 iii. *He laughed himself out of the room/down the hall.
 d. i. He laughed himself silly.
 ii. He laughed himself faint/dizzy.
 iii?? He laughed himself tired.
 e. i. They laughed John out of the room.
 ii. #They tittered John out of the room.
 iii.# They laughed John into the room/down the hall.
 iv.# They insulted John out of the room.
- (21) a. i. He danced himself to fame.
 ii. *He danced himself famous.
 b. i. He danced his feet sore.
 ii. *He danced his feet to soreness.
 iii. ?He danced himself sore.
 iv. *He danced himself crippled.

On the basis of these examples, it can be concluded that there are clearly specific lexical and semantic constraints on the resultative construction which must be identified and incorporated into any treatment which hopes to achieve a complete model of the construction.

Even minor variations in some component of a felicitous resultative construction results in an infelicitous instance. The variations displayed in (20a-b) and (21a) are straightforward syntactic substitutions, where the resultative phrases have the same semantics but different syntactic form. Each variation conveys the same result state, yet they differ in grammaticality.

Semantic variations are equally problematic. In (20c-e) and (21b), resultative phrases are exchanged for syntactically identical but semantically distinct, albeit closely related, phrases of the same syntactic type, a verb is interchanged with a semantically related verb, or a reflexive of one sort is exchanged for another reflexive, and each variation results in infelicity.

The idiosyncratic nature of these constructions suggests that an analysis of resultatives which focuses solely on syntactic constraints or solely on semantic constraints is inadequate to fully account for their behaviour. Furthermore, it is difficult to imagine on what basis such constraints might be defined, given the subtlety and apparent unsystematicity of the variations which result in infelicity of these constructions, as evidenced by the examples here. So how might the restrictions on the productivity of this construction be explained? The conventionality of the resultative construction must be acknowledged. Certain uses of the resultative construction seem to be restricted solely on the basis of partially lexicalised instances of the resultative construction, which, like idioms, allow little variation in their component parts. Thus some mechanism for encoding conventional constraints is needed. That is, *stipulativity* must play a role in lexicon design — the idiosyncratic uses of individual words in particular constructions must be recorded.

3 Current Analyses of the Resultative Construction

We have identified several properties of the resultative construction. They can be summarised as follows:

- The construction has a fixed syntactic form.
- This form holds irrespective of the standard subcategorization of the main verb in the construction.
- The construction has a fixed interpretation.
- The interpretation of the construction does not seem to follow directly from compositional processes.
- Many potential instantiations of the construction are infelicitous.

Any valid model of the resultative construction must accommodate each of these properties. The first four points involve the predictivity of the phenomenon, while the last point highlights that there is as well a stipulative aspect which must be taken into consideration.

I will briefly introduce three current analyses of the resultative construction, and will evaluate them with respect to their coverage of the data and their demands on the lexicon. Note that the first two of these analyses lump resultatives with directed manner of motion verbs, and therefore aim to cover a wider range of data with a single analysis. See Verspoor (1997) for a critique of those approaches.

3.1 Levin and Rappaport Hovav (1995)

The Levin and Rappaport Hovav (1995) (L&RH) analysis of resultatives is primarily a syntactic analysis, which is based on the restriction in (22).

- (22) **Direct Object Restriction (DOR):** a resultative phrase may be predicated only of an immediately postverbal NP, not of a subject or of an oblique complement.

According to this constraint, unergative (intransitive) verbs with no underlying object and hence no immediately postverbal NP require a “fake reflexive” (an NP co-indexed with the subject) or some other NP to be inserted into postverbal position, to introduce something which the resultative can predicate (1d). Transitive verbs, on the other hand, have an overt postverbal NP and unaccusatives have an underlying object (which moves to subject position due to syntactic constraints) and so these verbs have (underlying) direct objects which the resultative can predicate (1a-b). The implication of this treatment of resultatives is that any verb which appears in what L&RH term the *unaccusative resultative*

construction, in which an intransitive verb is directly followed by a resultative phrase, must be treated as having unaccusative argument structure in order to account for the felicity of the verb in a resultative construction without a postverbal NP and their infelicity in this construction with a postverbal NP. The verbs in (23)-(25) must therefore all be given an unaccusative analysis.

- (23) a. *They* slowly swam apart. [L&RH (5.15b)]
 b. *They slowly themselves swam apart.
- (24) a. *The refrigerator* door clicked open. [L&RH (5.27a)]
 b. *The refrigerator door clicked itself open.
- (25) a. *The prisoners* froze to death. [L&RH (2.19b)]
 b. *The prisoners froze themselves to death.

The intransitive *freeze* is generally accepted to be unaccusative and therefore this behaviour is explained via the Direct Object Restriction, while *swim* and *click* are not. In the context of change-of-location resultatives, however, the manner of motion and sound emission verbs must be viewed as unaccusative in order for the DOR to hold. This is accomplished in the Levin and Rappaport Hovav (1995) account via a lexical rule applied to verbs of manner of motion (e.g. *swim*) and verbs of sound emission (e.g. *click*), to the exclusion of other verb classes, which adds a directional phrase requirement and shifts the lexical classification of the verb to be unaccusative. There will therefore be two lexical entries for *swim*: *swim*_{unerg} and *swim*_{unacc} + dirP. Note that the added directional phrase need not be one that makes the denoted eventuality telic, and that thus its addition is a syntactic rather than semantic specification.

The semantics which Levin and Rappaport Hovav attribute to this construction depends on the standard compositional analysis, including the assumption introduced above that a change of state implies causation.

The L&RH model concentrates on the syntactic structure of resultative constructions and does not involve lexical semantic features of individual words. Their treatment cannot account for the idiosyncrasies introduced in Section 2.2, as they do not make any distinctions on the basis of the *form* of the resultative phrase, and the *type* of the resultative (change of state or change of location) only affects the behaviour of the manner of motion verbs/verbs of sound emission and is therefore only an issue for these verbs. All other resultative constructions are seemingly allowed on their account, regardless of the form or type of the resultative phrase, as long as the Direct Object Restriction is satisfied.

3.2 Wechsler (1996)

I turn next to a more semantically-based analysis of resultative constructions, proposed by Wechsler (1996), in which the syntactic mechanisms are handled by HPSG (Pollard and Sag 1994) and the behaviour of different verbs with respect to the resultative construction depends on background information encoded in the lexical entries of the verbs.

Wechsler (1996) draws a distinction between types of resultative constructions which parallels the control/raising distinction for complement-taking verbs (see e.g. Pollard and Sag 1994, ch. 3). Wechsler argues that differences between the semantic restrictions that *control resultatives* impose on their complement resultative phrase and those that are imposed by *raising resultatives* can be used to account for the resultative data. He provides a formalisation of the distinction between these resultative types in HPSG, and shows how his analysis can be used to account for a range of resultative data.

Briefly, *control resultatives* are resultatives in which the resultative phrase is predicated of an argument of the main verb, (26), and *raising resultatives* are resultatives in which the resultative phrase is predicated of something which is not an argument of the main verb, (27).⁷

- (26) a. John hammered *the metal* flat.
 b. *Sally* jumped free of the car.
- (27) a. The joggers ran their Nikes threadbare.
 b. The audience laughed the speaker off the stage.

⁷This distinction corresponds to a binding difference in Jackendoff (1990)'s Resultative Adjunct rule: the patient role in the meaning expressed by the resultative phrase may be bound to the patient of the verb (a 'control' resultative) but need not be (a 'raising' resultative).

The main distinction between these two types of resultatives according to Wechsler’s analysis is that control resultatives place semantic restrictions on their complement resultative phrases, while raising resultatives do not. Specifically, the resultative predicate in a control resultative must express a “canonical or generic result (or intended result) of the action denoted by the verb” (Wechsler 1996, p. 2). The nature of this canonical result is encoded in the lexical semantics of the verb. The resultative phrase is required to unify with the encoded result through the mechanisms of the formalisation. In contrast, raising resultatives do not specify any canonical result or other specification in their lexical semantics and therefore do not constrain the kinds of resultative phrases they can appear with. This distinction is supported on the basis of data such as that in (28), which shows control resultatives to be acceptable only with result phrases that are compatible with the canonical result of the action expressed by the main verb, and (29), which shows that the result phrases appearing with raising resultatives do not need to have any connection to the meaning of the main verb.

- (28) a. *Robert* ran clear of the car/*exhausted. [Wechsler 1996, p. 2, (6a)]
 b. John hammered *the metal* flat/*safe. [Wechsler 1996, p. 2, (6c)]
- (29) a. Olof painted himself into a corner. [Wechsler 1996, p. 2, (7b)]
 b. We laughed ourselves silly. [Wechsler 1996, p. 2, (7d)]

Syntactic issues associated with the resultative construction are mainly handled by the mechanisms of HPSG of which Wechsler takes advantage, with the addition of a lexical rule which adds the non-argument NPs which serve as the subjects of resultative predicates in raising resultatives (the *Raising Rule*). This addition, in conjunction with the control/raising resultatives distinction, leads to an account of the appearance of fake reflexives for resultative constructions with many unergative intransitives, (30), in contrast with the lack of reflexives for other unergative intransitives, specifically the manner of motion verbs (31), which behave as control resultatives.

- (30) a. **The dog* barked hoarse. [Wechsler 1996, p. 4, (11a)]
 b. The dog barked itself hoarse. [Wechsler 1996, p. 4, (11b)]

(31) *John* ran to the store.

In (30a), Wechsler argues, hoarseness cannot be a canonical result of barking and thus this result state is compatible only with a raising use of *bark*. In this case, the Raising Rule is triggered and the requirement for a post-verbal NP is added. Semantic considerations will determine that the NP is token-identical (or co-indexed) with the subject, and syntactic constraints will ensure that it appears as a reflexive. In contrast, all manner of motion verbs optionally encode a location as their canonical result. Thus the result state in (31) is compatible with the canonical result of *running*, and so this is a control resultative which does not trigger the addition of any non-argument noun phrases. Instead the single argument of *run* is structure-shared with the subject of the resultative predicate through unification.

Wechsler’s model of the resultatives utilizes the control/raising distinction to account for some of the apparent idiosyncrasies of resultatives, as raising resultatives are subject to the semantic canonical result constraint. The intuition underlying his analysis, that there must exist a clear semantic relationship between the event expressed by the main verb and the state captured in the result phrase of a resultative, seems to be on-target, but his formalization of this intuition in terms of a “canonical end result” is flawed for several reasons which have been discussed elsewhere (see Verspoor 1997). To summarize that discussion, the problems with this approach are:

- A ‘canonical’ end result is difficult to pinpoint
 - For a single verb both change-of-state and change-of-location endpoints might be feasible (32), making it extremely difficult to specify a single end result for many verbs.
- (32) a. John hammered the nail into the wall.
 b. John hammered the board out of the window/off of the slide/onto the ground.
- Just as the previous example showed that a single assumed endpoint is often inadequate to account for the full range of possible felicitous uses of a verb in the resultative construction, there are examples where no encoded canonical end state can be made specific enough to account for context-specific restrictions because a distinct end result might be assumed for different situations described with a particular verb, as shown in the contrast between (33) and (34).

- (35) a. Caused Motion Construction, e.g. *John sneezed the tissue off the table.*

Sem	CAUSE-MOVE	<	cause	theme	goal	>
	↓		↓	⋮	⋮	
	PRED	<				>
	↓		↓	↓	↓	
Syn	V		SUBJ	OBJ	OBL	

- b. Resultative Construction, e.g. *John hammered the metal flat.*

Sem	CAUSE-BECOME	<	agt	pat	result-goal	>
	↓		↓	⋮	⋮	
	PRED	<				>
	↓		↓	↓	↓	
Syn	V		SUBJ	OBJ	OBL _{PP/AP}	

- (33) a. John hammered the metal flat/into a ball.

b. John hammered the fruit to a pulp.

- (34) a.?? John hammered the metal to a pulp.

b.?? John hammered the fruit flat/into a ball.

- The result phrases for raising resultatives do not appear to be completely semantically unrestricted.
- Fine-grained variations in acceptability displayed by the idiosyncratic resultative data cannot be easily accommodated under this proposal.

Furthermore, Wechsler’s proposal does not account adequately for the causative interpretation of resultatives in contrast to manner of motion verbs. What seems to be the case, then, is that Wechsler’s proposal of a lexically-encoded background constraint applicable to resultatives might be better captured at a different level of representation, specifically at the level of pragmatics. I will return to this in Section 4.

3.3 Goldberg (1995)

A third analysis of resultatives, proposed by Goldberg (1995), falls into the framework of Construction Grammar. The Construction Grammar approach assumes that form-meaning correspondences are the basic units of language. Within this framework, constructions exist independently of the particular words which instantiate them. Each construction has a specific syntactic configuration which is associated with a specific semantics — each construction specifies the semantic roles of different syntactic positions and relations between the roles, and the semantics of the words which appear in the construction must fuse with the semantics of the construction itself. This approach is similar in spirit to Jackendoff’s (1990, to appear) analysis of certain phenomena, including the resultative.

Goldberg (1995) isolates two distinct resultative constructions (cf. Jackendoff 1990): the *Caused Motion Construction*, and the *Resultative Construction*. The constructions and their specifications are summarised in (35), where OBL stands for *oblique*, solid lines between semantic roles and roles in the PREDICATE’s role array indicate that the semantic role must be fused with an *independently existing* verbal participant role, and roles represented in bold are *profiled* arguments — that is, entities in a verb’s semantics that are “obligatorily accessed and function as focal points within the scene, achieving a special degree of prominence (Langacker 1987)” (Goldberg 1995, p. 44).

The interpretations Goldberg associates with the constructions should be clear from the representations she postulates for them, as presented in (35), but can be summarised as in (36).

- (36) a. Caused Motion: NP_{subject} causes NP_{object} to move to Result Location

b. Resultative: NP_{subject} causes NP_{object} to become Result State

Each different construction, then, has a meaning independent of the others and therefore different thematic constraints. Furthermore, each has a meaning independent of the words which instantiate it. Instantiation-specific meanings result from the merging of the meaning of the construction with the

meaning of the main verb, which is seen as an instance of the main semantic relation (CAUSE-MOVE, MOVE, etc.) or as specifying the means by which that semantic relation is accomplished. For example, in *John hammered the metal flat*, *hammer* specifies the means by which the CAUSE-BECOME relation is achieved and so the meaning of this instantiation of the resultative construction is *John caused the metal to become flat by means of hammering*.

Goldberg (1995) also identifies general semantic constraints which help to account for the apparent idiosyncrasy of these constructions. These are summarised (37) below.

- (37) a. Constraints on the Caused Motion construction
1. The causer must be an agent or natural force (i.e. not an instrument).
 2. The caused motion along the path must be directly caused.⁸
- b. Constraints on the Resultative construction
1. The agent must be animate.
 2. The change of state must occur simultaneously with the endpoint of the action denoted by the verb.
 3. The resultative phrase codes a clearly delimited endpoint (is an end-of-scale adjective).
 4. The resultative phrase cannot be a deverbal adjective.

These constraints restrict the instantiation of the constructions. Thus the constraints in (37a) can be shown to account for the differences in (38)-(40); in particular via the agent/natural force constraint (38) and the constraint that the motion must be directly caused by the action (the motion in (39b) is secondary to the shooting and there is no obvious causation between laughing and causing someone to get into his car). Similarly the constraints in (37b) can account for the differences in (41)-(42): (41) due to the animate agent constraint and (42) due to the end-of-scale constraint.

- (38) a. The sound waves blasted the dust off the table.
 b. *The loudspeaker blasted the dust off the table.
- (39) a. Pat shot the bullet across the room.
 b. *Pat shot Sam across the room. (*unacceptable on the interpretation that Pat shot Sam and the bullet forced him across the room*)
- (40) a. They laughed the poor guy off the stage/out of the auditorium.
 b. ?They laughed the poor guy into his car.
- (41) a. She slept herself sober.
 b. *The feather tickled her silly.
- (42) a. He drank himself drunk/sick/dead.
 b. ?He drank himself a little sick.
 c. *He drank himself funny/happy.

Several of these constraints, however, could be explained by more general pragmatic principles which govern the use of these constructions. I would like to suggest that rather than assuming constraints on the semantics of the construction itself, it is preferable to assume that these constraints apply at the pragmatic level, to determine the felicity of the utterance within a discourse context, as the constraints derive from general pragmatic principles rather than construction-specific properties. A rich discourse context can improve the felicity of many of these sentences, as shown in (43) (cf. (40b)), indicating that hard semantic constraints are too restrictive and supporting the influence of pragmatics on the interpretation of resultatives.

- (43) a. John was having a bit of difficulty changing the flat tire on his car, when a group of his classmates drove by. These guys were rather macho and couldn't believe John couldn't manage to change a tire, and started teasing and tormenting him.
 b. *They laughed the poor guy into his car,*

⁸See Goldberg (1995) for further details about what it means for something to be directly caused. The notion is relevant here to the extent that pragmatics can play a role in determining direct causation.

- c. where he stayed until they finally offered to help him out.

Furthermore, the constraints as expressed by Goldberg are defeasible. Consider for example (44), in which the instrument of the causation is specified rather than the agent, in apparent violation of the constraint in (37a.1). Relevant world knowledge or an appropriate discourse can seemingly license violation of Goldberg's proposed constraints. This defeasibility is a typical property of pragmatic constraints, in contrast to semantic constraints which should not be dependent on pragmatic reasoning.

- (44) a. The feather excited her into a frenzy.
b. The work pushed him to the brink of insanity.

These observations then lead to a reinterpretation of the constraints on these constructions in terms of pragmatic principles. Grice's Maxim of Quantity (Grice 1975), for example, provides the basis for the direct causation constraint in (37a.2). This Maxim states (i) *make your contribution as informative as is required for the current purposes of the exchange* and (ii) *do not make your contribution more informative than is required*, that, for example, a speaker will not use a construction whose primary semantic content is caused motion along a path if he wishes to focus on an aspect of an event other than caused motion. Verbs which express a primary effect other than motion, like the sense of *shoot* in (39b), would therefore not be used in this construction. Thus I would argue that the direct causation constraint is actually nothing more than a restatement of this pragmatic principle, specified to the case of the Caused Motion construction. The other constraints in (37) (with the possible exception of (37b.4) which seems to be an idiosyncratic syntactic constraint) can similarly be argued to follow from the need to firmly establish the causal relation during pragmatic reasoning.

4 The role of Pragmatics

Pragmatics plays an important role in the felicity of resultative constructions. Discourse coherence is essential. This was observed by Simpson (1983), who suggested that only predicates consistent with a change of state can occur in the resultative construction. I suggest that this notion of a predicate's "consistency" with a change of state is relative to the discourse context in which the predicate appears. Thus the contrast between examples (20e.i) and (20e.iii), repeated here, can be explained on the basis of discourse coherence.

- (20e) i. They laughed John out of the room.
iii. #They laughed John into the room/down the hall.

The discourse must support a link between the cause and the effect expressed in the resultative construction. In the case of (20e.iii), there is no obvious way in which laughing at someone can cause that person to go into a room or down a hall, while it is more clear how the laughing can cause that person to go *out* of the room where people are laughing at him. This example also shows clearly that discourse coherence constraints interact with conventionality: there are certain cause-effect links which must be conventionalised in world knowledge.

Rather than assuming that these verbs specify a highly specific canonical result, as Wechsler (1996) might, it seems to make more sense to argue that the semantic restrictedness hinges in part on the requirement of establishing a causal relation between the main event expressed in the sentence and the result state. This enables us to account for sentences such as (45)-(46).

- (45) a. John hammered *the metal* flat/*safe/*red.
b. John hammered *the metal* into a triangle/smooth/shiny/into the ground.
(46) a. John chiseled *the ice* smooth/into a bird/onto the floor.
b. John chiseled *the ice* *cold/*shiny.

This requirement would also allow us to account for situations in which pragmatics could ameliorate a particular sentence. For example, in a context such as (47), the sentence (47c), infelicitous in a context-neutral environment (see (45a)), seems to be completely felicitous. Here the context allows us to establish a natural causal relation between hammering and the metal being safe. I will discuss this further below.

- (47) a. The slide at the park had a section which had come loose.
b. Several children had hurt themselves on the protruding edge.
c. In order to prevent further injuries, John hammered the metal safe.

5 The balance between predictivity and stipulativity

We have seen that the resultative data has both predictive and idiosyncratic aspects. We have also seen that previous proposals for the analysis of resultatives cannot fully and generally account for the range of this data. What I will propose is an account which acknowledges both the predictive and idiosyncratic aspects of resultatives at the lexical level, but which gives an important constraining role to pragmatics. The proposal builds on Goldberg’s Construction Grammar proposal and the observations made in the previous section.

5.1 Handling predictivity

I assume a construction corresponding to the form of the resultatives, with an associated causative change-of-state meaning. This construction defines a basic form-meaning correspondence in which potentially any verb can be used, and thereby captures the predictive aspects of resultatives.

Specifically, *Resultatives* are defined as sentences of the form [NP_{subject} V NP_{controlled} ResP] which have the associated meaning [NP_{subject} cause NP_{controlled} to be in Result State by NP_{subject} V-ing]. I propose to treat Resultatives in terms of a Construction Grammar construction, shown in (48). This construction captures the basic syntactic form of the relevant sentences. The basic semantics of these sentences is also reflected in this construction: NP_{subject} causes NP_{object} to change to the result location or state expressed in ResP. The main verb expresses how the causation is achieved, and its meaning is integrated into the semantics of the construction as a whole via merging between PRED and CAUSE-EFFECT.

(48)

Sem	CAUSE-EFFECT	<	cause	undergoer	goal	>
				⋮	⋮	
	PRED	<	↓	↓	↓	>
Syn	V		SUBJ	OBJ	OBL PP/AP	

5.2 Ruling out ungrammatical instances – handling stipulativity

The proposal made above introduces a mechanism for licensing resultative constructions and accounting for their semantics. As with any account of the resultative construction, this account must also include an explanation of the idiosyncrasy of the phenomenon.

5.2.1 Pragmatic Coherence

It is important to bring the issue of pragmatic felicity into the discussion of the resultative construction and the restrictions which there appear to be on its use. It seems clear from the previous discussion in this paper that a pragmatic constraint requiring a causal relation to be established between the main event expressed in the resultative construction and the result state must exist. This *pragmatic coherence constraint* alone can account for much of the apparent idiosyncrasy of this construction, such as the infelicity of the examples repeated below.

- (20e) i. They laughed John out of the room.
 iii. #They laughed John into the room/down the hall.
 iv. #They insulted John out of the room.
- (45a) John hammered *the metal* flat/*safe/*red.
- (41b) *The feather tickled her silly.
- (44a) The feather excited her into a frenzy.

Many constraints on the resultative construction appear to derive from general pragmatic principles. Grice’s Maxim of Relevance (Grice 1975) is a heuristic governing discourse coherence which suggests that each constituent in a discourse must be as relevant as possible to the current discourse context. In the case of the resultative construction, this heuristic can be taken to mean that a rhetorical connection must exist between the elements in the construction in order for them to be felicitously combined. This maxim can be viewed not just as a constraint on attachment of discourse constituents within a discourse

but also on the coherence of the semantics expressed by particular constructions, i.e. within a single constituent, and that the recruitment of this maxim to apply intra-sententially can help to explain the impact of pragmatics on the felicity of resultative constructions. This approach has been demonstrated as a useful strategy for modeling the interaction of pragmatic reasoning with lexical semantics in the cases of co-predication and coordination (Lascarides *et al.* 1996).

As the resultative construction essentially conveys a cause and effect relation between the event expressed by the main predicate and the resultative phrase, it must be possible to establish a rhetorical connection between the two components in order for the cause-effect relation to be coherent. The relevant rhetorical relation in this case is *Result* (Hobbs 1985, Polanyi 1985). This causal link must be established on the basis of world knowledge inferences and reasoning about information in the discourse. Sentences like (20e.iii.)-(20e.iv.) are therefore normally ruled out because the Result relation between the cause and the effect in each case (e.g. some people laughing and John going into a room) cannot easily be supported. I argue that in a highly specific context which establishes the Result relation, these sentences would be entirely felicitous as they would satisfy the Gricean Maxim of Relevance (Grice 1975).

Consider again the discourse presented in (47):

- (47) a. The slide at the park had a section which had come loose.
 b. Several children had hurt themselves on the protruding edge.
 c. In order to prevent further injuries, John hammered the metal safe.

Under normal circumstances, hammering metal does not cause the metal to become safe. The context preceding (47c) in this discourse, however, establishes the basis for the causal relation — the metal is unsafe because an edge is protruding, so it follows that an event which stops the edge from protruding (e.g. hammering it) will cause the metal to be safe. Once this basis is established, the constraint on the resultative construction is met and the sentence will be judged felicitous in context.

The requirement of a pragmatically identifiable causal relation means that pragmatics can restrict the predictivity of the Resultative Construction: any instantiation of this Construction is subject to contextually-based evaluation in the pragmatic component. Few instances of resultatives will be ruled out at the lexical level (due to the unrestrictive nature of the construction definition), but any attempted use of a resultative must be determined to be felicitous in context. The pragmatic constraint therefore acts as a filter on the instantiation of the Construction, and will rule out many potential uses in context.

5.2.2 Conventionality

Even after the influence of the pragmatic coherence constraint is considered, however, there is still much idiosyncrasy left unaccounted for in the resultative data, specifically cases in which syntactic and semantic substitutions lead to infelicity.

I mentioned in Section 2.2 that some mechanism for encoding conventional constraints is needed in order to capture the idiosyncrasy associated with resultative construction. The framework provided by the Construction Grammar approach to this phenomenon points to a solution. Constructions can be viewed as specifying form-meaning pairs which are part of a language. However, constructions are, like many other linguistic phenomena, governed by conventional usage.

Goldberg (1995, p. 192) suggests there can be lexicalised instances of Constructions — instances in which the form and the meaning specified in the Construction will be preserved, but which will define more precisely the particular words or class of words which can appear in a readily acceptable instantiation. These instances are analogous to idioms in that the structure, meaning and the lexical items which instantiate the construction are fixed, but they differ from idioms because they derive from a more generally available form-meaning pair.

The Resultative Construction can therefore be viewed as defining a semi-productive sense extension mechanism: verbs can be used in sentences with the form and meaning reflected in the Construction (as long as their semantics are compatible with the Construction and any other constraints are satisfied), but some of these sense extensions become lexicalised due to the conventions of language use in particular linguistic communities. In some cases these lexicalised instances are truly idiomatic. They may acquire a meaning which cannot entirely be predicted on the basis of the Construction: Does *John laughed himself silly* really mean that John became *silly* as a result of laughing? In *You scared the daylight out of me*, what are *the daylight*s (Jackendoff to appear)? Once there is a lexicalised instance of a construction involving a particular verb, it becomes difficult to use that verb in a different instance of the same construction because that use would conflict with the conventionalised form. Hence the oddness of examples like *John laughed himself tired*.

I suggest that the idiosyncrasy of the resultative construction is a reflection of the high degree of conventionalisation governing the construction. Speakers prefer instances of this construction which conform to their lexicalised instances. Many, if not most, occurrences of this construction which speakers use and come across reflect a lexicalised form. This fact accounts for the idiosyncrasy — variations from lexicalised forms are in theory perfectly acceptable as they can be licensed by the existence of the Construction in the grammar but in practice they are viewed as anomalous or ungrammatical because they don't conform to the "standard" forms in use. Variations (i.e. syntactic and semantic substitutions) of entirely novel instances of the construction are therefore tolerated much more easily than variations of highly colloquial instances. So I can easily accept all variants in (49), but the variants of the colloquial (50a) in (50b-d) are less felicitous.

- (49) a. Sue brushed her hair smooth.
 b. Sue brushed her hair shiny/straight/flat/out of her eyes/...
- (50) a. Sue cried herself to sleep.
 b. ?Sue cried herself sick.
 c. ??Sue cried herself asleep.
 d. #Sue cried herself sleepy.

This conventionalisation is itself a result of the fact that the resultative constructions are licensed by a form-meaning pair in the grammar. These constructions are very different from constructions which are interpreted strictly compositionally, in that they don't result from generative mechanisms in the grammar and in that their meaning is essentially fixed. These properties indicate that Constructions are "special" in grammatical terms — that is, they do not follow from the normal principles of grammar. That they are subject to a much higher degree of conventionalisation than other constructions seems natural given that their existence in the grammar can be viewed as a result of conventionalisation.

This perspective on the Resultative Construction is in line with observations made about the semi-productivity of many other lexical processes e.g. the generation of denominal verbs (Jackendoff to appear), and blocking by exceptional forms in sense extensions (Briscoe *et al.* 1995, Copestake and Briscoe 1995). The property of semi-productivity has been argued to require lexicalisation of the forms output by the lexical rule. Furthermore, *preemption by synonymy* (Copestake 1995), in which an extended meaning will not be conventionalised if a common synonym exists, has been shown to be overridable in context in that a blocked form can be interpreted. Both of these characteristics surface in resultative constructions, indicating that it is a generative process constrained by conventionality.

In sum, I assume that there are lexicalised instances of this Construction represented in the lexicon, and that these instances limit the acceptability of sentences which vary from the conventionalised patterns, further accounting for some of the idiosyncrasy associated with resultatives.

6 Conclusions

Resultatives are defined by a form-meaning correspondence, the Resultative Construction, in the grammar of a language which can be used to generate potential new uses of a verb, with a particular associated meaning. The predictivity of this Construction is, however, limited in two ways: (1) through the requirement of pragmatic coherence of the generated form, and (2) through the existence of instantiations of the Construction in the lexicon, reflecting conventionally accepted uses of the Construction. The latter limiting factor stems from stipulativity in the lexicon: individual uses of words, as well as generalizations over word classes, can be represented in the lexicon in order to reflect common but potentially idiosyncratic usages of a particular word. The former moves some of the apparent stipulativity of the resultative construction out of the lexicon and into the control of pragmatic reasoning: not every valid instantiation of the Construction needs to be explicitly represented in the lexicon, because all instantiations can be considered lexically valid but subject to pragmatic validation. Given the context-dependent nature of the felicity of many instances of this construction, this approach results in a more adequate model of the data. The role of the conventionalised forms, then, is to obviate the need for explicit pragmatic validation in certain cases — these instantiations will always be considered felicitous.

The broader implication of the analysis of resultatives presented in this paper is that it is not adequate to assume that all information relevant to the grammatical and felicitous use of words is explicitly encoded in the lexicon. Nor is it enough to assume that all constraints on generative processes can derive from semantic constraints, or even entirely from a pragmatic coherence constraint. A naive approach to lexicon

construction — explicit representation of every possible behaviour of every word — or even an approach which utilizes generative mechanisms but relies solely on lexical semantic constraints, ignores the influence of context on the acceptability of particular sentences. There are different sources of information which interact to determine the felicity of any given sentence, and the decision as to what information to represent in the lexicon (a productive generalisation, specific subcategorisations for individual words, or a combination of the two) must be taken after those sources and the interactions between them have been identified. Once this has been done, and the lexicon has been structured in terms of its interactions with other linguistic modules which impact on interpretation, it is possible to more accurately model the full range of word use — both the predictive and the stipulative aspects.

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