USING TEMPLATES TO ACCOUNT FOR ENGLISH RESULTATIVES

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Abstract

This paper attempts to account for the English Resultative through the use of templates in Lexical Functional Grammar. This account will involve the use of LFG templates as an interface between the syntax and semantics and employ Glue Semantics as a logical means to combine the components. It will introduce two new templates for the data, and attempt to show how the notions introduced by Asudeh et al. (2008) can be extended to fit the resultative without having to introduce any new formal mechanisms.

1 Introduction

The English Resultative is a secondary predication relationship in which the main verbal predicate is affected by the existence of a resultant state. This resultant state describes the outcome of the action which was performed on the patient of the main predicate. There are five subtly different resultant structures, shown below in (1) through (5).

(1) **The transitive resultative**

He hammered the metal flat.

(2) **The transitive resultative with a non-subcategorized NP** [1]

Bryan drank Shannon under the table.

(3) **The fake reflexive**

John danced himself breathless.

(4) **The intransitive resultative with a non-subcategorized NP**

Kim ran the pavement thin.

(5) **The unaccusative resultative**

The river froze solid.

The base case of the resultative structure is usually the transitive resultative, as it is the simplest and most straight-forward case to begin from. In this case, the main verbal predicate is transitive, and takes its usual object. However, there is a second predicate which acts on the object, resulting in a change of its state. Thus,

[†]I am very thankful to Louisa Sadler, for pointing me in this direction in the first place, and Ash Asudeh for his patient comments on the many drafts of my poster and presentation.

[1]My thanks go to the editors for pointing out the similarity between the second and fourth types of the resultative, as the transitive verb in the example can also have an intransitive reading. At this point I do not have a solution for this issue, and will leave it to the reader to decide if they are two formations or only one, as the number of resultative formations does not affect my application of templates to the structure.

the meaning in (1), above, is not 'a substance was hit' but 'a substance was hit *until it changed into another shape'*.

It is this change of state that semantically differentiates the resultative from another secondary predication relationship; the depictive (shown in (6)). In the depictive the object is not changed by the second predicate, but is described by it. In the example, the fish does not become raw during the serving action, but is raw when the action occurs. The two structures are also differentiated syntactically, as the depictive can be acceptably incorporated into a fronting structure (as in (7)), while the resultative cannot (as in (8)).

(6) John served the fish raw.

(7) Raw, John served the fish.

(8) ? Pink, Kim dyed her hair.

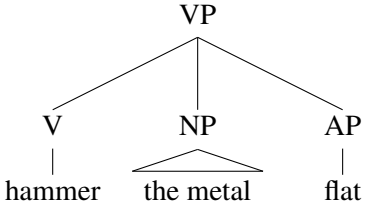
For the sake of expedience in this examination, I will focus only on the two most straightforward cases of the resultative, the transitive resultative and the unaccusative resultative. The difference between the two structures is that unlike the transitive resultative (described above), the unaccusative verb does not take an object, so the action of both the main and secondary predicates are carried out upon the subject of the sentence. Thus, in (5) above, the meaning is not 'there was a freezing event involving a river' but 'during a freezing event, a river became solid'.

2 Previous Treatments

2.1 Carrier and Randall (1992) (Government and Binding)

Due to the requirements of the Government and Binding approach, the resultative must be licensed by the nodes in the tree structure, and thus Carrier and Randall propose a ternary branching tree structure (shown in (9)) in order to account for the resultative. According to Carrier and Randall (1992) the ternary branching tree describes the resultative structure best as it allows for both the s-selection and M-Command relationships which are required for grammaticality. These relationships, according to Haegeman (1994), allow for the correct assignment of semantic (theta) roles in the structure, thus allowing the structure to admit only those syntactic trees which would result in a grammatical sentence.

(9)



However, the account favoured by Carrier and Randall (1992) is not entirely intuitive. Government and Binding Theory requires that "lexical information is syntactically represented" (Haegeman, 1994, pg. 55), and since there are two syntactic possibilities for the primary predicates used in the resultative (one regular use and one resultative use), there would have to be two lexical entries for resultative verbs, one for each use of the verbs. This duplication, however, misses the generalization that it is not the main predicate that changes in the resultative, but the state of the object of the main predicate.

2.2 Boas (2003) (Construction Grammar and Event Frame Semantics)

Boas asserts that all of the conditions for the formation of the resultative can be stated in the semantics of the lexical entry for the verb, within one of the multiple event-frames available, and that the syntactic rules need only store the form that the resultative takes, thus yielding two syntactic rules, shown in (10) and (11).

(10) [NP V NP XP] where X = A, N or P[2]

(11) [NP V XP] where X = A, N or P

In this distinctly semantic approach, Boas (2003) is able to account for the formation of the resultative through each individual lexical entry. Boas's C-Structure rules grossly overgenerate, but, according to his account, this overgeneration is deemed unacceptable by the individual semantics of the primary predicates themselves. Since each predicate contains a finite number of event frames which can be utilized in a given utterance, it is the semantics of the predicate which determines the grammaticality or acceptability of the sentence. Thus, in (12) the sentence is deemed unacceptable due to the fact that hammering a substance would not change its colour (it would change its shape). Similarly, in (13), the sentence is deemed unacceptable because of the fact that dying something does not change its shape (but would change its shape).

(12) *He hammered the metal pink.

(13) *She dyed the metal flat.

Although his account does manage to account for the resultative completely, it seems to lack an ability to generalize repetitive information, and relies heavily on semantics to disqualify unacceptable utterances. In the end, the account given by Boas (2003) can at times seem weighed down by the need to specify each utterance individually, and misses the observable fact that the resultative, although varied in its formation, can be described as a repetitive feature of the English language.

[2]Boas (2003) page 2, example (1.2)

2.3 Simpson (2006) (LFG)

In the account given by Simpson (2006), the description of the resultative is taken into the realms of LFG, and leaves behind the empirical requirements of the other formalisms. Simpson (2006) states that the resultative uses a regular set of restrictions, which can be logically stated within the lexicon. She posits the use of a powerful generative tool called a general lexical rule. A general lexical rule is a sort of interface between the syntax and the lexicon, as it is not stored in either place, but can be called for by a lexical entry before it is applied to a syntactic form.

Since there is a correlation between the base meaning of the verb and its resultative counterpart, namely that the object of the main verb will act as the subject of the XCOMP, Simpson (2006) posits the general lexical rule, shown in (14). This rule extends the semantic frame of the verb with an XCOMP and adds a control equation to the lexical definition which states that the subject of the XCOMP will be the object of the main verb.

(14) XCOMP Addition Rule (Simpson, 2006):

- Add a resultative attribute XCOMP
- Add the control equation XCOMP SUBJ = verb's OBJ

This lexical rule must then be specified for in the lexical entries of the resultative predicates. This allows for the fact that the resultative can only be predicated of some verbs (for example those which require a change of state) and cannot be predicated of many others (like many unergative verbs). In this way, the verb itself specifies the restrictions on the type of resultative predicate it can take, but the form of the resultative is specified outside of the lexicon in the XCOMP Addition Rule and the syntactic form of the utterance.

However, by requiring the rule to be specifically called for in each lexical entry that can potentially use the resultative, Simpson (2006) does not formally account for the generalization that the verb which calls the rule must permit a change of state. In her account there is an ability for the general lexical rule to potentially overgenerate, as it is a very powerful means of stating regularities, and must be tightly constrained. Finally, in her account, Simpson (2006) states that the general lexical rule must be applied in a sequential order for it to function correctly, as it must always be applied before any passivization. This seems slightly unintuitive in an LFG approach, as the acceptability of a sentence is usually evaluated in the interaction between the different structures and not in the sequential ordering of constraints.

3 Previous Use of Templates

Templates are a means of summarizing repetitive information, by building structures from smaller pieces of information rather than stating each of those pieces

each time they are used. For instance, by using the template in (15), below, we can summarize the fact that all transitive verbs have an f-structure which involves a subject and an object. This then allows for the lexical definition in (16) which takes the predicate KISS and inserts it into the transitive template to give us the more familiar form of (↑PRED) = 'KISS< (↑SUBJ)(↑OBJ) >'. Templates were introduced for use in computational settings so that programs were more straightforward to write and edit, and were first cited academically by Dalrymple et al. (2004).

(15) TRANSITIVE(FN) = (↑PRED) = 'FN< (↑SUBJ)(↑OBJ) >'

(16) kiss V $\lambda e.kiss(e) : (\uparrow_\sigma \text{REL})$
$\Big($ @TRANSITIVE(kiss)
$\lambda P \lambda x \lambda y \lambda e.P(e) \wedge agent(e) = x \wedge patient(e) = y$:
$(\uparrow_\sigma \text{REL}) \multimap (\uparrow \text{SUBJ})_\sigma \multimap (\uparrow \text{OBJ})_\sigma \multimap \uparrow_\sigma \Big)$

However, as part of their approach to the English-*way* construction and the Swedish Directed Motion Construction (DMC), Asudeh et al. (2008) use templates as an interface between the lexicon and the syntax, giving the templates a 'crucial theoretical role' (Asudeh et al., 2008). In their approach Asudeh et al. (2008) use a template hierarchy to allow for templates to either incorporate all parts of a previous template or select between two previous templates and incorporate the information it needs. For example, using a simple disjunction, a template for a predicate can specify information either from its base case (say a transitive interpretation) or its exceptional case (say a resultative interpretation). In this way, the resultative is licensed in the lexical entry, but that entry is able to supply only the predicate name, and the templates build the meaning and structure of the sentence.

By pairing template use with Glue Semantics, Asudeh et al. (2008) are able to create an interface between the syntactic structure, the lexicon, and the semantic structure. This is because each stage in the template absorption process, the template equation is paired with a Glue equation so that the semantics of the sentence is built up in the same pieces of information as the structure of the sentence. Thus each level adds something to the semantics of the sentence, and passes that on to the next template to be absorbed into the overall meaning.

4 Proposed Extension

4.1 Semantic Representations

Before beginning on the new application of templates, we must examine the semantic representations we wish to use for the resultative formation. In both (17) and (18) we can see that the semantic form reflects the fact that the object or patient of the main predicate (the event) is the subject or experiencer of the secondary predicate (the state).

(17) John hammered the metal flat.

$$\exists e \exists s.hammer(e) \ \wedge \ flat(s) \ \wedge \ result(e,s) \ \wedge \ agent(e) = John$$

$$\wedge \ patient(e) = metal \ \wedge \ experiencer(s) = metal \ \wedge \ cause(s) = John$$

(18) The river froze solid.

$$\exists e \exists s.freeze(e) \ \wedge \ result(e,s) \ \wedge \ solid(s)$$

$$\wedge \ patient(e) = river \ \wedge \ experiencer(s) = river$$

The main difference between the two semantic forms is that the transitive form needs an agent for the primary predicate and the unaccusative form does not. This reflects the usual uses of these verbs, as a transitive verb normally requires an agent and a patient, and an unaccusative verb normally only requires a patient.

4.2 Proposed Templates

In (19) and (20), below, we can see how the resultative templates could be built. In (19) we can see the generalized semantic equation with two predicate variables and two entity variables, thus leading to the use of both a subject and an object. The semantic equation is tied to a Glue equation which takes the meaning of the main predicate, combines it with the meaning of the secondary predicate and then adds in the meanings of the SUBJ and OBJ. It then takes in those meanings and combines them with the event's semantics and the state's semantics to yield the semantics of the overall equation, thus yielding the final semantics of the utterance.

(19) RESULT-T(FN) = @TRANSITIVE-X(FN)
$\lambda P \lambda R \lambda x \lambda y. \exists e. \exists s. P(e) \wedge R(s) \wedge \ result(e,s)$
$\wedge \ agent(e) = x \ \wedge \ patient(e) = y$
$\wedge \ experiencer(s) = y \ \wedge \ cause(s) = x$:
$(\uparrow_\sigma \text{REL}) \multimap ((\uparrow \text{XCOMP})_\sigma \text{REL}) \multimap$
$(\uparrow \text{SUBJ})_\sigma \multimap (\uparrow \text{OBJ})_\sigma \multimap (\uparrow_\sigma \text{EVENT}) \multimap$
$((\uparrow \text{XCOMP})_\sigma \text{STATE}) \multimap \uparrow_\sigma$

(20) RESULT-U(FN) = @INTRANSITIVE-X(FN)
$\lambda P \lambda R \lambda x. \exists e. \exists s. P(e) \wedge R(s) \wedge \ result(e,s)$
$\wedge \ patient(e) = x \ \wedge \ experiencer(s) = x$:
$(\uparrow_\sigma \text{REL}) \multimap ((\uparrow \text{XCOMP})_\sigma \text{REL}) \multimap$
$(\uparrow \text{SUBJ})_\sigma \multimap (\uparrow_\sigma \text{EVENT}) \multimap$
$((\uparrow \text{XCOMP})_\sigma \text{STATE}) \multimap \uparrow_\sigma$

Similarly, in (20) the generalized semantic equation contains two predicate variables, for the event and state. However, instead of two entity variables, there is only one, which reflects the lack of agentive role in unaccusative verbs, and

allows for the object role to be omitted. The associated Glue equation takes the meaning of the relation for the main predicate and adds to it the secondary relation before absorbing the information in the SUBJ. It then takes the meanings of the two predicates and yields the overall meaning of the sentence.

4.3 Proposed C-Structure Rules

With the semantics of the resultative coming from the template, and the restrictions on the resultative coming from the lexicon, we can add in resultative C-structure rules to allow for the formation of the resultative in both the C- and F-structures. This is done by adding in the rules in (21) and (22).

(21)
$$\begin{array}{llcccc} \text{V'} & \rightarrow & \text{V} & \text{NP} & \{NP|AP|PP\} \\ & & \uparrow{=}\downarrow & (\uparrow\text{OBJ}) = \downarrow & (\uparrow\text{XCOMP}) = \downarrow \\ & & & & (\downarrow\text{SUBJ}) = (\uparrow\text{OBJ}) \\ & & & & @\text{RESULT-T}((\uparrow\text{PRED FN})) \end{array}$$

(22)
$$\begin{array}{llcc} \text{V'} & \rightarrow & \text{V} & \{NP|AP|PP\} \\ & & \uparrow{=}\downarrow & (\uparrow\text{XCOMP}) = \downarrow \\ & & & (\downarrow\text{SUBJ}) = (\uparrow\text{SUBJ}) \\ & & & @\text{RESULT-U}((\uparrow\text{PRED FN})) \end{array}$$

Each of the rules accounts for a different kind of resultative. (21) accounts for the transitive resultative, as it contains an object position, and links that OBJ to the subject of the resultative XCOMP with the control equation $(\downarrow\text{SUBJ}) = (\uparrow\text{OBJ})$. It also calls for the resultative template using the '@' symbol to direct the grammar to the appropriate template, and takes the main predicate to be used in the template.

(22) creates the resultative in a similar manner, taking the main predicate to be used in the associated template. However, it differs in that it does not contain an object position and thus cannot use the same control equation. Instead, (22) links the SUBJ of the main predicate to the SUBJ of the XCOMP through the control equation $(\downarrow\text{SUBJ}) = (\uparrow\text{SUBJ})$.

4.4 Example lexical entries

In order for the template call to override the normal use of the resultative verbs, we must make that normal use something that can be optional, and rely upon the principles of completeness and coherence to allow or disallow utterances based on whether or not the verbal element contains a predicate. Since all sentences must have at least one verbal predicate in order to be complete, making the normal use of the verb optional does not overgenerate as any f-structure without a verbal predicate would not be deemed grammatical. Thus, in (23) and (24) the main predicates are optional and can be overridden by a template call.

(23) hammer V $\lambda e.hammer(e) : (\uparrow_\sigma \text{REL})$
@TRANSITIVE(hammer)
$\Big($ $\lambda P \lambda x \lambda y \lambda e.P(e) \wedge agent(e) = x \wedge patient(e) = y$: $\Big)$
$(\uparrow_\sigma \text{REL}) \multimap (\uparrow \text{SUBJ})_\sigma \multimap (\uparrow \text{OBJ})_\sigma \multimap \uparrow_\sigma$

(24) freeze V $\lambda e.freeze(e) : (\uparrow_\sigma \text{REL})$
@INTRANSITIVE(freeze)
$\Big($ $\lambda P \lambda x \lambda y \lambda e.P(e) \wedge agent(e) = x \wedge patient(e) = y$: $\Big)$
$(\uparrow_\sigma \text{REL}) \multimap (\uparrow \text{SUBJ})_\sigma \multimap (\uparrow \text{OBJ})_\sigma \multimap \uparrow_\sigma$

5 Conclusions and Future Work

In conclusion, the use of templates introduced by Asudeh et al. (2008) can be nicely extended for use with the English Resultative. It allows for a space between the syntactic structure and the semantic form which can be used to store information and build meanings outside of the normal working space. This allows for an interface between the syntax and semantics which acts as more than just a correlation and becomes an integral part of the theory. A resultative template for English would have to be broken down into sub-templates in order to account for the different forms the resultative can take, but it does allow for an elegant description of the phenomenon.

In future research we can begin to flesh out the formations needed for the other forms of the resultative and rigorously test the application of the templates. By fully studying this construction, we can begin to see more of the power that this use of templates can bring to our generative capabilities. We can also begin to look into resultatives cross-linguistically, to see if they behave similarly in other languages and if templates can be used in those occasions as well.

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