RESULTATIVES AND DYNAMIC SEMANTICS

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This paper intends to make three related points concerning resultative constructions. 1. On the basis of Hungarian data it is argued that out of three possible strategies, the method proposed in Kratzer 2004 is preferable. The case endings that mark Hungarian resultatives can be taken as the overt counterparts of the covert morphemes proposed in Kratzer 2004. These morphemes are taken to introduce causal information and to hold the resultative construction together. 2. On the basis of data from Russian and Hungarian it is argued that prefixes and particles are to be analysed with the same tools as nominal result predicates, adjectives, nouns or *PP*s. 3. It is argued that the best method of semantic composition for resultatives involves dynamic semantics with asymmetric merge (Muskens 1996).

1. Introduction

This contribution offers a semantic analysis of resultative constructions involving a verb and a 'nominal' secondary predicate (an adjective, a nominal or a *PP*), and a verb and an aspectual prefix or particle. More general considerations about the linguistic expression of causation, or parallels with the syntax and morphology of causatives (*Aunt Polly had/made Tom whitewash the fence*) will be set aside.

The paper is structured as follows. The present section introduces the core set of data, together with arguments for including certain particle verbs. Section 2. discusses problems for semantic composition presented by such constructions. Section 3. provides a simple dynamic sketch and discusses some worked-out cases. Conclusions, open questions are discussed in Section 4.

The Data

The focus of this paper is the semantics of resultative constructions involving a verb and an adjective (*hammer the metal flat*), a verb and a *PP* containing a result nominal (*cradle the child to sleep*) and a verb and certain aspectual prefixes or particles such as German *er-schreiben*, 'to acquire by writing'. In these constructions the event described by the verb is commonly taken to cause the eventuality contributed by the

secondary predicate. The data set also includes cases that are not always considered genuine resultatives, in that the secondary predicate or result *PP* describes the end point of a spatial trajectory. A case in point is *whistle off the stage*. It will be seen however that examples like these lend themselves to the same kind of analysis as genuine resultatives; the specific difference is exactly the introduction of a spatial trajectory.

One of the arguments for taking prefixes into consideration comes from Russian. This language lacks adjectival resultatives, as seen in (1a–b), but it can express resultative meanings by means of prefixation, as shown in (1c). (The data are taken from Spencer and Zaretskaya 1996.)

(1) a. Ona pokrasila dver' ∗zeljonoj/zeljonuju/zeljonaja
        She painted door green-INSTR/-ACC/-NOM
     b. ∗Reka zamjorzla v blok l'da
         River froze into block of-ice
     c. Ona vy-terla stol
        She VY-wiped(Perf) table 'She wiped the table clean'

In Hungarian the same meaning can be expressed with an adjectival resultative or with a prefixed verb, as seen from (2).

(2) A folyó jég-gé fagyott/be-fagyott
     The river ice-Transl froze/into-froze
     'The river froze solid/froze up'

There are restrictions on adjectival resultatives in Hungarian, in that they cannot introduce new arguments. Intended meanings (conveyed with adjectives in Germanic languages) are regulary expressed with prefixed verbs, cf. the pair in (3).

(3) A kutya fel-ugatta/∗éber-re ugatta a szomszédokat
     The dog up-barked/∗awake-onto barked the neighbours-Acc
     'The dog barked the neighbours awake'

From the Russian and Hungarian data I conclude that certain prefix–verb combinations express resultative meanings. These are to be analysed with the same methods as resultative constructions where the secondary predicate is an adjective or some other constituent containing a nominal. The prefix is assumed to be a lexicalised label, whose contribution is known to speakers of the language.

An additional argument comes from the variety of combinations involving prefixes like Hungarian *ki-* 'out(wards)'. (4a) is a clear resultative case; (4b) describes a giving event with an additional spatial trajectory; (4c) is a complex event where an event of sound emission causes the Theme to be 'off', relative to its original location. The contribution of the prefix is the same in all three cases; what varies is (*i*) its interaction with the host verb and (*ii*) the concept associated with the complex verb at the level of Lexical Conceptual Structure (LCS).

(4) a.   ki-sír x-et y-ból   whine x out of y
     b.   ki-ad x-et y-on (keresztül)   hand x out of/through y
     c.   ki-fütyül   whistle off/out of somewhere

A Note on Hungarian Case Markers in Complex Predicates

In resultative and depictive constructions Hungarian adjectives receive case endings. The depictive ending is *-n* 'on'. Result adjectives are marked with *-ra, -re* 'onto' (cf. (3)). Nouns expressing results are also marked, and their ending depends on the transition described by the verb. 'Permanent', qualitative change is marked with Translative case, *-vá, -vé* (*-v* is assimilated to the final consonant of the noun stem); an example was shown in (2). Nominals describing some resulting shape are marked with *-ba, -be* 'into' (e.g. *kariká-ba* 'into a hoop').

2.   Problems for Semantic Composition

Resultative constructions pose several challenges for compositional semantic analysis. The fundamental problem, presented by complex predicates in general, is how to combine two predicative expressions into one complex. That these predicates may be of variable arity is merely an added difficulty. Resultative constructions, in Germanic languages at least, are not explicitly marked: they are 'concealed' causatives (Bittner 1999). The next problem is therefore how the causal relation is introduced.

Resultatives (like causatives in general) can present an argument structure different from that of the host verb (for detailed discussion and analysis cf. Wunderlich 1997). They can have Themes not subcategorised for by the host verb (*bark awake*). The original Theme or Patient of the verb may be demoted (G. *er-schreiben*, 'acquire by writing'), or suppressed altogether (*drink dry*).

Arguments in resultative constructions have additional properties, which may be of interest to semanticists: (*i*) The Theme may not be left implicit, not even with host verbs that in isolation admit implicit arguments. (Consider *John drank* vs *∗John drank dry*). (*ii*) Particles or prefixes may contribute distinguished arguments that are quasi-indexical in the sense of Mitchell 1986, in that their preferred construal is indexical or anaphoric, but they can just as well be bound by quantifiers. (Cf. *After every party Dick is carted off to an undisclosed location.*) (*iii*) Opacity or definiteness restrictions on certain classes of host verbs disappear. *Mary baked every loaf* is strange as an out-of-the-blue sentence, whereas *Mary baked every loaf crisp* is perfect.

In addition resultatives can present sentence-internal dynamic effects, either on their own or when interacting with sentence material. For instance Hungarian *el-szeret* 'love away', 'woo away' presupposes a pre-existing relationship for the Theme, which is broken up by the Agent's activities. That is, resultatives can often be presupposition triggers themselves. They also interact with presupposed material: The sentence *Sie erschrieb sich ihr Geld mit Krimis* 'She made her money writing detec-

tive stories' (Wunderlich 1997) presupposes that the Agent has money; the assertion part of the sentence elaborates on the way she has made that money. The problem is that the same information is encoded twice over, once in the presupposition of the possessive *ihr Geld* 'her money', and once in the subevent structure of *er-schreiben*. A proper analysis needs to rely on sentence-internal dynamic composition (which will need to be omitted here, for lack of space).

3. Sketch of an Analysis

In the literature there have been three main strategies to analyse resultative constructions. The first is at the construction or composition level: a syntactic or a translation rule combines the two predicates and introduces the causal relation (Dowty 1991, von Stechow 1996, Bittner 1999, von Stechow 2007). Alternatively, one of the participating predicates may be type-lifted into a function that expects the other predicate as argument. Either the entry of the verb may undergo resultative extension (Wunderlich 1997) or the result predicate can be augmented (Kratzer 2004).

Given the overt morphological marking of Hungarian result predicates, this paper relies on a version of Kratzer's strategy: The morpheme on result adjectives yields a state description that needs to be completed with the description of the causing event. The analysis proposed here departs from Kratzer in that neither predicate will be a function expecting the other as argument. Instead they correspond to open propositions conjoined with asymmetric merge. This eliminates the need for complex and ad hoc type changing operations. It also allows, at least in principle, room for the analysis of dynamic effects in sentence internal composition.

(5) a. *piros-ra* $\mathcal{E}s; red(s)(\alpha); Res(e) = s$
     b. *red-$\emptyset$* $\mathcal{E}s; red(s)(\alpha); \mathbf{CAUSE}(s)(e)$

(5) shows Hungarian and English result adjectives. State discourse referents are introduced with random assignment $\mathcal{E}$ (Berg 1996, among many others). Subformulae are conjoined with asymmetric merge ; (Muskens 1996, van Eijck and Kamp 1997). Both translations contain a free event variable e that needs to be bound to the discourse referent supplied by the verb. In the Hungarian case the adjective describes **the** consequent state of the verb, hence the function *Res* (Kamp and Roßdeutscher 1994). The argument linking associated with *Res* ensures that the verb and the adjective share their Theme argument, i.e. the introduction of a new Theme argument by the adjective is precluded. There is no such restriction in the English case.

Since English *paint* can be telic, its entry already contains a state discourse referent. In the English case the result adjective is therefore merged to the consequent state of *paint*, in what is seen as an instance of modification. Hungarian *fest* 'paint' on the other hand is atelic, so the adjective will *add* a consequent state to its entry.[1]

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[1] A clarification: the function *Res* in (5a) encodes the end state conventionally associated with the event described by the complex verb.

Verbs of creation are puzzling for resultative constructions. An expression like *dem Mantel zu eng schneiden* 'to tailor the coat tight, into a tight fit' means that a new **and** tight coat has been created. In this case too the state descriptions contributed by the two predicates are merged. The consequent state of *schneiden* is, say, **EXIST**$(s)(x)$; merge with *tight*$(s')(y)$ yields **EXIST**$(s)(x)$; *tight*$(s)(x)$.

A prefix like *ki-* 'out(-wards)' is analysed as involving two states and two 'Gruberian' discourse referents, a Source and a Goal, such that the Goal is 'OUT' relative to the Source. The Theme is AT the Source in the initial state and AT the Goal in the final state. The transition from one state to another is caused by the event described by the verb.

(6)   *ki* 'out(-wards)'
$\mathcal{E}(s, s', \sigma, \gamma); AT(s)(\sigma, \beta); AT(s')(\gamma, \beta); OUT(\sigma, \gamma); CAUSE(s')(e)(; s \prec s')$

In the case of *ki-fütyül* 'whistle off' *ki* attaches to an atelic verb of sound emission, adding two states and a new Theme to its event structure, together with the trajectory of the Theme from Source to Goal.

In the case of *ki-ad* 'hand out' (e.g. in a scenario of handing something through the window) several of the discourse referents in (6) are merged with those in the entry of the verb. The Theme β is merged with the Theme of the verb, and the two state discourse referents s, s' are also merged with the precondition state and consequent state of the verb. The result is an event description where change of possession is accompanied by spatial movement. It is inferred that the Agent (in state s) is at the Source location, and the Beneficiary is at the Goal (in state s').

4.   Conclusion; Open Questions

This paper has provided a brief analysis of resultatives where the causal relation between the two main event descriptions is contributed by morphology (nominal resultatives) or by the secondary predicate itself (prefixes and particles). The analysis has relied on sentence-internal dynamic composition, notably, on random assignment ($\mathcal{E}$) and asymmetric merge. Thanks to this method neither predicate has had to be lifted to a higher order functional type expecting the other as argument. In addition, sentence internal merge is sufficiently flexible for handling variations in argument linking and in the aspectual type of the host verbs. A principled analysis of demoted or suppressed arguments is a task for the future. So is the analysis of interactions with presuppositions and other 'dynamic' sentence material.

Allowing the analysis to be driven by morphology is an attractive strategy, motivated by theoretical and empirical considerations. Nevertheless it needs to be supplemented by a more careful analysis of verb meanings. The problem is that the morphology-driven strategy would treat resultatives and depictives on a par. It is a well-known fact however that depictives are possible in several languages where nominal resultatives are not (in Russian and in Romance languages). The end note

therefore is that variation in the internal structure of verbs needs to be factored into a satisfactory analysis of nominal resultatives.

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