Reflexivity and Resultatives

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1. Introduction

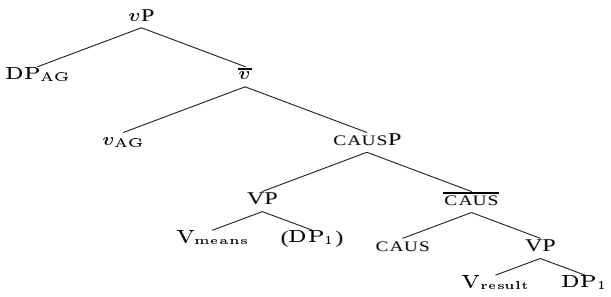
Resultative constructions, such as (1), have typically been assimilated either to ECM constructions (Kayne 1985, Hoekstra 1988) or, in various ways, to simple transitives (Dowty 1979, Larson 1991, Carrier and Randall 1992).

(1) Arthur hammered Excalibur flat.
Arthur laughed himself hoarse.

This paper presents data from Kannada that resist either type of analysis (§2). The grammar of reflexivity in Kannada reveals that resultatives must be syntactically distinguished both from ECM constructions and from simple transitives. Simple transitives and ECM constructions allow verbal reflexive marking when reflexive, but resultatives do not.

To explain this, we assign Kannada resultatives the base configuration in (2). Here both the result predicate (flat) and the means predicate, when transitive (hammer), project a DP complement, neither one a silent pronoun.

(2)



Given (2), resultatives are distinguished in having an object DP that is not local to v_{AG}, on a metric of locality we define in §3. This makes the difference to which VRM responds (§§4-5). A non-local object is not licensed in situ, and must move to spec-v for Case (§7). But this movement bleeds VRM, given the theory of VRM in Lidz 1998 (§6). The movement also permits a novel treatment of object-sharing in (2), requiring no special mechanisms of

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anaphora: object-sharing is Case-motivated ATB movement (§8). We are thus able to account for the Kannada facts, while newly introducing an attractive solution to traditional problems in the syntax and semantics of resultatives.

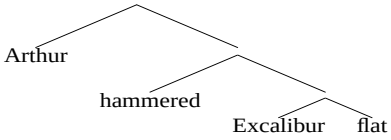
2. Kannada resultatives are not ECM or simple transitive constructions

Resultatives are commonly treated as congruent either to ECM constructions (3a) or to simple transitives (3b).

(3) a. Arthur considered Excalibur flat.
b. Arthur hammered Excalibur.

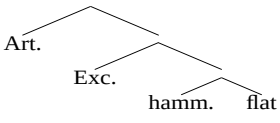
The first type of analysis, developed in Kayne 1985 and Hoekstra 1988, assigns resultatives the small clause structure in (4).

(4)

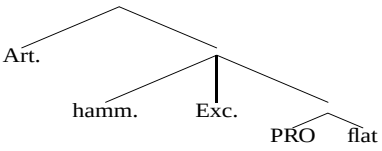


The second type has two main varieties. Complex predicate analyses, such as those of Dowty 1979 or Larson 1991, take the means predicate (hammer) and the result predicate (flat) to be sisters. A single DP then serves as a semantic argument to both, as in (5). Resultatives thus differ from ordinary transitives just in the complexity of the verb. Secondary predicate analyses, like that of Carrier and Randall 1992, give resultatives the syntax typical of the means verb, plus a small clause daughter to VP expressing the result, with a PRO subject. Thus the syntax of (1) is that of (3b), plus a small clause appended for *flat*, as in (6).

(5)



(6)



Neither type of analysis, however, succeeds with the Kannada resultative.

In Kannada, both ECM constructions (7) and simple transitives (8) allow verbal reflexive marking (VRM) on the matrix predicate when the subject binds an anaphor that is a syntactic coargument.

(7) Hari tann -annu puNyavantanendu nambi -koLL -utt -aane
H. self -ACC wealthy believe -VRM -NPST -3sm
'Hari believes himself to be wealthy.'

(8) Hari tann -annu hogaLi -koLL -utt -aane
H. self -ACC praise -VRM -NPST -3sm
'Hari praises himself.'[1]

But in resultatives, VRM is ungrammatical, whether the means verb is transitive (9) or intransitive (10).

(9) * Hari tann -annu chappatey -aag -i taTTi -koND -a
H. self -ACC flat -be(cm) -PP hammer -VRM.PST -3sm
Intended: 'Hari hammered himself flat.'

(10) * Hari tann -age keTTad -aag -i nakki -koND -a
H. self -DAT bad -be(come) -PP laugh -VRM.PST -3sm
Intended: 'Hari laughed himself hoarse.'

The grammatical forms appear without VRM (11,12), and reflexivity is signalled only by the anaphoric pronoun *tann.*

(11) Hari tann -annu chappatey -aag -i taTT -id -a
H. self -ACC flat -be(come) -PP hammer -PST -3sm
'Hari hammered himself flat.'

(12) Hari tann -age keTTad -aag -i nakk -id -a
H. self -DAT bad -be(come) -PP laugh -PST -3sm
'Hari laughed himself hoarse.'

The ban on VRM does not correspond to a long-distance relation between the anaphor and its binder. Were (11,12) contexts for long-distance anaphora, the pronominal *avan* '3sm' could replace the *tann* anaphor; but this is impossible (13,14).

(13) * Hari avan -annu chappatey -aag -i taTT -id -a
H. 3sm -ACC flat -be(come) -PP hammer -PST -3sm

(14) * Hari avan -age keTTad -aag -i nakk -id -a
H. 3sm -DAT bad -be(come) -PP laugh -PST -3sm

Thus subject and object in a Kannada resultative are local for the purposes of anaphor binding.

Neither is it the semantic causativity of resultatives that blocks VRM, since other causatives permit VRM. VRM appears on both simple (15) and periphrastic (16) causatives.

(15) Hari tann -annu chappatey -isi -koND -a
H. self -ACC flat -CAUS -VRM.PST -3sm
'Hari flattened himself.'

1. NPST = non-past, PST = past, PP = past participle, CAUS = causative.

(16) Hari tann -annu chappatey -aag -i maaDi -koND -a
H. self -ACC flat -be(come) -PP make -VRM.PST -3sm
'Hari made himself flat.'

Given this, we infer that resultatives must be distinguished *in their syntax* from the other constructions to which they are compared. This accords with the conclusion in Lidz 1998 that VRM is conditioned exclusively by syntax.

What then distinguishes the syntax of resultatives? The data—in particular the contrast between resultatives (which forbid VRM) and simple causatives (which require it)—suggests an answer. What sets resultatives apart is the overt projection of a means predicate, in addition to a result predicate. Somehow this blocks VRM.

We will pursue the idea that the presence of the means predicate interrupts a locality relation, relevant to VRM, between the object in the result VP and something above the means VP. That relevant *something*, we will decide in §5, is v_{AG}, the verbal head expressing agentivity.

3. C-locality

The structure we propose for Kannada resultatives, (2), allows for a precise and interesting execution of our idea. At its basis is the relation of *c-locality*, which we define in (17).

(17) **C-locality**: X is *c-local* to Y iff:

a. Y c-commands X, and

b. Every node that c-commands X, up to Y, is a function over its sister.

We will see that, in (2), the means VP prevents the DP in the result predicate from being c-local to anything outside of CAUSP; and ultimately this non-locality bleeds VRM. But first we pause to understand the mechanics of c-locality more carefully.

C-locality can be understood in terms of function composability. When X is c-local to Y, then what intervenes between X and Y is a cascade of composable functions. The nodes c-commanding X, up to Y, are functions that could be composed, in consecutive hierarchical order, to form a single complex function over X.[2]

To get a feel for where c-locality will and will not obtain, compare the two trees in Figure 1, where each node is paired with its semantic type. Arrows point from functions that c-command A to their arguments, and dotted lines connect functions that are composable.

2. F can compose with G iff the range of G is the domain of F. By definition: $\mathrm{COMPOSE}(f, g) \equiv \lambda x.(f(g(x))$

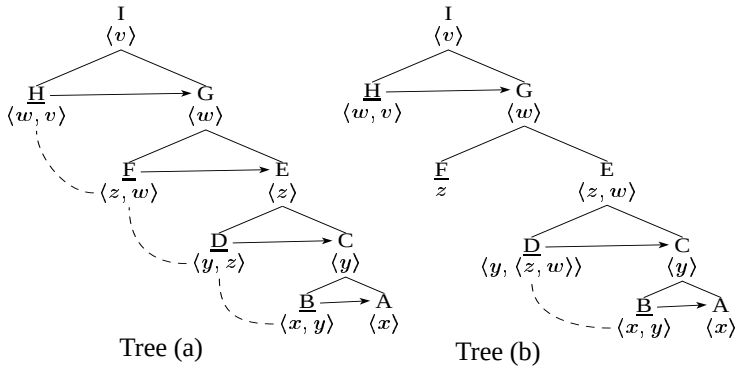


Figure 1: Function-argument relations among nodes c-commanding A

The two trees differ just in the types of nodes F and D. F is a function over its sister in (a) but not in (b). In (b), F is an argument of its sister, owing to the fact that D here is a two-place predicate.

As a result, node A enjoys broader c-locality relations in (a) than in (b). Every node that c-commands A in (a) is a function over its sister, hence here A is c-local to all its c-commanders. This is not true in (b). Here A is again c-local to B, D and F; but then c-locality is interrupted by F. Node A is not c-local to anything above F, i.e. it is not c-local to H, since F is not a function over its sister.

We will now see that resultatives differ from other constructions as (b) differs from (a), with the means VP playing the obstructive role of F in (b).

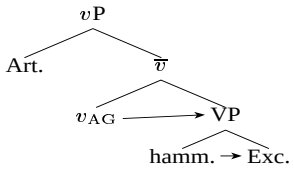
4. C-locality in resultatives

In simple transitives (18) and causatives (19), the object DP is c-local to v_{AG}, as well as to the subject DP in its specifier.[3] Every node up to spec-v_{AG} that c-commands the object is a function over its sister—as again indicated by arrows pointing from functions to arguments. The same is true for the lower subject in an ECM construction (20), and even for the object in a resultative (21), if the resultative is treated as a complex predicate as in Dowty 1979 or Larson 1991.[4]

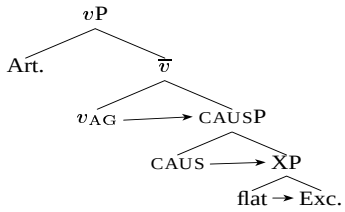
3. The relevance of these locality facts will be established in later sections.

4. The definition of c-locality presumes that any node has a unique sister. Hence it is not meaningfully applied to the ternary structure of Carrier and Randall 1992, (6). Still, suppose that definitional adjustments are made and we decide that—in (6) as in our (22) below—the DP argument to the result predicate is not c-local to v. Even then, (6) would gain no advantage in explaining the Kannada facts, we suggest, since the non c-local DP in (6) is PRO. There is no reason why c-locality between v and PRO, a caseless category, should grammatically matter. Compare our analysis in §§5–7.

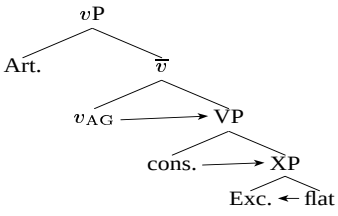
(18) Simple transitive



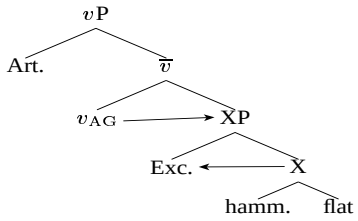
(19) Simple causative



(20) ECM construction

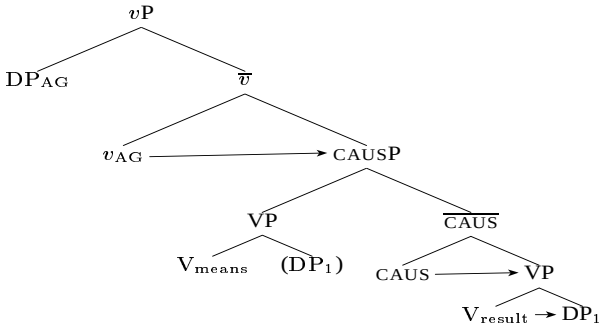


(21) Resultatives as complex verbs



Contrast our analysis of the resultative in (22). Whether the means verb is transitive (hammer) or not (laugh), the result predicate always has a DP complement. And this lower object DP is not c-local to v_{AG} or to its specifier—unlike in all the cases above.

(22) Our analysis of the Kannada resultative



As we would like, the opacity is induced by the projection of the means predicate on top of the result. Up to the means VP, every node that c-commands the lower DP is a function over its sister. But the means VP is not. It is an *argument* to $\overline{\text{CAUS}}$, satisfying a slot in the two-place relation denoted by CAUS. Consequently, c-locality is interrupted, and the lower object

is c-local to nothing above the means VP.[5]

5. C-locality and VRM: preliminaries

We now claim that it is this difference in c-locality relations that makes the difference for VRM. VRM occurs only if every VP-internal DP is c-local to v_{AG}, or perhaps to the subject.

(23) VRM is licensed only if the anaphor(s) is (are) c-local to:

a. Hypothesis A: the subject[6]

b. Hypothesis B: v_{AG}

In this section we demonstrate, on the basis of cases in which there is either no subject or no agentive v, that Hypothesis B is superior to Hypothesis A. §6 then establishes the general theory of VRM, allowing us to explain in §7 exactly why c-locality should condition VRM.

Against Hypothesis A, there is evidence that c-locality of object to subject is neither necessary nor sufficient for VRM. It is not necessary, since intransitive change of state verbs allow VRM, such as *wilt* in (24). Here no two arguments are coindexed, but VRM is licensed.

(24) hoov -u udur -i -koND -itu
flower -NOM wilt -PP -VRM -3sn
The flower wilted.

Conversely, VRM is sometimes prohibited even when there are two coindexed and c-local arguments. This happens with dative subject verbs, such as *fear* in (25); here VRM is impossible (Lidz 2001).

(25) * hari -ge tann -u hedari -koLL -utt -aane
H. -DAT self -NOM fear -VRM -NPST -3sm
'Hari fears himself.'

So the idea that VRM depends on subject-object c-locality is not attractive.

Hypothesis B, on the other hand, finds support in the data (cf. Mohanan and Mohanan 1998). Evidently, VRM occurs only with predicates that semantically implicate an agent, whether the agent is realized by a syntactic argument of the verb or not. For example, when an intransitive change of

5. Notice that the object DP in (22) would not be c-local to v_{AG} even if the causal relation between means and result were introduced as the semantic reflex of a combinatory rule, rather than by the head CAUS in syntax. Thus nothing in our analysis will depend on this head being present.

6. Hypothesis A recasts Reinhard and Reuland 1993's Condition B (a reflexive predicate is reflexive-marked) using c-locality to define predicatehood.

state verb such as *wilt* occurs with VRM, an adjunct may be added that expresses the agent of change (26). But without VRM this addition makes no sense (27). So VRM here coincides with the expression of agentivity (or external causation), and not with any relation between subject and object.

(26) gaali-ge hoov -u udur -i -koND -itu
wind-DAT flower -NOM wilt -PP -VRM -3sn
'The flower wilted because of the wind.'

(27) * gaali-ge hoov -u udur -i -tu
wind-DAT flower -NOM wilt -PST -3sn
Intended: 'The flower wilted because of the wind.'

The contrast between (25) and (28) reinforces the point. A non-causative psych verb like *fear*, (25) shows, cannot take VRM when its arguments are coindexed. But the causative of *fear* must take VRM, as shown in (28).

(28) hari tann -annu hedar -isi *(-koLL) -utt -aane
H. self -ACC fear -CAUS -VRM -NPST -3sm
'Hari frightens himself.'

From these facts, we infer that the licensing conditions for VRM refer critically to agentive v, and hence that Hypothesis B is worth pursuing: VRM entails some relation between v_{AG} and an object DP below it.

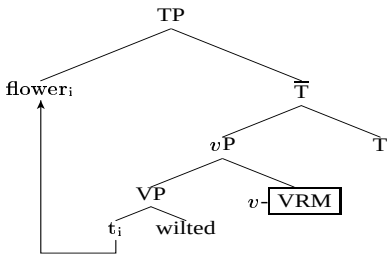
6. The licensing of VRM

Lidz (1998, to appear) argues that VRM appears just when v_{AG} has no DP in its specifier.[7]

(29) VRM $\Longleftrightarrow$ there is no DP in a specifier of v. (Lidz 1998)

Direct motivation for this principle comes from change of state intransitives like (24) above, which show VRM despite not being reflexive. VRM occurs in (24) because it has the unaccusative derivation in (30).

(30)



7. See Embick 1998 and to appear for similar claims in other cases.

Spec-v_{AG} is also *generally* absent in reflexive clauses, claims Lidz, owing to a principle of chain formation, given in (31): when a DP binds a reflexive, intermediate A-traces of that DP are erased.

(31) Anaphor CHAINs (Lidz 1998, Lidz and Idsardi 1998):

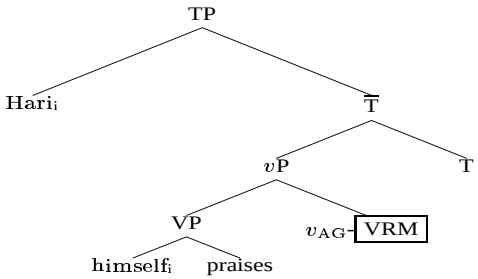
a. DP_i and $anaphor_i$ are connected by CHAIN.

b. A-traces intermediate between the head and tail of a CHAIN are deleted.

Thus a subject raised to spec-T, if it binds a reflexive, leaves no trace in spec-v_{AG}, as outlined in (32). This means that a simple reflexive clause like 'Hari praises himself' has the structure in (33). Subject raising leaves spec-v_{AG} empty, and VRM is consequently licensed.

(32) $[_{TP}$ hari $[_{vP}$ ~~hari~~ $[_{VP}$ praises rashmi]]] CHAIN: ⟨ hari, ~~hari~~ ⟩
$[_{TP}$ hari $[_{vP}$ $[_{VP}$ praises himself]]] CHAIN: ⟨ hari, himself ⟩

(33)



Now observe that VRM would be bled in a reflexive clause, even after deletion of the subject trace, if some other DP were to move to spec-v. Spec-v would then be occupied, and VRM not licensed. This then is what we propose happens in Kannada resultatives: the object DP obligatorily moves to spec-v, bleeding the insertion of VRM in v. The requirement that this DP raise is derived from the theory of Case assignment detailed in the following section.

7. C-locality and Case assignment

To explain why the failure of c-locality between the object DP and v_{AG} should block VRM, we propose the following theory of Case assignment. First, a DP has Case in its base position if an only if it is c-local to a Case-assigning head, as stated in (34) (cf. Chomsky 2000).

(34) Case by AGREE: X has Case in its base position iff X is c-local to a head Y, and Y assigns Case.

Thus a Case-assigning head Y licenses X only if what intervenes between the two could be composed to give a single function over X. Syntactic licensing is thereby linked to independently necessary properties of the combinatory semantics.

Next, we assume that v_{AG} is a Case assigner (Chomsky 1995). It then follows that objects in transitives, causatives and ECM constructions check Case in their base positions, because these are c-local to v_{AG} (§4); but the lower object DP in a resultative does not get Case in its base position, because it is not c-local to v_{AG} (§4).

Case for non c-local DPs is licensed otherwise, by movement to a specifier of v. We propose that this is also a Case position, as stated in (35). And we assume that the movement from within the result predicate is licit, all else equal; this means that A-movement does not require c-locality, an important claim to which we will return in our conclusions.

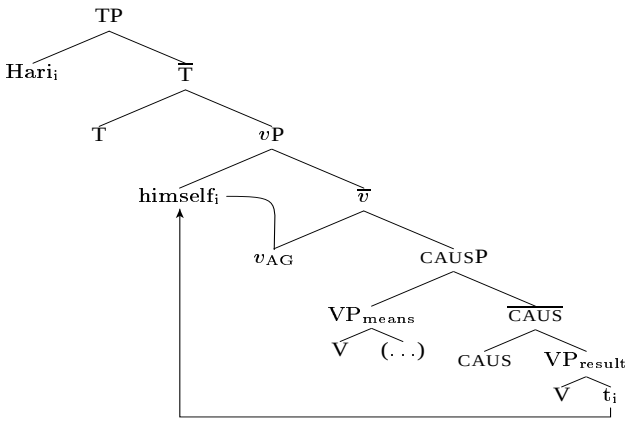
(35) Case by MOVE: X has Case if X is in a specifier of Y, and Y assigns Case.

Finally, we will say that movement for Case is permitted only to DPs that lack Case in situ.

(36) Last Resort: X moves iff movement is required to check a feature of X. (Chomsky 1995)

It follows that, while object DPs in general cannot (and do not) move to spec-v for Case, DPs born deep inside a resultative must (and do). The structure for Kannada resultatives is therefore as in (37), where the bowed line represents Case checking.

(37) Case by MOVE in a Kannada resultative



But now notice, the structure in (37) does not license VRM, since v_{AG} has a DP in its specifier. Hence we derive the theorem in (38), which finally explains why VRM is impossible in Kannada resultatives.

(38) Theorem: An anaphor not c-local to v_{AG} will bleed VRM, because it must MOVE to spec-v for Case.

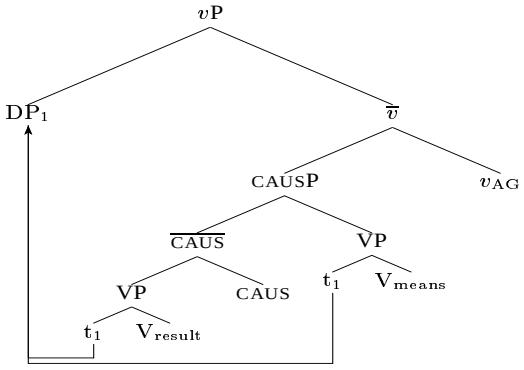
8. Case movement and object-sharing

When the means verb is transitive, resultatives show 'object-sharing'. A single overt DP (here, Excalibur) provides the value of two semantic arguments: the logical object of the means predicate (hammer) and the logical subject of the result (flat).

In Kannada, resultatives whose means component is transitive have two object positions in syntax; but still only one overt object surfaces. How does this single DP relate to the two object slots?

The Case-movement analysis just set out allows for a simple answer. Object-sharing in Kannada is ATB Case movement. Concretely, the verbal phrase in a resultative with object-sharing has the LF in (39).

(39) Object-sharing as ATB movement in a Kannada resultative



Here the object positions are occupied by traces, both coindexed with a single DP in a specifier of v_{AG}. The result is an ATB configuration. Familiar ATB movement is co-extraction from within the two arguments of a coordinating conjunction. (39) is co-extraction from within the two arguments of CAUS, a head formally of the same type as a coordinating conjunction.[8] Thus, any sound treatment of the familiar ATB cases ought to work here as well (see Williams 1978, Gazdar 1981, Munn 1992).

8. In an alternative analysis where the head CAUS is omitted (see note 5), this extraction would of course be structurally symmetrical, unlike in (39).

Finally we assume that v_{AG} can assign Case only once, i.e. can license only a single overt DP. This explains why a Kannada resultative cannot have two overt objects, despite its two object positions. The ATB configuration is nontheless licit, since it has only a single DP bearing Case features. Interestingly, this means that object-sharing is forced by the syntax we presume for resultatives.

In §10, after our conclusions, we give a simplified semantic derivation for (39), using conventional combinatorics and formalism.

9. Conclusions

We have argued that the lack of VRM in reflexive resultatives in Kannada is a consequence of our articulated phrase structure for resultatives, (2), in concert with a Case theory driven by c-locality. In (2), the means predicate interrupts the Case relation between v_{AG} and the object DP in situ. Hence the object moves to spec-v_{AG}, and this bleeds VRM, because VRM occurs just when spec-v_{AG} is empty.

The c-locality relation serves this account in two ways. Generally, it diagnoses the structural complexity of resultatives in comparison to other constructions; and specifically, it bounds the domain of locality for Case relations. In both roles its use seems to us natural, and also explanatory, as it aligns complex structural relations with the elementary relation of function to argument. Of course, the challenge this poses to a radically 'modular' separation of syntax from semantics is clear.

Finally, we observe that our theory establishes two domains of locality as importantly distinct. First is the c-locality domain, in which AGREE operates. Here locality may *prevent* movement: e.g. a DP c-local to v cannot MOVE for Case. Second is the less restrictive domain defined by traditional notions of locality, within which MOVE, in particular A-movement, *can* operate. Future research will explore whether this distinction can be utilized more broadly, in cases outside the Kannada resultative.

10. Comments on the semantics

Figure 2 exemplifies the semantic derivation we assume for Kannada resultatives, in particular for (40). The derivation proceeds bottom-up, calculating the interpretation for each node in the structural analysis of (40), which we presume is as in (39). We ignore the tense node, T, as a convenience. [9]

9. For simplicity's sake, we suppress reference to variable assignments in figure 2, and instead distinguish unbound variables (i.e. terms dependent on an assignment) by naming them with Greek letters. For example, instead of writing $\| t_1 \|^g$, we write α.)

(40) Hari kabbinavannu chappateyaagi taTTida
H. metal.ACC flat.be(come).PP hammer.PST.3sm
'Hari hammered the metal flat.'

1.	DP	α	trace rule
2.	V_{result}	$\lambda y.bcm.flat(y)$	lexical entry
3.	VP	$bcm.flat(\alpha)$	FApp: 1,2
4.	CAUS	$\lambda R \lambda M.CS(M, R)$	lexical entry
5.	$\overline{\text{CAUS}}$	$\lambda M.CS(M, bcm.flat(\alpha))$	FApp: 3,4
6.	DP	α	trace rule
7.	V_{means}	$\lambda y.hamm(y)$	lexical entry
8.	VP	$hamm(\alpha)$	FApp: 6,7
9.	CAUSP	$CS(hamm(\alpha), bcm.flat(\alpha))$	FApp: 5,8
10.	v_{AG}	$\lambda P \lambda x.AG(x, P)$	lexical entry
11.	$\overline{v}$	$\lambda x.AG(x, CS(hamm(\alpha), bcm.flat(\alpha)))$	FApp: 9,10
12.	$\overline{v}$	$\lambda z.(\lambda x.AG(x, CS(hamm(z), bcm.flat(z))))$	λAbs: 11 (movement)
13.	DP	m	lexical entry
14.	vP	$\lambda x.AG(x, CS(hamm(m), bcm.flat(m)))$	FApp: 12,13
15.	spec-T	h	lexical entry
16.	TP	$AG(h, CS(hamm(m), bcm.flat(m)))$	FApp: 14,15

Figure 2: Derivation for (40), analyzed as in (39)

The combinatory operations used in figure 2 are standard, basically those of Heim and Kratzer 1998. But our presumed denotations for the constants require some comment.

We factor the causativity expressed by resultatives into two relations: CS and AG. CS is a relation between two propositions, true when the first results in the second. AG is a relation between an individual and a proposition, true when the first is the agent of the second (Kratzer 1996). Thus our semantics for (40) can be glossed, brutally: 'Hari is the agent of the hammering of the metal's resulting in the metal's being flat.'

AG here relates an individual to the (proposition expressing the) event of causation, not the means event. But of course the agent of causation is also interpreted as the agent of the means verb: (40) entails that the hammerer is Hari. By itself, our semantics for (40) does not capture this fact. We leave open the question of how exactly it should be captured, given a theory that following factors agentivity from verb meanings, in the manner of Marantz 1984 and Kratzer 1996. Provisionally, we assume that the entailment arises by postulate, one we consider plausibly 'deep': $AG(x, CS(M, R)) \Rightarrow AG(x, M)$.

Finally, we note that our semantics could be rendered in neo-Davidsonian fashion, using event variables, without great technical difficulty. Yet this would require answers for subtle questions better avoided in this paper, such as the following (see Rothstein 2001:158–9). It seems the asserted content of a resultative *refers* to only a single event; how should this be represented

in an analysis that will presumably introduce distinct variables for the means event, the result event, and the event of causation?

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