Participant Sharing in Chinese Resultatives

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Introduction: Chinese resultatives take the form of verbal compounds V_1-V_2, V_1 denoting an activity e_1 and V_2 its resultant state s_2. See (1). Following the literature, we call them R(esultative) V(erb) C(ompound)s and use S(ubject)+V_1-V_2+O(bject) to represent sentences containing RVCs.

This talk discusses relations between O and V_1, V_2. We propose O is thematically related to both V_1 and V_2: it receives a theta role from V_2 by being its argument, and it receives a theta role from V_1, not by being its argument, but to satisfy a requirement of RVC formation, which we call *Participant Sharing*. We motivate *Participant Sharing* (cf. Rothstein 2004) by showing previous analyses (Li 1990, Lin 2004, Williams to appear) are inadequate in capturing the relation of O to V_1 and we implement the idea by adding into the semantic rule of resultative formation a conjunct $[\![\text{O}]\!] \in \theta(e_1)$, which requires the argument of V_2 also receive a thematic role from V_1.

Problem with Argument Sharing: Since there are two verbs but only two argument positions S and O, assuming both verbs have their own theta roles to assign, it is natural to ask: where does the additional theta role go if V_1 is transitive? It is easy to show an *Argument Sharing* idea (Li 1990) cannot be right. Look at (2): (2) is an example of unergative verbs being V_1; in this case, the O is not an argument of V_1 and Argument Sharing cannot be satisfied. Even worse, there are transitive V_1 but without Argument Sharing; following Lin (2004), I call these cases unselective transitive V_1, see (3). A comparison between (1) and (3) shows we would never know when Argument Sharing is to be applied.

Problem with Pragmatic Association: Based on examples like (2) and (3), Williams (to appear) proposes *Pragmatic Association*. In his theory, a thematic relation between V_2 and O is always present, but there is no thematic relation between V_1 and O. Any understood relation of O to V_1 is pragmatically inferred. Take (3) as an example. In Williams' analysis, it means 'Zhangsan hacked something, and the axe got blunt as a result' and pragmatics tells us that the *axe* is the instrument of *hacking*.

However, this analysis over-generates. Consider (1) again: Lin (2004) noticed pragmatic association predicts it can either have (4a) or (4b) as its interpretations. But (4b) is impossible, as is shown by the contradiction in (5). In other words, the *leaves* in (1) has to be interpreted as the patient of *hacking*. Notice, this problem cannot be solved by Kratzer's (2005) (citing Bittner 1999) Direct Causation either, since Chinese has RVCs not involving Causation, e.g. *xie-cuo* 'write-wrong', *shui-xing* 'sleep-awake'.

Participant Sharing: In view of the above problems, we propose *Participant Sharing*. It says (6) and treads a middle ground between the two earlier proposals: it enforces a grammatical relation between V_1 and O (unlike the Pragmatic Association approach), but it denies an Verb-Argument relation between V_1 and O (contra Argument Sharing) and by doing this it leaves open what the precise relation will be.

(6), together with the *anti-passive* assumption (see (7)) in resultative literature (Lin 2004, Kratzer 2005, Williams to appear), captures (1), (2) and (3). Notice (7) is at least motivated by (2) and (3).

First, (7) solves the problem faced by Argument Sharing by directly denying the principle. But crucially, the effect of Argument Sharing is preserved. Specifically, in (1)-type cases, although *leaves* is interpreted as the patient of *hack*, it is not an argument of it; the patient relation between *leaves* and *hack* is instead enforced by Participant Sharing (6). Likewise, in (2), Participant Sharing is satisfied by letting *handkerchief* receive an locative role from *cry*; in (3) it is also met by allowing *axe* to receive an instrument role from *hack*. *Second*, (6) solves the over-generation problem faced by Pragmatic Association, by excluding any sentence/interpretation whose O does not receive a theta role from V_1 of the RVC. Specifically, in (4b), the *tree* received the patient role from the *hack*, putting *leaves* in a situation where it can receive no imaginable thematic role, violating the Participant Sharing constraint.

Implementation: We formalize the above idea using an RVC-formation rule ((8)). Three things need mentioning. First, existentially binding of the internal argument of V_1 represents the idea that O is never an argument of V_1. Second, Participant Sharing is modeled by $[\![O]\!] \in \theta(e_1)$, where $[\![\theta]\!] = \lambda e \lambda x$ (x bears a theta role to e). Third, R represents the relation between e_1 and s_2; I leave it open whether R is a Causal (Kratzer 2005) or Temporal (Rothstein 2004). (9)-(11) show results of applying (8) to (1)-(3).

(1) *Zhangsan kan-diao le shuye.*
Zhangsan hack-fall PERF leaves
'Zhangsan hacked the leaves and the leaves fell off.'

(2) *Zhangsan ku-shi le shoupa*
Zhangsan cry-wet PERF handkerchief
'Zhangsan was crying and his handkerchief got wet as a result.'

(3) *Zhangsan kan-dun le fuzi*
Zhangsan hack-blunt PERF axe
'Zhangsan hacked something and the axe got blunt.'

(4) *Zhangsan kan-diao le shuye*
Zhangsan hack-fall PERF leaves
a. 'Zhangsan hacked the leaves, and the leaves fell.'
b. Impossible: 'Zhangsan hacked the tree and the leaves fell.'

(5) # *Zhangsan kan-diao le shuye, dan ta mei kan shuye*
Zhangsan hack-fall PERF leaves, but he not hack leaves
a. #'Z hacked the leaves and the leaves fell off, but Z did not hack the leaves'.
b. Impossible: 'Z hacked something and the leaves fell off, but Z did not hack the leaves.'

(6) PARTICIPANT SHARING: To combine two verbs V_1, V_2 into an RVC V_1-V_2, the event introduced by V_1 and the event introduced by V_2 have to share at least one participant.
where: an individual is a participant of an event if the NP denoting the individual receives a theta role from the verb that describes the event.

(7) ANTIPASSIVE ASSUMPTION: O is never an argument of V_1.

(8) RVC FORMATION
a. Transitive V_1: $\lambda x\lambda y\lambda e_1[P(x)(y)(e_1)] + \lambda x\lambda s_2[Q(x)(s_2)]$
$= \lambda x\lambda y\lambda e_1\exists z\exists s_2[R(e_1)(s_2) \wedge P(z)(y)(e_1) \wedge Q(x)(s_2) \wedge x \in \theta(e_1)]$
b. Intransitive V_1: $\lambda x\lambda e_1[P(x)(e_1)] + \lambda x\lambda s_2[Q(x)(s_2)]$
$= \lambda x\lambda y\lambda e_1\exists s_2[R(e_1)(s_2) \wedge P(y)(e_1) \wedge Q(x)(s_2) \wedge x \in \theta(e_1)]$

(9) $[\![(1)]\!] = \exists z\exists e_1\exists s_2[R(e_1)(s_2) \wedge$ hack(Zhangsan)$(z)(e_1) \wedge$ fallen(the leaves)$(s_2) \wedge$ the leaves $\in \theta(e_1)]$
Pragmatics tells us *the leaves* can only be interpreted as the patient of *hack*; $[\![(1)]\!]$ simplified to:
$[\![(1)]\!] = \exists z\exists e_1\exists s_2[R(e_1)(s_2) \wedge$ hack(Zs)$(z)(e_1) \wedge$ fallen(the lvs)$(s_2) \wedge$ the lvs = PATIENT(e_1)]
Since z is the internal argument of V_1, z = Patient (e_1); the above formula becomes:
$[\![(1)]\!] = \exists e_1\exists s_2[R(e_1)(s_2) \wedge$ hack(Zs)(the leaves) $(e_1) \wedge$ fallen(the leaves)$(s_2)]$
Thus, we get the right interpretation for (1).

(10) $[\![(2)]\!] = \exists e_1\exists s_2[R(e_1)(s_2) \wedge$ cry(Zs)$(e_1) \wedge$ wet(the h-chief)$(s_2) \wedge$ the h-chief$\in \theta(e_1)]$
Pragmatics tells us that *the handkerchief* can be interpreted as the location of *cry*, and the formula can be simplified to:
$[\![(2)]\!] = \exists e_1\exists s_2[R(e_1)(s_2) \wedge$ cry(Zs)$(e_1) \wedge$ wet(the h-chief)$(s_2) \wedge$ the h-chief = LOCATION $(e_1)]$

(11) $[\![(3)]\!] = \exists z\exists e_1\exists s_2[R(e_1)(s_2) \wedge$ hack(Zhangsan)$(z)(e_1) \wedge$ blunt(the axe)$(s_2) \wedge$ the axe $\in \theta(e_1)]$
Pragmatics tells us that *the axe* can be interpreted as the instrument of *hack* (in the context of being blunt), and the formula can be simplified to:
$[\![(3)]\!] = \exists z\exists e_1\exists s_2[R(e_1)(s_2) \wedge$ hack(Zs)$(z)(e_1) \wedge$ blunt(the axe)$(s_2) \wedge$ the axe=INSTRUMENT$(e_1)]$

Selected References: Kratzer, A. 2005. Building resultatives. In *Event arguments: Functions and applications*, ed. C. Maienborn and Wollstein-Leisten, 177-212. **Li, Y**. 1990. On V-V compounds in Chinese. *NLLT* 9:177-207. **Lin, J.** 2004. *Event structure and the encoding of arguments*. Thesis, MIT. **Rothstein, S**. 2004. *Structuring Event*. Blackwell. **Williams, A**. (to appear). Objects in resultatives. Accepted with minor revisions to *NLLT*.