

**MANDARIN RESULTATIVE
COMPOUNDS: A FAMILY OF LEXICAL
CONSTRUCTIONS**

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Abstract

This paper presents a novel analysis of certain Mandarin resultative compounds whose interpretations have provided a challenge to traditional assumptions regarding argument-function mapping. We argue that the peculiarities associated with these compounds point to the need to recognise constructional effects in grammar. In contrast to previous analyses, which make essentially *ad hoc* modifications to mapping theories in order to accommodate the facts, we propose that the various interpretations associated with a given compound arise from differing event structure templates, each with its own distinct mapping alignments. Mandarin resultative compounds, on this account, constitute a family of lexical constructions. Our analysis permits us to retain conventional mapping assumptions, while at the same time accounting for the specific characteristics associated with the relevant interpretations.

1 Introduction¹

Mandarin resultative compounds have been and continue to be an area of extensive research in Chinese linguistics. This is partly because the interpretations of these compounds pose serious challenges for conventional assumptions of argument realisation: in some instances a single clausal combination of words involving a resultative compound can permit up to three different interpretations. Consider the compound *zhui-lei* 'chase-tired' in (1).²

- (1) Taotao zhui-lei-le Youyou le (Y. Li 1995: 256)
 chase-tired-PERF CRS
- a. 'Taotao chased Youyou and as a result, Youyou got tired.'
 b. 'Taotao chased Youyou and as a result, Taotao got tired.'
 c. 'Youyou chased Taotao and as a result, Youyou got tired.'

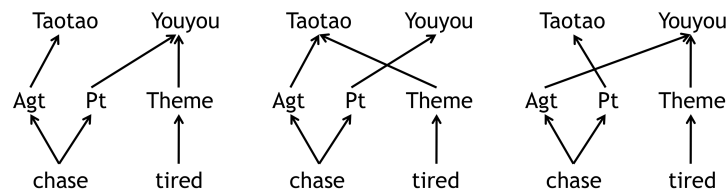


Figure 1: (left to right) argument mappings for (1a), (1b), and (1c).

¹ We thank the participants of the LFG11 conference for their generous feedback.

² Following Li and Thompson (1981), we gloss sentence final *le* as Currently Relevant State (CRS).

On the interpretation in (1a), the SUBJ *Taotao* and the OBJ *Youyou* are respectively the agent and patient of 'chase'. At the same time, the OBJ is also understood as the theme of 'tired'. On the interpretation in (1b), while the SUBJ and OBJ are again respectively the agent and patient of 'chase', it is the SUBJ that is associated with the theme of 'tired'. On the last interpretation in (1c), the SUBJ is associated with the patient of 'chase', while the OBJ is understood as both the agent of 'chase' and the theme of 'tired'. Thus, the reading in (1c) seems to involve a non-canonical correspondence between semantic roles and syntactic arguments, violating standard mapping assumptions: the agent-like participant is realised as the OBJ, while the patient-like participant maps onto the SUBJ. Given this seemingly odd configuration, it is perhaps unsurprising that the unexpected interpretation in (1c) is the least readily accessible of the three available interpretations to native speakers. In response to data like (1c), many researchers have proposed analyses that involve the modification of standard mapping assumptions within various frameworks (e.g. Huang & Lin 1992, Y. Li 1995, Her 2007, Shibagaki 2009, *inter alia*).

In contrast, this paper adopts a different approach. Rather than alter standard correspondences between thematic roles and function assignments largely in *ad hoc* ways to simply re-describe the facts, we follow Goldberg and Jackendoff's (2004) analysis of English resultatives and propose treating Mandarin resultative compounds as a family of related constructions. On our analysis, each available interpretation of a compound is associated with a distinct event structure, which is realised as a V-V compound with its own distinct mapping alignments. We motivate each of the event structures and show how the patterns of argument-function assignment can be accounted for straightforwardly in terms of Dowty's (1991) proto-property theory and the lexical mapping theory (LMT). By paying detailed attention to the lexical semantics of these complex predicates, we build conservatively on extant theories of argument linking, while grounding evident departures in event structure templates that characterise the family of Mandarin resultatives.

The remainder of this paper proceeds as follows. In section 2, we question if the preverbal NP should be treated as a SUBJ on interpretations such as (1c). We then present a recent LFG analysis of the phenomenon by Her (2007) as an exemplar of an analysis that modifies the mapping theory in order to account for data like (1c), while highlighting the shortcomings of this approach. Section 4 presents our construction-theoretic analysis, and section 5 concludes the paper.

2 Subjecthood of the preverbal NP

Before presenting any analyses, we must first ascertain if the preverbal NP is indeed a SUBJ on all interpretations of the compound. Whereas the question of SUBJ status of the preverbal NP on interpretations (1a-b) involving

canonical mapping does not arise, the same cannot be said for the reading in (1c). In the former set, argument realisation patterns are consistent with common mapping expectations: given a predicate that selects for both a SUBJ and an OBJ, the more agentive participant is realised as SUBJ, while the more patientive participant maps onto the OBJ. In contrast, as noted earlier, the interpretation in (1c) appears to violate the semantic role - grammatical relation mapping as it has been developed in most familiar formal syntactic frameworks. As such, it would be legitimate to question the SUBJ status of the preverbal NP on such readings. For this, we appeal to subjecthood diagnostics developed in Tan (1991). In an extended study of subjects in Mandarin, Tan argues that reflexive binding, imperatives, and adjunct control can be used as diagnostics for grammatical subjecthood in Mandarin.³ All three tests distinguish SUBJs from the other grammatical and discourse relations, while the first two tests also distinguish grammatical SUBJs from logical subjects. For ease of exposition, we shall refer to readings that appear to involve non-canonical argument-function mapping as 'inverted readings'.

Tan provides evidence showing that a reflexive can only be bound by the grammatical SUBJ in the same or dominating clause (Tan 1991: 26-27). If we apply this to the compound *zhui-lei* 'chase-tired', we see that the preverbal NP can indeed bind a reflexive on all three interpretations:

- (2) [na-zhi gou]_i zhui-lei-le ziji_i de zhuren
 that-CL dog chase-tired-PERF REFL POSS owner
 a. 'That dog chased its owner, causing the owner to be tired.'
 b. 'That dog got tired of chasing its owner.'
 c. 'That dog got its owner tired, by its owner chasing it.'

Therefore, the reflexive test diagnoses the preverbal NP as the SUBJ of the clause, even for the inverted reading in (2c).

Imperatives provide another test for subjecthood: "The addressee of the imperative sentence in Chinese, like in other languages, has to be the subject, expressed or omitted" (Tan 1991: 30). Applying this diagnostic to the compound *zhui-lei*, the omitted addressee in (3), which otherwise would have to occur in the preverbal position, is the SUBJ.

- (3) ∅ bie zai zhui-lei waipo le
 (you) not again chase-tired maternal.grandma CRS
 Mother to child:
 a. 'Stop chasing grandma and making grandma tired.'
 b. 'Stop making grandma tired by having grandma chase you.'

³ Tan also provides possessor relativizing as another test for subjecthood. However, it turns out that this is independently unacceptable with all resultative compounds. The reason for this is beyond the scope of this paper.

Hence, according to this test, the preverbal NP is the SUBJ, even on the inverted reading in (3b).

Unlike the previous two tests, the adjunct control test does not uniquely pick out the grammatical SUBJ: "either subjecthood or agentiveness legitimates control" (ibid.). The judgements here are mixed: while all speakers allow an agent to control an adjunct, only some also allow the non-agentive preverbal NP to control the adjunct on the inverted reading. Consider (4):

- (4) na-ge xiaohai guyi zhui-lei-le waipo
that-CL child intentionally chase-tired-PERF maternal.grandma
a. 'That child chased grandma with the intention of making her tired.'
b. '?That child intentionally got grandma tired by having grandma chase him/her.'

For all speakers, the sentence in (4) is acceptable on the interpretation in (4a), where the agent *na-ge xiaohai* 'that child' controls the adjunct *guyi* 'intentionally'. However, only some find the sentence in (4) to be acceptable on the interpretation in (4b), where the controller of the adjunct (the child) is not the agent (it is grandma who is the chaser). Since the adjunct control test does not discriminate between a grammatical SUBJ and logical subject, the marginality of (4b) is not crucial: given that the preverbal NP is not the logical subject on the desired interpretation, the fact that some speakers allow the adjunct to be controlled by this NP implies that the preverbal NP must be a grammatical SUBJ on the interpretation in (4b).

Since all three tests converge on the same inference, we conclude that the preverbal NP of a resultative compound is the SUBJ of the clause on the inverted reading.

3 A recent LFG treatment: Her 2007

Having confirmed the SUBJ status of the preverbal NP, we now examine a recent treatment of the phenomenon within the LFG framework. Her (2007) proposes that resultative compounds are formed by the operation in (5), which binds the single thematic role of V_2 (V_{res}) with either of the two roles of V_1 (V_{caus}), as indicated by the hyphen. The rules in (5i-iv) pertain to compounds formed with a transitive V_1 , while those in (v-vii) are relevant for compounds that have an intransitive V_2 . **Shaded variables** represent arguments that have been suppressed in order to fulfil the ARGUMENT-FUNCTION BIUNIQUENESS PRINCIPLE. [caus] (cause) and [af] (affectee) are causative properties that are assigned to argument roles according to the principle in (6). There are two implicit assumptions in (6). First, only argument roles that originate from $V_{2/res}$ can receive [af] while only argument roles that originate from $V_{1/caus}$ can receive [caus]. Second, the two causative

properties must be assigned together; one cannot be assigned in the absence of the other.

(5) Lexical rules for resultative compounding (Her 2007: 237)

$$V_{\text{caus}} \langle x, y \rangle + V_{\text{res}} \langle z \rangle \rightarrow V_{\text{caus}} V_{\text{res}} \langle \alpha, \beta \rangle,$$

where $\langle \alpha, \beta \rangle =$

- (i) $\langle x, y-z \rangle$
- (ii) $\langle x[\text{caus}], y-z[\text{af}] \rangle$
- (iii) $\langle x-z, y \rangle$
- (iv) $\langle y[\text{caus}], x-z[\text{af}] \rangle$

$$V_{\text{caus}} \langle x \rangle + V_{\text{res}} \langle z \rangle \rightarrow V_{\text{caus}} V_{\text{res}} \langle \alpha, (\beta) \rangle,$$

where $\langle \alpha, (\beta) \rangle =$

- (v) $\langle x-z \rangle$
- (vi) $\langle x-z \rangle$
- (vii) $\langle x[\text{caus}], z[\text{af}] \rangle$

(6) Causativity Assignment in Resultative Compounding (Her 2007: 234)

An unsuppressed role from V_{res} receives [af] iff an unsuppressed role from V_{caus} exists to receive [caus].

To illustrate the interaction between the rules in (5) and the principle in (6), consider (5i-ii). In both argument structures, the second argument of $V_{1/\text{caus}}$ is bound with the sole argument of $V_{2/\text{res}}$ to form a composite role. On Her's interpretation, only one of the two composing roles in the composite role can receive syntactic assignment in order to fulfil argument-function biuniqueness. For this to happen, the argument role that does not receive function assignment is suppressed. In (5i), it is the argument originating from $V_{2/\text{res}}$ that is suppressed, while in (5ii) the argument originating from $V_{1/\text{caus}}$ is suppressed. In (5i), even though the x role that originates from $V_{1/\text{caus}}$ can receive [caus], the z role originating from $V_{2/\text{res}}$ cannot receive [af] as it has been suppressed. Since the two properties must be assigned together, the x role is not assigned [caus]. In (5ii) on the other hand, the z role originating from $V_{2/\text{res}}$ has not been suppressed and thus is eligible to receive the [af] assignment, as the condition in (6) is met.

The fact that not all of the resulting argument structures in (5) contain the causative properties [caus] and [af] reflects the intuition that not all resultative compounds are 'causative' (Wang 1958; Huang 1988; Gu 1992; Cheng and Huang 1994; Cheng et al. 1997; Y. Li 1995, 1999 *inter alia*). To use the example in (1), only the interpretations in (1a) and (1c) are considered causative, for semantic and syntactic reasons. Semantically, although the basic meanings of the three interpretations are always that *Taotao* chased *Youyou* and as a result one of them became tired, it is only on the interpretations in (1a) and (1c) that there is a strong sense in which *Taotao* is responsible for the state that *Youyou* is in. On the other hand, no such additional meaning of causation is associated with (1b). Syntactically, (1a) and (1c) but not (1b) are compatible with the *ba*- and *bei*- constructions,

which have been argued to be diagnostic of causativity (Li and Thompson 1981; Huang 1992; Zou 1993; Y. Li 1995; Bender 2000; Ziegeler 2000 *inter alia*). On Her's analysis, only those compounds formed with argument structures containing [caus] and [af] bear these semantic and syntactic properties of causativity.

Like many other researchers who adapt the standard mapping theory of their adopted framework in order to account for the distribution of the data, Her makes modifications to the LMT. First, *only* patients/themes receive intrinsic classification (IC):

- (7) Intrinsic classification of argument roles for functions (Her 2007: 228)
 pt/th → [-r]

Second, mapping follows the UNIFIED MAPPING PRINCIPLE (UMP) in (8), which applies to all syntactic functions alike.

- (8) Unified Mapping Principle (Her 2007: 229)
 Map each argument role, from the most prominent to the least, onto the highest compatible function (CF) available. (A function is compatible iff it is not linked to a role.)

These changes allow him to account for the various interpretations associated with resultative compounds, including, crucially, the inverse readings. For instance, consider the sentence in (9), which has the inverse reading: even though the eater is more agentive than the eatee, the eatee is realised as SUBJ.

- (9) zhe zhong yao hui chi-si ni (Her 2007: 224)
 this kind drug will eat-dead you
 'Eating this kind of drug will kill you.'

Her shows that the acceptability of (9) is predicted by (5iv) and the modified LMT:

- (10) (5iv): < y[caus] , x-z[af] > (y = 'drug', z = 'you')
 IC [-r] [-r]
 CF S/O S/O
 UMP S O

Since y, originally the second argument of *chi* 'eat', and z, the sole argument of *si* 'dead', both represent patient/theme roles, both arguments receive the intrinsic classification [-r] in accordance with (7). Given the feature decomposition of functions in LFG, both arguments are compatible with either SUBJ or OBJ. The inverse mapping results from the assignment of the causative property roles. Her writes:

It has been well-established since Dowty (1991) that [caus] is a prototypical property associated with the AGENT role and [af] is associated with the prototypical PATIENT and that the former is more prominent than the latter. (Her 2007: 235)

According to the UMP then, the argument associated with [caus] takes precedence in mapping onto the highest compatible function. Therefore, *yao* 'drug' is realised as the SUBJ, while *ni* 'you' maps onto the OBJ, giving the mapping that is associated with the inverse reading.

Even though the analysis put forth by Her provides an explanation for the otherwise unexpected inverse reading, it is not without its problems. First, Shibagaki (2009) points out that Her's analysis incorrectly predicts (11) to be grammatical.

- (11) **ni hui chi-si zhe zhong yao* (Shibagaki 2009: 6)
 you will eat-dead this kind drug
 Intended: You will die from eating this kind of drug.

- (12) (5iii) < x-z , y > (x = 'you', y = 'drug')
 IC [-r]
 CF S/O/... S/O
 UMP S O

Given (5iii), (11) should be well-formed, as shown in (12). *z*, which represents the sole argument of 'dead', has been suppressed, and since *x* represents the agent of 'eat', it does not receive any intrinsic classification according to (7). On the other hand, *y*, as the theme of 'eat', is assigned [-r]. Since agents are more prominent than themes, the UMP maps *x* onto the SUBJ and *y* onto the OBJ, predicting incorrectly that the sentence in (11) is grammatical.⁴

Furthermore, in spite of his invocation of Dowty in the quote above, Her's analysis effectively factors causativity out of Dowty's proto-property theory: if [caus] is indeed a prototypical property of AGENT and [af] that of PATIENT, then should it not be the case that the arguments that have been assigned [caus] and [af] be treated as AGENT and PATIENT respectively? This is evidently not the case in (10), where *y[caus]* is treated as a theme and receives the intrinsic classification [-r].

More broadly viewed, analyses, such as Her's, that modify standard mapping assumptions give the appearance of being largely *ad hoc* solutions to attested deviations from predictions associated with the original

⁴ It is worth pointing out here that even if we assumed the intransitive use of *chi* 'eat', (5vii) would also incorrectly predict (12) to be grammatical. The relevance of this point will become clear in section 4.3.

formulation. For instance, the consequences of Her's modifications to the LMT are unclear with regard to the analyses of other phenomena in other languages. Clearly, if more conservative assumptions about mapping can be maintained in the face of these challenging data, this is to be preferred.

4 A construction-theoretic analysis

Like Her, other analyses that modify the mapping theory of their favoured framework do so in order to accommodate the rather extraordinary inverse reading (e.g. Huang & Lin 1992, Y. Li 1995, Shibagaki 2009, *inter alia*). Rather than alter standard correspondences between thematic roles and function assignments, reflected in the basic LFG mapping operations, we argue that this peculiarity calls for the need to recognise constructional effects in grammar. Following Goldberg and Jackendoff's (2004) analysis of English resultatives, we propose treating Mandarin resultative compounds as a family of related constructions. As will become apparent, positing distinct constructions permits us to maintain conventional mapping assumptions, even for the inverse reading, while at the same time accounting for the specific characteristics associated with each interpretation. To do this, we first need to pay greater attention to the lexical semantics of these complex predicates.

4.1 Causativity

Let us begin by considering the simple verbs that combine to form a compound. Recall that the example in (1) contains the resultative compound *zhui-lei* 'chase-tired'. (13-14) illustrate the prototypical uses of each component verb: *zhui* 'chase' is a transitive verb, while *lei* is intransitive.

(13) Taotao zhui-le Youyou
 chase-PERF
 'Taotao chased Youyou.'

(14) Taotao lei-le
 tired-PERF
 'Taotao has become tired.'

It is important to note that between the two verbs, only *lei* 'tired' can be used causatively as well:

(15) Taotao zhui-le Youyou (*Zhangsan)
 chase-PERF
 *Taotao caused Youyou to chase (Zhangsan).

- (16) zhe-jian shi lei-le bu shao ren (Wang 2010: 138)
 this-CL matter tired-PERF NEG few people
 'This matter caused quite a few people to become tired.'

The two uses of *lei* 'tired' in (14) and (16) thus constitute an inchoative-causative alternation, such that the SUBJ of the inchoative occurs as the OBJ of the causative when an external causer argument is introduced as the SUBJ. Using more or less standard notation, the lexical semantics of the two uses of *lei* 'tired' can be represented as in (17), where the difference between the two lies in the introduction of the semantic predicate CAUSE and a causer argument in the causative use of the verb.

- (17) a. Inchoative *lei* 'tired': [BECOME **tired**'(x)]
 b. Causative *lei* 'tired': [x CAUSE [BECOME **tired**'(y)]]

In contrast, since *zhui* 'chase' is simply an activity predicate, its lexical semantic representation is (18):

- (18) *zhui* 'chase': [**chase**'(x, y)]

Unlike the non-causative use of *lei* 'tired', the lexical semantic representation of *zhui* 'chase' does not contain BECOME, i.e. it does not have the representation of an achievement/accomplishment predicate. This is because unlike *lei* 'tired', *zhui* 'chase' is not a telic or change-of-state predicate. Independent evidence for the aktionsart class of the two predicates can be adduced from the placement of durational phrases encoded as NPs. In Mandarin, durational phrases can either occur preverbally or postverbally. Tan (1991: 153-159) shows that their preverbal placement is only permitted with telic predicates. This is illustrated in the contrast between (19) and (20).

- (19) John yi xiaoshi jiu xie-wan-le yi feng xin (Tan 1991: 155)
 one hour only write-finish-PERF one CL letter
 'John wrote a letter in only one hour.'

- (20) John (*yi xiaoshi jiu) tui-le che (Tan 1991: 158)
 one hour only push-PERF cart
 'John pushed the cart (*in an hour).'

(19) contains the phase compound *xie-wan* 'write-finish', which indicates the completion of the action. As such, *xie-wan* 'write-finish' is necessarily a telic predicate. Since it is a telic predicate, the preverbal placement of the durational phrase is permitted. On the other hand, the activity predicate *tui* 'push' does not have an inherent end point and is not a telic predicate. As (20) shows, a durational phrase cannot occur before the activity predicate.

Returning to our example *zhui-lei* 'chase-tired', (21-22) show that while *lei* 'tired' permits a preverbal durational phrase, the same is not true for *zhui* 'chase'.

(21) Taotao yi xiaoshi jiu lei-le
 one hour only tired-PERF
 'Taotao became tired in only one hour.'

(22) Taotao (*yi xiaoshi jiu) zhui-le Youyou
 one hour only chase-PERF
 'Taotao chased Youyou (*in only one hour).'

Therefore, the placement of durational phrases confirms the hypothesis that while *lei* 'tired' is a change-of-state predicate, *zhui* 'chase' is not.

Given these observations regarding the aktionsart class of the two verbs, and the fact that only *lei* 'tired' can be causativised, we hypothesize that only predicate structures that are headed by a change-of-state predicate can be causativised. This can be represented as in (23):

(23) Causative formation
 [x CAUSE [BECOME pred'(y).....]]

According to (23), causativisation is a process that introduces, by way of the semantic predicate CAUSE, a causer argument to an event structure headed by a change-of-state predicate.

4.2 Complex event structure

Having considered the lexical semantic properties of simple verbs, we now turn our focus back to compounds. Since a resultative compound is formed by the concatenation of two independent verbs, this entails that the event structure of the complex predicate is composed of the event structures associated with the two simple verbs. On the other hand, this raises the possibility that resultative compounds may be associated with distinct composite event structures: the event structures of the combining predicates may display different relations to one another. In fact, semantic analyses of English resultatives have proposed that there are essentially two types of event structures for resultatives, shown in (24):

(24) a. [[x DO-SOMETHING] CAUSE [y BECOME STATE]]
 b. [[y BECOME STATE] BY [x DO-SOMETHING]]
 (adapted from Levin and Rappaport Hovav 1995: 75-83)

(24a) represents a complex event structure in which the two subevents are related by the semantic predicate CAUSE: the event denoted by the activity predicate causes the second event. On the other hand, (24b) involves an 'adjunct interpretation' of the event denoted by the activity predicate, which is the event BY which the change-of-state occurs (Dowty 1979, Jackendoff 1990, Goldberg 1995, Levin and Rappaport-Hovav 1995). The structures in (24) then provide us with different means of relating the two events denoted by the two verbs that constitute a Mandarin resultative compound. We argue that both are relevant for Mandarin resultative compounds, and show that it is possible to remain faithful to standard mapping assumptions, even for the inverse reading, by assuming an 'adjunct interpretation' for some resultatives, as has been proposed for English.

Recall the example in (1), repeated here for the readers' convenience.

- (1) Taotao zhui-lei-le Youyou le (Y. Li 1995: 256)
 chase-tired-PERF CRS
 a. 'Taotao chased Youyou and as a result, Youyou got tired.'
 b. 'Taotao chased Youyou and as a result, Taotao got tired.'
 c. 'Youyou chased Taotao and as a result, Youyou got tired.'

As pointed out earlier, it has been noted in the literature that unlike (1b), (1a) and (1c) involve an additional meaning of causation. In particular, Y. Li's characterisation of (1c) is that "the sentence means that by behaving in certain ways (e.g., not letting *Youyou* catch him), *Taotao* was responsible for *Youyou*'s becoming tired" (Y. Li 1995: 256-266). In other words, *Taotao* is the cause for *Youyou*'s becoming tired, suggesting that *lei* 'tired' is being used causatively here, rather than as an inchoative. Thus, the structure in (25) must be part of the event structure of (1c). For the sake of convenience, we have abbreviated the two names.

- (25) [T CAUSE [BECOME **tired**'(Y)]]

Assuming an 'adjunct interpretation' for (1c), we can represent the event structure of the resultative event as in (26):⁵

⁵ Given the two ways of relating two events presented in (24), (i) is a logical alternative for the event structure representation of (1c).

- (i) [[**chase**'(Y, T)] CAUSE [T CAUSE [BECOME **tired**'(Y)]]

We have not encountered in the literature predicate decompositions such as (i), which involves the embedding of one CAUSE immediately under another. While the possibility of this is worth looking into, we will not pursue this issue here, and simply assume that predicate decompositions do not permit the embedding of one CAUSE directly under another.

(26) [[*T* CAUSE [BECOME **tired'**(*Y*)] BY [**chase'**(*Y*, *T*)]]

The event structure in (26) can be paraphrased as 'Taotao caused Youyou to become tired by way of Youyou's chasing Taotao', which coincides with Y. Li's intuitions regarding the meaning of the clause. Not only does the event structure reflect the intended interpretation of the clause, it also allows us to account straightforwardly for the argument-function mapping associated with the inverse reading in terms of Dowty's (1991) proto-property theory and the LMT: even though *Taotao* is the theme of 'chase', s/he is also a causer in (26). As correctly pointed out by Her, being a causer is a prototypical property of agents. On the other hand, *Youyou*, despite being the agent of 'chase', is also a causally affected argument - a prototypical property of patients. Therefore, in the calculation of proto-properties, *Taotao* is the proto-agent, while *Youyou* is the proto-patient. These attributions of proto-property roles to the arguments in turn determine intrinsic classifications: the proto-agent is assigned [-o], while the proto-patient is assigned [-r] (Ackerman 1992; Ackerman and Moore 1999, 2001; Joshi 1993; Zaenan 1993). Once the intrinsic classifications are established, standard LMT applies to give the correct argument-function assignments: since *Taotao* is assigned [-o] and is the proto-agent/logical subject, it maps onto SUBJ, leaving *Youyou* to map onto OBJ. Therefore, by paying due attention to the intricate lexical semantics involved, the event structure in (26) permits us to arrive at the argument-function mapping that characterises the inverse reading, without having to modify existing mapping mechanisms. Furthermore, unlike Her, we do not factor causativity out of proto-properties: indeed, causation plays a crucial role in our analysis by ensuring the correct assignment of proto-properties and its consequences for subsequent argument-function mapping.

When *lei* 'tired' is not used causatively, we have the event structure in (27), which is responsible for the interpretation in (1b).

(27) [[BECOME **tired'**(*T*)] BY [**chase'**(*T*, *Y*)]]

(27) can be paraphrased as 'Taotao became tired by way of Taotao's chasing Youyou', which is precisely the state of affairs in the interpretation in (1b). Here, *Youyou*, as the theme of 'chase' possesses only proto-patientive properties, whereas *Taotao*, despite being the theme of 'tired', is also the agent of 'chase', and therefore possesses some proto-agentive properties. Hence, *Taotao* is the proto-agent and is assigned [-o], while *Youyou* is the proto-patient and is assigned [-r]. Once again, standard LMT procedures will ensure that *Taotao* maps onto the SUBJ, while *Youyou* maps onto the OBJ, giving us the correct argument-function assignments.

We now turn our attention to the interpretation in (1a). Now, it is possible to derive the state of affairs associated with this interpretation

simply by switching the identity of the argument of [BECOME **tired'**()] in (27). That is, the event structure for (1a) could be represented as in (28):

(28) [[BECOME **tired'**(Y)] BY [chase'(T, Y)]]

On this analysis, the difference between the interpretations in (1a) and (1b) is a superficial one that lies merely in the identity of the argument of the 'become tired' event. On the other hand, one could also appeal to the event structure in (24a), which depicts a different relationship between the two events. On this latter analysis, the interpretation in (1a) has the event structure in (28'), which can be paraphrased as 'Taotao's chasing Youyou caused Youyou to become tired':⁶

(28') [[chase'(T, Y)] CAUSE [BECOME **tired'**(Y)]]

Unlike (28), (28') suggests a more fundamental difference between the interpretations in (1a) and (1b) that goes beyond simply the identity of the argument of the 'become tired' event: the two interpretations relate the two sub-events in different manners. In both (28) and (28'), *Taotao* is the proto-agent, while *Youyou* is the proto-patient. Therefore, both event structures provide us with the argument-function mappings required for (1b). How then should we decide between these two alternatives?

Now, recall that unlike (1b), (1a) and (1c) involve an additional meaning of causation. This implies that the semantic difference between (1a) and (1b) cannot merely be an issue of the identity of a variable. Thus, if we accept that (27) is the correct event structure for (1b), then selecting (28') as the event structure representation for (1a) provides a transparent way of stating this semantic difference. The welcome consequence of this analysis is that we are able to capture, with our representations, the intuition that, unlike (1b), (1a) and (1c) involve an additional meaning of causation: while the event structures for (1a) and (1c) (i.e. (28') and (26) respectively) contain the semantic predicate CAUSE, the event structure for (1b) in (27) does not. In this way, besides providing the bases for the correct argument-function assignments, the event structures that we have posited also directly reflect the semantics associated with each of the interpretations.

To summarise, each of the interpretations of (1) has a distinct event structure. Each event structure is independently associated with a V-V compound, forming three distinct lexical constructions, each with its own mapping alignments. Yet, all three event structures comprise of essentially the same independently motivated parts, reflecting the basic construction-

⁶ Notice in fact, that if we changed the identity of the argument of [BECOME **tired'**()] in (28'), we would arrive at the state of affairs associated with the interpretation in (1b).

theoretic perspective that independently motivated constructions present in a grammatical system can be re-used in different ways for different purposes. In the case of Mandarin resultative compounds, the simple event structures associated with two independent verbs can be concatenated in different ways, giving rise to different interpretations of the same compound.

4.3 The puzzle of *chi-si* 'eat-dead'

Let us now consider if our proposal can account for the ungrammaticality of (11), which Shibagaki observed is incorrectly by Her to be grammatical. The relevance of this example is striking when considered in the context of (9): both (9) and (11) contain the compound *chi-si* 'eat-dead', yet why is that (9) is grammatical, whereas (11) is ungrammatical? Given conventional mapping assumptions, we would expect (11), rather than (9), to be grammatical. We repeat the examples for the readers' convenience.

(9) zhe zhong yao hui chi-si ni (Her 2007: 224)
this kind drug will eat-dead you
'Eating this kind of drug will kill you.'

(11) *ni hui chi-si zhe zhong yao (Shibagaki 2009: 6)
you will eat-dead this kind drug
Intended: You will die from eating this kind of drug.

The ungrammaticality of (11) is perhaps even more surprising given the grammaticality of (29), also involving the compound *chi-si* 'eat-dead'. Like (11), the eater is realised as the SUBJ in (29). Yet, in the absence of an OBJ, (29) is grammatical, in contrast to (11).

(29) Taotao chi-si-le
eat-dead-PERF
'Taotao died from eating.'

Just as we had to be sensitive to the lexical semantic properties of the individual verbs that comprise the compound *zhui-lei* 'chase-tired', here too the properties of the simple verbs appear to matter crucially. In particular, we suggest that *chi* 'eat' in the compound *chi-si* 'eat-dead' is being used intransitively, as exemplified in the mini-dialogue in (30).

(30) Q: ni chi-le mei? A: chi-le
you eat-PERF NEG eat-PERF
'Have you eaten?' '(Yes, I) have eaten.'

Like its counterpart in English, *chi* 'eat' can be used intransitively without any special morphological marking. If we assume that it is the intransitive *chi* 'eat' that is participating in the compound *chi-si* 'eat-dead', then the reason for the grammaticality of (29) on the one hand and the ungrammaticality of (11) on the other hand is straightforward: since both *chi* 'eat' and *si* 'dead' are intransitive, the OBJ in (11) does not correspond to a semantic participant of either of the component verbs that make up the compound. In other words, just like its component verbs, the compound *chi-si* 'eat-dead' is intransitive, thus rendering (29) grammatical while (11) ungrammatical.

Given the two possible ways of relating the simple events that comprise a resultative event structure, there are two logical event structure representations for (29), shown in (31).

- (31) a. [[**eat'**(*T*)] CAUSE [BECOME **dead'**(*T*)]]
 b. [[BECOME **dead'**(*T*)] BY [**eat'**(*T*)]]

How do we decide between the two options? To answer this, we need look no further than (9). Since *chi-si* 'eat-dead' is, as we have argued, an intransitive compound, and presumably requires its sole semantic participant to be animate, what licenses the presence of *zhe zhong yao* 'this kind of drug'? Just as the inverse reading in (1c) involved a causer interpretation of the SUBJ, the same is true for the inverse reading in (9): *zhe zhong yao* 'this kind of drug' is interpreted as the cause of your becoming dead should you eat it. Therefore, *zhe zhong yao* 'this kind of drug' is an external cause argument introduced by the process of causativisation. Given the formulation of causative formation in (23), repeated below, it is a constraint that it can only operate on event structures that are headed by a change-of-state predicate. This means that of the two representations in (31), only (31b) can be causativised in order to accommodate the inverse reading in (9). Hence, we propose that (31b) is the proper representation for (29), and that the event structure for the inverse reading in (9) is that in (32).

- (23) Causative formation
 [x CAUSE [BECOME **pred'**(*y*).....]]

- (32) [*drug* CAUSE [[BECOME **dead'**(*you*)] BY [**eat'**(*you*)]]]

Unlike the inverse reading of *zhui-lei* 'chase-tired' in (1c), where a causativised simple verb was used in a resultative compound, the inverse reading of *chi-si* 'eat-dead' in (9) involves the causativisation of the entire compound. We see therefore that the basic elements of our analysis apply in a principled manner to account for the distribution of *chi-si* 'eat-dead'.

5 Concluding remarks

In this paper we have presented an analysis of Mandarin resultative compounds that extends to cover multiple readings and certain puzzling grammaticality distributions associated with them. An important difference between our analysis and previous approaches such as Her (2007) is that by paying close attention to lexical semantics, we build conservatively on extant theories of argument linking, while grounding the evident departures in event structure templates that characterise the family of resultative compounds. The uniqueness of each event structure template in turn motivates the need to recognise constructional effects in grammar. In the case of Mandarin resultatives, these constructional effects are located in semantics, rather than form, since the same V-V compound can be associated with more than one event structure. By grounding the constructional effects in the semantics, we make the prediction that besides being encoded as V-V compounds, there might be other possible encodings of these event structure templates. Indeed, Mandarin also contains phrasal resultatives that parallel the resultative compounds. For instance, (33) shows that the three-way ambiguity exhibited by some resultative compounds can also be found with phrasal resultatives.

- (33) zhe haizi zhui-de wo zhi chuanqi (Huang 2006: 10)
this child chase-de me straight pant
- a. 'This child chased me to the point that he panted unceasingly.'
 - b. 'This child chased me to the point that I panted unceasingly.'
 - c. 'This child caused me to chase to the point of (me) panting unceasingly.'

On our analysis, the three interpretations of the phrasal resultative in (33) share the same event structure templates that are responsible for the three interpretations of the resultative compound in (1) and differ only in the formal encoding of those semantics. By focusing on semantics, rather than form, we see the potential of making comparisons of and generalisations across cross-linguistic resultative constructions, while retaining the basic distinction between lexical and phrasal constructions.

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