CROSS-COMPONENTIAL CAUSATIVITY

ABSTRACT. Unlike their English counterparts, Chinese resultatives allow reverse theta role assignment under predictable conditions and do not demonstrate the effect of the Direct Object Restriction. Both differences are shown to result from a single structural factor: an empty subject is not permitted in the bare resultative phrase in English. The analysis also accounts for various subtle distinctions between the lexical and bi-clausal resultative constructions inside Chinese. An implication of this theory is that the causal relation in a resultative is computed directly off of the construction and that this computation takes place in different components of language: lexicon, syntax, and the post-syntactic semantics.

1. INTRODUCTION

Corresponding to the English resultative small clauses like (1), Chinese has the resultative compound verb (RCV) and the V-de construction, shown in (2) and (3) respectively:

(1) The farmer painted the barn red.

(2) wo didi shuai-sui-le yizhi huaping.
    my brother smash-broken-aspect a vase
    My brother smashed a vase into pieces.

(3) neige xiaoxi qi-de wo san-tian mei chi-fan.
    that news anger-DE me three-day not eat-meal
    That news angered me so much that I didn’t eat for three days.

In (2), two verbal morphemes form a compound, with the morpheme on the left (shuai ‘smash’) indicating the causing event and the second one (sui
‘broken’) the resulting event. In (3), the causing event is indicated by the matrix verb *qi* ‘anger’ while the embedded predicate *san-tian mei chi-fan* ‘didn’t eat for three days’ is the result. This construction is characterized by the obligatory suffix -de on the matrix verb. In this article, the verbal morpheme for the causing event in all three resultative constructions is referred to as Vcaus, and the predicative morpheme for the resulting event in all of them is called Xres, abstracting away from categorial details. In English, the resultative phrase is typically an AP or PP, whereas the Chinese counterpart is most likely verbal.

In spite of the obvious similarities in the basic semantics of these three constructions, there are two remarkable differences between the English small clause construction and its two Chinese counterparts. First, it is well known that English respects what Levin and Rappaport-Hovav (1995) call the Direct Object Restriction (DOR):²

(4) A resultative phrase may be predicated of the immediately postverbal NP, but may not be predicated of a subject or of an oblique complement. (Levin and Rappaport-Hovav 1995, p. 34)

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1 In this paper, I ignore the possibility that some predicative morphemes such as *sui* could be adjectives instead of verbs. The A-V distinction has never been fully justified in Chinese, but this uncertainty will have no effect on my discussion here. For some arguments in favor of treating these morphemes as verbs, see Y. Li (1990).

2 Strictly speaking, the DOR is a misnomer because the resultative phrase can be predicated not only of the direct object but also of some structurally ‘object-like’ NPs that nevertheless bear no thematic relation with Vcaus, as the examples in (6b–c) show. More will be said later about the precise characterization of such NPs. For literature bearing on the DOR, also see Simpson (1983), Hoekstra (1988), and Carrier and Randall (1992).

Also worth noting is that Bowers (1997) provides examples which he claims to be counterexamples to the DOR in English:

(iia) Mary struggled (*herself*) free/out of her bonds.

(iiib) The horse galloped (*itself*) clear of the fire/away from the fire.

But note that the so-called resultative phrases in these examples all have the locative/path flavor. Crucially, unequivocally non-locative phrases can never serve as Xres in the same context:

(iiia) Mary struggled tired. ≠ Mary became tired from struggling.

(iiib) The horse galloped limp. ≠ The horse got limp from galloping.

See Levin and Rappaport-Hovav (1995) for a similar argument against including the locative type of secondary predicates in the resultative construction.
(5) The farmer painted his barn exhausted.
   ≠ The farmer painted his barn and was exhausted as a result.

(6)a. The hunter shouted hoarse.
   ≠ The hunter screamed to such a degree that he sounded hoarse.

b. The hunter shouted himself hoarse.

c. The audience shouted the actor off the stage.

The contrast between (1) and (5) provides the basic evidence for (4), with
the resultative AP necessarily predicated of the direct object but never the
subject. Similarly, when Vcaus is unergative, no resultative interpretation
is possible, shown in (6a), unless an NP is added somewhere inside the
matrix VP as in (6b–c).

This respect for the DOR in English contrasts with Chinese, where the
restriction is regularly broken. When Vcaus is unergative, Xres can be
predicated of the subject of Vcaus in both the RCV construction, illustrated
in (7a–b), and the V-de construction, shown in (7c–d):

(7)a. neige lieren han-lei-le.
   that hunter shout-tired-asp
   That hunter became tired from shouting.

b. wo gege chang-ku-le.
   my brother sing-cry-asp
   My brother cried from singing.
   (e.g., from singing a song that reminded him of his late wife)

c. neige lieren han-de jin-pi-li-jin.
   that hunter shout-DE totally-exhausted
   That hunter became totally exhausted from shouting.

d. wo gege chang-de wang-le shijian
   my brother sing-DE forget-asp time
   My brother was so absorbed in singing that he forgot time.
When Vcaus is transitive, the DOR may be violated by either the RCV (8a–b) or the V-de (8c–d): 3

(8)a. ta he-zui-le jiu, dao-tou da-shui.

he drink-drunk-asp wine lay.down-head heavily-sleep

He got drunk from drinking wine, and fell into deep sleep.

b. wode pengyou dou ting-gou-le neishou ger le.

my friend all hear-fed.up-asp that song LE

My friends were all fed up with listening to that song.

c. wo deng-de ta zuo-li-bu-an.

I await-DE him restless

I became restless from awaiting him.

d. wo xiang-de ta chi-bu-xia fan, shui-bu-zhao jiao

I miss-DE her can’t-eat food can’t-sleep sleep

I missed her so much I lost my appetite and my sleep.

The second difference between English and Chinese resultatives involves more striking facts. It has been known for decades that under certain circumstances, both resultative constructions in Chinese allow a type of interpretation that seems to violate the thematic hierarchy, according to which

3 I am grateful to the audiences on several occasions for providing (8c–d) and similar examples. A reviewer doubts the absence of the DOR in Chinese because the transitive Vcaus in most examples does not have an affected object. First of all, the observation does not apply to unergative Vcaus, which unequivocally demonstrate the lack of the DOR, in comparison with the English (6a). This fact alone is enough to motivate a comparative study of the two languages. That the account of unergative Vcaus proposed in this paper also explains the DOR-less data with transitive Vcaus simply demonstrates that there is no reason to exclude (8) from the general absence of the DOR effect in Chinese. Furthermore, not every transitive verb in English resultative constructions intrinsically takes an affected object. For instance, pound does not necessarily produce any effect on metal, but one still cannot produce a resultative like Smith pounded metal exhausted.
the subject NP of a transitive verb in an active sentence should bear the theta role of Agent and the object of the verb, the theta role of Patient.4

(9)a. nei-ping jiu ba wo he-zui-le.
   *that-bottle wine BA me drink-drunk-asp
   I got drunk from drinking that bottle of wine.

b. zhei-shou ger ba wo ting-ku-le.
   *this-piece song BA me listen-to-cry-asp
   Listening to this song made me cry.

(10)a. nei-ping jiu ba wo he-de mingding-da-zui.
   *that-bottle wine BA me drink-DE completely-drunk
   I got totally drunk from drinking that bottle of wine.

b. zhei-shou ger ba wo ting-de yilian ku-le
   *this-piece song BA me listen-to-DE continuously cry-asp
   Listening to this song made me cry for two hours without stop.

In all these examples, the sentence-initial subject is understood as the Patient argument of the transitive Vcaus (he ‘drink’ in (a)-examples and ting ‘listen to’ in (b)-examples) and the NP introduced by ba, which is typically an object in other Chinese clausal constructions, is the Agent argument of Vcaus. See Li (1995) for arguments that these examples are best analyzed as involving a conditional but nonetheless true violation of the thematic hierarchy. However this ‘anomalous’ reading is analyzed, it is clearly impossible in English:

(11)a. *That barn painted me totally exhausted.

b. *This movie watched me to tears.

This article aims to offer a unified account of these two differences. In section 2, I briefly recount my (1995) analysis of RCV examples like (9) and

4 Unless otherwise stated, the use of ba here and in subsequent examples helps make the examples more ‘colloquially natural’ but is not required – each of these examples has a ba-less counterpart in which the post-ba NP occurs after the (matrix) verb. For the literature on ba, see Cheng (1988), Goodall (1989), Huang (1982), A. Li (1990), Li and Thompson (1981), Li (1995, 1997), Travis (1984), Wang (1974), and P. Wang (1986), among many others.
extend it to the V-de construction in (10). Section 3 starts with a detailed examination of the syntactic structure of the V-de resultative. The conclusion thereof leads to a structural representation of the English resultative small clauses that explains the Chinese–English contrast with respect to the DOR. A subtle difference between the two Chinese resultative constructions, analyzed in section 4, reveals that the causal information is computed cross-componentially in more than one component of UG. This property, together with the syntactic structure of English resultatives established in the previous section, explains why the thematically inverse reading is absent in English.

2. Inverse Theta Role Assignment: Li (1995)

My analysis of inverse theta role assignment in the RCV construction is based on two facts. First, when a resultative compound is composed of a transitive Vcaus and an intransitive Xres and is itself used as a transitive verb, it is potentially three-ways ambiguous, depending on which argument receives which theta role(s). Two of the variations have been separately demonstrated in (2) and (9). In fact, if we choose the words and the syntactic/discourse contexts appropriately, it is possible for a single compound to have all three interpretations. (12a) below patterns with (2) and (12c) with the thematically anomalous (9), while (12b) shows the third ambiguity:

(12)a. wo ba neizhi huli zhui-lei-le.
    I BA that fox chase-tired-asp
    That fox is tired from my chasing it.

b. wo jintian yijing zhui-lei-le neizhi huli le, shizai
    I today already chase-tired-asp that fox LE indeed
    can’t-walk-asp
    I’m already tired from chasing that fox today. I really can’t walk
    anymore.

5 To many people, examples like (12b) seem less common, sometimes requiring more elaborate scenarios. But they do exist: (12b) has been tested with a dozen or so native Chinese speakers, most of them non-linguists. Only two or three people disliked the sentence; all the rest did not hesitate to reach the reported reading. Based on these results, I will follow the position in Li (1995), i.e., that UG does permit all the three readings in (12), with (12b) subject to some further restriction as yet unknown.
Secondly, of the three possible interpretations, (12a) and (12c) necessarily imply that the subject NP denotes the cause for putting someone/something in the state described by Xres while the object NP denotes the individual that is affected. For instance, for (12c) to be used felicitously, *neizhi huli* ‘that fox’ (as the subject of the clause) must be understood as responsible for making *wo ‘me’* tired, probably through its capability of outrunning humans. This extra cause-affected reading is absent when Vcaus and Xres are used separately. Nor is it an obligatory part of the meaning of (12b): The sentence does not claim the fox to be the cause for my physical exhaustion – it could simply be that I am too weak to walk even for five minutes.

The ambiguity in (12) can be represented by different argument structures and by assigning the theta roles in the argument structures of the compound randomly to syntactic NP arguments. In Li (1995), I analyzed the extra cause-affected readings as the resultative construction assigning the causal roles (c-roles) Cause and Affectee to certain NP arguments. (13) is my representation of the three-way ambiguity, assuming that *zhui ‘chase’* has the argument structure <(θ1)(θ2)> and *lei ‘tired’* has <(θa)>:\(^6\)

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\(^6\) The following notations will be adopted in this article: The argument structure of a predicate is represented as theta roles embedded in pairs of angled brackets. The thematically most prominent theta role is surrounded by only one pair of brackets, the second prominent theta role by two pairs, etc. Since the specific semantic content of the theta roles are irrelevant to my analysis and since the hierarchical relations among them are already encoded in the argument structure, I will simply use abstract names like θ₂, θₐ to indicate theta roles. See Grimshaw (1990). Higginbotham’s (1985) theta-identification, which is essentially a mechanism to assign more than one theta role from different predicates to a single syntactic argument, is represented, for now, with a ‘–’ linking two theta roles. A line between a theta role and an NP indicates that that theta role is assigned to the NP in syntax. Similarly, a line between a causal role and an NP means that NP receives the reading of Cause or Affectee. The leftmost NP is the subject of the sentence, the next one is the direct object, etc. All these notational conventions are adopted from Li (1995).
(13a)  
\[
\text{zhui-lei } (\theta_1 \theta_2 \theta_3) \rightarrow \text{I chase that fox, the fox becomes tired. = (12a)}
\]
\[
\text{Cause} \quad \text{Affectee}
\]

(13b)  
\[
\text{zhui-lei } (\theta_1 \theta_2)
\]
\[
\text{I that fox } \rightarrow \text{I chase that fox, I become tired. = (12b)}
\]

(13c)  
\[
\text{zhui-lei } (\theta_1 \theta_2)
\]
\[
\text{that fox me } \rightarrow \text{I chase that fox, I become tired. = (12c)}
\]

(13a) and (13b) show the two different argument structures of the compound if the single theta role of Xres (lei 'tired') can be freely identified with either one of the two theta roles of Vcaus (zhui 'chase'). Support for this analysis can be found in Y. Li (1990). (13c) has the same argument structure as (13b), but the theta roles in the argument structure of the compound are assigned against the thematic hierarchy, with the most prominent theta roles (i.e., \( \theta_1-\theta_2 \)) assigned to the object of the sentence and the less prominent \( \theta_2 \) to the subject. Also note that c-roles are assigned to the NP arguments in (13a) and (13c) to reflect the extra cause-affected interpretations. The analysis in (13c) raises two questions: Why can this example even exist when it is in violation of the well-established thematic hierarchy? And why does the compound not have the fourth reading which is logically possible once inverse theta role assignment is permitted:

(14)  
\[
\ast \text{zhui-lei } (\theta_1 \theta_2-\theta_3)
\]
\[
\text{that fox me } \rightarrow \text{I chase that fox, the fox becomes tired.}
\]
The answer in Li (1995), part of which shares the essence of Grimshaw’s (1990) analysis of English psych verbs, can be summarized as follows:

(15) C-roles are assigned according to the algorithms below:
   a. the argument in the subject position receives the c-role Cause
      from a resultative compound if it receives a theta role only from
      Vcaus.
   b. the argument in the object position receives the c-role Affectee
      from a resultative compound if it receives a theta role at least
      from Xres.

(16) Theta role assignment may violate the thematic hierarchy when
    the NP arguments involved also receive c-roles as specified in
    (15).

(17) The mapping from the argument structure of a lexical item to
    syntax contains at least the following steps:
    Step 1: Randomly assign theta roles to syntactic argument
    positions.
    Step 2: Where possible, assign c-roles to these positions accord-
    ing to (15).
    Step 3: Check the result of theta role assignment according to
    (16).

As an example, consider the application of (17) to (13c). Since the theta
roles of the compound can be assigned randomly, one possibility is to as-
sign the most prominent θ1–θa to the object ‘me’ and the second prominent
θ2 to the subject ‘that fox’. As it happens, the c-role Cause can be assigned
to the subject because the latter receives a theta role only from Vcaus (i.e.,
zhu ‘chase’) and Affectee can be assigned to the object, which receives the
single theta role from Xres (i.e., lie ‘tired’). According to (16), these two
arguments are no longer subject to the restrictions of the thematic hierar-
chy, making (13c) acceptable. In contrast, random theta role assignment in
(14) links θ2–θa to the subject and θ1 to the object. This linking prevents
c-role assignment because the subject also receives a theta role from Xres
whereas the object does not. As a result, the thematic hierarchy must be
respected and inverse theta role assignment is ruled out. Similarly, (17)
correctly permits (13a) and (13b).
It is easy to extend the analysis of the RCV compounds to the V-de construction. (18b) below illustrates a thematically inverted example, using the same verbal predicates as the ‘normal’ counterpart in (18a):

(18)a. wo ba neizhi huli zhui-de jin-pi-li-jin.

I BA that fox chase-DE totally-exhausted

The most salient reading = That fox was totally exhausted from my chasing it.

b. neizhi huli yijing ba wo zhui-de jin-pi-li-jin le, ke wo haishi zhui-bu-shang ta.

I’m already totally exhausted from chasing that fox, but I still can’t catch up it.

Huang (1988, 1989, 1992) and Li (1997) argue that a sentence like (18a) is best analyzed as the bi-clausal structure in (19a). Thematically inverse cases can be treated in the same way. So (18b) has the structure (19b).

To facilitate understanding, only the English gloss is used in (19) and irrelevant details are omitted:

(19)a. I BA that fox Chase-DE [CP pro, totally exhausted]

b. that fox already BA me Chase-DE [CP pro, totally exhausted]

In these sentences, the matrix subject has the Cause reading and the matrix object, introduced by ba, has the Affectee reading. It follows that inverse theta role assignment by Vcaus becomes possible under (16), a correct result in view of the fact that in (19b), that fox receives the Patient theta role from the matrix verb chase and me receives the Agent theta role (cf. (18b)).

How are these crucial c-roles assigned in (19)? The matrix subject is expected to have the Cause role according to (15a) because it receives a theta role only from Vcaus (i.e., the matrix verb). But the matrix object is certainly not thematically linked to the embedded verb (= Xres) and thus should not have the Affectee role under (15b). The solution to this problem is simple. For (19a–b) to yield the well-formed interpretations, there is a coreferential relation between the embedded pro-subject and the object in the matrix clause. This means that though the matrix object is not thematically related to the embedded verb, it is part of a coreferential chain
that is so related. Therefore, (15) can be redefined in terms of coreferential chains. In the definition, I follow the convention that an argument NP can also form a one-member coreferential chain.

(15) In a resultative construction,

a. the structurally most prominent argument as a single-member chain receives the c-role Cause if the single member does not receive a theta role from Xres.

b. the most prominent argument other than the one bearing Cause receives the c-role Affectee if it heads a coreferential chain of which at least one member receives a theta role from Xres.

There are two coreferential chains in (19b). [that fox] is a single-member chain whose member is necessarily coreferential with itself. Because that fox is the most prominent argument in the sentence and only receives a theta role from Vcaus, it qualifies for the Cause role under the redefined (15a). The other chain is [me, pro], with pro receiving a theta role from Pres (= totally exhausted). Since me is both the second prominent argument in the V-de construction and is part of the chain, it has the Affectee role according to (15b). As for the compound in (13c), duplicated below, the previous analysis remains once every argument is regarded as a single-member chain:

(13c)  

Thus, me in (13c) is both the second prominent argument of the whole RCV construction and the single member of the chain that is thematically linked to Xres (by receiving θa). It follows that me receives the Affectee role under the redefined (15b). The same logic provides Cause for the subject that fox.

Before ending this section, consider an apparent alternative to this analysis of inverse theta role assignment. Rather than permitting random theta
role assignment and conditional violations of the thematic hierarchy, the D-structure of (18b) could be represented as (20) rather than (19b):

(20) that fox CAUSE [me chase-DE [pro totally exhausted]]

Then chase-DE raises to the matrix CAUSE (cf. Baker 1988). pro is coindexed with me, and me behaves like the matrix object in a typical ECM manner (and is eventually introduced by ba).

This analysis has two advantages. First, all processes are already independently motivated in syntax and thus not as unconventional as (16) and (17). Second, that fox and me can receive the Cause and Affectee readings in the same natural way as standard causative sentences like that fox made me totally exhausted. However, a comparison between the grammatical (18b) and the ungrammatical (21) below indicates that (20) is unlikely to be correct:

(21) *neizhi huli yijing ba wo pao-de jin-pi-li-jin le, ke wo that fox already BA me run-DE totally-exhausted but I
haishui zhuai-bu-shang ta.
still can't-catch-up it
Intended reading = That fox made me totally exhausted from running, but I still . . .

If (20) is the D-structure of (18b), then the D-structure of (21) must be (22), followed by verb-raising, etc., as suggested above for (20):

(22) that fox CAUSE [me run-DE [pro totally exhausted]]

Also note that (i) and (ii) are good, which presumably correspond to (20) and (22) with CAUSE and its subject removed:

(i) wo zhuai-de jin-pi-li-jin.
I chase-DE totally-exhausted
I became totally exhausted from chasing.

cf. (18b) and (20)

(ii) wo pao-de jin-pi-li-jin.
I run-DE totally-exhausted
I became totally exhausted from running.

cf. (21) and (22)

Obviously, the verb zhuai 'chase' can be optionally used as an intransitive. This highlights the unlikelihood of analyzing (18b) as (20). If (18b) is formed by embedding (i) as the complement of CAUSE, then the same process turning (ii) into (21) should be grammatical as well, a clearly incorrect consequence.
But this analysis of (21) would incorrectly predict the example to be well-formed, in the same way that (18b) and (20) are well-formed. On the other hand, if the matrix subject that fox does receive a theta role from Vcaus (= chase) in (18b), albeit against the thematic hierarchy, the contrast between (18b) and (21) follows straightforwardly from the theta-criterion, which requires that every argument receives a theta role (Chomsky 1981). In (18b), neizhi huli ‘that fox’ received the Patient theta role from zhui ‘chase’; but in (21), the same NP has no theta role because Vcaus (i.e., pao ‘run’) is intransitive and already has its Agent theta role assigned to the other NP wo ‘me’. This analysis also conforms to native speakers’ intuition: (21) is rejected because it is not clear how neizhi huli ‘that fox’ is related to the rest of the sentence. More generally, the contrast between (18b) and (21) is problematic for any analysis of the thematically anomalous examples that relies on providing a Cause role to the (matrix) subject through a separate predicate, whether this predicate is in the form of the matrix verb such as CAUSE or in the form of some deeply embedded soundless preposition (cf. Pesetsky 1995).

3. THE DOR

That the RCV compounds are not restricted by the DOR already has a natural explanation in my theory of compound ambiguity summarized in the previous section. If θ-roles from Vcaus and Xres can be freely identified, then identifying the subject θ-role of Xres with that of Vcaus is simply one of the expected results. For instance, (7b) can be analyzed as follows:

(23)a. Wo gege chang-ku-le.
   my brother sing-cry-asp
   My brother cried from singing.

b. \textit{chang} \langle \theta1 \rangle + \textit{ku} \langle \thetaa \rangle \rightarrow \textit{chang-ku} \langle \theta1 - \thetaa \rangle

Of course, this theory relies on treating compounds as formed in the lexicon rather than in the syntax. Independent evidence will be given in section 4 to support the lexical nature of the RCV compounds. Since English resultatives clearly are not formed in the lexicon, it does not come as a surprise that they obey different constraints from the RCV construction.
Less expected is the fact that the syntactically formed V-de construction does not respect the DOR either. In this section, I first examine the structure of the V-de construction, then I discuss its implications for the syntactic representation of English resultative small clauses.

3.1. Chinese

As mentioned earlier, Huang (1988, 1989, 1992) has argued for the biclausal nature of the V-de construction, with Vcaus as the matrix verb and Xres as the VP predicate of the embedded clause. This analysis is further strengthened in the context of ya-insertion. Consider a typical double-complement construction:

(24)a. wo gege gaosu wo bu-yao kan Jin Yong de xiaoshuo.
   \textit{my brother tell me don’t read Jin Yong ’s novel}
   My brother told me not to read Jin Yong’s novels.

b. wo gege gaosu wo ya, bu-yao kan Jin Yong de xiaoshuo.
   \textit{my brother tell me don’t read Jin Yong ’s novel}
   My brother told me, um, not to read Jin Yong’s novels.

c. *wo gege gaosu ya, wo bu-yao kan Jin Yong de xiaoshuo.
   \textit{my brother tell me don’t read Jin Yong ’s novel}
   *My brother told, um, me not to read Jin Yong’s novels.

The interjection \textit{ya}, functionally similar to \textit{um} in English, can be inserted between the two complements in (24b), but not between the matrix verb and the NP complement in (24c). This distributional property of \textit{ya} turns out to be helpful in deciding the precise structure of the V-de construction when Vcaus is necessarily transitive:\footnote{For the \textit{ya}-insertion test in (25) to bear on the current concern, Vcaus must be necessarily transitive. This is why the colloquial word \textit{mafan} ‘bother’ is chosen here – for many native speakers, the verb with the intended meaning can only be used as a transitive. (25b) may be marginally acceptable with the interpretation that my brother was fretful and as a result I was not in the mood to read a novel. This interpretation sounds bizarre because it is difficult to establish a causal relation between my brother’s mental fretfulness and my loss of interest in novel reading. In any case, such a reading fails to shed any light on the structure of the V-de construction when Vcaus is transitive.}
My brother bothered me so much that I wasn’t in the mood to read a novel.

My brother bothered me so much, um, that I wasn’t in the mood to read a novel.

My brother bothered, um, me so much that I wasn’t in the mood to read a novel.

Since (25) patterns strictly with (24), it is only natural to conclude that the NP wo ‘me/I’ is the object of the matrix verb mafan ‘bother’, not the subject of Xres mei xinsi kan xiaoshuo ‘not be in the mood to read a novel’.

That Xres is indeed part of an embedded clause is clearly shown in (26):

Their singing made me not in the mood to read novels.

Their singing, um, made me not in the mood to read novels.

The unergative nature of Vcaus in (26) is shown by the fact that semantically, chang ‘sing’ cannot possibly take wo ‘I/me’ as object. Also note that ya can be inserted between Vcaus and wo, further confirming that the latter is not the object of chang. In other words, wo can receive θ-role only from Xres. In addition, clause-adjoined adverbials can occur between chang and wo:

Their singing made me not in the mood to read novels for three days in a row.
The temporal adverbial *yilian san-tian* ‘for three days in a row’ can be interpreted only as modifying the embedded clause, indicating that these examples do not have an ECM structure in which the embedded subject receives a Case from the matrix verb. Hence, (26a) should have the following structure, with the embedded subject Case-marked by the embedded INFL:

(28) \[ [\text{CP} \text{ they sing-DE} \ [\text{CP} \text{ I lose-the-desire-to read novels}]] \]

It also follows that when the embedded subject position is phonetically empty, as in (25a–b) above, the subject is pro, as Huang has suggested.9 Furthermore, the embedded CP is in a complement position, given the fact that the object NP *neiben xiaoshuo* ‘that novel’ can be freely extracted out of the embedded CP in both topicalization (29a, c) and relativization (29b, d):

(29)a. neiben xiaoshuo, wo gege (ma-)fan-de wo [CP mei xinsi that novel my brother bother-DE me have.no mood kan t]. (cf. (25a))
read
That novel, I wasn’t in the mood to read because my brother bothered me so much.

b. [CP wo gege (ma-)fan-de wo [CP mei xinsi kan t] de]
my brother bother-DE me have.no mood read prt
neiben xiaoshuo
that novel
the novel that I wasn’t in the mood to read because my brother bothered me so much.

9 A reviewer points out that the empty subject may also be PRO, given the fact that Chinese has no overt tense/Agr morphology so that the embedded clause may be alternatively finite or non-finite. This possibility does exist, but I will treat the subject as pro in this paper for two reasons. First, it is unlikely to be PRO in (33) because PRO is typically bound by the closest c-commanding NP but the empty subject in (33) is clearly bound by the matrix subject in the presence of the matrix object. More importantly, the analysis proposed in this paper will not be affected even if we have the pro/PRO options, because even PRO can be bound by the subject (when there is no object) and therefore demonstrates the lack of the DOR effect.
(29)c. neiben xiaoshuo, tamen chang-de [CP wo mei xinsi kan t].
    \[ that \ \textit{novel} \ \textit{they sing-DE} \ I \ \textit{have.no mood read} \]
    (cf. (26))

    That novel, I wasn’t in the mood to read because of their singing.

d. [CP tamen chang-de [CP wo mei xinsi kan t] de] neiben
    \[ they \ \textit{sing-DE} \ I \ \textit{have.no mood read} \ \textit{prt} \ \textit{that} \]
    xiaoshuo
    \[ \textit{novel} \]
    the novel that I wasn’t in the mood to read because of their singing.

To summarize, Vcaus in the V-de construction is the matrix verb and Xres is part of the embedded clause in a complement position. If Vcaus is transitive, the NP following it is the matrix object. When the embedded clause has no overt subject, the position is filled by pro.

This structure immediately explains why the DOR effect is not observed in the V-de construction. When Vcaus is unergative, as in (7d), the syntactic structure is (30):

(30) [CP wo gege chang-de [CP pro wang-le shijian]].
    \[ my \ \textit{brother} \ \textit{sing-DE} \ \textit{forget-asp time} \]
    My brother was so absorbed in singing that he forgot the time.

With pro bound by the matrix subject my brother, the latter is naturally interpreted as the semantic subject of Xres forget the time. Similarly, (31) represents the syntactic structure of (8d), where Vcaus is transitive:

(31) [CP wo xiang-de ta [CP pro chi-bu-xia fan, shui-bu-zhao jiao]].
    \[ I \ \textit{miss-DE} \ \textit{her can’t-eat food can’t-sleep sleep} \]
    I missed her so much I lost my appetite and my sleep.

That pro can be bound by the matrix subject in (31) follows from treating this empty category as [+pronominal, –anaphoric], first proposed in Chomsky (1982). As a pronominal, Binding Theory only prevents it

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10 It should be noted that this analysis of pro in Chinese departs from Huang’s (1989) theory of Generalized Control, which requires pro to be locally bound like PRO. The
from being bound in its governing category, but has no restriction on any antecedent beyond that point. Put differently, (31) simply patterns with the standard double-complement case in (32):

(32) \[ \text{[CP wo gaosu ta [CP pro bu xiang chi-fan].} \]
\[ \text{I tell him not want eat-food} \]
I told him I didn’t want to eat.

The theory also predicts that pro can be optionally bound by the matrix object. Intuitively, this is not possible in (31) because it is infelicitous that my missing her without her being aware of it could make HER lose appetite. But when the subevent denoted by \( V_{caus} \) can affect the matrix object, the prediction is readily borne out:

(33) \[ \text{[CP wo qi-de ta [CP pro chi-bu-xia fan, shui-bu-zhao jiao]]} \]
\[ \text{I irritate-DE him can’t-eat food can’t-sleep sleep} \]
I irritated him so much that he lost his appetite and sleep.

As expected, the same binding pattern is also available in the standard double-complement context:

(34) \[ \text{[CP wo gaosu ta [CP pro bu-yao chi-fan].} \]
\[ \text{I tell him don’t eat-food} \]
I told him he shouldn’t eat.

In conclusion, the lack of any DOR effect in the \( V-de \) construction results from the binding properties of the pro subject of \( X_{res} \).

3.2. From Chinese to English

Since English does respect the DOR, the analysis above means the English resultative small clauses must involve neither free theta-identification as in the RCV compounds nor bound empty pronominal in the subject position of the embedded clause like the \( V-de \) construction. That free theta-identification does not apply to English resultatives is easy to guarantee, as long as the process is limited to compound formation in the lexicon, an empirical motivation for my treatment of pro as a pure pronominal is examples like (7c–d) and (32). But our difference has no effect on the solutions to be proposed here for the Chinese–English contrasts, provided that the empty subject of the embedded clause in the \( V-de \) construction is pro. This is because both Huang and I assign the same structure (30) to sentences with an unergative \( V_{caus} \), and (30) is sufficient to motivate a different structural analysis of the English resultative small clauses.
assumption that has no known counterexample. So let us focus on distinguishing the syntactic structure of English resultatives from that of the Chinese V-de construction.

Works on English resultatives vary in how to represent the syntactic structure(s) of the resultative phrase. See Hoekstra (1988), Carrier and Randall (1992, C&R), Levin and Rappaport-Hovav (1995, L&R), and Bowers (1997) for a few proposals.11 What is proposed in the current paper is based on a binary-branching Larsonian shell, closely resembling Bowers’s structure (though the two works are independently developed) with one important difference motivated by the previous discussion of the V-de construction in Chinese.

Several factors must be taken into consideration in order to decide on the structure of the resultative construction. First, there is no clear evidence that either the resultative construction or the double-object construction needs more than a binary branching structure. In fact, Larson (1988) reviews a full set of reasons that the first complement is structurally more prominent than the second. If the Xres phrase is placed in a complement position, as in all the works quoted above and many others, then *The farmer painted the barn red* is structurally identical to the double-object construction. Second, the conjunctive test groups the two postverbal phrases in both constructions into a single constituent:

(35)a. The farmer gave Bill an apple and me a pear.

b. The gardener watered the tulips flat and the zinnias bare.

(Bowers 1977, p. 55)

Third, in comparison with French, the fact that short VP-adverbials cannot occur between the verb and its NP complement in English indicates that

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11 Jackendoff (1990) treats English resultatives as syntactic but focuses on the question of how to assign a structured semantic interpretation to the construction “on the fly” (p. 235). The current paper shares the same spirit because I also try to compute the causal relations off of the resultative construction as a whole without altering the semantics and lexical properties of the component predicates. This approach contrasts with Carrier and Randall (forthcoming), who try to formulate English resultatives by deriving new verbs in the lexicon. For arguments against this lexical approach, see Jackendoff (1990, section 10.5).

But the similarity between Jackendoff’s theory and mine stops here. My goal is to explain the contrasts between English and Chinese resultatives in a unified and principled way. It is not clear to me how this task can be accomplished in his theory other than stipulated argument-binding.
English verbs stay inside VP at S-structure (Pollock 1989). Fourth, L&R note the following subtle contrast for some speakers (p. 47):

(36)a. Which people do you wonder whether they punched senseless?

b. Which counter do you wonder whether the cook wiped clean?

(37)a. Which pavement do you wonder whether they ran thin?

b. Which neighbors do you wonder whether the dog barked awake?

Since the contrast corresponds to the transitivity of Vcaus, L&R conclude that the wh-moved NPs in (36) are generated as the object of Vcaus whereas those in (37) are the D-structure subject of Xres. Also see C&R for arguments in favor of treating the postverbal NP as the direct object of a transitive Vcaus. Lastly, recent development of syntax suggests that every constituent has an endocentric structure. A direct consequence of this is that the so-called small-clause (SC) should be represented as the projection of some head as well. Together, these five factors practically impose a Larsonian shell structure on VPs as well as the English resultative constructions.

In a binary branching structure in which the resultative phrase is in the complement position, the only way to structurally separate the postverbal matrix object in (36) from the postverbal embedded subject in (37) is (38a):

(38a) \[
\text{VP} \\
\hspace{1cm} \text{NP1} \\
\hspace{2cm} \text{V'} \\
\hspace{3cm} \text{V} \\
\hspace{4cm} \text{XP (= resultative phrase)} \\
\hspace{5cm} \text{NP2} \\
\hspace{6cm} \ldots
\]

where NP1 is the object of V and NP2 the subject of XP. But (38a) yields the wrong word order if the verb is inside VP in English. Thus, another VP shell is called for. Furthermore, since a headed XP replaces SC and NP2 as the subject of XP is inside XP, we need the XP-internal subject structure proposed by numerous authors (Koopman and Sportiche 1985,
Thus, the relevant part of the structure for the English resultative should be (38b):

\[(38)b.\]

\[
\text{NP1 is the VP-internal matrix subject, NP2 is the matrix object if V is transitive, and NP3 is the subject of the resultative phrase. Verb-raising creates the VO word order and allows a conjunctive to link two lower VPs, which now contain NP2, the resultative phrase, and a phonetically empty verb trace. As a direct consequence, (38b) also correctly excludes double-object verbs from the resultative construction, provided that only two VP shells are permitted for each lexical verb. This is simply because XP structurally competes with the second complement. Under the same structure, we also expect, again correctly, that no more than one overt NP can occur postverbally in the resultatives: Since there is only one lexical verb, either NP2 or NP3 gets the accusative Case, but not both. This is so independently of how the accusative Case is assigned in specific theoretical implementations.}^{12}\]

To conclude, the English examples (1) and

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12 When Vcaus is unergative, the structure in (38b) is a typical ECM context, with NP2 absent and the accusative Case assigned to NP3 across XP. Alternatively, NP3 may raise to the Spec position of the lower VP and receive Case like a typical object, as Bowers (1997) suggested. The exact method of accusative Case assignment is never decided in the Principles-and-Parameters model (nor in its predecessors), particularly in the ECM context. The debate is further complicated by the possibility of AgrO. Chomsky’s own works (1981, 1993, 1996) clearly reflect such uncertainty. In this paper, I will arbitrarily assume accusative Case to be assigned across the AP boundary in (44), though my analysis does not rely on this particular choice.
(6b) should have the following structures after the subject raises to SpecIP (with irrelevant details omitted):

\[(39)a. \text{The farmer } \left[\text{VP } t \text{ painted the barn } \left[\text{AP } e \text{ red}\right]\right] = (1)\]

\[(39)b. \text{The hunter } \left[\text{VP } t \text{ shouted } \left[\text{AP } \text{ himself hoarse}\right]\right] = (6b)\]

In (39a), \(e\) stands for the Caseless subject of the AP resultative.

Next we need to determine the nature of \(e\). Since all overt NPs in (39a) already have their own theta roles, \(e\) can only be a pronominal, which I assume to be PRO under the assumption that English does not have pro. But this conclusion immediately creates a problem. Though local control correctly forces the barn in (39a) to be the antecedent of \(e\), the same analysis incorrectly predicts the lack of the DOR effect when \(V\)caus is unergative, for the same reason that the corresponding Chinese V-de examples are well-formed. Compare the unacceptable (40) with its Chinese counterpart (30), duplicated below:

\[(40) *\text{The farmer } \left[\text{VP } t \text{ shouted } \left[\text{AP } \text{ PRO hoarse}\right]\right]. = (6a)\]

\[(30) \left[\text{CP wo gege chang-de } \left[\text{CP pro wang-le shijian}\right]\right].
my brother sing-DE forget-asp time
\]

My brother was so absorbed in singing that the forgot time.

In fact, because the structure of (30) is rather straightforward and the contrast between (30) and (40) so sharp, the obvious conclusion is (41):

\[(41) \text{The English resultative phrase does not contain a PRO subject.}\]

There is the obvious question of how (41) is reconciled with the XP-internal subject structure, which puts the subject of a phrase in its Spec position. An answer is proposed in the appendix of this paper in the spirit of the Optimality Theory. But independently of the answer, I consider (41) firmly established on the basis of the contrast between (40) and (30).

Independent support for (41) is also abundant in English. In all uncontroversial cases where an XP is in the complement position of a lexical head \(Y\), PRO is banned from the Spec of XP:

\[(42)a. \text{The farmer believes } \left[\text{IP } \text{ himself/PRO to be knowledgeable}\right].
- ECM\]

\[(42)b. \text{The farmer considers } \left[\text{AP } \text{ himself/PRO knowledge}\right].
- \text{SC complement}\]
(42)c. The farmer made \([\text{VP/} \text{AP}] \text{ himself/*PRO cry/mad}\]. – causative
d. *It seems \([\text{IP PRO} \text{ to be mad}]\]. – expletive it

No matter what UG principle is responsible for the phenomena in (42), (41) is simply another instance compatible with the overall distribution of PRO in English.

Incorporating (41) into the structure of resultatives in (38b), let us examine the construction more closely, starting with a transitive Vcaus:

(43)

If the postverbal NP \(\text{the barn} \) is the matrix object, the subject argument of the adjective \(\text{red} \) would have to be a PRO in AP. Given (41), this PRO subject is not allowed in the resultative AP. And a subjectless AP leaves a theta role unassigned. However, AP does hold a mutual m-command relation with \(\text{the barn} \) because both are immediately dominated by the same VP node. So \(\text{the barn} \) can receive the theta role from AP (cf. Williams 1980), both satisfying the theta-criterion and acquiring the reading of being red (as the result of painting).\(^{13}\) Meanwhile, since the lower VP does not dominate the subject NP or its trace \(t_i \), AP cannot assign its theta role to either one of them through m-command. This guarantees the DOR effect when the matrix verb is transitive. The structure with an unergative matrix verb is (44):

\(^{13}\) This analysis assumes that an argument can indeed receive more than one theta role from different predicates, an idea already adopted in L&R and in Carrier and Randall (1992).
Since *himself is not the complement of *shout, it can only be generated inside AP, where it receives the subject theta role from *hoarse. In addition, *himself receives Case from the matrix verb *shout in the standard ECM fashion (see note 11). (41) does not apply here because the subject of AP is not a PRO. Finally, the ungrammatical (6a) has the structure (45):
For lack of any overt postverbal NP, the subject of *hoarse* would have to be a PRO if it were to be represented inside AP. But (41) excludes this possibility and enforces a ‘subject-less’ AP with an unassigned theta role. Since the only NP in the sentence is the subject outside the lower VP, there is no mutual m-command between it and AP. Consequently, the theta role of *hoarse* cannot be assigned away and the theta-criterion is violated, again correctly yielding the DOR effect. On the other hand, resultatives with unaccusative matrix verbs are expected to be grammatical:

(46)

The AP in (46) has the same structure as in (45), but the NP *the lake* is the underlying object of V. Hence, there is mutual m-command between AP and the trace of the NP. As a result, the theta role of *solid* can be assigned to this NP, and (45) is grammatical.

To summarize so far, the DOR effects observed in English resultatives follow from general syntactic principles, provided that (41) holds in the face of the XP-internal subject structure. At this cost, the proposed analysis both maintains the insights of the previous works on English resultatives and related constructions, and successfully distinguishes the English resultatives from the two corresponding Chinese constructions.
3.3. Further Justifications

The previous subsection lays out the structural representation of the English resultative construction and demonstrates its immediate consequences. Now we examine some implications and hidden issues of the proposed theory.

First, consider the role of mutual m-command in subject theta role assignment. At first glance, the proposed analysis uses two different ways to assign the subject theta role: in the Spec position of a lexical head (V and A in (44) for instance) and outside a lexical phrase via mutual m-command (cf. AP and its subject in (43), (45), and (46)). The actual difference between the two ways is minimal, though. Even in the Spec position of a lexical verb, the subject still needs to receive a theta role from the verb, more precisely from the verb raised to the upper V position. And the structural relation between the subject and the verb is still mutual m-command. In fact, the difference is not in the structural condition for assigning the theta role, but in what projection of the lexical head assigns it. In the context compatible with the XP-internal subject structure, it is the lexical head (i.e., zero-projection) that does the job; but when (41) prevents the subject theta role from being assigned this way, the phrasal projection of the lexical head must assign it in order to satisfy the theta-criterion. More precisely, the subject phrase S receives a theta role from some projection P of a lexical head whenever two conditions are met: P has a theta role to assign, and S and P m-command each other.

L&R object to the use of mutual m-command to explain the DOR effect, observing that depictive phrases are also inside VP but have no problem predicating either the subject or object:

(47)a. Jack wiped the table tired

b. Jack ate the fish raw.

Since the resultative phrase is also inside VP, mutual m-command cannot separate the two constructions and “[t]herefore, another explanation for the DOR must be found” (p. 49). This argument is based crucially on the underlying assumption that the subject is never base-generated inside VP. Given the structure proposed in this paper, the DOR effect results naturally from mutual m-command. As L&R point out, depictive phrases behave like VP-adjuncts in terms of the do-so test and V₀-fronting (p. 49). As such, tired in (47a) adjoins to the V node of the upper VP in a structure like (44), holding a mutual m-command relation with the VP-internal subject (or its trace after it raises to SpecIP). In (47b), raw is adjoined to V₀ of the lower VP and m-commands the matrix object the fish. On the other hand, since
the resultative phrase is always generated in the complement position of the lower VP, it never gets a chance to m-command the VP-internal subject, forcing the DOR effect.

The analysis developed so far also bears on L&R’s Change-of-State Linking Rule, which they use to explain the origin of the DOR (p. 51):

(48) Version (a): An NP that refers to the entity that undergoes the change of state in the eventuality described in the VP must be governed by the verb heading the VP.

Version (b): An NP that refers to the entity that undergoes the change of state in the eventuality described in the VP must be the direct object of the verb heading the VP.

While (48) works well in English, it clearly fails to capture the Chinese V-de construction. As we saw in (27) above, the whole resultative construction describes the eventuality but the NP that refers to the entity undergoing the change of state is the subject argument of an embedded CP. In this position, the NP is obviously not the direct object of Vcaus, nor can it be governed by the verb. In fact, we have seen that what (48) is designed to handle consists of two related but nonetheless separate issues. The DOR is the consequence of language-specific ways to represent resultatives. English uses bare lexical phrases (small clauses) for the Xres part of the construction, and the DOR is the natural product of the standard subject-predicate relation (via m-command). Chinese chooses to use compounding and a full bi-clausal structure for resultatives, in which the DOR has no place simply because it cannot be produced by the relevant UG principles such as control. The second issue coded in (48) is the aspectual property of the direct object in English. The Chinese V-de construction shows that there is no intrinsic relation in UG between the direct object of Vcaus and the change-of-state reference. Instead, in a complex structure describing the causal event, the argument referring to the entity undergoing the change of state is always the one second to the Cause argument in structural prominence. In English, this argument happens to be governed by Vcaus because the complex causal structure in the language is composed of a verb taking a bare resultative phrase. But in the V-de construction when Vcaus is unergative, the second prominent argument of the whole construction, if there is one, is the subject of the embedded clause. This NP naturally has the change-of-state reference even though it has no direct structural or thematic relation with Vcaus. In the theory presented in section 2, this NP receives the c-role Affectee under the modified algorithm (15).
Another consequence of the proposed theory on English resultatives is based on the following examples, provided by a reviewer:

(49)a. John, bullied his friends sick of him,
b. *John, bullied his friends sick of himself,.

At first sight, the grammaticality judgments in (49) seems problematic for the structure in (44). Since the resultative AP does not have a subject in its Spec position, the whole sentence becomes the binding domain for the pronoun and the anaphor, in which him must be free from John while himself can be bound by John, contrary to fact. This conclusion, however, is based on a particular version of binding theory, first formulated in Chomsky (1981), that is known for serious empirical problems. Consider (50), quoted from Reinhart and Reuland (1993 [R&R], p. 670):

(50) Max, boasted that the queen invited Lucie and himself, for a drink.

That himself can be bound by the matrix subject Max across the clause boundary is not expected under the common implementation of binding theory. To account for (50), R&R propose that binding relations refer to local domains consisting of a predicate (i.e., the lexical head) and all its arguments. Since himself is not the argument of the predicate invite (Lucie and himself is), the local domain for the purpose of anaphor binding simply does not exist, exempting himself from strict local binding. Technicalities aside, R&R’s solution boils down to the idea that binding conditions hold if and only if a pronoun or an anaphor has a c-commanding co-argument in the minimal domain containing all of them.

A conceptually similar approach is also found in Chomsky (1986), where binding domain is defined as the smallest phrase in which all grammatical functions (or all thematic relations, cf. Freidin 1992) are satisfied, namely a Complete Functional Complex (CFC). In this light, consider (49) again, with the structure proposed in 3.2:
In this tree, the smallest phrase containing all the arguments of the adjective *sick* is the lower VP, with *his friend* receiving the subject theta role from it under mutual m-command. Since the matrix subject _John_ is not in this local domain, or CFC, it cannot serve as the antecedent for the anaphor but can bind the pronoun, conforming to the data in (49). And to the extent that the data is corrected explained, (49) works seamlessly with the Larsonian shell structure of VP and supports reference to co-arguments in some versions of binding theory.

Before closing this section, note the interesting contrast between (49) and (52) in terms of anaphor binding:

(52) John, put a book next to him/himself.

In a Larsonian structure, the locative phrase *next to him/himself* is placed in the same position as the resultative phrase. So the coindexing between *himself* and _John_ might seem unexpected. But there is an important difference between the two constructions: The locative phrase is an argument of the verb _put_, while the resultative phrase simply occupies the complement position without any known thematic relation with the verb _bully_. Stowell (1981) suggests that arguments cannot be predicates at the same
time. Together with (41), this amounts to forcing next (which I treat as an adjective just for the purpose of discussion) to completely lose its subject theta role: No PRO is allowed to receive the theta role inside the AP headed by next, nor can a book receive the subject theta role in the matrix object position – otherwise the AP would be a predicate banned from the argument position. To the extent that (41) is independently justifiable, (52) now has a straightforward explanation under Chomsky’s (1986) definitions of binding conditions. Without the subject theta role to worry about, AP is not only the CFC for the pronoun but also its binding domain, because a pronoun does not need a binder in the CFC to be well-formed. So him is automatically free in AP and can be bound by John outside AP. The same AP is also a CFC for the anaphor, but it is not the binding domain for the lack of a potential binder in it. It follows that the whole sentence becomes the binding domain for himself and John is the legitimate binder. In contrast, the resultative phrase in (49) is not an argument, and therefore can function as a predicate, effectively turning the lower VP into the CFC and the binding domain, as we saw earlier.

4. **Inverse Theta Role Assignment**

In this section, I first examine a subtle difference between the two resultative constructions in Chinese, with a view to establishing a characteristic of c-role assignment. Then I show that from this characteristic and the syntactic structures of English resultatives motivated in section 3, we can derive the second difference between Chinese and English resultatives, i.e., that the former allow inverse theta role assignment while the latter do not.

4.1. **Reflexives in Chinese Resultative Constructions**

Two properties of the morpheme ba are relevant to current discussion. First, ba disambiguates RCV compounds by imposing the Affectee reading on the NP it introduces. This is why (12b)–(13b) in section 2 is acceptable only in the absence of ba, while both (12a)–(13a) and (12c)–(13c) are well-formed in addition to their ba-less variants. Details on this property can be found in Li (1995). Secondly, ba provides a Case in addition to the accusative Case from the verb:

(53)  
\[
\text{He startled me so that I forgot the things I wanted to say.}
\]
Since the postverbal NP \textit{wo xiang shuo de hua} ‘what I wanted to say’ needs the accusative Case, the NP \textit{wo} ‘me’ must have received an extra Case from \textit{ba}. See Y. Li (1990) on the Case assigners in a RCV construction.

Used with the \textit{V-de} construction, \textit{ba} also characteristically introduces the Affectee argument. This is best illustrated in (18), repeated below:\footnote{Under somewhat marked contexts, \textit{ba} may introduce a non-affected argument in the \textit{V-de} construction:}

\begin{enumerate}
    \item\textit{wo ba neizhi huli zhui-de jin-pi-li-jin.}
        \begin{tabular}{ll}
            \textit{I BA that fox chase-DE totally-exhausted} \\
            The most salient reading = I chased that fox and it was totally exhausted as a result.
        \end{tabular}

    \item neizhi huli yijing \textit{ba} \textit{wo zhui-de jin-pi-li-jin le}, ke \textit{wo haishi zhui-bu-shang ta.}
        \begin{tabular}{ll}
            \textit{that fox already BA me chase-DE totally-exhausted but I still can’t catch up it} \\
            I’m already totally exhausted from chasing that fox, but I still can’t catch up it.
        \end{tabular}
\end{enumerate}

In both sentences, the NPs after \textit{ba, neizhi huli} ‘that fox’ in (18a) and \textit{wo ‘me’} in (18b), are the Affectee arguments. (18b) is especially revealing because, as we saw earlier, reverse theta role assignment crucially relies on treating the Agent argument of \textit{Vcaus} as Affectee.

Since the embedded subject of the \textit{V-de} construction can be either pro or an overt NP (cf. subsection 3.1), we predict that \textit{ba} still has an Affectee NP to introduce when the embedded subject is a reflexive, because a coreferential chain of [NP, reflexive] receives a theta role from Xres in the same way a chain of [NP, pro] does. This prediction is borne out, given that the \textit{V-de} construction marginally permits the co-occurrence of the matrix object and the embedded subject:

\begin{enumerate}
    \item\textit{(i) wo ba neige xiaotou zhui-de \text{\small [CP lian jiaotong dou dusai-le.]} \text{\small I BA that thief chase-DE even traffic jam-asp}}
        \begin{tabular}{ll}
            Even traffic was jammed because I was chasing that thief.
        \end{tabular}
\end{enumerate}

Since \textit{that thief} is not part of any chain thematically linked to Xres \textit{jam}, it is not Affectee. Instead of being a problem for the current analysis, (\textit{i}) in fact further supports treating RCV compounds as lexically formed. See Li (1997) for details.
If my coach trains me by making me run after him and today I outlasted him, (54a) may be appropriate to describe the situation with its first reading. The second reading of the sentence is also possible, though less easy to get, when the coach always follows me as part of the training but I outlasted him this time. In both cases, jiaolian ‘coach’ is understood as the Affectee. For (54b), suppose that the head of the delegation normally stays throughout the negotiation in spite of all difficulties and even when other delegates leave. But your continual ridicule drove even him out of the conference site. The thematically reverse reading is not available for (54b), presumably because the passive recipient of ridicule can hardly be the cause to drive the ridiculer away. The overall marginality of these sentences may be due to their complexity and length on top of the general tendency to avoid overt anaphoric forms when a coindexed pro/PRO is possible.

Given (54), what seems to be a surprise is the completely ungrammatical use of reflexives in the corresponding RCV construction, even when the compound is well-formed otherwise:

(55)a. wo ba jiaolian dou zhi-lei-le (*taziji le\textsuperscript{15}). (cf. (54a))

\[ I \ BA coach \ even \ chase-tired-asp \ himself \prt \]

\textsuperscript{15} The sentence-final particle le is added because it is preferred in my dialect when the RCV compound takes a postverbal NP complement. Without it, the sentences in (48) not only are equally unintelligible but also sound ‘incomplete’. In other words, le is used here to eliminate irrelevant factors for the unacceptability of (48).
Intended reading:
I ran after the coach for so long that even he himself was tired.
or
The coach ran after me for so long that even he himself was tired.

b. ni ba daibiaotuan-zhang dou waku-zou-le (*taziji you BA delegation-head even ridicule-leave-asp himself le).
prt
(cf. (54b))

Intended reading:
You ridiculed the head of the delegation so much that even he himself left.

According to (15), each NP after ba can receive the c-role Affectee because it is both the matrix object and part of the coreferential chain ([coach, himself] in (55a) and [delegation-head, himself] in (55b)) whose second member receives a theta role from Xres. It follows that this NP can be introduced by ba. Furthermore, because ba provides an extra Case (cf. (53) above), all three NPs in each of the two examples also satisfy the Case filter, and the unacceptability of (55) becomes totally unexpected.

To fully appreciate the problem raised by (55), consider the following examples:

(56)a. ni zongsuan kan-tou-le niziji le!
you finally see-through-asp yourself prt
You finally saw through yourself!

b. yaoshi ta qi-bing-le taziji, zanmen shei dou mei
if he annoy-sick-asp himself we anyone DOU have.no hao-rizi guo.
good-time live
If he angers himself into sickness, none of us will have a good time.
During that competition, it is he who defeated himself.

As mentioned above, the use of overt anaphors is somewhat limited in Chinese. This holds true for the resultative compounds as well. But as long as the discourse context permits, reflexives can indeed occur in a postverbal object position. All examples in (56) are in fact perfect. As a result, the total unacceptability of (55) is unlikely to be attributed the limited use of reflexives, given that there are plausible discourse contexts for these examples.\(^{16}\)

Next consider the ungrammatical (57), first noticed and analyzed in Li (1995):

\[
(57) \quad ^{\ast} \text{ni ba daibiaotuan-zhang dou waku-zou-le nide zhushou le.}
\]

\text{Intended reading:}
\begin{quote}
The intended reading is “You ridiculed the head of the delegation so much that even your aide left.”
\end{quote}

As in (55), Case is not the problem. Rather, the NP \textit{the head of the delegation} cannot be introduced by \textit{ba} because this morpheme requires the NP to be an Affectee, as noted in the beginning of this section. And \textit{the head of the delegation} is not qualified for Affectee for lack of any thematic relation with Xres \textit{zou} ‘leave’. On the one hand this straightforward account of (57) lends support to my (1995) theory of Chinese RCV compounds, which is also adopted in this paper. On the other hand, it further highlights the problem with (55): If (57) is unacceptable because the NP following \textit{ba} is not Affectee, why does not (55) improve when the same NP should have the Affectee reading through the coreferential relation with the postverbal reflexive? It should also be noted that both (55) and (57) lack any theta-identification often found in resultative compounds. But as I showed in Y. Li (1990), theta-identification is NOT a necessary condition for these

\(^{16}\) I am grateful to a reviewer for bringing the relevance of examples like (56) to my attention.
compounds. When the total number of theta roles from both component morphemes is less than or equal to the number of Cases available in a sentence, no theta-identification is needed:

(58)  
\begin{align*} 
\text{ta ba wo chang-ku-le.} \\
&\text{he BA me sing-cry-asp} \\
\text{His singing made me cry.} 
\end{align*}

Both chang ‘sing’ and ku ‘cry’ are unergatives, so there are altogether two theta roles in the compound. Since there are at least two Cases in each clause, each theta role can be assigned to a separate NP argument without identification. In other words, the lack of theta-identification in (55) and (57) is not the reason for their unacceptability.

4.2. Cross-Componential C-role Assignment

The contrast between the RCV examples in (55) and the V-de counterparts in (54) suggests some significant difference between the two resultative constructions. One difference reflected in the literature, independently of the current problem, is that the compounds are formed in the lexicon while the V-de sentences are syntactically constructed. There is more evidence that this is the correct characterization of the two resultative constructions. While many compounds have V-de counterparts, as we have seen several times so far, the correspondence fails when both Vcaus and Xres can be understood as transitives sharing the same subject and object:

(59)a. ta chang-hui-le neishou ge. 
   \text{he sing-know-asp that song} 
   \text{He learned that song through singing it.}

b. wo xia-ying-le neipan qi 
   \text{I play-win-asp that chess game} 
   \text{I played that chess game and won it as a result.}

c. xuesheng-men ting-dong-le laoshi-de baogao. 
   \text{student-s listen.to-understand-asp teacher’s talk} 
   \text{Students listened to the teacher’s talk and understood it.}

(60)a.??ta chang-de hui-le neishou ge. 
   \text{he sing-DE know-asp that song} 
   \text{Intended reading: Same as (59a).}
Given the sharp contrast in acceptability, we conclude that whatever reasons are responsible for the ungrammatical status of (60)–(61) must not be applicable to (59). But this general approach would become impossible to pursue if the RCV compounds were syntactically derived from bi-clausal D-structures comparable to those of the corresponding V-de examples.

On the other hand, my (1990) theory of the RCV compounds explains the status of (59) – the subject theta role and object theta role of Vcaus are respectively identified with those of Xres, a logical possibility of free theta-identification that applies independently of syntactic principles.

Suppose that UG indeed forms RCV compounds in the lexicon and the V-de in syntax. Since c-roles are obviously the products of a resultative construction, we have the default hypothesis in (62):

\[(62) \text{C-roles are assigned when a resultative construction is formed.}\]

Now consider how the contrast in the previous section can be explained at the conceptual level.

The compound *chase-tired* in (55a) is formed in the lexicon, so the Cause and Affectee roles must be determined in the lexicon, according to
But in the lexicon, the binding chain [coach, himself] is not available yet because binding is a syntactic process. Without this binding chain, however, the assignment of the Affectee role is blocked. But without the ‘protection’ of the Affectee role, inverse theta role assignment is ruled out by (16). Hence, (48a) is excluded. In contrast, the V-de example in (54a) is formed in syntax, the same component of UG where the binding chain is established. It follows that both Cause and Affectee roles can be assigned properly, thereby successfully overriding the effect of the thematic hierarchy as proposed in section 2.

Let us now work out the technical details of this analysis. To begin with, if the resultative compound has c-roles determined in the lexicon, then these c-roles cannot be directly assigned to argument NPs, which are syntactic entities non-existent in the lexicon. In fact, given the common assumption that the lexicon is a set of lexical items with corresponding argument structures (as well as other lexical information), c-roles can only be associated with theta roles in the lexicon. Consequently, we deduce the following theorem from (62):

\[
\text{(63) Let } R \text{ be a resultative construction and } E_1 \ldots E_n \text{ be the elements in } R \text{ that can bear c-roles.}
\]

a. If \( R \) is formed in syntax (e.g., the V-de construction), then \( E_i = \) a syntactic argument (e.g., NP) in the syntactic structure of \( R \).

b. If \( R \) is formed in the lexicon (e.g., the resultative compound), then \( E_i = \) a theta role in the argument structure of \( R \).

Intuitively, (63) simply says structures in different components of UG are built with different kinds of entities, and that while c-roles are assigned cross-componentially, their targets can only be the kinds of entities existing in the particular component where they are assigned.

If c-roles are assigned both in the lexicon and in syntax, the null hypothesis is that the argument structure and the syntactic structure in which this happens share certain cross-componential similarities with respect to c-role assignment:

\[
\text{(64a) Syntactic structure: } [\text{NP1} \ldots [\text{NP2} \ldots [\text{NP3} \ldots ]]]
\]

b. Argument structure: \( \theta_1(\theta_2(\theta_3(\ldots))) \)

(64a) may be the schematic representation of (54a), with irrelevant constituents omitted in the structure. (64b) is a typical argument structure of compounds like chase-tired, as we have seen many times by now. In both
cases, the potentially c-role bearing elements (i.e., NPs and theta roles) are arranged into hierarchies. In fact, it is precisely this shared hierarchical structure that underlies and regulates the (normal) mapping from the argument structure to syntax (cf. Grimshaw 1990). The most obvious difference between the two is that the three NPs in (64a) each have its own position in the hierarchical structure, whereas two of the three theta roles in (64b) occupy the same hierarchical slot as the result of theta-identification.

But this difference is unnecessary because (64b) is simply one of many notational possibilities for representing the argument structure of a compound. In fact, there are at least two conceptual reasons for not adopting (64b). First, if c-roles are assigned to both (64a) and (64b), the default assumption is for the two structures to be similar with respect to the way in which the c-role bearing elements are organized. Secondly, the coindexation between two NPs in (64a) indicates their coreferentiality. If coreferentiality has a counterpart at all in the lexicon, it is theta-identification, the process that forces two different theta roles to ‘refer’ to the same (sub)set of things defined by the two predicative morphemes. For instance, θ2-θα for the compound chase-tired in (64b) means that the set of things being chased and the set of things being tired must be identical for this compound. Therefore, even regardless of c-role assignment, theta-identification is best represented in a way comparable to syntactic coindexation. Given these considerations, I redefine (64) in (65) as the first approximation:

(65a) Syntactic structure:  [NP1 . . . [NP2 . . . [NP3 . . . ]]]

b. Argument structure:  ⟨θ1, ⟨θ2, ⟨θα⟩⟩⟩

In (65b), each theta role from the component morphemes is given a unique position in the argument structure of the compound. Theta-identification is represented with coindexation (i.e., coindexed theta roles are to be assigned to the same syntactic argument). Also, the theta roles from the head of the whole compound (=θ1 and θ2) are given the most prominent positions in (65b) while the one from the non-head (=θα) takes a less prominent position. This directly matches the syntactic structure in (65a), in which the argument NPs of the matrix predicate (= NP1 and NP2) are structurally more prominent than those of the embedded predicate.¹⁷

In order for the algorithm of c-role assignment to apply correctly, the argument structure of a compound needs to provide one more piece of

¹⁷ For arguments that Vcaus is the head of the resultative compound, see Li (1990, 1993, 1995). Following the same logic, the argument structure of a conjunctive compound like lai-wang ‘come-go’ (cf. Y. Li 1990) can be represented as (i):
information: which theta role comes from Vcaus and which from Xres. Again, the solution comes from a comparison with the syntactic structure. A syntactic structure not only describes the hierarchy among constituents, but also marks out the syntactically relevant information of each constituent, such as the category and the level of projection. Therefore, it is natural for the argument structure to reflect corresponding information in a similar fashion. Focusing on the V-de example in (54a) and the compound *chase-tired* as before, we now have:

(66)a. Syntactic structure:  
\[([_{CP1}NP1 \ldots [NP2, \ldots [_{CVP2}NP3, \ldots]]])\]

b. Argument structure:  
\[\langle_{Vcaus} \theta1, \theta2, \langle_{Xres} \thetaa, \rangle\rangle\]

(66a) is straightforward. In (66b), \(\theta1\) and \(\theta2\) come from Vcaus and are labeled as such; similarly, \(\thetaa\) is marked as the only theta role of Xres. The labeling also reflects the fact that Vcaus is the head of the compound and Xres is the embedded non-head. By looking at such a structure, UG has enough information to carry on c-role assignment.

Returning to the contrast in question between the V-de and the compound, what (62), (63), and (66) boil down to is that there are two separate levels of structure mapping in the formation of resultatives: The argument structures of component morphemes are mapped to the argument structure of the compound in the lexicon; and the argument structures of lexical predicates are mapped to the syntactic structure of the V-de construction in syntax. More generally, a resultative is formed through the process of mapping the source structure to the target structure, either in the lexicon or in syntax. Because of this separation of mapping levels, the operations and algorithms in (15), (16), and (17) should be adjusted accordingly. In the definitions below, \(S_R\) = the syntactic or argument structure of a resultative construction and \(\{E_1, E_2, \ldots E_n\}\) = the set of elements in \(S_R\) that can bear c-roles, where \(E_1\) = the structurally most prominent in \(S_R\) and \(E_2\) = the second prominent, etc. By definition, \(S_R\) consists of two subparts, \(S_{caus}\) being the structure from Vcaus, and \(S_{res}\) the structure from Xres; e.g., in the V-de construction, the matrix CP is \(S_{caus}\) while the embedded CP is \(S_{res}\).

\[(15')a. E_1 \text{ as a single-member chain receives the c-role Cause if it is in } S_{caus}.\]

\[(i) \quad \text{come } (\theta1) + \text{go } (\thetaa) \rightarrow \text{come-go } (\langle\theta1\rangle(\thetaa))\]

Note its similarity to a conjunctive sentence in syntax: \([\text{NP } \ldots ] \text{ conj } [\text{NP } \ldots ]\).
(15’b). The most prominent $E_i$ other than the one receiving Cause receives the c-role Affectee if it heads a coreferential chain of which at least one member is in $S_{res}$.

(16’) The mapping from the source structure $S$ to the target structure $T$ respects the thematic hierarchy\(^{18}\) coded in $S$ except for every $E_i$ in $T$ that receives a c-role.

(17’) The mapping from source structure $S$ to the target structure $T$ contains following steps:

Step 1: Randomly link theta roles in $S$ to $E_i$ in $T$.

Step 2: Where possible, assign a c-role to $E_i$ according to (15’).

Step 3: Check the result of mapping according to (16’).

The transition from (15)–(17) to (15’)–(17’) is mostly straightforward. The original reference to $V_{caus}$ and $X_{res}$ is replaced with reference to $S_{caus}$ and $S_{res}$, the substructures that each of them ‘projects’ at the relevant component of UG. As we saw, this is made possible by explicit labeling of the argument structure in (66b), which also reflects the maximum similarities between syntactic and argument structures for the purpose of c-role assignment. Also, the term theta role linking is used in (17’) to include both conventional theta role assignment from an argument structure to a syntactic structure, and the mapping of theta roles from the argument structure of a component morpheme to that of the compound.

To illustrate how the new definitions work, first consider the $V$-$de$ example in (54a), with the theta role and c-role assignments given in (67). Only one reading is discussed to save space.

(54)a. [CP wo ba jiaolian zhui-de [CP lian taziji dou pao-bu-dong-le]].

I ran after the coach for so long that even he himself couldn’t run anymore.

\(^{18}\) A more general definition than (16’) should refer to the hierarchical information coded in the source structure, not simply the thematic hierarchy. This is because the argument structure of a resultative compound reflects a hierarchy jointly determined by the thematic hierarchy and the hierarchical relation between c-roles. But I will stay with the more familiar (though less accurate) terms as long as no confusion is caused.
The construction is formed in syntax, so the argument structures of the verbs are the source of the mapping and the syntactic structure of the biclausal construction is the target. By (17'), the theta roles of each verb are randomly linked to its argument(s). In this particular case, the linking for *chase* is consistent with the theta-hierarchy coded in its argument structure. Then c-roles are assigned according to (15'). Since *I* is the most prominent argument (=E₁) and is a constituent in the matrix CP (=S_{caus}), it receives Cause; *the coach* is the next prominent argument and forms a chain with *himself*, which is an argument in the embedded CP (= S_{res}). Thus *the coach* acquires Affectee. The interpretation follows. The anomalous reading of (54a) is derived simply by inversely linking *θ₁* to *the coach* and *θ₂* to *I*, everything else being the same.

Now, look at the compound example in (55a), also duplicated below.

(55a. "wo ba jiaolian dou zhui-lei-le taziji le.

* I BA coach even chase-tired-asp himself prt

Intended interpretation: Same as (54a).

Because of the separation of mapping levels, theta role linking occurs at both levels: during the mapping in the lexicon from the argument structures of the component morphemes to the argument structure of the compound, and during the mapping in syntax from the argument structure of the compound to the syntactic structure of the sentence.¹⁹

(68) \[\text{mapping in lexicon} \]

\[
\text{chase-tired } \left(\text{V}_{\text{base}} \theta_1(\theta_2(\text{X}_{\text{res}} \theta_3)))\right)\]

\[
\text{chase } \left(\theta_1(\theta_2)) \text{ tired } (\theta_3)\right)\]

¹⁹ Note that the first mapping is not a possibility for the V-de construction, because the verbal predicates themselves are not resultative compounds. So *chase* enters syntax directly without any mapping operation on its ‘original’ argument structure.
In the lexicon, the theta roles of the component morphemes are linked into the argument structure of the compound. No theta-identification takes place because all three theta roles will be needed in syntax for the three separate NP arguments. Since the compound is formed in the lexicon, (62) dictates that any c-roles for the compound must be assigned in the lexicon as well. However, Affectee is not assigned for lack of a coindexed chain between 62 and θa. When the compound is used in syntax, its argument structure has three separate theta roles with none of them carrying the Affectee tag. Theta role linking takes place as usual, and the coach and himself now form a binding chain. But because there is no c-role assignment in syntax under (62), the coach cannot be introduced by ba. Put differently, the sentences in (55) are ruled out for the same reason that (57) is ruled out. The NP that relies on ba to provide a Case does not have the required Affectee reading, and this is so because syntactic binding cannot affect c-role assignment in the lexicon. This analysis of (55) also helps illustrate the intuition behind (62). The compound is formed in the lexicon and counts as a resultative construction only there. It enters syntax like any other verb, so a clause with a resultative compound is NOT regarded by syntax as a resultative construction, for the same reason that a clause whose VP is headed by kill is not regarded as a syntactic causative construction.

In sum, the c-role assigning process as defined in (15) applies repeatedly to different components of UG. In other words, it applies whenever and wherever a resultative construction is formed. It is this cross-componential property of c-role assignment that explains the contrast between (54) and (55).

4.3. Lack of Anomalous Interpretations in English Resultatives

The ungrammatical example in (11a) is repeated below, accompanied by the structure established for English resultatives in section 3.2. Recall that the resultative AP must not contain a PRO subject and the theta role of the adjective must be assigned to the matrix object through mutual m-command.
Since the resultative is not a compound construction, anomalous theta role assignment can only take place in syntax. The required mapping is illustrated in (70):

\[(70) *_{CP \text{ the barn} \ldots [\ldots \text{me} \ldots]}\]

Obviously, (70) will be ruled out immediately if the two NPs involved cannot receive any c-roles.

To apply (15')–(17'), the first step is to identify $S_{\text{caus}}$ and $S_{\text{res}}$, which are the matrix CP and the resultative AP, respectively:

\[(71) [CP \text{ the barn} \ldots [\ldots \text{me} \ldots [AP \ldots]]]\]

The NP the barn, occupying the subject position in (69), meets the requirement for the Cause role because it is the most prominent argument in the sentence and is inside $S_{\text{caus}}$. But the NP me cannot receive the Affectee role even if it is the second prominent argument. This is so because it forms a single-member chain which contains no member inside AP, the $S_{\text{res}}$ for the English resultative construction. According to Step 3 of (17'), the thematic mapping in (70) is now subject to (16'), which exempts anomalous theta
role assignment only for those arguments carrying c-roles. Since me does not have a c-role, it is subject to the regulations of the thematic hierarchy, which prevents θ1 (the Agent role of *paint* in this specific example) from being assigned to the argument in the structurally less prominent object position. Therefore, (69/70) is ruled out and English resultatives never permit thematically reverse interpretations.

(69/70) forms a contrast with well-formed V-de examples such as (10a), duplicated in (72):

(72)a. nei-ping jiu ba wo he-de mingding-da-zui.
    *that-bottle wine BA me drink-DE completely-drunk*
    I drank that bottle of wine and got totally drunk as a result.

As shown in (72b), there is a multi-member chain [me, pro] that allows me to receive Affectee because pro is a constituent in S_res, namely the embedded clause. With the two thematically reverse arguments each receiving a c-role, neither is subject to the restriction of the thematic hierarchy under (16'), making the sentence grammatical. The contrast between English and Chinese also highlights the essence of the analysis. C-role assignment as proposed in this paper is a highly ‘near-sighted’ operation that does not see beyond the structure it works on at that particular point of computation. Given a potential c-role bearing element E in a resultative structure S, the only clue it has regarding E’s relation with the subparts of a causal event is whether E is a component of the corresponding substructure of S. In Chinese, the c-role assignment operation sees the pro (or a reflexive) in the embedded clause and interprets it as part of the resulting event. In English, the object is unambiguously part of the matrix clause and is regarded as part of the causing event only for the purpose of c-role assignment in syntax. The Chinese–English contrast on thematic inversion follows. For some conceptual advantages of near-sighted syntactic operations, see Chomsky (1996).

An apparent problem arises from this explanation for why English resultatives do not allow anomalous theta role linking. If (69/70) is bad for lack of c-roles, c-roles should not be available for examples like (43) either,
because except for the way theta roles are linked, it has the same syntactic structures as (69):

(43) The farmer painted the barn red.

But this is clearly false. The correct interpretation of (43) necessarily describes the farmer as the cause for the barn’s becoming red and the barn as the entity being affected by the farmer’s painting it. Such cause and affectee readings are not (necessarily) available when paint and red are used separately. But this ‘extra’ semantics is precisely why c-roles are originally justified for Chinese resultatives. If both c-roles can be assigned in English after all, however, we will completely lose the explanation offered in this subsection.

This is only an apparent problem. In fact, the explanation for the cause-affectee readings in (43) lends further support to the theory of cross-componential c-role assignment. Consider the following English sentence:

(73) The farmer painted the barn, and the barn became red.

In the normal reading of (73), the farmer is again understood as the cause and the barn the affectee, though the sentence is not a resultative construction. This shows that the cause-affectee readings can also be obtained at a level of natural language other than the lexicon and syntax. Given the theory presented earlier, let us suppose that the c-role assigning algorithm (15') not only applies in the lexicon and syntax but also in a post-syntactic component of language, call it P. In P, (73) is understood as describing two temporally consecutive events (painting and becoming red) that involve two participants (the farmer and the barn), one of which is in both events. In this context, a natural interpretation is that there is a causal relation between the two events. As a result, the farmer acquires the c-role Cause through association with the causing event, and the barn has the c-role Affectee because it is part of the second event only.

Logically, the claim that c-roles are assigned in syntax for the V-de construction has at least two interpretations. In one interpretation, syntax is overt, so the V-de construction receives its c-roles by S-structure (or before Spellout in Chomsky’s 1996 Minimalist Program) and the English resultatives receive c-roles after S-structure, possibly at LF. The second interpretation is for syntax to include LF, effectively pushing c-role assignment in English resultatives to a post-LF component. There is evidence that in English, c-roles for resultatives are assigned after LF.

Assuming that LF is derived from S-structure only through the structure preserving process (cf. Emonds 1970) of move-α, it follows that the conjunctive structure in (73) remains the same at LF. If (73) does not count
as a resultative in overt syntax, it is unlikely that it does so at LF. If it is not regarded as a resultative, however, no c-roles can be assigned in the sentence under (15'). Furthermore, (73) does not have to have the cause-affectee readings associated with the farmer and the barn—it is possible that the sentence describes two separate events without any causal relation between them. This means that the component P where (73) can acquire the cause-effectee readings must be able to represent a single syntactically conjunctive structure either as a conjunctive so that no c-roles will be assigned, or as a resultative/cause structure so c-roles can be assigned. LF is not known for assigning multiple interpretations to the conjunctive and or for creating multiple structures from a single structure in this manner. We therefore conclude that the post-syntactic component P must be post-LF.

In the absence of counter-arguments, I assume that P is what the field of semantics (minus the theory of LF) is meant to study.

Ignoring the details that are irrelevant to the current discussion, (73) has two alternative representations at P, where $x'$ is the meaning of the word $x$ and coindexation indicates coreference:

\[(74)a. \text{AND}(\text{paint'}(\text{the-farmer'}, \text{the-barn}_k'), \text{red'}(\text{the-barn}_k'))
\]

\[b. \text{CAUSE}(\text{paint'}(\text{the-farmer'}, \text{the-barn}_k'), \text{red'}(\text{the-barn}_k'))
\]

As a pure conjunctive, (74a) is excluded from the application domain of the algorithm (15'), thus yielding the reading without a Cause and an Affectee. On the other hand, (74b) describes a causal relation between two propositions, with the one containing paint' corresponding to $S_{\text{caus}}$ and the one containing red' to $S_{\text{res}}$. Furthermore, the-farmer' is in the proposition for $S_{\text{caus}}$ while the-barn' is in the proposition for $S_{\text{res}}$ in addition to being part of $S_{\text{caus}}$. So applying (15') to (74b) gives the Cause reading to the-farmer' and the Affectee reading to the-barn'. Depending on the particular choice of semantic representations for (73), the details of the analysis may be spelled out somewhat differently, and (15') may need rephrasing to accommodate notational differences. But it is obvious that the fundamental idea of (15') can be easily extended to the semantic component P.

Returning to (43), the syntactic resultative only has one semantic representation at P, which is the same as the second interpretation of the conjunctive example (73):

\[(75) \text{CAUSE}(\text{paint'}(\text{the-farmer'}, \text{the-barn}_k'), \text{red'}(\text{the-barn}_k'))
\]

It follows that the-farmer' is also understood as Cause and the-barn' as Affectee. As for the ungrammatical (69/70), *The barn painted me totally exhausted, whether the arguments can receive Cause and Affectee readings at P will have no effect on the grammaticality of the sentence, which is
already ruled out by UG in syntax. This follows from the general assumption that illegitimate constructions in one linguistic component cannot be salvaged from another component.

5. Conclusion

This article offers an account of two remarkable differences between the Chinese resultative constructions and the English resultative small clauses with respect to the DOR and anomalous theta role assignment. I showed that both differences are attributed to the subjectless phrase that describes the result in English. Furthermore, a subtle difference between the two Chinese resultative constructions follows from cross-componential application of the c-role assigning algorithm (15′), which also plays a crucial role in the absence of reverse theta role assignment in English.

Appendix:
The XP-internal Subject and the Subjectless AP in English Resultatives

As Sections 3 and 4 show, the proposal (41) that the English resultative phrase cannot have a PRO subject plays an important role in our account of the two differences between the English resultative and its Chinese counterparts. (41) can be derived in several ways. First of all, one may adopt the conventional VP structure without the subject. Provided that the resultative phrase is in the second complement position of a double-object-like structure and the depictive phrase is an adjunct (cf. Rizzi 1990), all the analyses of sections 3 and 4 can be maintained with straightforward conversion. I have not taken this path, however, because of the accumulated evidence for the XP-internal subject structure. Alternatively, one may choose a Larsonian-style structure like I do but assume that under certain conditions the upper half of the XP structure is not projected (in the spirit of Collins 1997). In this appendix, I offer a third way to derive (41). It is important to remember, though, that the validity of (41) does not depend on such an explanation – (41) is already empirically motivated and is shown to have the explanatory power for the Chinese-English contrasts.

Logically, if the XP-internal subject structure is correct, (41) cannot be, and vice versa, unless one of them can ‘give in’ conditionally. In the Government and Binding model of syntax, this last alternative is impossible – if a derivation fails to respect a single linguistic principle, it is ungrammatical. However, this view runs counter to the empirically based
analysis of resultatives in this paper. A different viewpoint has been offered recently regarding the relations among linguistic principles. In this Optimality Theory (OT), certain principles are explicitly ranked in such a way that if they are in conflict, a derivation obeying the highest ranked principle is ruled grammatical even when it violates lower ranked ones. I refer the reader to Prince and Smolensky (1993) and Grimshaw (1994) for two representatives of this view. More literature can be found on the Rutgers Optimality Archive (ftp://ruccs.rutgers.edu/pub/OT). In fact, the analysis of Chinese resultatives adopted from Li (1995) and further developed in this paper is another example of OT. The very claim that c-roles can exempt a resultative from the regulations of the thematic hierarchy, in effect, ranks the causal relation in terms of Cause and Affectee higher than the thematic hierarchy in deciding the grammaticality of syntactic and morphological derivations.20

In the spirit of OT, consider the structures of the *farmer painted the barn red* and the *hunter shouted himself hoarse*, with the subject of the resultative AP represented AP-internally:

20 The idea of ranking syntactic principles is also implicitly but critically employed in Chomsky’s recent works on the Minimalist Program. See Marantz (1995) for a clarification of this point.
Note that the overt NP *himself* in (77) receives accusative Case. If this Case is assigned in the ECM manner, then the matrix verb *shout* must govern the embedded NP (possibly through the verb’s trace under Baker’s 1988 Government Transparency Corollary). If the Case is assigned through Spec-head agreement (cf. Chomsky 1993), *himself* must move to the corresponding Spec position and its trace inside AP must be at least antecedent-governed. Either way, AP does not block government of its Spec position from outside. It now follows from the PRO-theorem (Chomsky 1982) that the embedded PRO subject in (76) is not allowed by the binding principles A and B.\(^{21}\)

\(^{21}\) Kayne (1991) notes that PRO can be governed by a head structurally ‘lower’ than it without violating the binding conditions and uses this observation to account for the various clitic-related phenomena in Romance. He further suggests that a structurally lower governing head H has the minimality effect on PRO and prevents it from being governed by anything outside the phrase of HP. Kayne’s proposal does not pose necessary problems for the analysis I am pursuing in the text. For one thing, Kayne’s minimality effect is created under c-command, with a raised verb adjoining to \(l’\) and c-commanding PRO from there. (Segments of \(l’\) do not block c-command. Also see Kayne 1994.) In contrast, A in (67)
In the standard theory, this result would be enough to rule out the whole sentence, and incorrectly, for that matter. But suppose that binding principles and the Case filter are ranked higher than UG’s ‘desire’ to put all arguments of a lexical head X inside the maximal projection of X. In particular, let us follow Chomsky’s (1995, 1996) proposal, originally from Muysken (1982), that the maximal projection of head X is simply the structure at which X does not project any further. In the default context, X projects until all its arguments and modifiers are provided with appropriate positions. This is the XP in the conventional theory of government and binding. But if the generation of any such position leads to a conflict with a higher ranked principle in UG, such as the binding conditions, then X may stop projecting, provided that the Theta-criterion can be satisfied. The resulting projection is still regarded as the maximal projection of X, marked as XP. In (77), the adjective *hoarse* can project to contain its subject argument, because the latter is an overt NP that can and probably must be governed by the matrix verb in order to have accusative Case. In contrast, if *red* in (76) projects to include its subject, the position could not be filled by an overt NP – with the accusative Case already assigned to the matrix object *the barn*, the overt NP would not have any Case. Nor could PRO occur in the position, for the familiar binding condition violations. As an alternative to avoid violating either the Case filter or the binding conditions, *red* stops projecting ‘before’ the Spec position is generated, yielding the structure in (43).\footnote{Strictly speaking, Chomsky’s bare phrase structure requires that the resultative predicate AP is also A, without the ‘vacuous’ projection from A to AP in (42). But it is easy to see that this makes no difference to my analysis, as long as the subject of the adjective is not generated inside AP.} The AP thus formed is thematically incomplete because *red* still has a theta role to assign. But the Theta-criterion can only m-commands PRO and therefore may not have the minimality effect on the latter. See Rizzi (1990) for the claim that only c-command matters for minimality. Furthermore, Bowers (1993) argues that in a Larsonian shell structure, the upper XP is really PredP. (A similar idea is explored with Chomsky’s 1996 vP above VP.) Suppose that Bowers’ Pred is a functional head. Then what is labeled AP in (67) and (68) should be (i):\footnote{It is reasonable to assume that the functional Pred is not a governor and hence has no minimality effect at all on the NP in its Spec position. In any case, there are many ways to incorporate Kayne’s proposal while still excluding PRO in (67) as I do in the text.}

\begin{itemize}
  \item[(i)]
  \[
  \begin{tikzpicture}
    \node (PredP) at (0,0) {PredP};
    \node (NP) at (-1,-1) {NP};
    \node (Pred) at (0,-1) {Pred'};
    \node (AP) at (1,-1) {AP};
    \draw (PredP) -- (NP);
    \draw (PredP) -- (Pred);
    \draw (PredP) -- (AP);
  \end{tikzpicture}
  \]
\end{itemize}
still be satisfied through mutual m-command between AP and the matrix object. Exactly the same reasoning imposes a subjectless resultative AP for “The hunter shouted hoarse”, where the matrix verb is unergative. The structure was given in (45).

To conclude, except for the facilitation of discussion, there is no need for (41) to be stated because it simply follows from the interaction of UG principles on the particular structural context – when a phrase is the complement of a lexical head. Apparently, languages do vary with respect to what structures to pick for resultatives. Chinese picks compounding and a bi-clausal structure, whereas English adds a lexical phrase in a mono-clausal context. But once the choice is made, the status of (41) in a specific language is automatically determined, as long as certain UG principles/mechanisms are ranked in the sense of OT.

REFERENCES


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