

A FORCE-THEORETIC APPROACH TO MANDARIN SINGLE-CLAUSE RESULTATIVE CONSTRUCTIONS*

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1. Introduction

Resultative Constructions (hereafter RCs) are found in quite a few languages. In the English example (1a), *the waiter's* wiping serves as a causal event for *the table's* becoming clean. To express the same meaning, Mandarin uses a single clause with a 'V₁ - V₂' predicate¹, as exemplified in (1b)². In the complex predicate, V₁ usually represents a causal action, while V₂ can be a result state or action. Other 'V₁ - V₂' examples include *da-shang* 'hit-injured', *ma-ku* 'scold-cry', etc.

- (1) a. The waiter wiped the table clean.
b. fuwusheng **ca-ganjing-le** zhuozi.
waiter wipe-clean-PERF table
'The waiter wiped the table clean.'

Like their English counterparts, Mandarin RCs also face the problem of theta-role assignment. Li (1998) points out that sentence (2) with the complex *zhui-lei* 'chase-tired' is ambiguous in three different interpretations, with each embodying distinct theta-role assignments, as shown in Table 1.

- (2) Zhangsan **zhui-lei-le** Lisi.
Zhangsan chase-tired-PERF Lisi
Reading A: 'Zhangsan chased Lisi so that Lisi got tired.'
Reading B: 'Lisi chased Zhangsan so that Lisi got tired.'
Reading C: 'Zhangsan chased Lisi so that Zhangsan got tired.'

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¹The verbs in 'V₁-V₂' encompass both action verbs, states of being, and adjectives used predicatively. Note that Mandarin RCs can also surface in the form of 'V-*de* + clause' (i.e. not single-clause), as exemplified below. Since this paper mainly deals with single-clause resultative constructions, later mentions of Mandarin RCs only refer to RCs with 'V₁-V₂' predicates, unless indicated otherwise.

- (i) ta qi-de wo bu xiang xie xin le.
he annoy-DE me not want write letter SFP
'He annoyed me so much that I didn't want to write the letter.'

²Abbreviations: DE = post-verbal resultative marker, Lv = light verb, PASS = passive marker, PERF = perfective marker, POSS = possessive marker, SFP = sentence-final particle.

	External Argument: <i>Zhangsan</i>	Internal Argument: <i>Lisi</i>
Reading A	Agent of V ₁ & Experiencer of V ₂	Patient of V ₁
Reading C	Patient of V ₁	Agent of V ₁ & Experiencer of V ₂
Reading B	Agent of V ₁	Patient of V ₁ & Experiencer of V ₂

Table 1. Theta-role assignments in different interpretations of sentence (2)

Considering the complexity, there arises the question of how they surface with the same argument structure. In addition to the varied interpretations, sentence (2) under Reading B involves reversed theta-role assignments, with Agent placed in object position and Patient in subject position (Huang et al., 2009). The convoluted theta-role assignment is observed more apparently in (3)³, which seems to allow a word order as *jiu he wo* ‘wine drink I’.

- (3) na ping jiu **he-zui**-le Lisi.
 that bottle wine drink-drunk-PERF Lisi
 ‘That bottle of wine got Lisi drunk.’

Some may argue that ‘wine’ appears in subject position as the causer for *Lisi*’s drunken state, rather than an agent. Following this line, *yumen-de xinqing* ‘the depressed feeling’ should be allowed in the same position, since ‘depression’ can also be a causer for *Lisi*’s intoxication, as evidenced in sentence (4a) with the causative verb *shi* ‘make’. Conversely, sentence (4b) with ‘the depressed feeling’ as its subject, turns out to be unacceptable. This gets us to wonder about the constraint on external arguments in Mandarin RCs?

- (4) a. yumen-de xinqing shi Lisi **he-zui**-le.
 depressed-POSS mood make Lisi drink-drunk-PERF
 ‘The depressed feeling made Lisi drunk from drinking.’
- b. *yumen-de xinqing **he-zui**-le Lisi.
 depressed-POSS mood drink-drunk-PERF Lisi
 Intended reading: ‘The depressed feeling made Lisi drunk from drinking.’

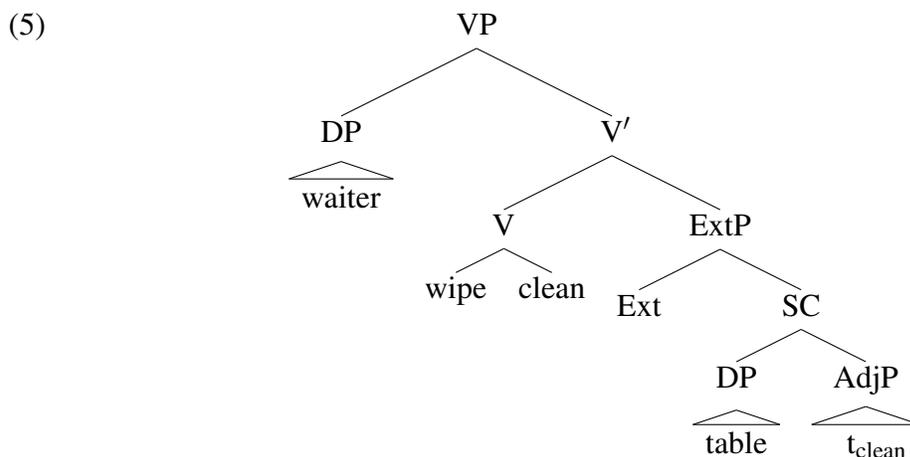
This paper takes a force-theoretic approach (Copley and Harley, 2015) to Mandarin resultative constructions, attempting to answer the problems raised above. The rest of the paper is organized as follows: section 2 reviews Sybesma’s (1999) syntactic approach and Li’s (1990) lexicalist approach to Mandarin RCs, and introduces the force-theoretic framework to be applied. Section 3 elaborates on how the framework is applied to Mandarin RCs and justifies the use of this framework. In section 4, I address the aforementioned problems and discuss implications following the force-theoretic framework. Section 5 presents a summary and some concluding remarks.

³Note that the two component verbs *he* ‘drink’ and *zui* ‘drunk’ are not derivationally related in Chinese.

2. Theoretical background

2.1 Previous accounts of Mandarin resultative constructions

This section presents a general picture of how the Mandarin resultative constructions with ‘V₁-V₂’ complexes have been handled, including a syntactic approach from Sybesma (1999) and a lexicalist approach from Li (1990, 1998). Sybesma proposes an analysis of Mandarin ‘V₁-V₂’ RCs on a par with the English counterparts, by including V₂ and its argument (also the internal argument of the complex) in a small clause, as in (5). He agrees with Hoekstra (1992: 160) in that the resultative V₂ functions to ‘turn a non-telic predication into a telic one, by specifying the state which terminates the event’. For example, the underlying structure of (1b) contains a small clause [_{SC} table clean]. Immediately above the small clause is a projection of Extent Phrase, which itself serves as the complement of V₁. Apparently, V₂ within the small clause needs to undergo head movements and incorporate with the matrix verb V₁ to derive the surface form.



Li (1990) provides a lexicalist account for Mandarin RCs, realizing the complex theta-role assignments mentioned in section 1. In order to derive the theta-grid for a ‘V₁-V₂’ complex, theta-roles of V₁ identified with those of V₂ are first merged together to be assigned to a single argument. This manages to reduce the number of required arguments to a maximum of two and circumvent violations of theta-criterion (Chomsky, 1981), which requires that each argument bears one and only one theta-role. Then head-feature percolation comes in to ensure the theta-roles of the complex follow the same thematic prominence as the head verb (i.e. V₁ of the complex). In the case of *zhui-lei* in (2), its component verbs have the following theta-grids as in (6), with V₁ assigning two theta-roles and V₂ assigning only one. Following this, the three readings of (2) are explained as different identification possibilities, as presented in Table 2, with identification symbolized by ‘=’.

- (6) θ -grids for *zhui* and *lei*:
zhui ‘chase’: < agent < patient >>
lei ‘tired’: < experiencer >

	External Argument	Internal Argument
Reading A	Agent of V_1 = Experiencer of V_2	Patient of V_1
Reading B	Patient of V_1	Agent of V_1 = Experiencer of V_2
Reading C	Agent of V_1	Patient of V_1 = Experiencer of V_2

Table 2. Varied theta-identifications for different readings of sentence (2)

Assuming that V_1 is the head, theta-grid for *zhui-lei* needs to follow the same thematic hierarchy as *zhui*. However, this can only account for Reading A and C, with Agent of V_1 serving as the external argument of ‘ V_1 - V_2 ’. In order to tackle the apparent violation of thematic hierarchy in Reading B, Li (1990) introduces causative structures with Causer and Causee; Causer is held responsible for putting Causee in a specific state or into action. It is stipulated that the causative hierarchy \langle Causer \langle Causee $\rangle\rangle$ is able to override the thematic hierarchy percolated from head verbs. Following this, Patient of V_2 and Agent of V_1 in Reading B are assigned the new roles of Causer and Causee respectively, and are thus not subject to V_1 ’s (*zhui*) thematic hierarchy. The introduction of causation structures does provide an extended explanatory scope, but it also renders the approach less integrated.

The arguments above demonstrate that neither a syntactic nor a lexicalist approach can satisfactorily solve the problems brought up in section 1. In the next section, I will introduce a syntax-semantics interface theory of event structures, which is also the theoretic basis of this study.

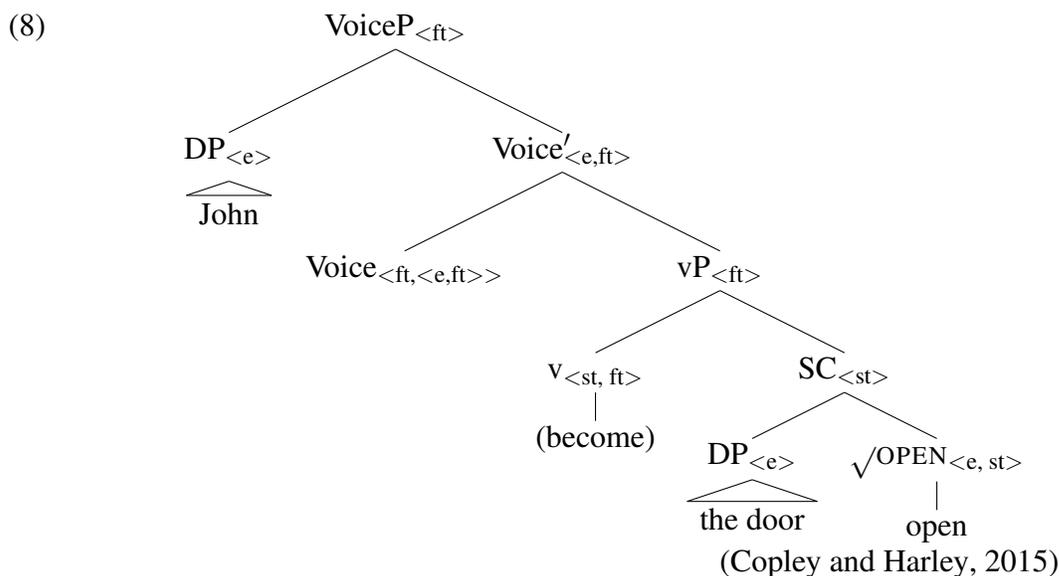
2.2 Introducing the force-theoretic framework

The force-theoretic framework (Copley and Harley, 2015) originates as an alternative account for Accomplishment verbs, e.g. *open* in *John opened the door*. Traditional approaches take accomplishment verbs as composed of two sub-events chained together in a causal relationship, e.g. the causing sub-event e_1 *John’s opening* and the result sub-event e_2 *the door’s being open*. This chain is represented as $\exists e_1 \exists e_2: e_1 \text{ CAUSE } e_2$. When it comes to a sentence like (7), the two sub-event analysis runs into problems, because no result sub-event e_2 occurred.

(7) Mary was painting the dresser black, but she didn’t finish.

In order to account for the non-culmination in (7), Copley and Harley (2015) develop a syntax-semantics interface theory of Accomplishments which draws on the notion of *force*. According to them, the verb *open* is understood as a force representing the energy input from a force producer; the force is inherently defeasible and thus entails no necessary effect. Semantically, forces are realized as a new type, $f(\text{orce}): \langle s, s \rangle$, denoting the function from an initial situation (S_0) to a final situation (S_1) that occurs if nothing external intervenes. In the sentence *John opened the door*, S_1 is encoded as a small clause [_{SC} the door open], and S_0 is the situation immediately before S_1 with *the door’s* readiness to be open. This sentence has a basic structure as in (8), with a L_v (become) representing the force leading to situation changes. The external argument *John* is ”introduced by a Voice head, which takes a predicate of forces as its complement and returns a function

from individuals to forces” (Copley and Harley, 2015: 125).



The force-theoretic framework is also applied to compositions of other Vendlerian eventuality types, based on the underlying conception that dynamic predicates are forces while stative ones are situations. Such a treatment successfully captures non-culminated cases of accomplishment verbs.

2.3 Why a force-theoretic approach to Mandarin RCs

In Mandarin, accomplishment verbs may take the form of ‘V₁-V₂’ resultative complexes. For example, *open* has a Mandarin counterpart as *da-kai*, which literally means ‘hit-open’, although *da* here has lost its semantic meaning and only functions to bring the new state ‘open’. Similar complexes include *da-po* ‘hit-broken’, *da-bai* ‘hit-defeated’, etc. In the same way that *open* is decomposed in (8), complexes like *da-kai* can be accounted for by the force-theoretic framework as well, with *da* an overt representation of the Lv (become).

Mandarin resultative constructions also show semantic compatibility with the force-theoretic framework. On one hand, V₁ tends to encode complex manners of force exertion. For instance, in *zhuang-huai* ‘knock-broken’ and *ya-huai* ‘press-broken’, different manners of force exertion (‘knock’ and ‘press’) are involved, despite the common result state ‘broken’. On the other hand, V₂ can represent different consequences following the same force exertion, as witnessed in the contrast between *zhuang-huai* ‘knock-broken’ and *zhuang-kai* ‘knock-open’. All these suggest that the force-theoretic framework may be a promising approach to Mandarin RCs.

3. A force-theoretic approach to Mandarin RCs

3.1 An application to Mandarin RCs

With a recognition of the problems that previous accounts fail to address, this study approaches Mandarin RCs from their conceptual basis. Resultative constructions are characterized by causing actions and result states/actions. When a resultative complex ‘ V_1 - V_2 ’ is understood from the perspective of Copley and Harley (2015), it necessarily involves (maybe at least) two distinct situations, an initial situation S_0 and a final situation S_1 . The two situations are associated by the cause-and-effect relationship, which manifests itself in a driving force for the situation change. The force is exerted from force producer (i.e. causer in causing action) to force recipient (i.e. the affected entity). In sentence (1b), which I repeat as (9), it has the conceptual interpretations as in (10).

- (9) fuwusheng **ca-ganjing**-le zhuozi.
waiter wipe-clean-PERF table
‘The waiter wiped the table clean.’

- (10) Conceptual interpretations in sentence (9):

S_0 : *the table’s readiness to be clean.*

S_1 : *the table is clean.*

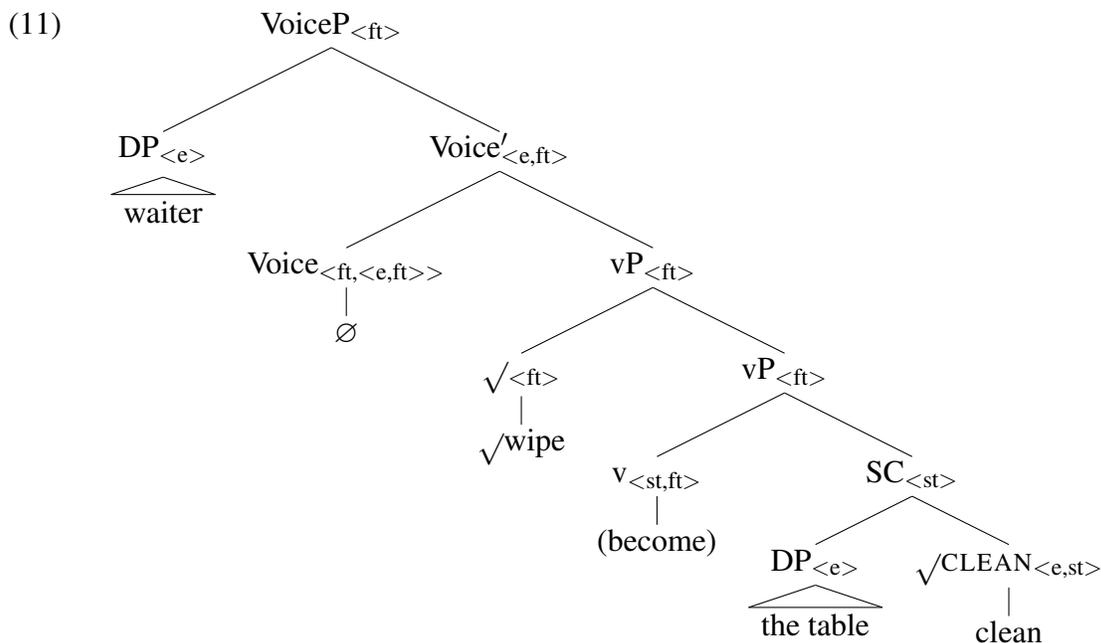
Force producer: *waiter.*

Force recipient: *table.*

Moreover, V_2 *clean* signifies the resultative situation S_1 , while V_1 *wipe* describes the manner in which the force is exerted. Sentence (9) thus has the interpretation that *the waiter* causes the table to become clean through his wiping. Following the exemplar structure in (8), sentence (9) is formally represented in (11) with an addition of one intermediate projection.

Small clauses situate the new situation *the table is clean*; Lv (become) is a force that evokes the situation change. Note that ‘ V_1 - V_2 ’ resultative complexes are interpreted within a lexical-decomposition syntax, so that V_1 and V_2 are understood not as independent verbs, but as verb roots. In that case, V_1 ’s root $\sqrt{\text{WIPE}}$ is not a force in itself, but serves as a manner modifying the force. Structurally, the manner $\sqrt{\text{WIPE}}$ adjoins to the predicate of force vP, while semantically, $\sqrt{\text{WIPE}}$ and vP (become) are combined by Predicate Modification. After that, an empty voice head comes in and introduces the force producer ‘waiter’.

Copley and Harley (2015) also hint on the morphological derivation of complex predicates. In the case of *ca-ganjing* ‘wipe-clean’, V_2 ’s root $\sqrt{\text{CLEAN}}$ firstly undergoes head-movement to Lv (become); the intermediate outcome $[\sqrt{\text{v}} \text{v}^0]_{\text{v}^0}$ then combines with $\sqrt{\text{WIPE}}$ via m-merger (Matushansky, 2006), deriving the surface form *ca-ganjing*.



Generally, Mandarin sentences with ‘ V_1 - V_2 ’ resultative complexes are reconceptualized as such: DP_1 (external argument) exerts a force to DP_2 (internal argument), leading to a new situation S_1 for DP_2 . That is, external and internal arguments represent force producers and force recipients respectively. V_1 can describe the manner of force exertion, whereas V_2 denotes the resultative state or action that happens to DP_2 , the affected entity. The mapping between conceptual interpretations and linguistic representations is presented in the following figures.

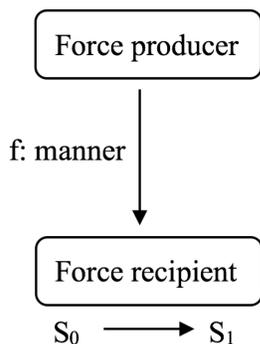


Figure 1. Conceptual interpretations

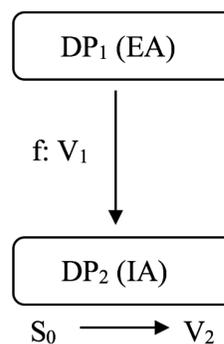


Figure 2. Linguistic representations

3.2 Justifying the force-theoretic approach to Mandarin RCs

The conceptual structure for Mandarin RCs provides us with the following predictions. Internal Arguments (hereafter IA) are the affected entities in result situations represented by V_2 , which predicts the dependence of IA and V_2 . External arguments (hereafter EA) exert

forces in manners encoded in V_1 , so that EA and V_1 are necessarily involved in causing action with semantic relevance. In this section, we attempt to verify EA's relevance to V_1 and IA's relevance to V_2 .

First imagine a scenario that a famous singer sang a sad song so that the audience were moved to tears. Causing action and result situation in this scenario are presented as follows.

(12) Causing action: the singer sang a song.

$\boxed{\text{NP}_1}$ $\boxed{V_1}$ $\boxed{\text{NP}_2}$

Result situation: the audience cried.

$\boxed{\text{NP}_3}$ $\boxed{V_2}$

It is demonstrated that V_1 and V_2 are related to causing action and result situation respectively. Moreover, three NPs appear in this scenario, with two in causing action and one in result situation. The scenario allows us to test the predictions concerning EA and IA by checking which specific NPs can appear in external or internal argument position. The test sentence adopts the resultative complex *chang-ku* 'sing-cry', comprised of V_1 'sing' and V_2 'cry'.

(13) $\boxed{\text{EA}}$ *chang-ku* $\boxed{\text{IA}}$.

When 3 NPs are placed in 2 different slots, there are 6 arrangement possibilities. Table 3 presents the acceptability results of each arrangement possibility.

	External Argument	Internal Argument	Judgement
(a)	NP_1	NP_2	✗
(b)	NP_1	NP_3	✓
(c)	NP_2	NP_1	✗
(d)	NP_2	NP_3	✓
(e)	NP_3	NP_1	✗
(f)	NP_3	NP_2	✗

Table 3. Acceptability results of different NPs in EA/IA positions

It is found that only arrangement (b) and arrangement (d) are compatible with the scenario in (12). The internal arguments of both arrangements are NP_3 in result situation; any arrangement with IA position occupied by NPs from causing action is ungrammatical or conveys a meaning incompatible with the required scenario. Therefore, IA is only associated with the result situation represented by V_2 . As for the EA position, either NP_1 or NP_2 can appear as an appropriate subject in (13), though NP_3 is not allowed here. Since NP_1 and NP_2 are both involved in causing action where forces are exerted in a manner encoded in V_1 , EA's relevance to V_1 is also justified.

In sentence (9), the external argument 'waiter' is associated with V_1 , but the internal argument 'table' is ambiguous in terms of its relevance, because both causing action and

result situation here involve the entity ‘table’, as shown in (14). Does this mean that internal arguments are also relevant to V_1 ?

(14) Causing action: the waiter wiped the table.

NP₁
 V₁
 NP₂

Result situation: the table was clean.

NP₃
 V₂

In Scenario (14), there are only two NPs, with ‘*the table*’ overlapping in causing action and result situation, that is, $NP_2 = NP_3$. Basically, there is no violation of EA’s and IA’s respective relevance, with IA *zhuozi* ‘table’ still the affected entity in result situation (V_2). IA’s seeming relevance to V_1 or causing action arises from the special case where one entity in causing action happens to be the affected entity. This analysis echoes Huang et al. (2009), which attributes the seeming relevance to world knowledge: a table that becomes clean has to be the one that is wiped. In summary, IA’s seeming connection with V_1 is only coincidental, while EA’s relevance to V_1 and IA’s relevance to V_2 are necessary.

4. Explain the unresolved problems

4.1 Reversed theta-role assignments and constraints on external arguments in RCs

Following the current framework, it is not a problem for Mandarin RCs to involve reversed theta-role assignments, because arguments in resultative constructions are not interpreted in relation to their component verbs. In sentence (15) replicated from (3), the external argument ‘wine’ appears in the causing action and is relevant to V_1 ; the internal argument *Lisi* is the affected person in the new situation. Accordingly, the two arguments take the roles of force producer and force recipient respectively. *Jiu* ‘wine’ is a force producer in the sense that it can exert an influence and intoxicate the drinker. The influence is conceptually represented as a reaction force from ‘wine’ to ‘drinker’, in contrast to the force exerted by ‘drinker’ to ‘wine’. As exemplified in (16), causing actions do not directly encode reaction forces, but they are still important for exertion of reaction forces in two aspects. First, reaction forces happen at the same stages as causing actions; second, causing actions provide initiators (e.g. ‘drinker’) for exertion of reaction forces.

(15) na ping jiu **he-zui-le** Lisi.
 that bottle wine drink-drunk-PERF Lisi
 ‘That bottle of wine got Lisi drunk.’

(16) Causing action: Lisi drank wine.

NP₁
 V₁
 NP₂

Result situation: Lisi was drunk.

NP₃
 V₂

The seeming reversed theta-role assignments arise from forces exerted from Themes (or Patients) to Agents, causing changes of states to Agents. Moreover, force producers are not necessarily volitional Agents; certain inanimate objects can also produce forces as long as they are ‘teleologically capable’ of generating the energy needed to introduce situation changes (Folli and Harley, 2008).

Back to the question why causers like ‘depression’ cannot replace ‘wine’ as external arguments in (15), we have better answers. Structurally, external arguments in Mandarin RCs require relevance to causing actions and to V_2 , but ‘depression’ as a causer is not involved in the causing action in (16). Conceptually, such a replacement is unacceptable because ‘depression’ does not possess the teleological capacity to get one drunk. Considering the two aspects, ‘depression’ cannot serve as an alternative external argument for the complex *he-zui* ‘drink-drunk’ in (15).

4.2 Multiple interpretations

This section attempts to explain the three different interpretations of sentence (2) (replicated as (17) below) based on the force-theoretic framework. As mentioned before, each interpretation embodies distinct theta-role assignments, which are understood from the component verbs of the complex *zhui-lei* ‘chase-tired’. Under the current framework, however, external arguments and internal arguments in Mandarin RCs are assigned the roles of force producers and force recipients respectively. In both Reading A and Reading B, EA *Zhangsan* is the force producer and IA *Lisi* is the force recipient. Despite this, the two readings involve divergent scenarios, as witnessed in (18).

- (17) Zhangsan **zhui-lei**-le Lisi.
 Zhangsan chase-tired-PERF Lisi
 Reading A: ‘Zhangsan chased Lisi so that Lisi got tired.’
 Reading B: ‘Lisi chased Zhangsan so that Lisi got tired.’
 Reading C: ‘Zhangsan chased Lisi so that Zhangsan got tired.’

(18)

Reading A: Causing action: Zhangsan chased Lisi. <div style="text-align: center;"> NP₁ V₁ NP₂ </div> Result situation: Lisi was tired. <div style="text-align: center;"> NP₃ V₂ </div>	Reading B: Causing action: Lisi chased Zhangsan. <div style="text-align: center;"> NP₁ V₁ NP₂ </div> Result situation: Lisi was tired. <div style="text-align: center;"> NP₃ V₂ </div>
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Causing actions in both readings involve the same force manner ‘chase’, but differ in who chased who. In other words, the affected person *Lisi* can get tired either because *Lisi* was being chased or because *Lisi* was chasing. The former case conforms to Reading A, where the affected entity NP_3 coincides with the chatee NP_2 ($NP_2 = NP_3$). *Zhangsan* is the chaser and meanwhile the force producer that caused *Lisi* to run and get tired. In the latter case with *Lisi* as the chaser, the chatee *Zhangsan* can run continuously and get the chaser tired finally, making *Lisi* the affected person ($NP_1 = NP_3$). This case is consistent with Reading

B, and satisfies respective relevance conditions of EA and IA. Moreover, the latter case also involves reversed theta-role assignments, since the patient (chasee) is in a subject position.

It seems that either NP in a causing action can serve as a force producer in relation to its relevant result situation. In the case of sentence (17) under Reading B, the chasee exerted a conceptual force to the chaser, causing the chaser tired. But for the same causing action ‘*Lisi chased Zhangsan*’, it is also likely that the chaser *Lisi* produced a force leading to *Zhangsan*’s tiredness, although this relevant scenario involves a different result situation ‘*Zhangsan was tired*’ and produces a different sentence (19). Likewise, the causing action ‘*Lisi drank wine*’ in (16) may also bring in a new situation for *wine*. The prediction is borne out by sentence (20), with a different result situation: ‘*the wine was unavailable*’.

(19) Lisi **zhui-lei-le** Zhangsan.
Lisi chase-tired-PERF Zhangsan
Intending reading: ‘Lisi chased Zhangsan so that Zhangsan got tired.’

(20) Lisi **he-wan-le** na ping jiu.
Lisi drink-finished-PERF that bottle wine
‘Lisi drank up that bottle of wine.’

Sentence (15) and sentence (20) involve the same causing action, though with different result situations. They represent applications of different forces embodied in the same causing action.

When it comes to Reading C, there seems to be a violation of IA’s relevance to result situation represented by V_2 . As in (21), IA *Lisi* is not involved in the result situation. Moreover, the only NP, i.e. Experiencer of the result, is in an EA position.

(21) Reading C:
Causing action: Zhangsan chased Lisi.

NP ₁	V ₁	NP ₂
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 Result situation: Zhangsan was tired.

NP ₃	V ₂
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This paper, however, does not agree with the aforementioned violation, as *Lisi* in Reading C is not a real argument due to the following reasons. First, *Lisi* does not allow passivization or topicalization, as evidenced in (22).

(22) a. *Lisi bei Zhangsan **zhui-lei-le**.
Lisi PASS Zhangsan chase-tired-perf
Intended reading: ‘Lisi was chased by Zhangsan so that Zhangsan got tired.’

b. *Lisi, Zhangsan **zhui-lei-le**.
Lisi, Zhangsan chase-tired-perf
Intended reading: ‘As for Lisi, Zhangsan chased him and got tired.’

Second, non-affected entities are only allowed to supersede a limited number of Mandarin resultative complexes, including *chi-bao* ‘eat-full’, *he-zui* ‘drink-drunk’, and those in the form of V_1 -*lei* ‘tired’, etc. Even for these complexes, not any DP is allowed, as seen in the contrast in (23).

- (23) a. Lisi **chi-bao** fan-le.
Lisi eat-full meal-SFP
‘Lisi was full because of meal-eating.’
- b. *Lisi **chi-bao** liang-wan mi-fan-le.
Lisi eat-full two-bowl rice-meal-SFP
Intended meaning: ‘Lisi was full because he ate two bowls of rice.’

Therefore, *Lisi* in sentence (17) under Reading C is not a full-fledged argument, although it is still to be investigated what types of DPs can follow such complexes as *chi-bao* and how these DPs are involved in derivations. Following from this, resultative complexes in such cases are not two-place predicates, but used as intransitives. This is confirmed by sentence (17)’s (under Reading C) semantic relevance to sentence (24).

- (24) Zhangsan **zhui-lei**-le.
Zhangsan chase-tired-perf
‘Zhangsan got tired because of chasing’.

As an English verb may allow the causative-inchoative alternation, e.g. *open* in (25), the complex *zhui-lei* also has an inchoative use as in (24).

- (25) a. Causative: John opened the door.
b. Inchoative: The door opened.

The gloss in (24) shows that *Zhangsan* is the affected entity (force recipient) and the force is exerted via chasing, although there is no information on force producer. While this paper mainly focuses on causative uses of RCs, it is conceivable that derivations of inchoative RCs do not involve projections of VoiceP, thus introducing no force producers. In that case, the affected entities are raised to EA positions, which explains why external arguments in inchoative sentences appear to be related to result situations and V_2 . Sentence (17) under Reading C also presents the same semantic information without identifying force producer. The ostensible IA *Lisi* here may be an adjunct, serving to provide supplementary information on who is chased. Therefore, sentence (17) under Reading C can be derived using a mechanism similar to that used in deriving (24), though adaptations are necessary to accommodate the ostensible IA. Full details of the derivation are left for future research.

Despite a lack of thorough knowledge concerning Reading C, it is apparent that the non-affected entity in EA position is not a full-fledged argument. This does not discredit the force-theoretic treatment of Mandarin RCs, which has proved to be feasible in accounting

for Reading A and Reading B, along with reversed theta role assignments. Furthermore, the force-theoretic framework also successfully predicts the absence of a fourth reading, Reading D. Refer to the different interpretations in (17), it is found that Reading A and Reading C involve the same causing action but differ in the affected entity. People may wonder whether there is Reading D, which shares the same causing action as Reading B, but has a different result situation? That is, *Lisi chased Zhangsan* → *Zhangsan got tired*. Reading D is not available for two reasons. First, it violates EA's and IA's respective relevance conditions; second, unlike Reading C, there is no way of deriving (17) from (24) with the intended interpretation (Reading D), because the additional element *Lisi* is unlikely to be adjoined and put in an IA position to provide supplementary information on chasers.

5. Conclusions

This study reconceptualizes Mandarin single-clause resultative constructions as force exertion from external arguments to internal arguments, with internal arguments reaching new situations S_1 . External arguments, as force producers, are relevant to causing actions and force manners encoded in V_1 , while internal arguments are the affected entities in result situations represented by V_2 . Moreover, it is also suggested that in a causing action, a force is not only exerted from Agent to Patient/Theme; Patient/Theme may produce a reaction force to Agent as well. In the latter case, Patient/Theme and Agent are force producer (EA) and force recipient (IA) respectively, leading to reversed theta-role assignments. Following from this framework, external arguments in Mandarin RCs are required to be entities involved in causing actions, which explains why causers like 'depression' cannot serve as external arguments for the complex *he-zui* 'drink-drank'.

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