

Giving Verbs More Arguments in Mandarin Chinese

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1 Introduction

Languages have ways of adding arguments to the argument structure of verbs. Typically, this is expressed via morphology on the verbs or through adpositions. In this paper, I investigate how Mandarin Chinese (MC) adds arguments to verbs. Specifically, MC uses the verbal morpheme corresponding to *give* ‘*gei*’ to introduce additional arguments. In particular, it can either appear affixed to the main verb or appear as a preposition-like morpheme, producing on the surface what looks to be a double-object (DO) and prepositional-dative (PD) alternation. I examine the syntactic and semantic properties of this alternation, arguing that while they involve different syntactic structures, they both have a possessor-like low applicative semantics (Pylkkänen 2002). Finally, I provide a compositional syntax-semantics for the alternation, suggesting they can be derived simply by switching the order of application of semantic rules with function application and event identification (Kratzer 1996).

2 Marking Additional Arguments with *Give*

In English, transitive verbs can be augmented with additional arguments, either in DO or PD form. The DO form is unmarked, while the PD form requires a preposition. As Pylkkänen (2002) notes, this is only possible in English if the additional argument is interpreted as a (potential) possessor.

- (1) a. John wrote a letter.
b. John wrote Mary a letter.
c. John wrote a letter for/to Mary.

MC differs from English in that both the DO and PD variants are marked with the morpheme ‘*gei*’ corresponding to *give*. In the DO form, it is affixed to the main verb while it appears as a preposition-like element in the PD form. As shown below, ‘*gei*’ is obligatory to add an additional argument and cannot be omitted.

- (2) a. Zhangsan xie-le yi-feng xin.
Zhangsan write-ASP one-CLS letter
‘Zhangsan wrote a letter.’
b. Zhangsan xie-*(*gei*)-le Mali yi-feng xin.
Zhangsan write-GIVE-ASP Mary one-CLS letter
‘Zhangsan wrote Mary a letter.’
c. Zhangsan xie-le yi-feng xin *(*gei*) Mali.
Zhangsan write-ASP one-CLS letter GIVE Mary
‘Zhangsan wrote a letter to Mary.’

In the following sections, I demonstrate specific properties of both the DO and PD variants, illustrating that they uniformly encode low applicative possessor semantics. However, they differ in that the additional argument in the DO form is introduced high in a manner similar to the high applicative structure in Pylkkänen (2002).

2.1 The Semantics of the DO Variant

The key semantic property of the DO variant marked with ‘*gei*’ is that the argument introduced must be interpreted as a potential possessor/recipient. The first piece of evidence is that the presence of ‘*gei*’ can affect the interpretations of ditransitive verbs of transference like ‘*mai*’ *buy*. Without

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‘*gei*’, the indirect object (IO) of the ditransitive verb is interpreted as a source rather than a possessor/recipient. Affixing ‘*gei*’ results in a possessor/recipient interpretation (Zhang 1998). As shown below, the variant without ‘*gei*’ permits an inanimate IO while the variant with ‘*gei*’ disallows it, and the interpretations between the two variants differ between source and possessor/recipient.

- (3) a. Zhangsan mai-le Mali/shuju yi-zhi bi.
Zhangsan buy-ASP Mary/bookstore one-CLS pen
‘Zhangsan bought a pen from Mary/the bookstore.’
b. Zhangsan mai-gei-le Mali/*shuju yi-zhi bi.
Zhangsan buy-GIVE-ASP Mary/jiaoshi one-CLS pen
‘Zhangsan bought Mary/*the classroom a pen.’

The second piece of evidence comes from the question test, as described by Rappaport Hovav and Levin (2008). The observation is that the IO can only be questioned with the animate question word ‘*shei*’ *who* rather than other questions words like the locative ‘*nali*’ *where*.

- (4) a. Zhangsan xie-gei-le Mali/*Lundun yi-feng xin.
Zhangsan write-GIVE-ASP Mary/London one-CLS letter
‘Zhangsan wrote Mary/*London a letter.’
b. Zhangsan xie-gei-le shei/*nali yi-feng xin?
Zhangsan write-GIVE-ASP who/where one-CLS letter
‘Who/*where did Zhangsan write a letter (to)?’

A final piece of evidence comes from Pylkkänen’s (2002) diagnostics for differentiating between beneficiary high applicatives and possessor low applicatives. Because low applicatives denote a relation between a possessor and a theme, it is incompatible with intransitive unergative or stative verbs. Beneficiary high applicatives denote a relation between an individual and an event and thus unergatives and statives are possible. As seen below, the MC DO variant marked with ‘*gei*’ is incompatible with unergatives and statives, suggesting that they encode low applicative possessor semantics (Paul and Whitman 2010).

- (5) a. *Zhangsan pao-gei-le Mali.
Zhangsan run-GIVE-ASP Mary.
Intended: ‘Zhangsan ran for Mary.’
b. *Zhangsan kan-gei-zhe Mali bao ne.
Zhangsan watch-GIVE-DURATIVE Mary bag PRT
Intended: ‘Zhangsan is watching the bag for Mary.’

2.2 The Semantics of the PD Variant

Studies of the DO-PD alternation in English ditransitive verbs like *send* have pointed to the fact that the PD variant is semantically different from the DO variant. In particular, the second argument in a PD can denote a location while the first argument in the DO variant must be a potential possessor (Harley 2003). In particular, canonical transitive verbs like *knit* and *teach* show a contrast in entailment of successful transfer between the DO and PD variant, suggesting that the first object in the DO must be a possessor while the second argument in the PD need not.

- (6) a. John sent the article to Sue/Philadelphia.
b. John sent Sue/*Philadelphia the article.

(7) a. John taught French to the students but they didn’t learn it.
b. John taught the students French # but they didn’t learn it.
c. I knitted this sweater for our baby who will be born in a month.
d. I knitted our baby this sweater # who will be born in a month.

One might expect then that the PD variant in MC marked with ‘*gei*’ would show these same contrasts. However, the the PD variant in MC marked with ‘*gei*’ patterns exactly like the DO variant

in encoding possessor semantics. First, as shown below, the second argument cannot be inanimate and can only be questioned by the question word ‘*shei*’ *who*.

- (8) a. Zhangsan xie-le yi-feng xin gei Lisi/*Lundun.
 Zhangsan write-ASP one-CLS letter GIVE Lisi/London
 ‘Zhangsan wrote a letter to Lisi/*London.’
 b. Zhangsan xie-le yi-feng xin gei shei/*nali?
 Zhangsan write-ASP one-CLS letter GIVE who/where
 ‘Who/*where did Zhangsan write a letter to?’

Second, as Paul and Whitman (2010) note, the PD variant is also incompatible with unergative and stative verbs as is the DO variant, suggesting that they require a theme object to encode a possession relation.

- (9) a. *Zhangsan pao-le gei Lisi.
 Zhangsan run-ASP GIVE Lisi/London
 Intended: ‘Zhangsan ran for Lisi.’
 b. *Zhangsan kan-zhe bao gei Lisi ne.
 Zhangsan watch-DUR bag GIVE Lisi
 Intended: ‘Zhangsan is watching the bag for Lisi.’

Finally, Biggs (2014) notes that entailment of successful transfer is not limited to the DO variant. The PD variant entails successful transfer with different verb roots, as argued by Rappaport Hovav and Levin (2008) in their verb-dependent approach. For example, the ditransitive verb ‘*song*’ *gift* entails successful transfer in both variants, while the transitive verb ‘*qie*’ *cut* does not across both the DO and PD variants. In other words, entailment of successful transfer is not a property the PD inherently lacks but can be traced to the lexical semantics of individual verb roots.

- (10) a. Zhangsan song-gei-le Lisi yi-shu hua, # keshi Lisi mei shou-dao.
 Zhangsan gift-GIVE-ASP Lisi one-CLS flower but Lisi NEG receive-arrive
 ‘Zhangsan gifted Lisi a bouquet of flowers # but she didn’t receive it.’
 b. Zhangsan song-le yi-shu hua gei Lisi, # keshi Lisi mei shou-dao.
 Zhangsan gift-ASP one-CLS flower GIVE Lisi but Lisi NEG receive-arrive
 ‘Zhangsan gifted a bouquet of flowers to Lisi # but she didn’t receive it.’
 (11) a. Zhangsan qie-gei-le Lisi yidian cong, keshi Lisi mei jiezhu.
 Zhangsan cut-GIVE-ASP Lisi a.little scallion but Lisi NEG catch
 ‘Zhangsan cut Lisi a little scallion but she didn’t get it.’
 b. Zhangsan qie-le yidian cong gei Lisi, keshi Lisi mei jiezhu.
 Zhangsan cut-ASP a.little scallion GIVE Lisi but Lisi NEG catch
 ‘Zhangsan cut a little scallion for Lisi but she didn’t get it.’

To summarize, we see that the DO and PD variant both encode possessor semantics based on the various diagnostics, where the first argument in the DO and the second argument in the PD must be animate, potential possessors. I demonstrate in the next section that various diagnostics, however, point to the two variants having different syntactic structures nonetheless.

2.3 The High Applicative Syntax of the DO Variant

While I have shown that the DO variant has the low applicative semantics in Pykkänen’s (2002) sense, two diagnostics illustrate however that it has high applicative syntax as in the structure below.

- (12) [_{AppIP} DP Appl [_{VP} V DP]]

The first diagnostic concerns the distribution of the distributive quantifier ‘*ge*’ in MC. As has been argued by Soh (2005), ‘*ge*’ in MC diagnoses the existence of a *v*/VP boundary in that it is a verbal modifier that adjoins to a constituent containing an indefinite expression it c-commands.

The key observation here is that in the DO variant, ‘*ge*’ can intervene between the direct object and indirect object, suggesting that the indirect object is outside the VP constituent that ‘*ge*’ attaches to. In other words, the indirect object is introduced by a separate head outside the VP, exactly as Pytkäinen (2002) suggested for her beneficiary high applicatives.

- (13) Zhangsan xie-gei-le nei san-ge ren ge yi-ben shu.
 Zhangsan write-GIVE-ASP those three-CLS people GE one-CLS book
 ‘Zhangsan wrote those three people a book each.’

Further corroborating evidence for such a high applicative syntax comes from scope facts when the two objects are quantificational. As shown below, in the DO variant scope is fixed between the indirect object and the direct object, and inverse scope is impossible (Biggs 2014).

- (14) Zhangsan xie-gei-le mei-wei lao shi liang-shou shi.
 Zhangsan write-GIVE-ASP every-CLS teacher two-CLS poems
 ‘Zhangsan wrote every teacher two poems.’

($\forall > 2$, $*2 > \forall$)

Under Bruening’s (2001, 2010) analysis of scopal interactions in DO constructions, this means that the two objects are not equidistant for quantifier-raising (QR) for scope-taking purposes. For Bruening, two objects are equidistant for QR if they are contained within the same maximal projection of a single head. Since they are equidistant, both are available for QR and scope ambiguity results. Since scope is fixed in the DO variant, this means that the universal quantifier contained in the indirect object in the above example must not only c-command the numeral in the direct object, but must also be contained outside the maximal projection containing the direct object. Again, this points back to the structure in (12), where the indirect object is introduced by a separate head outside of the VP containing the direct object, exactly as Pytkäinen (2002) proposed for beneficiary high applicatives.

2.4 The Syntax of the PD Variant

Using the exact same diagnostics as presented above for the DO variant, the PD variant clearly must be different syntactically from the DO variant. First, the distributive quantifier ‘*ge*’, which can intervene between the indirect object and direct object in the DO variant, cannot do so in the PD variant. This indicates that there is no *v*/VP boundary between the direct object and the indirect object marked by ‘*gei*’ in the PD variant.

- (15) *Zhangsan xie-le liang-ben shu ge gei nei san-ge ren.
 Zhangsan write-ASP two-CLS book GE GIVE those three-CLS people
 Intended: ‘Zhangsan wrote three books each to those three people.’

In regards to scope, the observation is that scope in the PD variant is ambiguous (Bruening 2001, 2010, Biggs 2014). In the example below, there could be two books written collectively to everybody, or each person could have received their own two books. This indicates that the two objects are equidistant for QR in Bruening’s terms and thus they are contained within the same maximal projection.

- (16) Zhangsan xie-le liang-ben shu gei mei-ge ren.
 Zhangsan write-ASP two-CLS book GIVE every-CLS people
 ‘Zhangsan wrote two books to every person.’

($\forall > 2$, $2 > \forall$)

Taking into account these facts, Soh (2005) (and also Bruening (2010)) assigns the PD variant the following structure, where the indirect object marked by ‘*gei*’ is in a complement position while the direct object is in the specifier position of V.

- (17) [_{VP} *v* [_{VP} DP [_V V DP]]]

2.5 Interim Summary

In this section, we demonstrated that the morpheme ‘*gei*’ can add arguments to a canonical transitive verb in MC. It can do this in either a DO variant where ‘*gei*’ is affixed to the verb or as a preposition-like element, resulting in what looks like a DO-PD alternation. However, unlike the much studied DO-PD alternation in English, both the DO and PD variants marked by ‘*gei*’ seem to denote (potential) possessor semantics. In particular, they both disallow inanimate indirect objects and are incompatible with unergative and stative verbs. Nonetheless, they demonstrate different syntactic structures, as evidenced by the distribution of the distributive quantifier ‘*ge*’ and scopal interactions when the two objects are both quantificational. The DO seems to resemble Pylkkänen’s (2002) high applicative, even if it does not denote beneficiary semantics. The PD variant, on the other hand, shows the opposite behavior in regards to these diagnostics, suggesting that the ‘*gei*’ phrase adding an indirect object is contained within the same maximal projection as the direct object.

3 Proposal

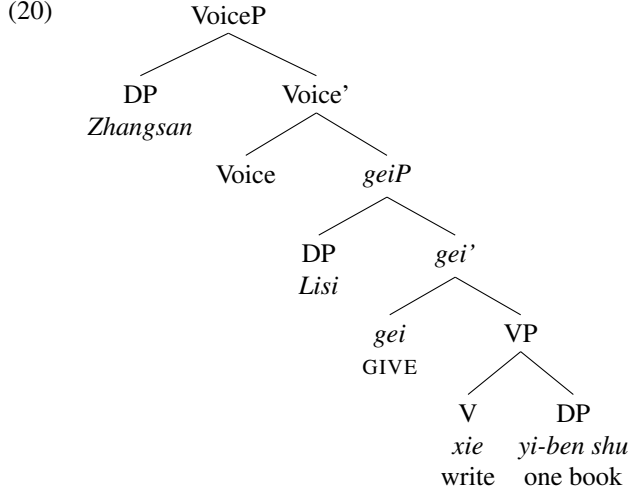
Given how we need to account for two seemingly different syntactic structures having the same semantics (see also Wood and Marantz (2017)), I propose that the alternation is due quite simply to the switch in order of application of the semantic composition rules function application and event identification (Kratzer 1996). This will thus deliver the same semantic denotations even if the order of combination of syntactic constituents are different. Key to the proposal is the semantic denotation of ‘*gei*’. Following the observations in (3), which showed that ‘*gei*’ directly affects the interpretation of the indirect object added, I propose that ‘*gei*’ directly encodes a possessor thematic role, mandating that the argument it introduces is interpreted as a possessor. In terms of semantic type, it is interpreted as a head of type $\langle e, \langle s, t \rangle \rangle$, where e is the type of individuals, t the type of truth values, and s the type of events.

$$(18) \llbracket \textit{gei} \rrbracket: \lambda x \lambda e [\text{POSSESSOR}(e)(x)]$$

With its semantic type, the head spelled out by ‘*gei*’ can semantically combine with other syntactic constituents in one of two ways. It can either take a DP argument of type e via function application, resulting in a constituent of type $\langle s, t \rangle$, a predicate of events. Alternatively, it can combine with another type $\langle s, t \rangle$ constituent via Kratzer’s (1996) event identification rule, effectively a more specific form of predicate conjunction. Here, a type $\langle e, \langle s, t \rangle \rangle$ constituent combines with another type $\langle s, t \rangle$ constituent, with the events being identified as the same ones.

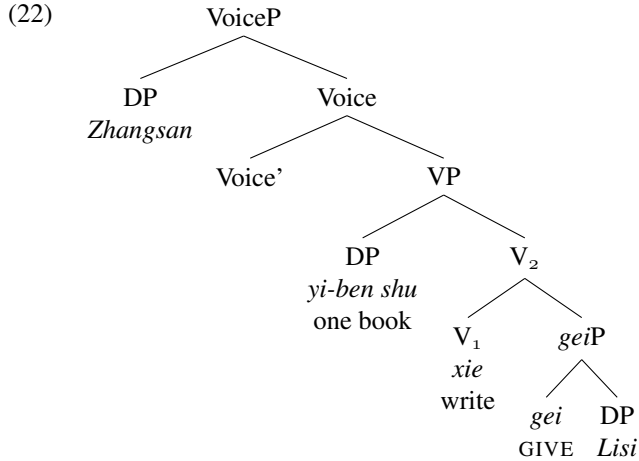
$$(19) \text{ Event Identification:} \\ f_{\langle e, \langle s, t \rangle \rangle} g_{\langle s, t \rangle} h_{\langle e, \langle s, t \rangle \rangle} \\ \lambda x \lambda e [f(e)(x) \wedge g(e)]$$

I propose this is exactly how the DO and PD variant end up with the same semantic denotations despite their syntactic differences. In the DO variant, the head ‘*gei*’ combines with a saturated VP of type $\langle s, t \rangle$ via event identification to produce another type $\langle e, \langle s, t \rangle \rangle$ constituent. It then introduces the indirect object syntactically to saturate the open argument to produce a type $\langle s, t \rangle$ predicate of events. The syntactic and semantic derivation is illustrated in (20) and (21). I assume head movement adjoins ‘*xie*’ to ‘*gei*’, and the complex head further moves to Voice to derive the surface order.



- (21)
- a. $\llbracket V \rrbracket: \lambda x \lambda e[\text{WRITE}(e)(x)]$
 - b. $\llbracket VP \rrbracket: \lambda e[\text{WRITE}(e)(\text{one book})]$ (F.A.)
 - c. $\llbracket gei \rrbracket: \lambda x \lambda e[\text{POSSESSOR}(e)(x)]$
 - d. $\llbracket gei' \rrbracket: \lambda x \lambda e[\text{WRITE}(e)(\text{one book}) \wedge \text{POSSESSOR}(e)(x)]$ (E.I.)
 - e. $\llbracket geiP \rrbracket: \lambda e[\text{WRITE}(e)(\text{one book}) \wedge \text{POSSESSOR}(e)(\text{Lisi})]$ (F.A.)
 - f. $\llbracket \text{Voice} \rrbracket: \lambda x \lambda e[\text{AGENT}(e)(x)]$
 - g. $\llbracket \text{Voice}' \rrbracket: \lambda x \lambda e[\text{AGENT}(e)(x) \wedge \text{WRITE}(e)(\text{one book}) \wedge \text{POSSESSOR}(e)(\text{Lisi})]$ (E.I.)
 - h. $\llbracket \text{VoiceP} \rrbracket: \lambda e[\text{AGENT}(e)(\text{Zhangsan}) \wedge \text{WRITE}(e)(\text{one book}) \wedge \text{POSSESSOR}(e)(\text{Lisi})]$ (F.A.)

The PD variant, on the other hand, utilizes function application to saturate the open argument position of 'gei' first, producing a type $\langle s, t \rangle$ constituent. This then combines with the unsaturated verb of type $\langle e, \langle s, t \rangle \rangle$ via event identification, producing another $\langle e, \langle s, t \rangle \rangle$ constituent. The indirect object is then introduced to saturate the open argument position of 'xie', producing a type $\langle s, t \rangle$ constituent. Here, head movement of the main verb up through Voice produces the surface order.



- (23)
- a. $\llbracket gei \rrbracket: \lambda x \lambda e[\text{POSSESSOR}(e)(x)]$
 - b. $\llbracket geiP \rrbracket: \lambda e[\text{POSSESSOR}(e)(\text{Lisi})]$ (F.A.)
 - c. $\llbracket V_1 \rrbracket: \lambda x \lambda e[\text{WRITE}(e)(x)]$
 - d. $\llbracket V_2 \rrbracket: \lambda x \lambda e[\text{WRITE}(e)(\text{one book}) \wedge \text{POSSESSOR}(e)(\text{Lisi})]$ (E.I.)
 - e. $\llbracket VP \rrbracket: \lambda e[\text{WRITE}(e)(\text{one book}) \wedge \text{POSSESSOR}(e)(\text{Lisi})]$ (F.A.)
 - f. $\llbracket \text{Voice} \rrbracket: \lambda x \lambda e[\text{AGENT}(e)(x)]$

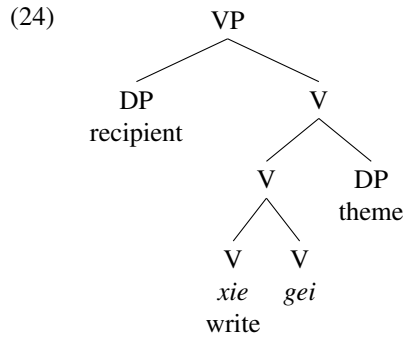
- g. $\llbracket \text{Voice} \rrbracket: \lambda x \lambda e [\text{AGENT}(e)(x) \wedge \text{WRITE}(e)(\text{one book}) \wedge \text{POSSESSOR}(e)(\text{Lisi})]$ (E.I.)
 h. $\llbracket \text{VoiceP} \rrbracket: \lambda e [\text{AGENT}(e)(\text{Zhangsan}) \wedge \text{WRITE}(e)(\text{one book}) \wedge \text{POSSESSOR}(e)(\text{Lisi})]$ (F.A.)

As noted, we end up ultimately with the exact same semantic denotations in (21h) as in (23h), even if the order of syntactic merger is different. In particular, we also preserve a high applicative syntax for the DO variant and a syntax where the indirect object is within the maximal projection of the same head that introduces the direct object for the PD variant. This allows for an explanation of the distribution of the distributive quantifier ‘*ge*’ as well as the scopal interaction facts as discussed before.

4 Some Other Proposals: Lin and Huang (2015)

At this point it may be worthy to examine other proposals regarding the syntactic category of ‘*gei*’ in the DO and PD constructions. Numerous studies have investigated the precise syntactic category of ‘*gei*’; here, I concentrate on a recent proposal by Lin and Huang (2015).

Seeking to unify all uses of ‘*gei*’ not just in the DO and PD constructions but also the pre-verbal and post-verbal purposive constructions, Lin and Huang argue that ‘*gei*’ uniformly a ditransitive verb taking two arguments, a theme and a recipient. For the DO variant, they suggest that the verb and ‘*gei*’ form a complex head with the argument structure of ‘*gei*’ dictating that there must both be a theme and a recipient.

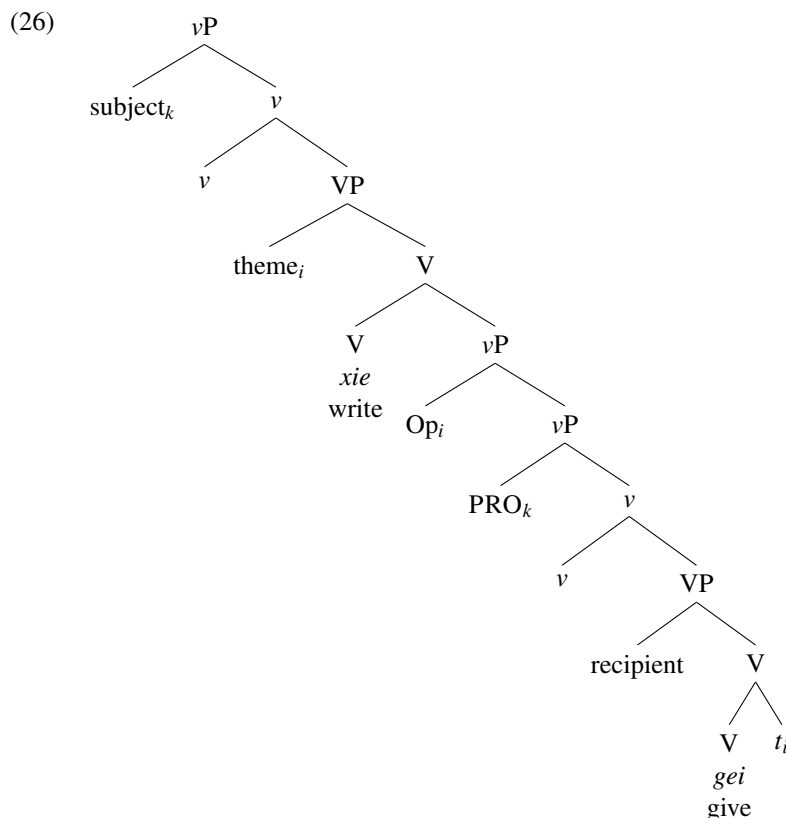


There are several problems with this analysis. For one, Paul and Whitman (2010) note that *V-gei* cannot be treated as a complex head based on A-not-A question patterns in MC. They observe that A-not-A questions can target true compound verbs but not *V-gei*. A-not-A questions can only target the main verb for repetition, unlike true compound verbs.

- (25) a. Ta xihuan bu xihuan shuxue?
 3SG like NEG like Mathematics
 ‘Does he/she like Mathematics?’
 b. *Ta huan-gei bu huan-gei ni qian?
 3SG return-GIVE NEG return-GIVE 3SG money
 Intended: ‘Will he/she return the money to you?’
 c. Ta huan bu huan-gei ni qian?
 3SG return NEG return-GIVE 3SG money
 ‘Will he/she return the money to you?’

Second, Lin and Huang’s structure for the DO should predict that the distributive quantifier ‘*ge*’, based on Soh’s (2005) description of its distribution, should not be able to intervene between the indirect and direct object since they are both contained within the maximal projection of the same head. Likewise, because of that, under Bruening’s (2001) analysis of the scopal interaction facts, they will also predict scope in the DO variant to be ambiguous, since both the indirect and direct object should be equidistant for QR.

Moving on to the PD variant, Lin and Huang assign the following structure, suggesting that the ‘*gei*’ constituent introducing the indirect object is actually a constituent as large as a *vP* (VoiceP), and ‘*gei*’ is actually the lexical verb within this *vP*. A series of movement steps occur; first, the theme position is filled with an empty operator that moves to adjoin to the embedded *vP*, which is then bound by the theme introduced by the verb ‘*xie*’. The subject position of ‘*gei*’ is filled with a *PRO*, controlled by the DP subject introduced higher up with ‘*xie*’. The only DP argument introduced by ‘*give*’ is the recipient.



Abstracting away from the motivations for the series of movement steps, the PD structure they propose runs into the same problems in regards to the specific diagnostics discussed here. First, it is mysterious why the distributive quantifier ‘*ge*’ cannot intervene between the theme and the recipient in the PD variant, given the existence of an embedded *vP* boundary. Second, scope should be fixed in the PD variant under their analysis, given how the recipient is introduced in a different maximal projection from the theme. One might argue that perhaps the coindexation and binding of the operator prevents scopal interactions of the theme with the recipient but it remains to be worked out what the restrictions would be. Independent of these diagnostics, Lin and Huang should also predict that the two lexical verbs ‘*xie*’ and ‘*gei*’ should be independently modifiable by different manner adverbials since they are both full *vPs*. As shown below, this is impossible.

- (27) Ta hen kuai de xie-le yi-feng xin (*manman de) gei Lisi
 3SG very fast DE write-ASP one-CLS letter slow.slow DE GIVE Lisi
 Intended: ‘He/she quickly wrote a letter and slowly sent it to Lisi.’

Thus, while Lin and Huang’s attempt at a unified analysis of the constructions ‘*gei*’ can appear in is admirable, their proposals for the DO and PD alternation make the wrong predictions regarding the range of facts discussed here. On the other hand, the proposal defended here argues they have different syntactic structures that compositionally return the same semantic denotations and also ensures that the facts regarding the distribution of ‘*ge*’ and scopal interactions are explained.

5 Conclusion

In this paper, I examined the semantic and syntactic properties of ‘*gei*’ when it appears to introduce additional arguments to a verb’s argument structure, resulting in what looks like a DO-PD alternation. Specifically, I showed that both the DO-and PD denote low applicative possessor semantics based on a range of diagnostics. Nonetheless, they have different syntactic structures based on the distribution of the distributive quantifier ‘*ge*’ and scopal interaction facts when the two objects are both quantificational. I proposed that the alternation can be derived with different syntactic mergers of different syntactic constituents, triggering a change in the order in the application of the semantic rules of function application and event identification. Thus, the two different syntactic structures ultimately end up having identical semantic denotations while exhibiting different syntactic properties.

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