Applicative structure and Mandarin ditransitives[*]

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We argue that applicative heads always appear above the lexical VP, regardless of the semantics of the construction. *Thematic Applicatives* select a nominal expression and a VP as argument, parallel to Pylkkänen's (2008) "high" applicatives. The applied argument is merged in Spec, ApplP and receives a role such as beneficiary. *Raising Applicatives* appear in the same position above the lexical VP, but do not select an underlying nominal argument. Instead, they attract a goal DP from within the ditransitive VP to their specifier. This pattern captures the properties of a theme-goal ditransitive construction (Pylkkänen's "low" applicative). We show that the Mandarin double object construction 'Verb gěi IO DO' instantiates a raising applicative, where *gěi* realizes $Appl^0$.

Key words: Applicative, thematic vs. raising; high vs. low; Double object construction; Mandarin Chinese; countercyclic agree
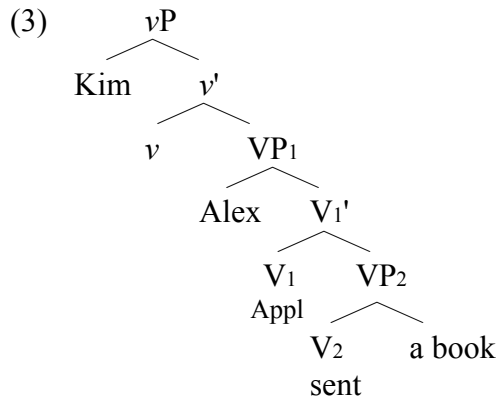
1. Introduction

Marantz (1993) makes an influential proposal about the syntax of ditransitive constructions. According to what we will call the *Applicative Hypothesis*, applicative constructions like the Kinyarwanda benefactive pattern in (1) and ditransitive constructions like (2) both involve a structure like (3), where an Applicative light verb (V_1) selects the lexical VP (VP_2) as its complement.

   (1)   *Kinyarwanda* (Kimyeni 1980)
          Umukoôbwa a -ra -som-er -a   umuhuûngu igitabo.
          girl   she-PR-read-BEN-ASP boy   book
          'The girl is reading a book for the boy.'

(2)　　Kim sent Alex the book.

(3)
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             vP
          ╱      ╲
        Kim       v'
               ╱     ╲
              v       VP₁
                    ╱     ╲
                 Alex      V₁'
                        ╱      ╲
                      V₁        VP₂
                     Appl     ╱     ╲
                            V₂      a book
                            sent
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This basic analysis has been applied to a variety of ditransitive constructions beyond the Bantu languages that inspired it, including Greek (Anagnostopoulou 2003), Japanese (Miyagawa & Tsujioka 2004), and Korean (Miyagawa & Jung 2004).

The objective of this paper is to apply the Applicative Hypothesis to ditransitive constructions like (4) in Mandarin Chinese.

(4)　　*Wǒ mài-gěi -le   Mǎlì yī-ge shǒubiǎo.*[1]
　　　　1SG sell-GEI-PERF Mali 1-CL watch
　　　　'I sold Mali a watch.'

In the course of developing the analysis, we take up an important theoretical challenge for the Applicative Hypothesis. The hypothesis claims that ditransitive constructions involve extra structure *above* the lexical VP. This is potentially at odds with another tradition, which claims that ditransitive constructions involve additional structure *within* the lexical VP. Analyses of this type include Kayne's (1984) small clause analysis, and Pesetsky's (1995) zero morpheme analysis. The two traditions are combined by Pylkkänen (2002, 2008), who proposes that applicative patterns like (1), whose interpretation does not involve a goal argument, are to be associated with a "high" applicative projection above VP as in (3), while ditransitive constructions involving transfer of the theme to or from the goal as in (2) are to be associated with a "low" applicative projection inside the VP.

In this paper we identify Mandarin *gěi* in (4) as the head of an applicative projection taking the lexical VP as its complement, in exactly the configuration of (3). We show, however, that the ditransitive pattern

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[1] The following abbreviations are used in glossing examples: CL classifier; EXP experiential aspect; NEG negation; PART sentence-final particle; PASS passive; PERF perfective aspect; PL plural (e.g. 3PL = 3rd person plural); SG singular; SUB subordinator.

associated with applicative *gěi* has all and only the properties of a "low" applicative, that is, of a theme-goal ditransitive construction. We argue that this is a general pattern across languages: light verb applicatives always appear above the lexical VP, whether they show the syntax and semantics of "high" or "low" applicatives. Nevertheless, the distinction between high and low applicatives is real: the two patterns involve different sets of thematic roles, and they satisfy different diagnostics.

To deal with this apparent paradox, we propose what we call the *Raising Applicative Hypothesis*.[2] This hypothesis claims that applicative light verbs, like other predicates, come in two familiar flavors. *Thematic Applicatives* select a nominal expression and a VP as argument. They correspond to Pylkkänen's High Applicative structure. The nominal argument is merged in Spec, ApplP and receives a role such as beneficiary. *Raising Applicatives* appear in the exact same position above the lexical VP, but unlike Thematic Applicatives, they do not select an underlying nominal argument. Instead, they attract a nominal argument from within the lexical VP to their specifier. The two structures are shown in (5-6).

(5) Thematic Applicative
$[_{\text{APPLP}} \text{DP}_{\text{Benefactive}} [_{\text{APPL'}} \text{Appl} [_{\text{VP}} \text{V DP}]]]$

(6) Raising Applicative
$[_{\text{APPLP}} \text{DP}_{\text{Goal}} [_{\text{APPL'}} \text{Appl} [_{\text{VP}} t_{\text{Goal}} [_{\text{V'}} \text{V DP}_{\text{Theme}}]]]]$

The paper is organized as follows. Section 2 presents the basic facts of ditransitive constructions in Mandarin, focusing on patterns involving *gěi*, and demonstrates in detail that ditransitive *gěi* is a raising applicative. Section 3 discusses the technical implementation of the Raising Applicative Hypothesis for Mandarin. We see in this section that a widely attested constraint on A' extraction of indirect objects in double object constructions is attested in Mandarin as well, and show that the constraint falls out naturally from the Raising Applicative analysis in the Agree framework of Chomsky (2000). Section 4 briefly puts the Raising Applicative analysis in a crosslinguistic context, focusing on the fact that overt applicative morphemes in general appear to be suffixes.

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[2] We owe the term *Raising Applicative* to Julie Legate (pc). It corresponds to the label *Expletive Applicative* used in Georgala, Paul & Whitman (2008), where the hypothesis is first presented.

2. The Mandarin V-*gěi* double object construction
2.1 Background

Mandarin *gěi* occurs as the independent lexical verb 'give'.[3] *Gěi* also appears in the three positions in (7) in combination with a lexical verb:

(7) a. Double Object: V-*gěi* IO DO
Wǒ mài-gěi -le   Mǎlì yī-ge shǒubiǎo.
1SG sell-GEI-PERF Mali 1-CL   watch
'I sold Mali a watch.'

   b. P-dative: V DO [PP *gěi* IO]
Wǒ mài-le   yī-ge shǒubiǎo [PP gěi Mǎlì].
1SG sell-PERF 1-CL   watch   for Mali
'I sold a watch to Mali.'

   c. Benefactive: [PP *gěi* DP] V DO
Tā [PP gěi wǒ] dāng fānyì.
3SG   for 1SG act interpreter
'He serves as an interpreter for me.'

A number of facts combine to show that dative and benefactive [*gěi* DP] in the P-dative and benefactive patterns (7b-c) is a PP. First, aspectual suffixes such as the perfective *-le* do not combine with dative and benefactive *gěi*.

(8) a. *Wǒ mài(-le)   yī-ge shǒubiǎo [PP gěi (*-le)   Mǎlì]*.
1SG sell-PERF 1-CL watch   for -PERF Mali
'I sold a watch to Mali.'

   b. *Tā [PP gěi (*-le)   wǒ] dāng (-le)   fānyì.*
3SG   for -PERF1SG act -PERF interpreter
'He served as an interpreter for me.'

Second, the constituent [*gěi* DP] in the P-dative and benefactive patterns can be fronted, as shown in (9).[4]

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[3] The verb *gěi* 'give' is illustrated below:
   (i)   *Wǒ gěi -le   Mǎlì yī-ge shǒubiǎo.*
1SG give-PERF Mali 1-CL   watch
'I gave Mali a watch.'
The preposition *gěi* and the applicative head *gěi* are both historically derived from the verb *gěi* 'give'. Modern Mandarin has numerous other instances of co-existing source and derivatives such as verb *zài* 'be at', preposition *zài* 'at', preverbal durative aspect marker *zài*; verb *gēn* 'follow', preposition *gēn* 'with', conjunction *gēn* 'and' (cf. Djamouri & Paul 2009 for further discussion).

[4] Besides PPs, DPs, QPs, adverbs, and clauses may also occupy the sentence-initial topic position. By way of contrast, only VPs selected as a complement by an auxiliary can be topicalized (cf. Tang 1990: 203, footnote 22).

(9)   a.   *[PP Gěi Mǎlì], wǒ mài-le   yī-ge shǒubiǎo.*
            for Mali 1SG sell-PERF 1-CL watch
            'For Mali, I sold a watch.'
      b.   *[PP Gěi Mǎlì], wǒ mǎi-le   yīdiǎn jiǔ.*
            for Mali   1SG buy-PERF a.little wine
            'For Mali, I bought a little wine.'
      c.   *[PP Gěi wǒ], tā   dāng fānyì.*
            for 1SG 3SG act interpreter
            'For me, he serves as an interpreter.'

Note that (9a) can only mean 'I sold the watch for Mali's benefit'; with the fronted PP, the transfer of possession implication characteristic of the DOC pattern in (7a) disappears.

Except for the prepositional status of preverbal *gěi*, there is no consensus in the literature concerning these different patterns, as the brief review of previous analyses below shows.

Li (1990: 110) analyses both instances of postverbal *gěi* as verbs. In the DOC 'V-*gěi* IO DO', V-*gěi* is considered a compound verb to which the IO adjoins, thus forming a complex verb capable of assigning case to the DO. The dative construction 'V DO [*gěi* IO]', by contrast, is claimed to instantiate a serial verb construction.

Tang (1990: 268) discusses only the dative pattern 'V DO [*gěi* IO]' and proposes a structure where the *gěi* PP is the complement of a lower PredP (cf. Bowers 1993), which itself is complement of the ditransitive verb. The DO in the specifier of this VP controls PRO in Spec, PredP:

(10)   [PREDP V [VP DO$_i$ [V'[PREDP PRO$_i$ [PRED' Pred° [PP *gěi* IO]]] t$_V$]]]

In a similar vein, Cheng et al. (1999) claim that '*gěi* DP' in the dative pattern underlyingly involves a secondary predication on the DO, akin to purposive clauses such as *I brought 30 dollars to give (to) him.*[5]

(11)   DP V [VP2 DO [V2' [Vcause *gěi*] OP$_i$ [VP3 IO [V3' HAVE t$_i$]]]]

Gěi 'give' heading VP2 results from incorporating the abstract verb of possession 'have' to 'cause'; whether this happens in the lexicon or in syntax is left open. The same incorporation is postulated for *gěi* in the DOC 'V-*gěi* IO DO', where *gěi* in turn incorporates to the lexical verb, resulting in a compound [V° V- *gěi*]. Importantly, *gěi* here originates in a position *below* the lexical verb, the exact opposite of our proposal. We show in section 2.4 that the sequence 'V-*gěi*' in the DOC is syntactically derived.

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[5] If taken literally, Tang and Cheng et al.'s secondary predication analyses run afoul of the fact that in Mandarin, PPs in general can function neither as primary nor as secondary predicates (Djamouri & Paul 2009). However both analyses of dative *gěi* as heading a PP concur with the analysis adopted in this paper, while the structures proposed by Tang and Cheng et al. are readily translated into a Larsonian VP shell structure.

*2.2. 'V-*gĕi *IO DO' DOC pattern displays low applicative properties*

The DOC pattern has the expected valence for a "low" or VP-internal applicative construction: it involves a goal (IO) and theme (DO) argument. It also satisfies the two diagnostics for a low applicative construction proposed by Pylkkänen (2002, 2008). First, low applicatives are unacceptable with intransitives of any kind, because their semantics stipulate the presence of a theme argument. Second, they are incompatible with static predicates such as 'hold' or 'watch', the type of event denoted by static predicates being inconsistent with the theme undergoing a change of possession. The English DOC satisfies these diagnostics, as (12-13) show:

(12)　　a. I danced for Kim.
　　　　b.*I danced Kim.

(13)　　a. I watched the bag for Kim.
　　　　b.*I watched Kim the bag.

The 'V-*gĕi*' DOC pattern behaves the same way:

(14)　　a.　　*Nĭ gĕi wŏ xiǎoxīn   yīdiǎnr!*
　　　　　　　2SG for 1SG be:careful a.little
　　　　　　　'Do me the favor of being a bit more careful!'
　　　　b.　　**Nĭ xiǎoxīn   -gĕi wŏ!*
　　　　　　　 2SG be:careful-GEI 1SG

(15)　　a.　　*Wŏ gĕi Mǎlì kān -zhe bāo ne,   bù   néng líkāi.*
　　　　　　　1SG for Mali watch-DUR bag PART NEG can leave
　　　　　　　'I'm watching the bag for Mary, I cannot leave.'
　　　　b.　　**Wŏ kān   -gĕi -zhe Mǎlì bāo.*
　　　　　　　 1SG watch-GEI-DUR Mali bag

We see in (14) that the intransitive predicate *xiǎoxīn* 'be careful' allows a preverbal benefactive PP, but disallows the DOC pattern. Similarly, stative *kān-zhe bāo* 'hold the bag' allows the benefactive PP pattern but not the DOC pattern. Thus the DOC pattern satisfies both of Pylkkänen's tests for a low applicative construction.
　　　　For some speakers, there is also a salient contrast between the DOC pattern in (7a) and the P-dative pattern in (7b) with respect to the strength of the implication of successful transfer of possession .

(16)　　a.　　*Zhāngsān qiā-gĕi -le   Lĭsì yīdiǎnr cōng,*
　　　　　　　Zhangsan nip-GEI-PERF Lisi a.little scallion
　　　　　　　(# *kěshì Lĭsì méiyŏu jīezhù).*
　　　　　　　　but   Lisi NEG   get

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'Zhangsan nipped off Lisi a bit of scallion,
but Lisi didn't get it.'   (Zhu 1979: 82)

　　b.　　*Zhāngsān qiā yīdiǎnr cōng　　gěi　Lǐsì*,
　　　　　Zhangsan nip a.little scallion for Lisi
　　　　　(*kěshì Lǐsì méiyǒu jīezhù*).
　　　　　 but　　Lisi NEG　get
　　　　　'Zhangsan nipped off a bit of scallion for Lisi,
　　　　　but Lisi didn't get it.'

The datum in question is often claimed (e.g. Stowell 1982) to distinguish the DOC and P-dative patterns in English as well:

　　(17)　a.　　I cut Alex a flower (# and gave it to Robin).
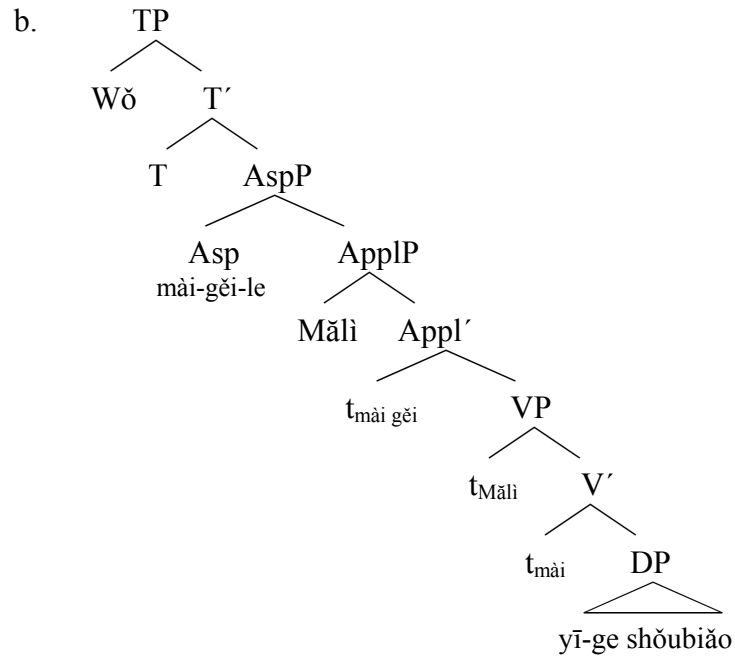　　　　　b.　　I cut a flower for Alex (and gave it to Robin).

These facts provide further support for the view that, in English and Mandarin, the DOC pattern is not directly derivable from the P-dative construction.
　　　　Summing up, the DOC pattern 'V-*gěi* IO DO' in (7a) passes the tests for a low applicative construction, and shows clear differences from the P-dative construction 'V DO [*gěi* IO]'. In the next section, however, we show in detail that *gěi*, the head of the DOC, originates *above* VP.

2.3. The high applicative position of gěi *in the DOC*

Consider, now, the surface configuration of the *gěi* DOC: [V-*gěi*-Aspect IO DO]. This configuration is straightforwardly derivable by head movement of V to APPL to Aspect (cf. Lin 2001 for V-to-Aspect raising in Chinese), if *gěi* is assigned a position *above* the VP, in other words, the structural position of a high applicative. This configuration is shown in (18b).

　　(18)　a.　　*Wǒ mài-gěi -le　　Mǎlì yī-ge shǒubiǎo*.
　　　　　　　1SG sell-GEI-PERF Mali 1-CL watch
　　　　　　　'I sold Mali a watch.'　　　　　　　(= (7a))

b.

```
                    TP
                   /  \
                 Wǒ    T′
                      /  \
                     T    AspP
                         /    \
                       Asp     ApplP
                    mài-gěi-le  /   \
                             Mǎlì   Appl′
                                   /    \
                              t_mài gěi  VP
                                        /  \
                                    t_Mǎlì  V′
                                           /  \
                                       t_mài  DP
                                             /‾‾\
                                        yī-ge shǒubiǎo
```

If, however, *gěi* heads a low applicative projection in an underlying structure like (19), it is simply not clear how it assumes its surface position. The same difficulty applies to an analysis where *gěi* is incorporated from PP (as in Soh (1998: 174)).

(19)

```
              TP
             /  \
           Wǒ    T′
                /  \
               T    AspP
                   /    \
                 -le     VP
                        /  \
                      mài   ApplP
                           /    \
                         Mǎlì   Appl′
                               /    \
                             gěi    DP
                                   /‾‾\
                              yī-ge shǒubiǎo
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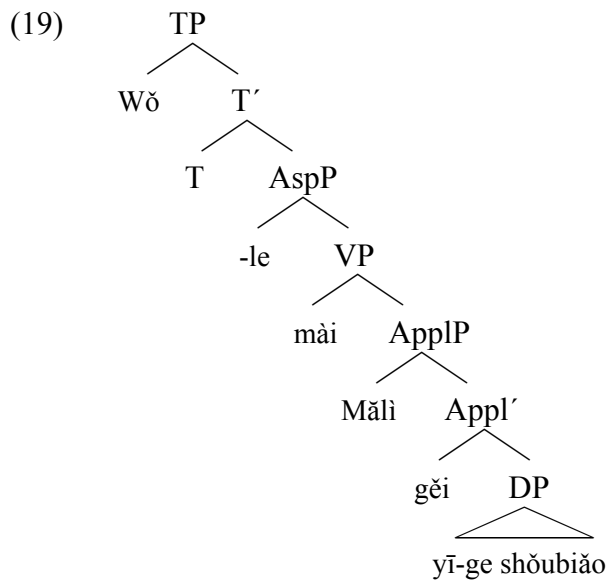
If *gěi* originates inside VP as in (19), it must raise and *right*-adjoin to the lexical verb, before both raise and left-adjoin to Aspect. Such a derivation runs counter to the widespread consensus that head adjunction is always to

the left (Kayne 1994, Baker 1996); it would also violate the generalization that head adjunction is consistently to the left in Chinese (Lin 2001).

Alternatively, if *gěi* were to raise and left-adjoin to the lexical verb, the result would be the ungrammatical order in (20):

(20)   *Wǒ* [*ₐₛₚₚ gěi -mài-le* [*ᵥₚ tgěi-mài* [*ₐₚₚₗₚ Mǎlì* [*ₐₚₚₗ' tgěi* [*shǒu.*]].
        1SG   GEI-sell-PERF   Mali   watch

These facts also argue against an analysis such as Cheng et al. (1999), where it is *gěi* that incorporates into the lexical verb, thus requiring right-adjunction. Note that assuming the underlying order of heads 'Aspect - V', composition of the verb and *gěi* cannot be derived by a non-syntactic operation such as morphological merger, because V-*gěi* must be able to raise as a unit to Aspect.

Several additional facts argue against a P-incorporation analysis of the V-*gěi* DOC, even one which takes place in the syntax. First, postverbal PPs headed by *gěi* are restricted to the order 'V DO [ₚₚ *gěi* IO]' in (7b). A P-incorporation account must explain why P-incorporation is accompanied by a change in the word order of IO and DO. Second, as we saw in (16), the *gěi* DOC and P dative constructions are semantically distinct. This fact must be explained if the former is derived from the latter by P-incorporation. Finally, we see evidence in 2.5 that the IO is moved out of VP altogether in the *gěi* DOC. This would be completely unexplained under a P-incorporation account, as P-incorporation is usually considered to case-license the complement of P in situ (Baker 1986).

*2.4   Evidence that 'V-*gěi*' is syntactically derived*

Evidence that the surface order of the *gěi* DOC 'V-*gěi* IO DO' is derived by a syntactic operation comes from the contrasting behavior of V-V compounds. At first glance, the combination 'V-*gěi*' in the DOC (21) seems to pattern with V-V compounds like *jiǎn-chá* 'inspect-examine' = 'examine' (22): in both cases aspectual suffixes must follow the entire sequence:

(21)   *Wǒ sòng (*-le) -gěi -le   Akiū yī-ge shǒubiǎo*
        1SG offer -PERF-GEI-PERF Akiu 1-CL watch
        'I gave Akiu a watch as a present.'

(22)   *Tāmen [ᵥ° jiǎn (*-le) -chá   ]-le   wǒ -de hùzhào*
        3PL   inspect-PERF-examine-PERF 1SG-SUB passport
        'They examined my passport.'

However, data from verb copying show that V-*gěi* in the DOC and V-V compounds have different derivations, and that the derivation of V-*gěi* is

syntactic. (For detailed discussion of verb copying, cf. a.o. Huang 1982; Paul 1988, 2002 and references therein).

(23)　　*Wǒ sòng gěi tā qián*
　　　　　1SG offer GEI 3SG money
　　　　　[ᵥₚ yǐjīng sòng (-gěi)-le　　hǎojǐ -cì　] le*
　　　　　　already offer　-GEI-PERF many-time PART
　　　　　'I have given him money as a present several times already.'

(24)　　*Tāmen jiǎn　-chá　　hùzhào*
　　　　　3PL　　inspect-examine passport
　　　　　*[ᵥₚ jiǎn *(-chá)　-le　　bàntiān]*
　　　　　　inspect-examine-PERF long.time
　　　　　'They examined the passports for a long time.'

Verb copying must copy both members of a V-V compound (24), but it cannot copy V-*gěi* (23). The most straightforward explanation of this contrast is that verb copying takes place before V-*gěi* is composed by verb raising in the syntax. By contrast V-V compounds are formed in the lexicon, and are thus available for verb copying as soon as they enter the syntactic derivation.

　　　　The so-called A-not-A question pattern (cf. Huang 1982) provides further support for differentiating V-*gěi* from V-V compounds built in the lexicon. This pattern may optionally treat both members of a V-V compound as a unit, placing both together as a unit before negation (25a):

(25)　　a.　　*Tā [ᵥ° xǐ-huān] bù [ᵥ° xǐ-huān] shùxué ?*
　　　　　　　3SG　like　　NEG　like　　mathematics
　　　　b.　　*Tā xǐ- bù　xǐ-huān shùxué ?*
　　　　　　　3SG like NEG like　　　mathematics
　　　　c.　　*Tā [ᵥ° xǐ-huān] shùxué bù [ᵥ° xǐ-huān] shùxué ?*
　　　　　　　3SG　like　　　math. NEG　like　　mathematics
　　　　　　　'Does he like mathematics?'

However V-*gěi* cannot be treated as a unit, as we see in (26a).

(26)　　a.　　**Ta huán -gěi bu huán -gěi nǐ qián?*
　　　　　　　　3SG return-GEI NEG return-GEI 2SG money
　　　　b.　　*Ta huán bu huán -gěi ni qián ?*
　　　　　　　3SG return NEG return-GEI 2SG money
　　　　　　　'Will he return the money to you?'
　　　　(slightly modified example from Peyraube 1980: 227)[6]

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[6] Peyraube (1980: 226) considers these data as evidence for the prepositional status of *gěi* and adopts the traditional analysis of DOCs in Chinese linguistics: V [ₚₚ gěi IO] DO.

Once again, this difference between 'V-*gěi*' and lexical V-V compounds is straightforwardly explained if V-*gěi* is combined in the syntax. [7]

2.5. Evidence that the IO moves out of VP in the DOC

We have provided evidence that *gěi* in the DOC originates above the lexical VP, in the position of a high applicative, and that 'V-*gěi*' must be syntactically combined, in contrast to lexical V-V compounds. We now examine the position of the indirect object. Consider the contrast in (27) :

(27) a. *Wǒ mài-gěi -le* [$_{APPLP}$ *tāmen* [$_{APPL'}$ *t$_{gei}$*
　　　　1SG sell-GEI-PERF　　3PL
　　　　[$_{VP}$ [*sān　cì*] [$_{VP}$ *t$_{tamen}$* [$_{V'}$ *t$_V$ shǒubiǎo*]]]].
　　　　　　3　time　　　　　　　　watch
　　　　'I have sold them three times watches.'

　　b. **Wǒ mài-le* [$_{VP}$ *shǒubiǎo*
　　　　 1SG sell-PERF　watch
　　　　[$_{V'}$ [*sān　　cì*] [$_{V'}$ *t$_V$* [$_{PP}$ *gěi tāmen*].
　　　　　　3 time　　　　　　to　3PL
　　　　'I have sold watches three times to them.'

　　c. *Wǒ mài-le* 　[$_{VP}$ [*sān　　cì*]
　　　　1SG sell-PERF　　3 time
　　　　[$_{VP}$ *shǒubiǎo t$_V$* [$_{PP}$ *gěi tāmen*]] *le.*[8]
　　　　　　watch　　　　　to 3PL　　PART
　　　　'I have sold watches three times to them.'

In (27a), the frequency adverb *sān cì* 'three times' can intervene between the IO *tāmen* 'them' and the DO *shǒubiǎo* 'watch' in the DOC, but it cannot

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Needless to say, this analysis has difficulty explaining how *gěi* can be separated from the IO by an aspect marker: 'V-*gěi*-Asp IO DO' (cf. (18), (21) above).

[7] Even in a framework such as Distributed Morphology where compounding is reduced to syntactic operations, these differences between compounds such as *jiǎn-chá* 'examine', *xǐ-huān* 'like' and the 'V-*gěi*' sequences will need to be somehow captured, perhaps, as a reviewer suggests, by distinguishing higher functional heads such as Appl from compounds composed of purely lexical heads.

[8] We assume a Larsonian shell structure for dative VPs 'V-DO-PP' (cf. (27c)). In the underlying structure [$_{VP}$ DO [$_{V'}$ V PP]] the DO originates in Spec, VP and the surface order is derived by raising V to *v*. The alternative, that the DO originates in the complement of V and the PP is right-adjoined to VP, is also consistent with our account of raising applicatives. But it is counterindicated by the relative scope of the DO and PP:

　　(i) *Wǒ mài-le* 　[$_{VP}$ [*ji　　ge shǒubiǎo] t$_V$* [$_{PP}$ *gěi liǎng ge rén*]]] *le.*
　　　　1SG sell-PERF　several CL watch　　　　　　to 2　　CL person PART
　　　　'I sold several watches to two persons.'

In (i), *liǎng ge rén* 'two people' cannot take scope over *jǐ-ge shǒubiǎo* 'several watches'; that is, (i) cannot mean that for two people I gave each of them a different set of multiple watches. This is unexpected if 'several watches' does not c-command 'two people'.

intervene between the DO *shǒubiǎo* 'watch' and the PP [PP *gěi tāmen*] 'to them' in the corresponding dative pattern in (27b).

Instead, frequency adverbs must precede the DO in the dative pattern as in (27c). Assuming that the frequency adverb is positioned on the left edge of VP,[9] (27a) is exactly the order predicted by the Raising Applicative analysis in (18b): the IO moves over the adverb into [Spec, ApplP]. (27c) shows that the DO in the P-dative construction does not undergo similar displacement. The unacceptability of (27b) is due to the fact that adverbs occupy a position left-adjacent to VP and cannot be attached at the V' level.

Strictly speaking, these adverb placement facts only indicate that the surface position of IO in the Mandarin DOC is outside the lexical VP; we have yet to show that this is a derived position, resulting from movement of the IO. An alternative position would be one close to Marantz's original applicative analysis in (3), where the IO originates in the specifier of ApplP. Facts from the distribution of quantifiers show that this alternative is untenable.

In Mandarin, distributive adverbial quantifiers such as *měi-rén* 'every(one)' and *yī-rén* 'each' can occur to the right of the IO in the DOC.[10]

> (28) a. *Wǒ sòng-gěi háizimen*
>   1SG give-GEI children
>   *[měi-rén   /yī-ren] [yībǎi kuài qián]*
>   every(one)/each   100 CL money
>   'I gave the children each 100 dollars.'
>   b. *Xiàozhǎng fēn -gěi wǒmen*
>   principal   allot-GEI 1PL
>   *[měi-rén   /yī-ren] [shí-ge dàxuéshēng]*
>   every(one)/each   10 CL student
>   'The principal allotted us each 10 students.'

Unlike frequency adverbs, however, the distributive adverbial quantifiers need to be able to scope over the IO. In terms of the classification proposed by Fitzpatrick (2006) *měi-rén* 'every(one)' and *yi-rén* 'each' are adverbial

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[9] This assumption is consistent either with the view that frequency adverbs are adjoined to VP, or that they occupy a functional projection immediately above VP (cf. Cinque 1999).

[10] The observation that a distributive quantifier may intervene between the IO and the DO in the DOC goes back to Kung (1993: 182) and is taken up by Soh (2005). Note, however, that for many native speakers, the adverb *gè* 'each' used by Kung (1993) and Soh (2005) is unacceptable or only marginally acceptable in the position between the IO and DO. Instead, *měiren* 'every(one)' or *yi rén* 'each' must be used here.
Kung (1993) considers the distribution of *gè* 'each' as supporting a small clause analysis of the DOC where *gè* 'each' adjoins to a null verb heading PredP (cf. Bowers 1993):
    (i)   [VP V [PredP IO [Pred' *gè*-Pred° DO]]]
But Kung's structure fails to explain how 'each' scopes over the IO. This is directly explained by our hypothesis that the IO moves from its base position to a position left of the quantifer. Note that Kung does not take into account the 'V-gěi' DOC.

quantifiers. Fitzpatrick argues that adverbial quantifier patterns such as these are derived by A-movement of the associated NP over the adverbial quantifier, precisely as required by our raising applicative analysis where the IO raises out of the VP to Spec, ApplP:

(29)   *Wǒ sòng-gěi* [_{APPLP} *háizimen* [_{VP} *měi-rén* [_{VP} t_{haizimen}
    1SG give-GEI   children   every(one)
    [*yībǎi kuài qián*]]]
    100 -CL   money
    'I gave the children each 100 dollars.'

Sentences (28a-b) cannot be derived by quantifier stranding. The order of distributive adverbial quantifiers and frequency adverbs is fixed:

(30)   a.   *Wǒ sòng-gěi háizi-men měi-rén   sān ci qián.*
              1SG give-GEI child-PL every(one) 3 time money
              'I gave every child money three times.'
    b.   * *Wǒ sòng-gěi háizimen sān ci měi-rén   qián*
               1SG give-GEI child-PL   3 time every(one) money

Following the assumption that frequency adverbs mark the left edge of VP, if *měi-rén* was stranded inside VP, we would expect (30b) to be acceptable.
    Second, these quantifiers never form a constituent with the associated NP, in either order of quantifier and NP:

(31)   a.   * *Wǒ sòng-gěi* [*měi-(ge) rén háizi-men*]
               1SG give-GEI   every(one)   child-PL
              yībǎi kuài qián
              100 -CL   money
    b.   * *Xiaozhang fen-gěi* [*yī (-ge) rén wǒmen]*
               principal allot-GEI each   1PL
              shí-ge dàxuéshēng
              10 CL student

(32)   a.   * *Wǒ mà -le*   *[háizi-men měi-rén].*
               1SG scold-PERF child-PL every(one)
              ('*I scolded the children everyone.')
    b.   * *Wǒ mà -le*   *[háizi-men yī -rén].*
               1SG scold-PERF child-PL each
              (*'I scolded the children each.')[11]

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[11] Distributive adverbial quantifiers are thus clearly different from quantifiers within a DP which in combination with a classifier precede the head noun:
    (i)   *Wǒ sòng-gěi* [_{DP} *měi -ge háizi (*men)] yībǎi kuài qián*
        1SG give-GEI   every-CL child PL   100 -CL money
        'I gave every child 100 dollars.'

Third, in the case of *yi-rén* 'each', there are no corresponding constituents formed from *yi-rén* plus NP:

(33) a. * *Xiàozhǎng fēn -gěi [yī -rén wǒmen]*
          principal allot-GEI each   1PL
          shí-ge dàxuéshēng
          10 CL student

      b. *Xiàozhǎng fēn -gěi [yī -ge lǎoshī]*
          principal allot-GEI 1 -CL teacher
          shí-ge dàxuéshēng
          10 CL student
          'The principal allotted ten students to a teacher.'

While (33a) is simply unacceptable, (33b) has only a nondistributive meaning distinct from (28b).

Last, but not least, distributive quantifiers are impossible to the right of the IO in the P-dative construction (34), or to the right of direct objects (35) in monotransitive clauses, or to the right of the DO in the P-dative construction (36):

(34) * *Wǒ sòng -le   yībǎi kuài qián*
        1SG give-PERF 100 CL   money
        [PP *gěi háizi-men] měi-rén   /yī-rén.*
           to child -PL   every(one)/each
        (?? 'I gave 100 dollars each to the children.')

(35) * *Wǒ pèngdào-le   xuéshēng-men měi-rén   /yī-rén.*
        1SG meet   -PERF student   -PL every(one)/each
        ('*I met the students each.')

(36) * *Xiàozhǎng fēn -le   shí-ge dàxuéshēng měi-rén*
        principal   allot-PERF 10 -CL student   everybody
        [PP gěi women].
            to 1PL
        (*'The principal allotted 10 students each to us.')

In contrast to (28a), *haizi* in (i) must be singular and excludes the presence of the collective plural suffix *-men*, another clear difference between the quantified DP and the structure involving the distributive quantifier adverbs.
In the P-dative construction, the only way to quantify the IO is via a DP-internal quantifier phrase (cf. (34) below):

(ii) *Wǒ sòng-le   yībǎi kuài qián* [PP *gěi měi -ge háizi]*
      1SG give -PERF 100 CL   money   to every-CL child
      'I gave 100 dollars to every child.'

The contrast between (29) and (34-36) is explained straightforwardly by the hypothesis that (29) involves A-movement out of the VP, as predicted by the Raising Applicative analysis, but (34-36) do not. No A movement is involved in the derivation of (34-36), so no distributive quantifier is licensed.

2.6. Wrap-up

In this section we have provided further evidence that $Appl^0$, lexicalized as *gěi*, originates *above* the VP headed by the donatory verb. Based on Lin's (2001) derivation of aspectual suffixes via syntactic movement of V to Aspect and drawing on data from verb copying and A-not-A questions, we have shown that the combination 'V-*gěi*' in the DOC is distinct from V-V compounds formed in the lexicon, and that the pattern is most straightforwardly derived by raising the lexical verb and left-adjoining it to *gěi*. Furthermore, the position of distributive quantifiers provides evidence for movement of the IO from its base position within VP to Spec, ApplP.

3. The licensing role of applicative heads and the A' restriction on IOs
3.1 Countercyclic Agree

Above we argued that the Chinese DOC in (7a) is a raising applicative, and should be assigned the structure and derivation in (18b), repeated in (37):

> (37)   *[$_{TP}$ Wǒ [$_{ASPP}$ mài-gěi-le*
>   1SG   sell-GEI-ASP
>   *[$_{APPLP}$ Mǎlì [$_{APPL'}$ t$_{mài-gěi}$ [$_{VP}$ t$_{Mǎlì}$ [$_{V'}$ t$_{mài}$ yī-ge shǒubiǎo]]]]]]*.
>   Mali   1 -CL watch
>   'I sold Mali a watch.'

Let us now consider in detail how the DO and IO are licensed in this construction. We adopt the basic definition of Agree in Chomsky (2000)

> (38)   Agree (Chomsky 2000: 122)
>   The probe P agrees with the closest Matching goal in D.
>   a. Matching is feature identity.
>   b. D is the sister of P. [D= c-command Domain of P].
>   c. Locality reduces to closest c-command.

Based on the evidence discussed in the previous section showing that the IO raises out of VP, we assume that Appl bears an EPP/OCC feature that

attracts the IO to Spec, ApplP.[12] Under this approach, the DO 'watch' and verb 'sell' are first merged in V'; then the IO 'Mali' is merged in Spec, VP. Both the DO and IO bear case features which must be checked. Next Appl is merged with VP. As Appl also bears a case feature, it enters into an Agree relation with the closest DP, the IO, and checks off its case feature, and the EPP/OCC feature on Appl attracts the IO to its Spec. Next v is merged with ApplP; v also bears a case feature, so it seeks the closest DP with an unchecked case feature. This is the DO. An Agree relation is established between v and DO, and the case feature of the latter is checked off.

Although the building of the structure in (37) by external and internal Merge is perfectly cyclic, the application of Agree is countercyclic: Agree applies first between Appl and the IO in Spec, VP, then between v and the DO lower in the tree, in V'. The inherently countercyclic nature of Agree has been noted by other researchers (cf. Alexiadou & Anagnostopoulou 2007): since Agree applies between a head higher in the structure and a goal it c-commands, it moves 'down the tree', while normal external and internal Merge build the tree in cyclic fashion from bottom to top. In most A-licensing applications of Agree, the inherently countercyclic nature of this operation is masked by the fact that there is at most one licensing head per cyclic domain: thus only v triggers Agree in monotransitive vPs, and only T does so in the next cyclic domain (i.e. phase), CP. Applicative structures however render transparent the inherent countercylic nature of Agree, because they introduce a second Agreeing head, Appl, within a single cyclic domain, vP.

3.2. *The A' movement restriction on shifted IOs*

A notable fact about the 'V-*gěi* IO DO' DOC pattern in Chinese is that the IO is ineligible for A' movement (Tang 1977), as shown by (39a-b).

(39)   a.   *[Akiū mài-gěi t_{ren} chēzi] de   nèi -ge rén*
                Akiu sell-GEI   car   SUB that-CL person
                hěn yǒuqián.
                very rich

        b.   *Nèi-ge rén,   Akiū mài-gěi t_{ren} chēzi.*
             that-CL person Akiu sell-GEI   car

This is a property shared by applicative constructions in a wide variety of languages, as pointed out by Emonds & Whitney (2006: 93-99). The restriction was originally observed for English DOCs by Fillmore (1965):

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[12] A reviewer points out that EPP/OCC features are typically associated with functional heads, while Appl might be taken to be a lexical (verbal) head in the original conception of Marantz (1993). This simply reflects the development of the Applicative Hypothesis; other researchers analyzing Appl as a case checking (and therefore functional) head include a.o. Anagnostopoulou (2003), Miyagawa & Tsujioka (2004), and Miyagawa & Jung (2004).

(40)　a.　??The person who Akiu sold a car was very rich.
　　　b.　??Who did Akiu sell a car?

Let us call this long-noted constraint the *A' Restriction on Shifted IOs* (ARSIO).[13] Surveying 40 years of literature, Emonds & Whitney note that it applies to many languages with 'dative shift'-like constructions, including languages with overt applicative morphemes. They (p. 95) cite the following Chichewa data from Baker (1988: 291-292):

(41)　a.　*Atsikana a-na　-perek-er　-a　mfumu chisteko.*
　　　　　girl　　SP-PAST-hand-APPL-ASP chief　door
　　　　　'The girl handed the chief the door.'
　　　b.　*Iyi　ndi mfumu imene ndi-na　-nen-a*
　　　　　this is　chief　which 1SS-PAST-say-ASP
　　　　　kuti atsikana a -na　-perek-er　-a　chisteko.
　　　　　that girl　　SP-PAST-hand-APPL-ASP door
　　　　　('??This is the chief which I said that the girl handed the door.')

Emonds & Whitney observe that the ARSIO is sufficiently widespread to provide support for the view that IOs in DOCs are not simply base generated objects, and endorse the basic raising or 'dative shift' analysis of the IO in DOCs adopted in this paper. However as they point out, there is no consensus as to the exact structural implementation of the ARSIO.

3.3. Raising Applicative Structure and the A' Restriction

We propose that the restriction on A' extraction on IOs in DOCs is a product of the structure where ApplP is embedded under *v*P. As we pointed out in 3.1, the derivation of a *v*P selecting an applicative projection proceeds in normal cyclic fashion, with VP and ApplP constructed from bottom up, and movement of the IO to Spec, ApplP taking place as soon as Appl is introduced in the derivation. We propose that items whose features have been checked by Agree within a cyclic domain are unavailable for operations beyond that cyclic domain, This falls out naturally from Chomsky's (2001) version of the Phase Impenetrability Condition:

(42) Phase Impenetrability Condition

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[13] Emonds & Whitney (2006) note that there is considerable crosslinguistic and cross-idiolectal variation in the strength of the ARSIO. They cite Den Dikken (1995) who observes that the ARSIO is violable in English with short A' extraction for some speakers. According to Tang (1977: 82, example (53b)) the ARSIO appears violable with short Topicalization in a Chinese DOC with no overt applicative *gĕi*.

The domain of a strong phase head is not accessible to operations at ZP (the next strong phase); only H and its edge are accessible to such operations.

The PIC insures that operations involving Agree in a higher cyclic domain can reach no further than the edge of the next cyclic domain (strong phase) down. Items may escape the PIC by being moved to the edge of the lower cyclic domain. But in the case of an IO that enters into an Agree relation with Appl, both its case and EPP/OCC features have already been checked. The unavailability of the latter feature in particular makes it impossible for the IO to be attracted to the edge of vP.[14] Thus while a category checked under Agree by v and attracted to its Spec can be available for operations in the next cyclic domain (specifically A' movement in the CP domain), categories checked earlier in the derivation of vP, such as a DP checked by Appl, will not.

3.4. A-movement in Mandarin DOCs

Mandarin *gĕi* DOCs exhibit another property which is widespread but not universal among DOCs: the IO is unavailable not only for A', but for A movement. Thus the IO in the *gĕi* DOC construction is ineligible for passivization (43a) or fronting with *bă* (43b):

(43)   a.   **Akiū bèi   pĕngyŏu mài- gĕi chēzi le*
             Akiu PASS friend   sell-GEI car   PART
             ('Akiu was sold a car by a friend.')
     b.   **Pĕngyŏu ba Akiū mài- gĕi chēzi le*
             friend   BA Akiu sell-GEI   car   PART

Chinese patterns with languages such as Greek (Anagnostopoulou 2003, Georgala, Paul & Whitman 2008, Georgala & Whitman 2009), which disallow passive of the IO in DOCs. This falls out straightforwardly from the account in 3.1. Since IO is licensed by Appl and DO by v, only the latter is affected by the failure of defective ([-transitive]) v to check case features in a passive. As predicted by this account, the DO in a DOC may passivize, in Chinese (44a) and Greek (45).[15] *Ba*-extraction of the DO (44b) is also possible in Chinese.

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[14] One could imagine a less restrictive version of the PIC (either the 2001 version cited above or Chomsky's 1999 version) that specifies as inaccessible for operations in a higher cyclic domain only categories which have entered into an Agree relation in a lower cyclic domain, and do not occupy its edge. This would have the effect of making Appl-licensed IOs inaccessible to A' movement in the case at hand, but allowing, for example, PPs to undergo wh-movement out of vP without having first to move to the phase edge. The alternative seems attractive, but we do not pursue it further here.

[15] A reviewer points out the apparent Shortest Move/Minimality violation incurred by A movement of the DO over the IO in (44-45). We assume that checking of the case and EPP/OCC features of the IO by Appl prior to passivization eliminates the IO as a possible intervener.

(44) a. *Chēzi bèi   pěngyǒu mài- gěi Akiū le*
car   PASS friend   sell-GEI Akiu PART
'The car was sold by a friend to Akiu.'

b. *Pěngyǒu ba chēzi mài- gěi Akiū le*
friend   BA car   sell-GEI Akiu PART
'The friend sold a car to Akiu.'

(45) *Ena   ivlio   *(tis)   dhothike*
a.NOM book. NOM 3SG.CLITIC was.given.3SG
(tis   Lenas).
the.GEN Lena.GEN
'A book was given her/Lena.'

4. Morphological exponence and the Raising Applicative Hypothesis

Georgala et al. (2008) point out that the Raising Applicative Hypothesis predicts that overt applicative affixes are realized uniformly as verbal suffixes.[16] In contrast, if we were to find an overt head in Pylkkänen's low applicative structure (46), it should be realized as a verbal prefix (assuming that we do not have head adjunction to the right), or as a particle in VP.

(46)   [$_{\text{VOICEP}}$ Voice° [$_{\text{VP}}$ V [$_{\text{APPLP}}$ DP$_{\text{goal}}$ [$_{\text{APPL'}}$ Appl° DP$_{\text{theme}}$]]]]
        (Pylkkänen 2002; annotated to indicate thematic roles)

In fact there are clear cases of applicative constructions associated with prefixal morphology, including e.g. Ainu and Abaza.

(47)   Ainu instrumental applicative   (Shibatani 1990: 69)
        Tam -kurpoki   a *-ko* -tam -etaye.
        sword-underneath 1SG-APPL-sword-draw
        'I drew the sword underneath the sword.'

(48)   Abaza locative applicative   (O'Herin 2001: 481)
        d-/a-   [ðə-*dzqa*] -yə-r-gəl-t'.
        a3SG.h-dir[1PL-beside]-c3SG.m-CAUSE-stand-dyn
        'He caused him/her to stand next to us.'

What is interesting about (47-48) is that they have the semantics of high rather than low applicatives in Pylkkänen's (2002, 2008) terms. Neither expresses transfer of possession; the Ainu applicative is an instrumental, while the Abaza example is a locative. The applicative affix in both of these

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[16] On the assumption that the lexical verb raises uniformly to *v*. Whitney and Emonds (2006: 106) also point out that applicative affixes are generally suffixes.

patterns is analyzed as an incorporated P (Baker 1996 for Ainu, O'Herin 2001 for Abaza). We are unaware of clear examples of a prefixal applicative restricted to a low applicative (transfer of possession) function.

It is equally difficult to identify exponents of a low applicative head in the shape of a VP-internal particle or verb-like element. A possible candidate is serial verb constructions where the second verb is a transfer-of-posession predicate such as *give*:

(49)   Haitian (Lefebvre 1998: 291)
         Mí mandá   biífi *dá* hen.
         1SG send   letter give her
         'I have sent letters to her.'

However in such constructions the order of IO and DO is uniformly reversed from the pattern predicted by the low applicative structure (46): the DO precedes the second verb, and the IO follows it. Crosslinguistically, it appears thus that there are no clear candidates for an overt low applicative head, either incorporated or in situ.

5. Conclusion

This article has argued for a distinction between *thematic* and *raising* applicatives. The former introduces an additional argument above the root VP, while the latter functions as a case-licensing head, introducing no additional argument, but attracting the IO from its base position in the VP. The Raising Applicative Hypothesis preserves the original structural insight of the Applicative Hypothesis for ditransitives and other "extra object" constructions. This insight is supported by the typical crosslinguistic realization of applicative morphemes as suffixes, and by the behavior of the Chinese V-*gěi* double object construction that we have examined in detail. At the same time, Pylkkänen, (2002, 2008) gives ample evidence for two distinct types of extra objects, one originating outside the core VP, another inside it. The Raising Applicative hypothesis allows both types to be licensed with a single position for the licensing head.

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