PREPOSITION INCORPORATION IN MANDARIN: ECONOMY WITHIN VP

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Abstract

In this paper, we examine the phenomenon of Preposition Incorporation (PI) in modern Mandarin. While the category PP is found in various positions within the clause, it is never found with VP. Instead, the P 'incorporates' into V, or else is absent. We argue that previous generative approaches have failed to provide a simple and consistent explanation which applies to all types of verbs.

We propose an OT analysis in which a given argument structure has different potential surface expressions, with interacting constraints to give the correct range of actual output forms. The constraints are of the familiar types: markedness, in particular, that the VP-internal structure be maximally simple, and faithfulness, in particular, that any non-core GFs are 'marked' by the presence of a P. Further, our analysis extends to different classes of ditransitive verbs; the 'put' class has a very limited range of surface expressions, a subset of those available to the 'send' class.

1. Introduction

Modern Mandarin has very strong restrictions on what XPs it allows VP-internally, following V. Typically, only subcategorized arguments are allowed (cf. Fang 2006); some verbs have two internal arguments and hence allow sequences such as V NP NP.

With intransitive verbs, the sequence V PP is never found, even though PPs are found in every other position in the clause. We call this hypothetical construction the 'full PP' construction. Instead of this, the P must be 'incorporated' into the verb, giving the sequence V+P NP. We call this 'PI' (preposition incorporation). As shown in the examples below, the aspect marker -*le* is a diagnostic for PI. And with some verbs, the incorporated P can be absent; we call this 'BVC' (bare verb construction).

The full PP construction, PI and BVC are all in principle expressions of the same argument-structure. We further develop the LMT/LFG analysis of Her (1999), using OT to account for:

1. the obligatory nature of PI (the reason for *V PP), and

2. the optionality of different surface representations.

We briefly compare our account with the previous analysis of Li (1990), Gao (2005), and Feng (2003), of which Gao's is the most thorough.

2. Two Types of Verb

2.1. The 'send' class

The relevant data for a verb like 'send', with a(rgument)-structure $<$ agent, goal, theme $>$, is as follows:

(1) a. *Ta song-le   yibenshu   **gei wo**.   (*V NP PP)
         he send-PERF one.CL.book to me
         'He sent a book to me.'

     b. *Ta song-le   **gei wo** yibenshu.   (*V PP NP)
         he send-PERF to me one.CL.book

     c. Ta **gei wo** song-le   yibenshu.   (PP$_{go}$ V NP$_{th}$)
         he to me send-PERF one.CL.book

     d. Ta song-**gei**-le   **wo** yibenshu.   (PI; V NP NP)
         he send-to-PERF me one.CL.book

e.　Ta song-le　　**wo** yibenshu.　　　　　　　　　　　　　　　　(BVC; V NP NP)
　　　　　he send-PERF me one.CL.book

The key examples are (d) and (e). While these are grammatical with the structure V NP NP, examples (a) and (b) are not, with a PP in the structure.

　　Her (1999) presents an LMT analysis of simple ditransitives in Mandarin, which we follow here:

(2)　　*song(-gei)* 'send(-to)'
　　　　argument-structure:　<　　ag,　　go,　　th　　>
　　　　　　　　intrinsic:　　　[−o]　　[+o]　　[−r]
　　　　　　　　　　GF:　　　SUBJ　OBJ$_\theta$　OBJ

The Goal argument of *song* is never expressed as an OBL, in a PP; and it does not passivize, hence it is categorized as [+o]. If this is correct, then the (a/b) examples above cannot be generated, as desired.

2.2.　The 'put' class

The relevant data for a verb like 'put', with a-structure < agent, theme, location >, is as follows:

(3)　　a.　*Wo fang-le　　nabenshu　**zai zhuozishang**.　　　　　　　　　(*V NP PP)
　　　　　　I　put-PERF that.CL.book on desk.top
　　　　　　'I put that book on the table.'

　　　b.　*Wo fang-le　**zai zhuozishang** nabenshu.　　　　　　　　　　(*V PP NP)
　　　　　　I　put-PERF on desk.top　　　that.CL.book

　　　c.　Wo **zai zhuozishang** fang-le　　nabenshu.　　　　　　　　　　(V NP)
　　　　　　I　on desk.top　　　put-PERF that.CL.book

　　　d.　*Nabenshu　　wo fang-le　**zai zhuozi-shang**.　　　　　　　　(*V PP)
　　　　　　that.CL.book I　put-PERF on desk.top

　　　e.　Nabenshu　　wo fang-**zai**-le　**zhuozi-shang**.　　　　　　　　(PI; V NP)
　　　　　　that.CL.book I　put.on-PERF desk.top
　　　　　　'I put that book on the table.'

　　　f.　Nabenshu　　wo fang-le　**zhuozi-shang**.　　　　　　　　　　(BVC)
　　　　　　that.CL.book I　put-PERF desk.top

Either the PP must appear external to VP, as in (c), or else the NP object must be external to VP, as in (e) and (f), with accompanying PI or BVC. In other words, topicalization of one complement commonly occurs when there is another complement in postverbal position as in (e) and (f), with this class of verb (Huang 1982). Topicalization is somewhat free in Mandarin, though we assume that such displacement always has some function for pragmatic or information-structure reasons. The discourse-related aspects of Mandarin constituent order are well-known (e.g., Li and Thompson 1981). The key point in our data is that while two postverbal complements are allowed in principle with 'send', only one postverbal complement is allowed with 'put'.

　　The a-structure of 'put' is as follows:

(4)　　*fang-(zai)* 'put(-on)'
　　　　　　a-str:　<　　ag,　　th,　　　loc　　　>
　　　　　　instrinsic:　　[−o]　　[−r]　　　[+r]
　　　　　　　　GF:　　SUBJ　OBJ　OBL$_\theta$/OBJ$_\theta$

[+r] can be OBL$_\theta$ or OBJ$_\theta$, and in Mandarin these can be expressed as PP or NP. The location argument is classified as [+r], and hence it could be a PP or an NP in c-structure. Note, however, that (5) is ungrammatical (cf. (3)e):

(5)   *Wo fang-**zai**-le **zhuozi-shang** nabenshu.   (*PI; V NP NP)
       I   put.on-PERF desk.top   that.CL.book

    As seen in the contrast between (3e) and (5), two NPs may appear VP-internally with verbs of the 'send' class but not those of the 'put' class. Hence the expression of arguments within VP cannot solely be a fact of c-structure restrictions in Mandarin. Instead, we argue that the full account of which structures are grammatical also involves Optimality Theory-style competition between interacting constraints, which refer to the thematic hierarchy, for the contrast just mentioned.

3.   Structures and Constraints

3.1.   Competing Structures

In an OT analysis, structures compete as expressions of the same abstract information, and the structures that are relevant for Mandarin VPs are shown in (6), concentrating for now on structures with just one internal argument. For the (b) structure, we assume a lexical rule combining V and P as a complex V. As the aspect marker *-le* follows the sequence V+P, this is strong motivation that PI (verb) structures are formed lexically.

(6)   (a) PP   (b) PI   (c) BVC
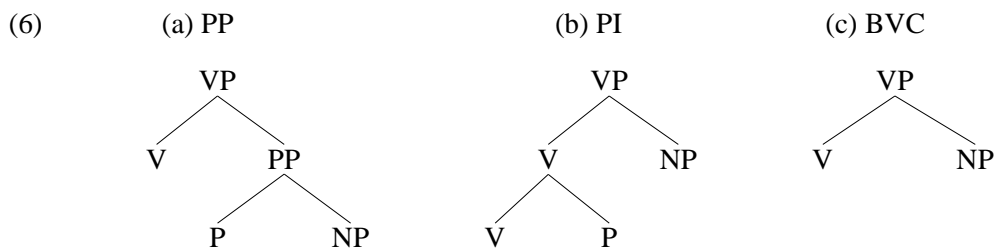
    The (a) structure never surfaces in Mandarin. Gao (2005) adopts a movement analysis in which the (b) structure is derived from the (a) structure via 'Preposition Incorporation', and the (c) structures are derived from the (b) structures by 'Phonetic Suppression' of the P. This of course implicitly claims that the (a–c) structures share the same a-structure, for they are all derived from the same underlying structure.

    In Gao's analysis, there is no simple mechanism which forces the P to incorporate if the PP is adjacent to V – the grammar can allow it as an option, but not force it as a necessary operation. Gao suggests that V and P assign different cases, and in situations of adjacency of V and PP, the V's case 'wins'. Note that this implicitly compares the favorability of V's case over P's case.

    In our analysis, structures (a) and (b) are more FAITHFUL than (c), but (c) is more ECONOMICAL than (b) (and more than (a)).

3.2.   Competing Constraints are Necessary

Gao's analysis suffers from a problem with intransitive Vs, which do not assign case (see (7)); therefore the motivation for PI cannot be that V's case and P's case clash, as V has no case. Instead, they show that the language prefers direct (NP) complements to V in favor to PP complements, regardless of the properties of the head V of the VP.

(7)   a.   Xiaotou   pao **dao menkou**.   (V PP)
                  small.thief run to   entrance
                  'The thief ran to the entrance.'

        b.   *Xiaotou   **dao menkou** pao-le.   (*PP V)
                  small.thief to   entrance run-PERF

        c.   *Xiaotou   pao-le   **dao menkou**.   (*V PP)
                  small.thief run-PERF to   entrance

        d.   Xiaotou   pao-**dao**-le **menkou**.   (PI)
                  small.thief run-to-PERF entrance

        e.   *Xiaotou   pao-le   **menkou**.   (*BVC)
   small.thief run-PERF entrance

These examples illustrate the surface expression with an intransitive verb. (a) looks like a sequence of V and PP, out of which the PP cannot scramble (b).[1] However, the facts of aspectual *-le* in (c) and (d) show that the P is actually part of the verb (hence, in a PI structure), rather than heading a constituent PP. Finally, (e) shows that BVC is not possible with this verb.
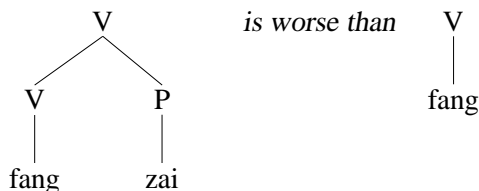
3.3. Constraints

To account for the competitions between structures outlined above, we propose the following constraints. (8)–(10) are markedness constraints:

(8) θ(VP): Order in the VP obeys the thematic hierarchy … $\mathrm{go} > \mathrm{th} > \mathrm{loc}$.
            NP_{θ} precedes NP in Mandarin, so

                NP(Loc) $\prec$ NP(Theme) *is worse than* NP(Theme) $\prec$ NP(Loc)

(9)   ECON(VP): *XP within VP. (cf. Fang 2006)
            V – PP violates this more than V – NP:
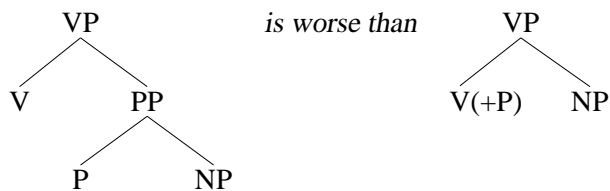
(10)   ECON(V): V is mono-morphemic.
            V+P violates this; V does not:

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[1] (7)b is grammatical, but with a different meaning, namely 'The thief came to the entrance and then ran away (from there)'.

And we have one faithfulness constraint, which requires marked values of the LMT features to have overt expression as a P:

(11)   FAITH([+f]): An intrinsic [+o] or [+r] argument is marked by a P in c-structure.
         (Only [$-f$] arguments are unmarked; the BVC violates the constraint.)

3.4. Constraint Ranking

The basic constraint ranking for Mandarin is that the first two constraints outrank the second two:

(12)   { θ(VP), ECON(VP) }   ≫   { ECON(V), FAITH([+f]) }
              these restrict   these allow
              the content of VP   PI or BVC

The key to our analysis is to restrict the internal contents of VP, and then let the other constraints arbitrate between the PI or BVC structures. In the full analysis, θ(VP) outranks ECON(VP), but the lowest two constraints are tied, which we take as an abbreviation for the idea that in a specific evaluation, one of the two possible rankings will taken; over multiple instances, the grammar will generate two outputs in 50-50 distribution, for a given relevant input (see e.g., Müller 1999).

4. The Analysis of PI

We illustrate our analysis first with some general considerations, and then go on to the 'send' and 'put' classes respectively.

4.1. Economy within VP

The motivation for PI and BVC is the pressure for Economy within VP, rather than Case Conflict, which cannot apply in examples like those in (7). The Mandarin VP is highly restricted in the post-verbal domain, allowing at most subcategorized arguments or a single adverbial, but not both (for detailed analysis, see Fang 2006).

In fact, if multiple VP-internal constituents are required, the V must be 'copied' (see Tai 1985, Li 1990, Sybesma 1999, Feng 2003):

(13)   a.   Zhangsan tan gangqin tan-le   hen jiu.
              Zhangsan play piano   play-PERF very long
              'Zhangsan played piano for a very long time.'

         b.   *Zhangsan tan-le   gangqin hen jiu.
              Zhangsan play-PERF piano   very long

Fang (2006) presents an LFG analysis of examples like (13)a, with a modified coordinated VP structure. Each VP itself has minimal structure, as preferred by our high-ranking constraint ECON(VP).

4.2. The 'send' class

The 'send' class has the a-structure shown in (14). The Goal is intrinsically classified by LMT as [+o], so in the linking to GFs it be an OBJ of some kind. However, the Theme will be the unmarked choice for OBJ, by the usual principles of LMT.

(14)   *song(-gei)* 'send(-to)'
        a-str: <   ag,   go,   th   >
        intrinsic: [+o]
        GF: SUBJ OBJ_θ OBJ
        c-str: NP NP_θ / $*PP_\theta$ NP

The constraint ranking already disfavors expression of any PP within VP. To illustrate the analysis clearly, we present two tableaux, with the same inputs, with the two possible rankings of the lowest two constraints.

(15)

send<ag,go,th>	θ(VP)	EC(VP)	EC(V)	FTH([+f])	
[a] [V NP_{th} PP_{go}]	*	3	1		*NP PP
[b] [V+P NP_{go} NP_{th}]		2	*2		*PI
[c] [V NP_{go} NP_{th}]		2	1	*	BVC
[d] [V PP_{go} NP_{th}]		*3	1		*V PP

(16)

send<ag,go,th>	θ(VP)	EC(VP)	FTH([+f])	EC(V)	
[a] [V NP_{th} PP_{go}]	*	3		1	*NP PP
[b] [V+P NP_{go} NP_{th}]		2		2	PI
[c] [V NP_{go} NP_{th}]		2	*	1	*BVC
[d] [V PP_{go} NP_{th}]		*3		1	*V PP

We count violations numerically, so having a PP inside VP creates one more violation of *XP (EC(VP)) than having an NP there. The first two constraints are the most high-ranked, so the [a] and [d] candidates are eliminated, and the LMT principles will also guarantee that the Goal is linked as OBJ_θ. As in (1)d and (1)e, both [b] and [c] candidates are selected by the two rankings, each of which is shown in one tableau above.

The variation between [b] and [c] is determined by the relative ranking of ECON(V) and FAITH([+f]). These potential winning candidates correspond to (1)d and (1)e. It is worth noting that FAITH([+f]) is active even though the Goal argument of *song* is never expressed as a PP, as the incorporated P in PI also satisfies this constraint.

For verbs of this type, the apparent order NP – PP is possible in Mandarin. However Chao (1968) and Huang and Mo (1992) argue that in such a case *gei* is a co-verb heading a secondary VP. Each VP then obeys θ(VP), as well as the other constraints on VP structure:

(17)   Ta [_{VP} **song** nabenshu   [_{VP} **gei**   wo]].
        he   send that.CL.book   'give' me

As shown by the bracketing, this structure has one VP as a complement inside another, and the structure is V – NP – VP, not V – NP – PP.

4.3. The 'put' class

The 'put' class has the a-structure shown in (18). The Loc role is instrinsically classified by LMT as [+r], so in the linking to GFs it must either be OBJ_θ or OBL_θ, which would correspond to expression as an NP or as a PP:

(18)   *fang-(zai)* 'put(-on)'

a-str:	<	ag,	th,	loc	>
intrinsic:				[+r]
GF:		SUBJ	OBJ	OBL_θ/OBJ_θ
c-str:		NP	NP	PP/NP_θ

For this a-structure, θ(VP) eliminates candidates [b]/[c], for they do not follow the order in the thematic hierarchy. This renders irrelevant the ranking of the lowest two constraints, which we just show here in the same ranking order as (15). The only way out of the ineffability that θ(VP) triggers is that one argument of V must topicalize or otherwise be expressed external to VP:

(19)

put<ag,th,loc>	θ(VP)	EC(VP)	EC(V)	FTH([+f])	
[a] [V NP_{th} PP_{loc}]		3	1		*NP PP
[b] [V+P NP_{loc} NP_{th}]	*	2	2		*PI
[c] [V NP_{loc} NP_{th}]	*	2	1	*	*BVC
[d] [PP_{loc} [V NP_{th}]]		1	1		V NP

Due to ECON(VP), [d] always wins as it has the least structure in the lowest VP. This corresponds to (3)b.

Of course, fronting a category out of VP always involves some extra discourse information, as we noted in section 2.2. For this reason, the [d] candidate is technically unfaithful as an unmarked expression, even though it is the winner in the competition shown here. We assume that the few constraints that we have presented here outrank any constraints involving faithfulness to discourse-related information.

The [b/c] candidates above violate θ(VP). However, the [b'/c'] candidates shown in (20) with the NP_{th} in front of the V do not violate this constraint, and correspond to (3)e/f:

(20)

put<ag,th,loc>	θ(VP)	EC(VP)	EC(V)	FTH([+f])	
[b] [V+P NP_{loc} NP_{th}]	*	2	2		*PI
[c] [V NP_{loc} NP_{th}]	*	2	1	*	*BVC
[b'] [NP_{th} [V+P NP_{loc}]]		1	2		PI (see below)
[c'] [NP_{th} [V NP_{loc}]]		1	1	*	BVC

The contrast between [b] and [b'] is shown in (21). As the restricted object must always immediately follow the verb, the sequence NP NP with the verb 'put' always violates θ(VP).

(21)   a.   *Wo fang-**zai**-le **zhuozi-shang** nabenshu.   (V+P NP NP)
               I   put.on-PERF desk.top   that.CL.book

        b.   Nabenshu   wo fang-**zai**-le **zhuozi-shang**. (V+P NP)
               that.CL.book I   put.on-PERF desk.top

The relative ranking of the lower two constraints will dictate whether the 'put'-type verbs surface with PI or BVC, as long as only one argument is VP-internal. The ranking as given in (20) is the same as in (15), and

BVC is the winning candidate. With the constraint ranking as in (16), PI would be the winner. Importantly, the 'put' class only allows one NP VP-internally, while the 'send' class allows two.

5.   Conclusion

In conclusion, we have proposed this ranking for Mandarin:

(22)   { θ(VP), ECON(VP) }   ≫   { ECON(V), FAITH([+f]) }
                 these restrict   these allow
              the content of VP   PI or BVC

The ranking of the first two constraints over the second two explains the preference for NP over PP within VP, and the restrictions on the order of constituents within VP, seen in the difference between 'send'-type and 'put'-type verbs. Specifically, due to θ(VP), a VP with the structure [V NP NP] is possible with 'send' but not 'put'. The high-ranking constraints also ensure that a constituent PP can never appear within VP, even though it can appear in other positions within the clause.

    The lower-ranked constraints have effects as follows:

(23)   a.   FAITH([+f]) ≫ ECON(V) favors PI over BVC.

            b.   ECON(V) ≫ FAITH([+f]) favors BVC over PI.

    There is of course further complexity in the data; here we have concentrated on illustrating the style of the analysis with ditransitive verbs. A fuller account of a wide range of Mandarin intransitive, transitive and ditransitive verbs can be found in Peck (2006).

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