# Revisiting Pseudo-Incorporation: Post-verbal Non-referential Bare NPs in Mandarin

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## 1. Introduction

Different from English, Mandarin is a language that allows non-referential bare NP arguments not involving any functional projections or plural marking. In the presence of an adverbial temporal duration phrase (henceforth DrP), which occurs post-verbally in Mandarin, post-verbal bare NPs are limited to the lowest position, i.e. to the right of the DrP, assuming that the DrP is a syntactic adjunct *left*-adjoining to the intermediate projections in the main verbal phrase (Huang et al, 2009; Liao, 2013; a.o.):

(1) a. Zhangsan mai-le    san   nian **che**      b. *Zhangsan mai-le   **che** san   nian
       Zhangsan sell-ASP three year car              Zhangsan  sell-ASP car  three year
       'Zhangan sold cars for three years.'          'Zhangsan sold cars for three years.'

DPs of various kinds (e.g. Dem(onstrative)Ps, Num(eral)Ps, Cl(assifier)Ps, etc.) are required to be in a position higher than the DrP:

(2) a. Lisi nian-le   **(zhe-)yi-ben shu**  san   tian    b. *Lisi nian-le   san   tian **(zhe-)yi-ben shu**
       Lisi read-ASP this-one-CL  book three day              Lisi  read-ASP three day this-one-CL   book
       'Lisi read this/a book for three days.'               'Lisi read this/a book for three days.'

The baseline patterns from the above examples are clear: when the object is a *bare non-referential* NP, it has to follow the DrP[1]; when the object is a DP *with functional projections*, it has to precede the DrP.

The current paper aims to capture these baseline patterns by answering the following research questions: (i) what is non-referentiality? (ii) How is it related to the bare form of the object and the post-DrP position? It is structured as follows. Section 2 reviews some literature on the syntactic realization of Mandarin post-verbal NPs and raises issues regarding its insufficiencies for the patterns of interest. Following in Section 3 is the comparison between Mandarin NPs and NPs in other languages, mainly Hindi, as an attempt to show that Mandarin post-verbal NPs present a case of Pseudo-Incorporation (P-I) given their properties characteristic of P-I-hood found in Hindi NPs. Section 4 provides as a general analysis an argument structure from which the positional NP-DP distinction in Mandarin and the P-I properties in both Mandarin and Hindi NPs can be derived. Section 5 discusses the predictions made by the analysis and various languages that attest to the predictions. Finally, Section 6 concludes the paper.

[1]  Mandarin also has *definite* bare NPs (Cheng & Sybesma, 1999, 2005). According to Cheng & Sybesma (1999), Mandarin definite bare NPs involve a covert CL(ASSIFIER) head that takes the bare NP as its complement and functions as the $\iota$-operator (Partee, 1987), rendering the NP definite. In other words, Mandarin definite NPs are indeed underlying DPs and still conform to the baseline patterns in having to precede the DrP:

(i) a. Zhangsan wei-le   **gou** *san   tian*      b. Zhangsan wei-le   *san   tian* **gou**
       Zhangsan feed-ASP dog three day               Zhangsan feed-ASP three day  dog
       'Zhangsan fed the dog(s)/*dogs for three days.'   'Zhangsan fed *the dog(s)/dogs for three days.'

The bare NP, when appearing in the post-DrP position, can only obtain a non-referential reading, which in (ib) allows for the dog or set of dogs to vary in the different *feeding* events within the three day's time, whereas the dog or set of dogs must remain constant in all the *feeding* events during the three days in (ia).

## 2. Previous analyses for Mandarin post-verbal NPs

In this section, we will briefly review one piece of literature that addresses the distribution of Mandarin post-verbal non-referential NPs and point out its insufficiencies in accounting for the baseline patterns. Huang, Li & Li (2009) propose the following verbal structure for Mandarin arguments:

(3)
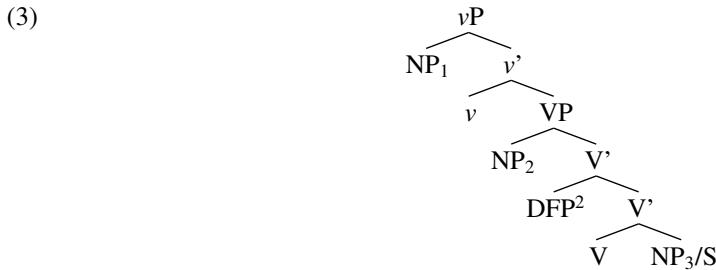


According to them. there are two argument positions inside the VP, i.e. the specifier position (Spec.VP) and the complement position (Comp.V). The DrP left-adjoins to the V', syntactically distinguishing between the two argument positions in either of which the object could compose. This gives rise to the two positional possibilities with respect to the position of the DrP, i.e. *before* or *after* the DrP. And V-to-*v* movement is assumed for the surface word order. Aware of the limited distribution of post-verbal non-referential NP objects in Mandarin, they propose the following constraint that restricts the syntactic realization of such NPs to Comp.V:

(4)  Huang, Li & Li (2009:95):

A non-referential constituent which bears a theta-relation with a head H should be combined with H to form the smallest possible constituent.

The constraint in (4) can capture the contrast between (1a) and (1b) but the cause of it is unclear; that is, why do non-referential NPs have to form the smallest constituent with the main V? Furthermore, the constraint remains agnostic about the occurrence of DPs, allowing for the possibility of DPs composing in Comp.V, a word order that we know is ungrammatical, (2b).

## 3. Mandarin post-verbal bare NPs and Pseudo-Incorporation

Pseudo-(Noun)-Incorporated (P-I) is a phenomenon first introduced by Massam (2001), where she found in Niuean certain bare nominal objects exhibit properties of morphological incorporation yet are syntactically accessible. In this section, we will attempt to explain the post-DrP position exclusively hosting NPs by establishing a case of Mandarin post-verbal NPs being *pseudo-incorporated*, where P-I has to happen in the lowest position in the structure. Hindi non-Case-marked NPs that are reported to be pseudo-incorporated (Dayal, 2011, 2015) will be our main comparison for Mandarin post-verbal NPs. And it will be shown that Mandarin post-verbal NPs exhibit the hallmark properties of P-I[3].

### 3.1. Obligatory narrow scope

According to Mohanan (1995) and Dayal (2011, 2015), Hindi is a P-I language, in which non-Case-marked bare NP objects show the cross-linguistically steady characteristics of P-I. Three of the properties are discussed here, starting with the *obligatory narrow scope* of the NPs (The other two to be discussed in the following sections are *number neutrality* and the *inability of discourse anaphora*.). Mandarin non-referential NP objects will be argued to present a (nearly) parallel case to the Hindi examples.

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[2]  In Huang, Li, & Li's (2009) original structure, only an adverbial frequency phrase (FP) left-adjoins to the V' since most of their examples involve a frequency phrase like *liang ci* ('two times'). A DrP is added to this structure by myself in the same position as that of the FP (hence notated as DFP) since FPs and DrPs have the same post-verbal distribution and show similar interactions with the post-verbal arguments.

[3]  All of the Hindi examples in this paper are excerpted from (Dayal, 2011), with the following glosses: ERG = ergative; ACC = accusative; FUT = future; IMP = imperfective; PFV = perfective; PROG = progressive; PRS = present.

(5) Obligatory Narrow Scope:

a. Hindi:

(i) anu *bacca* nahiiN sambhaalegii
  Anu child not look-after-FUT
  'Anu will not look after children.'
    (¬ > ∃; *∃ > ¬)

(ii) anu *ek bacce-ko* / *bacce-ko* nahiiN sambhaalegii
  Anu one child-ACC child-ACC not look-after-FUT
  'Anu will not look after a particular child/the child.'
    (*¬ > ∃; ∃ > ¬)

b. Mandarin: Lisi **bixu/meiyou** mai san nian **che**
  Lisi must/not sell three year car
  'Lisi must/didn't sell cars for three years.'  (□ > ∃; ¬ > ∃)
  *'There are some cars such that Lisi must/didn't sell them for three years.'
    (*∃ > □; *∃ > ¬)

As shown in the contrast between (5ai) and (5aii), Hindi non-Case-marked bare NP objects necessarily take narrow scope with respect to other scope-bearing elements in the sentence. The same is found in the case of Mandarin post-DrP NPs: the modal/negation necessarily scope over the NP, (5b).

*3.2. Number neutrality*

Consider the following contrast between the Hindi non-Case-marked NP subject and object:

(6) Number Neutrality:

Hindi: a. puure din kamre meN *cuuhaa* ghustaa rahaa
    whole day room in mouse enter-IMP PROG
    'The whole day the mouse/a mouse (the same one) kept entering the room.'

b. anu puure din *cuuhaa* pakaRtii rahii
    Anu whole day mouse catch-IMP PROG
    'Anu kept catching mice (different ones) the whole day.'

Hindi makes a distinction between singular and plural nominals. Only the bare *singular* NP *object* exhibits number neutrality. Since number neutrality is a hallmark of incorporation and the object position is the target of incorporation, we can conclude that the bare NP object in (6b) is an incorporated NP.

Now consider the following Mandarin examples:

(7) Mandarin: a. **Laoshu** yizhi pao-jin fangjian
      mouse continuously run-enter room
      'The mouse/mice keep(s) running into the room.'

b. Zhangsan zhua-le yi zheng tian **laoshu**
    Zhangsan catch-ASP one whole day mouse
    'Zhangsan kept catching mice/*the mouse (mice) the whole day.'

There are two differences between the interpretations of Mandarin and Hindi bare NPs. First, Mandarin disallows indefinite subjects (Cheng, 1994; Cheng & Sybesma 1999, 2005; a.o.). So the NP subject in (7a) is necessarily interpreted to be a *definite* NP (i.e. an underlying DP that has been ι-shifted under our assumption). Second, given the well-known property of Mandarin bare NPs that they are number-unspecified, the NP subject in (7a) is compatible with either a singular or plural interpretation. These differences raise the issue of whether number neutrality could be used as an argument for the P-I-hood of Mandarin NPs since they are number neutral in general. However, once we compare the NP subject with the post-DrP NP object in (7b), we get a contrast where the object must assume a *non-referential* and *plural* interpretation. Also, we see the NP-DP distinction between the subject and the post-DrP positions. Under the assumption that DPs cannot be incorporated, together with the observation that NPs necessarily turn DPs in the subject position, we at least get a similar contrast to the one in (6) which makes the post-DrP position a potential incorporation position.

## 3.3. Inability of discourse anaphora

The third property concerns P-I NPs' inability to antecede a discourse anaphor. See first the Hindi example in the following:

(8) Inability of Discourse Anaphora:

Hindi: a. anu apne beTe ke-liye *laRkii*$_i$ / *laRkiyaaN*$_i$ dekh      rahii hai
        Anu self's son  for    girl    girls      looking at PROG be-PRS
        'Anu is girl-looking/girls-looking for her son.'

   b. vo $^\#$*us-kaa*$_i$ / *un-kaa*$_i$ swabhaav jaannaa caahtii    hai
      she her       their    nature   to-know want-IMP be-PRS
      'She wants to know $^\#$her/their (the girls') temperment.'

As pointed out by Dayal (2011), there is a singular-plural and aspectual distinction in discourse anaphora for Hindi P-I NPs: when the P-I NP (singular or plural) is under atelic aspect, singular anaphoric pronouns cannot be used, even for the singular P-I NP. They are however acceptable to the singular P-I NP under telic aspect. Plural anaphoric pronouns, on the other hand, are acceptable in all cases. As Dayal (2011) notes, P-I in Hungarian (Yanovich, 2008) and Danish (Asudeh & Mikkelsen, 2000) also supports both singular and plural pronominal anaphora, and shows the same kind of aspect-sensitivity. Based on the following example, Mandarin post-DrP NPs are argued to add to this category, suggesting aspect-sensitivity being a general property of discourse anaphora in P-I:

(9) Mandarin: a. Zhangsan mianshi-le     san   tian **yingzhengzhe**$_i$
              Zhangsan interview-ASP three day applicant
              'Zhangsan interviewed applicants for three days.'

   b. Ta wen-le   $^\#$**ta**$_i$     / $^\checkmark$**tamen**$_i$ henduo wenti
      he ask-ASP him(her)  them     many   question
      'He asked $^\#$him(her)/$^\checkmark$them many questions.'

The post-DrP NP object in (9a) is under atelic aspect, as indicated by the DrP *san tian* ('for three days'). It, as Hindi P-I NPs, cannot support singular pronominal anaphora in (9b)[4].

## 3.4. Pseudo-Incorporation not Noun-Incorporation

We know we are looking at cases of Pseudo-Incorporation rather than canonical cases of Noun-Incorporation (N-I) in Hindi and Mandarin for two reasons. First, unlike in N-I, where the incorporated

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[4]  We are unable to determine whether Mandarin NP objects do support singular pronominal anaphora under telic aspect due to one syntactic complication: temporal adverbials that signal telicity, e.g. *zai san xiaoshi nei* ('in three hours'), occur pre-verbally in Mandarin:

(i) a. Zhangsan *zai san  xiaoshi nei* mianshi-*wan*-le     **yingzhengzhe**$_i$
       Zhangsan at three hour   in  interview-finish-ASP applicant
       'Zhangsan finished interviewing $^{??}$(the) applicant(s) in three hours.'

  b. Ta wen-le   $^\checkmark$**ta**$_i$   / $^\checkmark$**tamen**$_i$ henduo wenti
     he ask-ASP him(her)  them     many   question
     'He asked $^\checkmark$him(her)/$^\checkmark$them many questions.'

Although on the surface it looks like in (ib) singular anaphoric pronouns can refer to the NP object under telic aspect, we cannot be sure what the position of the object exactly is in (ia), since the *pre*-verbal *in*-phrase cannot help us distinguish the *post*-verbal position of the NP object. Hence, we cannot determine whether the object composes in the lowest (post-DrP) position, our potential P-I position in Mandarin. Moreover, the NP object under telic aspect seems to have an obligatory *definite* interpretation, meaning they are in fact DPs that come higher than true NP objects in the post-verbal field. Given these considerations, we will drop the discussion of NP objects under telic aspect. Why there seems to be an enforced definiteness on the NP under telic aspect is a mystery at this point.

nominal is a head-level $N^0$, the bare nominal objects in Hindi and Mandarin are phrase-level NPs that can be modified:

(10) a. Hindi:
    anu  sirf  *puraanii kitaab*  becegii
    Anu  only  old      book  sell-FUT
    'Anu will only sell old books.'

    b. Mandarin:
    Zhangsan chi-le   san  tian  **exin-de laoshu**
    Zhangsan eat-ASP three day gross    mouse
    'Zhangsan ate gross mice for three days.'

Second, in Mandarin N-I, the incorporated $N^0$ *left*-adjoins to $V^0$, forming a complex verbal predicate (Lin, 2001; Paul & Whitman, 2010). That is, the bare nominal comes *before* the verb instead of after:

(11) a. Zhangsan **bang-da**-le Lisi    (Inc. Instr.)
    Zhangsan bat-hit-ASP Lisi
    'Zhangsan hit Lisi with a bat.'

    b. Zhangsan **hai-zang**-le  Lisi    (Inc. Loc.)
    Zhangsan sea-bury-ASP Lisi
    'Zhangsan buried Lisi in the sea.'

    c. Zhangsan-de  xiaohai-men **gua-fen**-le    Zhangsan-de  qian    (Inc. Pat.)
    Zhangsan-GEN child-PL    mellon-split-ASP Zhangsan-GEN money
    'Zhangsan's children split Zhangsan's money (like splitting a mellon).'

# 4. Analysis

Our research goal is to account for the positional NP-DP distinction in post-verbal argument realization (i.e. the word orders in (1) & (2)), as well as to derive the cross-linguistic P-I properties Mandarin NPs exhibit. We will build our analysis on the following proposed argument structure:

(12) The Argument Structure:



$\dashrightarrow$ Agreement
$\longrightarrow$ Movement

Following Lin (2001) and Williams (2005, 2008), I assume that Mandarin verbs only denote properties of eventualities: $[\![V]\!] = \lambda e \, . \, V(e)$. Similar to $v^0$ in the sense of Kratzer (1996), the internal $\theta$-roles are severed from the denotations of Mandarin verbs and encoded in a functional head immediately embedding the VP, notated as $\Theta^0$: $[\![\Theta]\!] = \lambda x_e \lambda e \, . \, \theta(x, e)$. The main verb, $V^0$, bears a $[+\theta]$ feature if it denotes an eventuality requiring a participant that should play an internal $\theta$-role ('$\theta$' being a variable for the internal $\theta$-roles). $\Theta^0$ probes down the structure and agrees with $V^0$, whose $[+\theta]$ feature specifies the thematic relation $\Theta^0$ introduces[5]. This agreement relationship ensures strict proximity between $\Theta^0$

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[5] One might have doubts about treating $\theta$-roles as features on the verb since unlike other more canonical agreement features, such as $\phi$-features (person, gender, number... etc.), no morphological spell-outs of verbs exhibit a $\theta$-role distinction, to the best of my knowledge. This paper completely acknowledges this view and does not intend to argue for the legitimacy of $\theta$-roles being included as agreement features. The agreement mechanism is simply adopted as a means to establish the tight connection between $\Theta^0$ and $V^0$ since we know that what internal arguments there can be is dictated by the eventualities. This may also be a way to capture the subject-object asymmetry that has led to Kratzer's (1996) proposal of severing the external $\theta$-roles from the denotations of verbs, where thematic relations might vary with regards to various verb-IA pairs (IA = internal argument) given a specific verb like *throw*, e.g. *throw a ball* vs. *throw a party*, whereas the thematic relations in different EA-verb pairs (EA = external argument) remain constant for each verb regardless of what entities the EA denotes. In the case of $\Theta^0$ under discussion, although in Mandarin internal $\theta$-roles are severed from verbs and put in a functional head syntactically, they are not *really* severed from verbs because the verbs still have a say of what the internal $\theta$-roles can be.

and $V^0$, necessary for restricting the internal arguments to post-verbal positions, as is the case of simple sentences in Mandarin. It also prevents overgeneration: verbs that lack internal arguments carry the $[-\theta]$ feature; consequently, no $\Theta^0$ is projected in the structure; hence, no internal arguments. Cyclic movement of $V^0$ to $v^0$ is assumed for the surface word order, as in Huang, Li & Li (2009).

## 4.1. Deriving the Mandarin word orders and P-I properties

We will take from Dayal (2011) the insight that P-I NPs are property NPs and treat Mandarin non-referential NPs as being of a slightly shifted property type $\langle e, \langle s, t \rangle \rangle$, which relates entities of which a certain property holds true to eventualities: $[\![NP]\!] = \lambda x_e \lambda e . NP(x, e)$[6]. The overall analysis is type-driven. It assumes the widely acknowledged modes of semantic composition, e.g. Event Identification (Kratzer, 1996), Predicate Modification, Function Application (Heim & Kratzer, 1998), etc., and the composition sites of the arguments are determined by the arguments' types as well as the availability of the composition modes. Following Huang et al. (2009), DrPs are hypothesized to be syntactic adjuncts inside the $\Theta$P with the following denotation: $[\![DrP]\!] = \lambda Q_{\langle st \rangle} \lambda e . Q(e) \wedge \tau(e) = \textit{n-time} \in D_{\langle \langle st \rangle, \langle st \rangle \rangle}$.

### 4.1.1. Deriving the word orders

Having laid out the framework, we can now derive the type-dependent word orders in (1) and (2). Given the types of Mandarin verbs and non-referential NPs, the NPs can directly compose as the complements to verbs whereas DPs of entity- or quantifier-type cannot due to type mismatch:

(13) Zhangsan mai-le san nian **che** (=(1a))
Zhangsan sell-ASP three year car
'Zhangsan sold cars for three years.'
$[\![mai]\!] = \lambda e . sell(e)$
$[\![che]\!] = \lambda x \lambda e . car(x, e)$
$[\![VP]\!] = \lambda x \lambda e . sell(e) \wedge car(x, e)$
  – via Event Identification[7]
$[\![\Theta]\!] = \lambda x \lambda e . \textsc{Theme}(x, e)$
$[\![\Theta'_1]\!] = \lambda x \lambda e . sell(e) \wedge car(x, e) \wedge \textsc{Theme}(x, e)$
  – via Predication Modification[8]
$[\![①]\!] = \lambda e \exists x [sell(e) \wedge car(x, e) \wedge \textsc{Theme}(x, e)]$
  (Diesing, 1990, 1992)[9]
$[\![san\ nian]\!] = \lambda Q \lambda e . Q(e) \wedge \tau(e) = \textit{three-years}$
$[\![\Theta P]\!] = [\![\Theta'_2]\!]$
$= \lambda e \exists x [sell(e) \wedge car(x, e) \wedge \textsc{Theme}(x, e)] \wedge \tau(e) = \textit{three-years}$



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[6] Under the general interpretations of relations between individuals and eventualities, e.g. the thematic ones, the relations are considered to contribute to what being eventualities means. Therefore, for a $\theta$-role-denoting head like $v^0$ ($[\![v]\!] = \lambda x \lambda e . \textsc{Agent}(x,e)$), the incorporation of this thematic relation into some eventualities amounts to saying that what makes those events events is by virtue of having an agent in them. However, under the type proposal of Mandarin non-referential NPs, I am holding a more relaxed view on what meaning contributions these NPs have to the eventualities they are incorporated into. I am leaving open the issue whether in Mandarin what makes events events is through having a property relation in them (It is very unlikely the case since we can have various kinds of NP objects for a particular verb, and we do not necessarily want to say that the event denoted by the verb needs all those NPs to be an event.). What I intend for the *eventized* denotations of property NPs is that an event must have *something* in it (i.e. participants), and that something can obtain its property information by the direct introduction of a property into an event. Thanks to Ethan Poole for raising this concern on the type of non-referential NPs to me.
[7] Event Identification (Kratzer, 1996):
  f     g     →     h     $\lambda x_e \lambda e_s [f(x)(e) \& g(e)]$
  $\langle e, \langle s, t \rangle \rangle$  $\langle s, t \rangle$     $\langle e, \langle s, t \rangle \rangle$
[8] Predicate Modification (modified):
  $\alpha$     $\beta$     →     $\gamma$     $\lambda x_e \lambda e_s [\alpha(x)(e) \& \beta(x)(e)]$
  $\langle e, \langle s, t \rangle \rangle$  $\langle e, \langle s, t \rangle \rangle$     $\langle e, \langle s, t \rangle \rangle$
[9] The post-DrP non-referential NP syntactically saturates the post-verbal argument position in Mandarin. Hence, Existential Closure is applied to close off the open argument position as soon as $\Theta^0$ specifies the $\theta$-role of the NP.

We have now made the complement position to the main verb the exclusive composition site for property NPs (i.e. non-referential NPs) and accounted for the (un)availability of the word orders in (1a) and (2b). DPs can only compose after $\Theta^0$ has introduced an argument position, putting them in the specifier of the $\Theta$P that is higher than the DrP. The word order in (2a) is then accounted for:

(14) Lisi nian-le **zhe-yi-ben shu** san tian (=(2a))
Lisi read-ASP this-one-CL book three day
'Lisi read this book for three days.'

$[\![\text{nian}]\!] = [\![\text{V'}_1]\!] = \lambda e . \; read(e)$
$[\![\text{san tian}]\!] = \lambda Q\lambda e . \; Q(e) \wedge \tau(e) = \textit{three-days}$
$[\![\text{VP}]\!] = [\![\text{V'}_2]\!] = \lambda e . \; read(e) \wedge \tau(e) = \textit{three-days}$
$[\![\Theta]\!] = \lambda x\lambda e . \; \text{THEME}(x, e)$
$[\![\Theta']\!] =$
$\lambda x\lambda e . \; read(e) \wedge \tau(e) = \textit{three-days} \wedge \text{THEME}(x, e)$
   – via Event Identification
$[\![\text{zhe-yi-ben shu}]\!] = \textit{this book}$
$[\![\Theta P]\!] = \lambda e . \; read(e) \wedge \tau(e) = \textit{three-days} \wedge \text{THEME}(\textit{this book}, e)$



The last word order to account for is the unavailable one in (1b) with a pre-DrP NP. Given the set-up of the current framework, non-referential NPs can in theory compose in Spec.VP or Spec.$\Theta$P via Event Identification and Predicate Modification, respectively, as allowed by their own and their sisters' types in those positions. If the DrP adjoins to V', as is also allowed by its type, we would overgenerate the incorrect word order where the NP precedes the DrP. Therefore, we need an account for the unavailability of property-NP-composition in those positions. Spec.VP would be an unavailable position for property NPs if we hold the view that arguments compose *before* adjuncts (Chomsky, 1981). As in the skeleton of our argument structure below, before DrP-adjunction, there would be no distinction between the complement and specifier position inside the VP, and the position for NP arguments to compose would be next to $V^0$. Later DrP-adjunction consequently puts the DrP higher than the NP:

(15)



As for Spec.$\Theta$P, I inherit Hale & Keyser's (1991, 1993) notions of L- and S-Syntax and Lin's (2001) *Lexicalization Parameter* in hypothesizing the typological variation where languages differ in what part of the above structure they lexicalize as verbs: P-I languages that have property NP objects like Mandarin lexicalize only the verb root $V^0$ whereas non-P-I languages like English lexicalize $\Theta'$ (see its denotation). In other words, $\Theta'$ is the cut-off point between the word-level syntax (L-Syntax) and the syntax proper (S-Syntax)[10]. Syntactic accessibility below $\Theta'$ is language-dependent (non-P-I languages have no access to below $\Theta'$ since the structure below $\Theta'$ is now spelled out as a *word*), and Function Application (FA) is assumed to be the required composition mode in argument positions in the syntax proper, given that all English arguments are of entity- or quantifier-type (Carlson, 1977). This hypothesis restricts the composition mode in Spec.$\Theta$P to FA and excludes the possibility of NP-composition there due to type-mode incompatibility. (1b) is thus accounted for.

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[10] What is adopted from Hale & Keyser (1991, 1993) is only the insight that there are two levels of syntax corresponding to the lexical and syntactic components of a language, not the exact structures per se. Therefore, the cut-off point $\Theta'$ may not reflect the boundary between L- and S-Syntax in their system.

In sum, Comp.V is now the only available position for property NPs (i.e. the P-I position), which explains why P-I NPs are cross-linguistically objects only. Languages like English do not have property NP objects given the inaccessibility to the word-level syntax where properties can be directly introduced into eventualities. The current analysis also explains why Mandarin bare NP subjects are necessarily definite: in order to compose in the subject position above Θ', they have to be ι-shifted to be of type $e$.

### 4.1.2. Deriving P-I properties

Building on the current analysis, we can derive the aforementioned P-I properties. P-I NPs having obligatory narrow scope is a fairly straightforward outcome. Recall the Mandarin example in (5b). Since Existential Closure has to apply not long after NP-composition, it traps the scope of the NPs inside the ΘP. Any scope-bearing elements that are higher than the ΘP will eventually scope over the NPs. The modal and negation in (5b) precede the main verb; that is, they are at least syntactically higher than $v^0$, the assumed landing site of $V^0$. Their taking wide scope with respect to post-DrP NPs is expected.

Deriving number neutrality is a more complicated issue. As Dayal (2011) shows, the number neutral interpretation of Hindi P-I NPs is also aspect-dependent:

(16) anu-ne   *tiin ghanTe meN / tiin ghanTe tak* kitaab paRhii
    Anu-ERG 3  hours  in   3  hours  for book  read-PFV
    'Anu read a book in three hours' = exactly one book            [*Accomplishment*]
    'Anu read a book for three hours' = one or more books            [*Activity*]

Only in atelic aspect, as indicated by *tiin ghanTe tak* ('for three hours') in (16), does the number neutral reading of non-Case-marked *singular* NPs surface. Since Hindi *singular* NPs strictly denote in the atomic domain, in order to get number neutrality out of them and capture the aspectual contrast above, Dayal (2011) resorts to the pluractional operator (OP$_{PA}$) proposed by Lasersohn (1995) that generates *iterativity* of the verbal event. This results in a plurality of events denoted by the verb under atelic aspect, and within each sub-event there is an atomic entity denoted by the NP object. The plurality of events permits the possibilities of having the same or different objects across the sub-events, giving rise to the '*one or more*' interpretation. Telicity, defined over atomic events (Dayal, 2011), resists iterativity (i.e. it is incompatible with OP$_{PA}$); hence, there is only one single event with one single object.

Things are not as clear in Mandarin since Mandarin bare NPs are number-unspecified in nature, i.e. number neutrality in post-DrP NPs could have come from the NPs per se instead of P-I. However, given the following example, I will still argue that number neutrality in Mandarin comes via OP$_{PA}$ as in Hindi:

(17) Zhangsan qu-le     san  nian **laopo**
    Zhangsan marry-ASP three year wife
    'Zhangsan married (different) wives (repeatedly) for three years.'
    #'Zhangsan married a wife (the same one) (repeatedly) for three years.'

The number-unspecified nature of the NP in this example is pragmatically controlled for: (most) social norms, including those in the Chinese culture, restrict the object to being only one a marriage. Yet, the NP in (17) still obtains number neutrality and the verbal event does have an iterative interpretation. Following Dayal (2011), we can implement OP$_{PA}$ in our structure to derive the denotation for (17) (The denotation of OP$_{PA}$ is slightly redefined to fit the current framework):

(18)  $[\![OP_{PA}]\!] =$

$\lambda P_{\langle st \rangle} \lambda E \, [Card(E) \geq 2 \, \wedge$      *Plurality*

$\forall e \forall e' \in E \, [P(e) \, \wedge$      *Event type*

$\neg \tau(e) \circ \tau(e') \, \wedge$      *Non overlap*

$\exists t \, [between(t, \tau(e), \tau(e')) \, \wedge$

$\neg \exists e'' \, [P(e'') \wedge t = \tau(e'')]]]]]$      *Hiatus*

$[\![\Theta'_1]\!] = \lambda e \exists x \, [marry(e) \wedge wife(x, e) \wedge \text{THEME}(x, e)]$

$[\![①]\!] = \lambda E \, [Card(E) \geq 2 \wedge \forall e \forall e' \in E \, [\exists x \, [marry(e) \wedge$

$\quad wife(x, e) \wedge \text{THEME}(x, e) \wedge \neg \tau(e) \circ \tau(e') \, ...]]]$

$[\![san\ nian]\!] = \lambda Q \lambda e \, . \, Q(e) \wedge \tau(e) = three\text{-}years$

$[\![\Theta P]\!] = [\![\Theta'_2]\!] = \lambda E \, [Card(E) \geq 2 \wedge \forall e \forall e' \in E \, [\exists x \, [marry(e) \wedge wife(x, e) \wedge$

$\quad \text{THEME}(x, e) \wedge \neg \tau(e) \circ \tau(e') \, ...]]] \wedge \tau(E) = three\text{-}years$
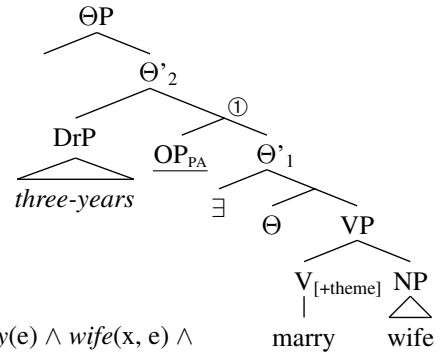


$OP_{PA}$ takes a property of eventualities and returns a plurality of sub-events (*Plurality*), where the property holds true of all the sub-events (*Event type*) which do not temporally overlap (*Non overlap*) and between which there are some time gaps (*Hiatus*). This $OP_{PA}$-generated plurality of events over the *three years*' time leads to the plurality of *wives* (i.e. number neutrality), despite there being only one *wife* per event[11].

    Recall the aspect-sensitivity in P-I NPs' inability of discourse anaphora. It seems to be correlated with number neutrality in that *singular* anaphoric pronouns are unavailable when *singular* P-I NPs, as antecedents, become number neutral in atelic aspect. This would mean that *iterativity* should play a role in discourse anaphora as well. In deriving this P-I property, we will follow Dayal (2011)'s treatment for the anaphora inability in Hindi P-I by attributing it to the *pronoun*'s inability of being temporally subordinated due to their lack of a temporal index. According to Dayal (2011), the anaphoric pronouns can be instantiated as functions from events to individuals, where the P-I NPs they refer to provide the ranges of the functions. Thus, the pronouns in the Mandarin example in (9b) would have the following denotations: $[\![ta]\!] = f_{\mathbf{applicant}}(e); [\![tamen]\!] = f_{\mathbf{applicants}}(e)$. The pronouns' inability of temporal subordination means that they obligatorily scope over $OP_{PA}$ given the structure in (18), when the meaning of (9b) is integrated into that of (9a), in turn leading to the following denotation where the respective pronominal functions take a plurality of events and return '*one*' or '*more than one*' applicant:

(19)  $[\![(9)]\!] = \exists E \, [Card(E) \geq 2 \wedge \forall e \forall e' \in E \, [\exists y \, [interview(e) \wedge applicant(y, e) \wedge Theme(y, e) \, ...]] \wedge$
$\quad \tau(E) = three\text{-}days \wedge Ag(ZS, E)] \wedge \underline{\exists E' \, [\tau(E') \subseteq \tau(E) \wedge ask\text{-}questions(E') \wedge Ag(ZS, E')}$
$\quad \underline{\wedge \, Goal(E') = {}^{\#}f_{\mathbf{applicant}}(\mathbf{E}) \, / \, {}^{\checkmark}f_{\mathbf{applicants}}(\mathbf{E})]}$

The singular pronominal function distributes one individual who is an applicant across a plurality of *question-asking* events, giving rise to a semantic anomaly where the same applicant is the object of repeated question-asking; hence, the badness of singular pronominal anaphora[12].

## 5. Predictions and other P-I languages

    As a general account for P-I, the current analysis predicts strict proximity between P-I NPs and verbs, modulo verb movement or scrambling. Support for this prediction can be found in Turkish, a verb-final language that reflects in the surface order the underlying order of the object and the verb. The following Turkish examples show that Case-marked and bare NP objects differ in proximity with the verb, as well as in interpretation (Özyıldız, 2016):

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[11] Note that the possibility of the object *wife* being the same across all of the *marrying* events is pragmatically ruled out. The NP objects in the Hindi and Mandarin *mouse-catching* examples in (6) and (7) is a similar case.

[12] However, this semantic anomaly is contextually rescuable if we restrict the post-DrP NP in (9a) to being the same applicant across the iterative *interviewing* events by setting up a scenario where only one applicant (any one) is going to be interviewed for three days. The NP can indeed antecede the singular pronoun in (9b) in that case.

(20) a. Ali bira-yı   hızlı *bira-yı içer.        b. Ali #bira hızlı bira   içer.
Ali beer-ACC fast  beer-ACC drinks        Ali beer.∅ fast  beer.∅ drinks
'Ali drinks the beer fast.'               'Ali drinks beer fast.'

In the presence of an adverbial, bare NP objects are non-referential and closest to the verb whereas Case-marked NP objects are necessarily *definite* and higher[13]. This is the exact parallel to the Mandarin case, except for that in Mandarin, verbs move forward and disrupt the proximity on the surface.

Another piece of support can be found in Niuean, a VSO language where VP-fronting is hypothesized (Massam, 2001)[14]:

(21) a. Takafaga **ika** tūmau nī   a   ia        b. Takafaga tūmau nī   e   ia **e**  **tau ika**
hunt     fish always EMPH ABS he        hunt     always EMPH ERG he ABS PL  fish
'He is always fishing                'He is always fishing.'

As shown above, only the non-Case-marked bare NP fronts with the verb, (21a), while the DP with Case- and plural marking stays in-situ, (21b). This outcome naturally follows from our account for P-I NPs since only bare NP objects would be inside the projection of $V^0$ when the projection fronts.

## 6. Summary

This paper argues that there is an NP-DP distinction in the word orders of Mandarin post-verbal arguments, and that this distinction is reflective of the post-verbal NPs being an instance of Pseudo-Incorporation (P-I), based on the hallmark properties of P-I they exhibit. An account resorting to the syntax-semantics interface is proposed to regulate the word order distinction by the arguments' semantic types: only NPs of property type can compose in the lowest position, Comp.V (i.e. the P-I position), while DPs of various types go higher. The proposed account also derives the aforementioned P-I properties and makes attested typological predictions, providing a new point of view on P-I analyses.

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[13] Under our analysis, this would follow from the Case-marked NPs being $\iota$-shifted to being of type *e*, restricting them to composing in Spec.ΘP that is higher than the adverb.

[14] Glosses for Niuean: EMPH = emphatic; ABS = absolutive; PL = plural.

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