Some Notes on Sloppy Identity in Mandarin Sluicing[*]

Ting-Chi Wei

National Kaohsiung Normal University

Based on the three essential properties of sloppy identity, including c-commanding, lexical identity between a *wh*-correlate and a *wh*-remnant, and the *na* 'that' effect, the PF-deletion analysis and the *pro* sluice analysis will be carefully surveyed to see which one is more tenable in explaining the sloppy identity issues in Mandarin sluicing. It is found that only the former with a full-fledged syntactic representation can capture the essence of sloppy identity, except for the strict-reading-only *na*-effect. Comparatively, although the *pro* sluice analysis can easily explain the *na*-effect and can seemingly account for sloppy identity via the unselective binding and the construal of the E-type pronoun, some theoretical problems still arise in the face of the other two traits. Thus, we propose that sloppy identity is regulated by a stricter version of the syntactic requirement between two conjuncts and can be interpreted in virtue of a modified Dependency Theory (Fiengo and May 1994). That is, sloppy identity is one manifestation of the syntactic parallelism deduced from the fully articulated syntactic structure rather than a result of *pro* construal.

Keywords: sluicing, sloppy identity, strict identity, PF-deletion, *pro* sluice analysis

1. Introduction

Linguists who are interested in the issue of sloppy identity almost all pay their attention to the VP-ellipsis (Sag 1976, Williams 1977, Huang 1988a-b, 1991, Fiengo and May 1994, Hoji 1997a-b, 1998, 2003, Otani and Whitman 1991, Kim 1999, etc.). In contrast, very few research focuses on sluicing, except the most extensive studies on sluicing by Merchant (2001).[1] Actually, early in Ross (1969), the so-called sloppy identity has already been preliminarily justified as in (1).

(1) I know how to say I'm sorry, and Bill knows how, too.
 'I know how to say I'm sorry, and Bill knows how to say I'm sorry.'
 (strict)
 'I know how to say I'm sorry, and Bill knows how to say he (=Bill) is sorry.'
 (sloppy)

---

[1] Merchant (2001:8) describes that it is very hard to get sloppy reading in sluicing even with some variations on judgment. This view is opposite to that of Ross (1969).

After that, in favor of PF-deletion, Takahashi (1994:271-272) utilizes strict/sloppy identity in Japanese sluicing to argue against the base-generated *pro* copular analysis (Nishiyama, Whitman, and Yi 1996), which would fail to generate the sloppy reading within its simplex sluice structure, i.e. [*pro/sore* 'it' *wh*-remnant (copular)]. Later, the same structure is interpreted by Kuwabara (1997) as an underlying cleft structure, whose sloppy identity is blocked by the overt pronoun, which replaces a propositional phrase containing a bound variable. From another viewpoint, Fukaya and Hoji (1999) have observed that both case-marked and non-case-marked sluicing in Japanese can give rise to sloppy reading but involve different derivational processes.[2] The former relies on LF-copying analysis (Chung, Ladusaw, and McCloskey 1995, hereafter CLM), while the latter on deep anaphora. The above description reveals that the issue of sloppy identity in Japanese sluicing is still under heated debate. As to Mandarin sluicing, Wang (2002) and Wang and Wu (2006) hold it as evidence to the IP-deletion approach but without providing further elaborations on the issue. On the other hand, under the framework of the *pro* sluice structure, i.e. [*pro* (copular) *wh*-remnant], Adams (2003) rejects the existence of sloppy identity, but Wei (2004) admits that sloppy identity does exist in Mandarin sluicing and further proposes that the derivation of strict and sloppy identity is attributed to the distinction between the nominal *pro* and the event *pro*. Only an adjunct *wh*-remnant anaphoric to event *pro* can generate the sloppy identity, while an argument *wh*-remnant referential to nominal *pro* cannot. However, more new data show that this argument-adjunct asymmetry will face an empirical problem.

We find that in addition to the c-commanding requirement (Ross 1967, Takahashi 1994), there is another cross-linguistic restriction on sloppy identity in sluicing; that is, it hinges on a "lexical" identity between the overt *wh*-correlate and *wh*-remnant, regardless of the types of *wh*-remnants involved, except for the case of "contrast sluice" (Merchant 2001:36) and the *na* 'that' effect (Wei 2004). The former allows sloppy identity even in lack of lexical identity between the *wh*-elements and the latter prohibits it despite its obedience to the lexical consistence. We will show that the "contrast sluice" is not a sluice *per se*; thus, it is not a counterexample to the identity between *wh*-elements for sloppy identity. As to the *na*-effect, it is still analyzed as a sluice due to the fact that *na* is freely present in any sluicing sentences without changes in meaning, except for its impact on the blockage of sloppy identity reading. The three properties, including c-commanding, identity between *wh*-words, and *na*-effect, will be surveyed by the PF-deletion analysis (Takahashi 1994, Merchant 2001, Chung 2005 and Wang 2002) and the *pro* sluice analysis (Adams 2003 and Wei

---

[2] The case-marker on the *wh*-remnant is optional in Japanese. Those with case-markers are called "C(ase)M(arked)-sluicing" and those without "Non-CM-sluicing". The CM-sluicing requires a linguistic antecedent and respects subjacency, contrary to the non-CM-sluicing.

2004) to see which analysis is more tenable in approaching the essence of sloppy identity in Mandarin sluicing.[3]

The survey shows that the PF-deletion analysis can capture the characteristics of sloppy identity with respect to c-commanding and lexical identity apart from the *na*-effect. In contrast, although the *pro* sluice analysis can easily explain the *na*-effect and can seemingly account for sloppy identity via the unselective binding (Cheng and Huang 1996 and Lin 1996) and the E-type pronoun (Evans 1980), a theoretical problem still arises. Hence, we propose that the sloppy identity can be explained by the deletion analysis via a stricter version of the syntactic identity requirement between two conjuncts, requiring that every item in the sluice clause (including the *wh*-remnant) must be identical to an item in the antecedent CP at the level of LF. Meanwhile, we suggest that the sloppy identity can be interpreted via a modified Dependency Theory (Fiengo and May 1994), which makes use of a syntactic dependency relationship along with the two indexical types, α-occurrence and β-occurrence, to regulate the reference of a pronoun in strict/sloppy identity. Finally, we conclude that the sloppy identity is actually a reflection of the syntactic parallelism deduced from the fully articulated syntactic structure rather than a result of *pro* construal, which, however, may be more successful in explaining the *na*-effect and the distribution of *shi*. Therefore, the result of this study implies that sluicing in Mandarin cannot be uniformly dealt with by the same approach as the sloppy identity, since there are still some other issues left unanswered by the PF-deletion analysis, such as *na*-effect, the distribution of *shi* 'be' and left-branching modifier. Since the scope of this paper is limited to the implication of sloppy identity on the derivation of sluicing, we leave the other possibilities open.

The organization of this paper is as follows. Section 2 describes the essential properties of sloppy identity in sluicing. Section 3 surveys the PF-deletion analysis and the *pro* sluice analysis. In Section 4, we compare these two analyses and conclude this work.

---

[3] A reviewer has raised a conceptual or methodological problem concerning the confusing mixture of the terminology, such as PF-deletion, LF-copying and LF-reconstruction, which had not been seriously distinguished in the previous manuscript. To solve this problem, the priority is to clarify the three terms. According to Takahashi (1994) and Tomioka (2008), in the PF-deletion analysis, before SPELL-OUT, a missing IP starts its life in the derivation with full-fledged structure, which later will be elided at PF but remain intact at LF. In contrast, the LF-copying analysis treats the missing IP to be truly empty at the beginning before SPELL-OUT but to be copied from its antecedent at LF (CLM 1995). That is, the two analyses differ in the structures before SPELL-OUT and the mechanisms such as deletion and copying, respectively. As to the LF-reconstruction, it is a term usually used in the LF-copying analyses to denote the process of recovery as in Williams (1977) and Chao (1987). Hence, we decided to strictly distinguish PF-deletion from LF-copying/LF-reconstruction to avoid terminological confusion. In this paper, the PF-deletion analysis is entertained to interpret the sloppy identity in Sluicing. Hence, there will be a fully articulated syntactic structure at the end of the derivation. As for the LF-copying analysis with regard to sloppy identity, I will leave it open for further research.

2. Sloppy identity in sluicing

The sloppy identity in Mandarin sluicing manifests three general properties: (1) c-commanding, (2) lexical identity between *wh*-words, and (3) *na* 'that' effect.

Ross (1967) has proposed that for an elided expression to have the sloppy identity, a pronoun relating to the reading must be c-commanded by its antecedent as in (2a); otherwise, the sloppy identity is voided as in (2b). Takahashi (1994:269) claims that sluicing in Japanese also obeys this restriction, indicating that the sluice clause in both languages contains a hierarchical structure just like the antecedent clause. Sluicing in Mandarin also observes this constraint as in (3).

(2) a. $John_i$ knows **why** he_i was scolded, and Mary knows **why**, too.
   '$John_i$ knows why he_i was scolded, and Mary knows why he_i was scolded.'
   (strict)
   '$John_i$ knows why he_i was scolded, and $Mary_j$ knows why she_j was scolded.'
   (sloppy)
   b. John's mother knows why he was scolded, and Mary's mother knows why, too.
   '$John_i$'s mother knows why he_i was scolded, and Mary's mother knows why he_i was scolded.' (strict)

(3) a. $Zhangsan_i$ bu   zhidao [ta_i **weishenme**   bei   ma], dan $Lisi_j$ zhidao
   Zhangsan not know   he   why   PASS scold but Lisi know
   (shi) **weishenme**.[4]
     be   why
   '$Zhangsan_i$ didn't know why he_i was scolded, but $Lisi_j$ knows why $he_{i/j}$ was scolded.' (strict/sloppy)
   b. [$Zhangsan_i$-de   muqin] zhidao [[ta_i weishenme bei   ma]],
     Zhangsan-POSS mother know   he why   PASS scold
     dan [$Lisi_j$-de   muqin] bu   zhidao (shi) weishenme.
     but   Lisi-POSS mother not know   be   why
   '$Zhangsan_i$'s mother knows why he_i was scolded, but $Lisi_j$'s mother does not know why $he_{i/*j}$ was scolded.' (strict/*sloppy)

Second, we have observed that the derivation of sloppy identity requires "lexical" identity between the overt *wh*-correlate and *wh*-remnant, independent of argument-adjunct distinction. It seems that the matching requirement is a

---

[4] Abbreviations: PASS = passive marker; POSS = possessive marker; Q = question marker; NOM = nominative marker; TOP = topic marker; GEN = genitive marker; ACC = accusative marker; PROG = progressive marker; CL = classifier.

cross-linguistic phenomenon. Take English sluicing for example. The *wh*-adjuncts in (1) and (2a) and the *wh*-arguments in English translations of (5) and (6) obey this restriction. The same situation also occurs in Japanese sluicing as in (4) and (5) concerning a *wh*-adjunct and a *wh*-argument, respectively, (Takahashi's (1994) (11) and (12), in that order). Mandarin sluicing also manifests the same effect as in (3a) for *wh*-adjunct identity and (6) for *wh*-argument identity.[5] Apparently, the example (6) empirically challenges Wei's (2004) claim that sluicing with a *wh*-argument cannot derive sloppy identity.

(4) John-wa [zibun-ga **naze** sikarareta   ka] wakattenai ga,
    John-TOP self-NOM why was scolded Q   not knows but
    Mary-wa [**naze** ka] wakateiru.[6]
    Mary-TOP why   Q   knows
    'John doesn't know why he was scolded, but Mary knows why.' (strict/sloppy)

(5) a. UConn-ga   [soko-no basukettobooru tiinu-ga   **dare-o**   sukautosita ka]
       UConn-NOM   it-GEN basketball   team-NOM   who-ACC scouted   Q
       happyoosita.
       announced
       'UConn announced who its basketball team scouted.'
    b. Duke-mo [**dare-o**   ka] happyoosita.
       Duke-also who-ACC Q   announced
       'Duke announced who, too.' (strict/sloppy)

(6) Zhangsan$_i$ zhidao [**shei** zai   piping ta$_i$], dan Lisi$_j$ bu zhidao shi **shei**.
    Zhangsan know   who PROG criticize him but Lisi not know   be   who
    'Zhangsan knows who is criticizing him, but Lisi$_j$ doesn't know who.'
    (strict/sloppy)

In line with this lexical identity restriction, we can predict that the derivation of the sloppy reading requires the *wh*-antecedent to be overtly present; otherwise, only the strict reading is allowed. In (7) and (8), the *wh*-remnants, *why* and *weishenme* 'why',

---

[5] Hoji (1990) claims that lexical pronouns in Japanese such as *kare* 'he' and *kanojo* 'she' are not bound pronouns and do not permit sloppy reading in the elliptical structures. Essentially, Takahashi (1994) agrees with this view but he further demonstrates that the anaphor such as *zibun* 'self' and the pronominal or deictic expressions such as *sore* 'it', *soko* 'there', *soitu* 'that guy' permit sloppy identity. There is no such distinction in Mandarin.

[6] Takahashi (1994) makes use of the existence of sloppy identity to assimilate Japanese sluicing to English sluicing in terms of IP-deletion account. For other views against this, see Fukaya and Hoji (1999) and Kuwabara (1997).

have merely matrix or embedded strict reading in lack of a sloppy reading when there are no corresponding *wh*-correlates.

(7) John does not know he was scolded, but Mary know why. (strict)

(8) Zhangsan$_i$ bu   zhidao [ta$_i$ bei   ma],   dan Lisi$_j$ zhidao (shi) weishenme.
Zhangsan not know   he PASS scold but Lisi   know   be   why
'Zhangsan$_i$ didn't know that he$_i$ was scolded, but Lisi$_j$ knows why Zhangsan$_i$ was scolded.' (Embedded strict)
'Zhangsan$_i$ didn't know that he$_i$ was scolded, but Lisi$_j$ knows why Zhangsan$_i$ does not know that he$_i$ was scolded.' (Matrix strict)

Note that the strict lexical parallelism of sloppy identity will confine the interpretation of *wh*-remnant within the range of embedded clause. For instance, in (2a) and (3a), the *wh*-remnants only target the embedded scope of strict or sloppy reading instead of the matrix reading. Without *wh*-correlates, the matrix reading is permissible as in (7) and (8). It indicates that the range of strict/sloppy identity is syntactically determined by the existence of the *wh*-correlates.

It follows that once the lexical or categorial parallelism of the *wh*-remnant is lost between two conjuncts, the sloppy reading disappears as well. In (9a) and (10a), the grammatical categories of the two *wh*-remnants are different; in this case, only the strict identity is generated. In (9b) and (10b, c), though the grammatical categories of the *wh*-sluices are similar, they actually differ in lexical form and semantic function. This disparity also suppresses the emergence of sloppy identity.

(9) a. John knows **what** he has done, but Mary wants to know **why**.   (strict)
    b. John knows **why** he was scolded, and Mary wants to know **when**. (strict)

(10) a. Zhangsan$_i$ zhidao [**shei**   zai   piping   ta$_i$], dan Lisi$_j$ bu zhidao (shi)
      Zhangsan know   who PROG criticize him but Lisi not know   be
      weishenme.
      why
      'Zhangsan knows who is criticizing him, but Lisi doesn't know why.' (strict)

    b. Zhangsan$_i$ zhidao [ta$_i$ **weishenme** bei ma], dan Lisi$_j$ bu zhidao (shi)

      Zhangsan know he   why   PASS scold but Lisi not know   be

      (wei-le-)-shenme liyou.

        for-ASP-what   reason

      'Zhangsan$_i$ knows why he$_i$ was scolded, but Lisi$_j$ doesn't know for what reason

      he$_{i/*j}$ was scolded.' (strict)

    c. Zhangsan$_i$ zhidao ta$_i$ yinggai nian **na-yi-ben-shu**,   dan Lisi$_j$ bu

      Zhangsan know him should read which-one-CL-book but Lisi   not

      zhidao (shi) **sheide shu**.

      know   be   whose book

      'Zhangsan$_i$ knows which book he$_i$ should read, but Lisi$_j$ doesn't know whose

      book he$_{i/*j}$ should read.' (strict)

However, we do find some counterexamples which show sloppy identity even if the lexical identity of the *wh*-remnant is violated as shown in (11), a construction which is called "contrast sluice" in Merchant (2001:36). The same phenomenon also happens in English as illustrated in the English translation.

(11) Zhangsan zhidao ta yinggai nian **na-yi-ben-xiaoshuo**, Lisi zhidao (shi)

     Zhangsan know   he should   read which-one-CL-novel Lisi know   be

     na-yi-ben-zazhi.

     which-one-CL-magazine

     'Zhangsan$_i$ knows which novel he$_i$ should read, and Lisi$_j$ knows which magazine

     (he$_{i/j}$ should read).' (strict/sloppy)

We find that the "contrast sluice" is different from the typical sluicing in several ways. First, the *wh*-words of the typical sluicing with sloppy identity generally require the same lexico-syntactic forms, whereas those of the "contrast sluice" basically own the different ones. For example in (6), the two *shei*'s 'who' have the identical forms, questioning "the identity of the person who criticizes him". Similarly, even in (3a), with two identical *wh*-adjunct *weishenme's* 'why', the *wh*-words in question actually refer to the causes of the event, *ta bei ma* 'he is scolded'. By contrast, in (11), the two nominal *wh*-words manifest the different forms; one is *xiaoshuo* 'novel' and the other is *zazhi* 'magazine'. Further, from the notion of contrastive focus, the divergence in the construal of the *wh*-words indicates that there exist two contrasts in (11). One is the contrast between *Zhangsan* and *Lisi*, and the other is the contrast between *na-yi-ben-xiaoshuo* 'which novel' and *na-yi-ben-zazhi* 'which magazine'. The middle field *ta yinggai nian* 'he should read' is missing with only the matrix verb *zhidao*

'know' left. In that sense, the lexical mismatch between the *wh*-words constitutes a natural consequence of contrast. But there is no such contrast in typical sluicing. Given that the "contrast sluice" is actually not a sluicing at all, it implies that any sloppy identity condition on sluicing will not apply to it; that is, the issue is not our concern here. If that is so, the lexical identity of the *wh*-elements for sloppy identity is still maintained in our analysis.[7]

---

[7] A reviewer wonders whether the example such as (i) is a kind of "contrast sluice" with a contrast on *zenmeyang* 'how' and *weishenme* 'why'.

(i) ?? Zhangsan bu   zhidao [ta   zenmeyang   qu Taipei], dan Lisi zhidao [weishenme~~ta qu Taipei~~].
      Zhangsan not know   he how   go Taipei   but Lisi know   why   he go Taipei
      'Zhangsan doesn't know how he goes to Taipei, but Lisi knows why he goes to Taipei.'

In fact, Merchant (2001:36-7) defines "contrast sluice" as a structure containing the focused *wh*-nominals in the argument positions, which are analyzed as variables, making possible the satisfaction of the entailment condition as shown in (ii). (Readers can refer to Note 13 for the definition of Merchant's (2001) Focus entailment condition on IP-ellipsis.)

(ii) a. She has [five CATS]$_F$, but I don't know how many DOGS ~~[$_{IP}$ she has t]~~.
     b. IP$_E$'= $\exists$ x.she has x,   F-clo(IP$_A$)= $\exists$ x.she has x.

In other words, Merchant only concerns the issue of entailment, which is jeopardized by the unparallel contrasts, even if he finds a way out of this dilemma via focus. In fact, he is not concerned with the issue whether *wh*-adjuncts can be focalized. We will try to explain (i) from Merchant's analysis.
    The sentence in (i) is ambiguous with three possible readings as shown in (iii).

(iii) a. Zhangsan doesn't know how he goes to Taipei, but Lisi knows why Zhangsan does not know how he goes to Taipei.
     b. *Zhangsan doesn't know how he goes to Taipei, but Lisi knows why Zhangsan goes to Taipei how.
     c. ??Zhangsan doesn't know how he goes to Taipei, but Lisi knows why Zhangsan goes to Taipei.

As a typical sluice, the reading (iiia) is more preferable than (iiib), which is ruled out due to the illicit multiple *wh*-adjuncts within the embedded elided sluice. The "contrast sluice" reading (iiic) is prohibited, mostly because it violates the entailment condition, which is essential to the licensing of sluicing, as illustrated in (iv). When the two *wh*-adjuncts are focalized in (iva), both clauses fail to entail each other as in (ivb), in contrast to (iib).

(iv) a. Zhangsan bu zhidao [[zenmeyang]$_F$ ta qu Taipei], dan Lisi zhidao[[weishenme]$_F$ ~~ta qu Taipei~~].
     b. IP$_E$'= $\exists$ x.ta qu Taipei by x,   F-clo(IP$_A$)= $\exists$ x.ta qu Taipei for x.

    In fact, Merchant (p.c.) does not relate "contrast sluice" to the issues of sloppy identity, since there is no sloppy identity in English sluicing in his data. In this work, we claim that the entailment condition is only essential to the licensing of sluicing, but not to the derivation of sloppy identity in sluicing, which needs stricter conditions. Hence, the sloppy identity in the non-sluice (11) is not within the scope of this study.
    The reviewer has also pointed out that the strict-reading-only (10c) or (21b) will pose a problem to the interpretation of contrast sluice, especially when *na-yi-ben shu* 'which book' and *sheide-shu* 'whose book' may refer to different entities in the respective argument position. Concerning this problem, I agree with the reviewer's suggestion that the issue of "entity" or "event" should be irrelevant to the discrimination of "contrast sluice" from "typical sluice". Along this vein, the lack of sloppy identity in (10c) and (21b) is attributed to their non-identical lexico-syntactic forms and their non-contrastive nature of the *wh*-words (which book/whose book vs. which novel/which magazine in

Third, we further observe that when *na* 'that' or the definite description *na*-(NumP/ClP) occurs in front of the *wh*-remnant, the strict reading is the only option even if the matching requirement is met. For instance, in (12a), only the embedded strict reading is licit in the case of an argument *wh*-remnant. In (12b), the scope of the strict reading can be embedded or matrix especially when the *wh*-remnant is an adjunct. It is worth noting that the copular *shi* 'be' after *na* 'that' is obligatorily required, being different from the optional *shi* in sluicing as in (10).[8] That is, the presence of the demonstrative *na* will block the sloppy reading. The reason why we still consider (12) as a sluice is due to the fact that *na* can be added to almost any sluicing sentences without change in meaning, except for the blockage of sloppy identity.

(12) a. Zhangsan zhidao ta   yinggai nian **na-yi-ben-shu**,   dan Lisi bu
　　　 Zhangsan know   him   should   read   which-one-CL-book   but Lisi not

　　　 zhidao   na (yi-ben-shu) *(shi) **na-yi-ben**.
　　　 know   that one-CL-book   be   which-one-CL

　　　 'Zhangsan_i knows which book he_i should read, but Lisi_j does not know which book he_{i/*j} should read.' (strict/*sloppy)

　 b. Zhangsan bu   zhidao ta **weishenme** bei   ma,   dan Lisi zhidao
　　　 Zhangsan not know   he why   PASS scold but Lisi know

　　　 na (ge-yuanyin) *(shi) **weishenme**.
　　　 that CL-reason   be   why

　　　 'Zhangsan_i didn't know why he_i was scolded, but Lisi_j knows why he_{i/*j} was scolded.' (Embedded strict/*sloppy)

　　　 'Zhangsan_i didn't know why he_i was scolded, but Lisi_j knows why Zhangsan_i didn't know why he_i is scolded.' (Matrix strict/*sloppy)

In fact, similar phenomenon also occurs in Japanese sluicing. As noted by Takahashi (1994: 271-2), when the sluice clause contains the pronoun *sore* "it" and (optionally) the copula, the sloppy reading is not permitted. Thus, (13) has only strict reading: Mary knows why John was scolded.[9]

---

(11)). In addition, it is possible that the *wh*-words of a contrast sluice may undergo focus movement by SPELL-OUT just as a typical sluice does. Since they involve contrastive focuses, lacking in typical sluices, we will not take them into account in this paper.

[8] In Mandarin sluicing, the copula *shi* 'be' is optional in front of the *wh*-remnants other than *shei* 'who' and *shenme* 'what'. The latter two require its presence.

[9] This paper attempts to consider sloppy identity a common phenomenon across languages such as Mandarin, English, and Japanese. Due to the limit of space, we will only focus on Mandarin and the latter two are left for future research.

(13) John-wa [zibun-ga **naze** sikarareta   ka] wakattenai ga,

John-TOP   self-NOM why was-scolded Q   not knows   but

Mary-wa   [sore-ga **naze** (dearu) ka] wakateiru.

Mary-TOP   it-NOM why   is   Q   knows

'John doesn't know why he was scolded, but Mary knows why it is.'[10]

On the basis of these three properties, we will survey two potential analyses of sluicing, the PF-deletion analysis and the *pro* sluice analysis, to see which one is more tenable. The former is characterized by its fully articulated syntactic structure before SPELL-OUT and at LF and the latter by its simple sluice clause at all levels.

3. Two analyses on the sloppy identity of Mandarin sluicing

3.1 The PF-deletion analysis

The PF-deletion approach proposed by Takahashi (1994) presupposes that the full-fledged representation of the elided IP structure at LF will naturally explain the strict/sloppy identity in English and Japanese sluicing. Even so, it is a pity that he has not explored this issue further. Likewise, as to Mandarin sluicing, the deletion approach adopted by Wang (2002) and Wang and Wu (2006) does not provide any explanation of the issue in question.[11] Below, the three properties of sloppy identity

---

[10] Merchant (2001:120-121) shows that sluicing in English is not equal to "pseudosluicing" for three reasons. First, sluicing can have adjunct remnants and implicit argument remnants, but pseudosluicing cannot as in (i).

(i) a. He fixed the car, but I don't know how/why/when (*it was).
    b. They served the guests, but I don't know what (*it was).

Second, sluicing requires a greatest pitch accent on *wh*-remnant, whereas pseudosluicing on the copula.

(ii) a. Someone gave me a valentine, but I don't know WHO.
    b. Someone KISSED you, and you don't remember who it WAS?!?

Third, sluicing does not permit non-D-linked *wh*-phrases, but pseudosluicing does.

(iii) Someone dented my car last night—
     a. I wish I knew who (*the hell)!
     b. I wish I knew who the hell it was!

To argue against this trend, Nishiyama, Whitman, and Yi (1996) claim that when a demonstrative (e.g. *that*) is in place of *it*, the sentences become legitimate. In this paper, I will take the copular analysis of Mandarin sluicing into account.

(iv) John left, but I don't know why (that is).

[11] The copying approach proposed by Liu (2006) also fails to do so.

in Mandarin sluicing will be checked one by one under the IP-deletion analysis to see if this approach is tenable.[12]

The c-commanding property, requiring that a pronoun relating to the sloppy identity must be c-commanded by its antecedent, is in conformity with the real essence of the IP-deletion analysis. It implies that only when the elided material after *wh*-remnant is fully articulated before SPELL-OUT or at LF can the c-commanding requirement be satisfied. In other words, the derivation of the sloppy reading hinges on a full-fledged hierarchical structure.

The lexical identity property points to the fact that the sloppy identity must be derived under the circumstance that the overt *wh*-correlate and *wh*-remnant is lexically identical. In fact, in terms of parallelism, the PF-deletion analysis requires that every lexical item in the elided IP must be identical to an item in the correlate clause. This idea has been elaborated by Chung (2005) from the Minimalist notion of numeration. Chung argues that the deletion cannot be "merely" constrained by semantic (entailment) conditions alone (Merchant 2001), requiring the nonfocused portions of the antecedent IP and the elided IP to entail each other, mostly because they fail to rule out the prepositional stranding in sluicing as follows.[13]

---

[12] One of the reviewers has pointed out a serious problem concerning the inconsistent judgment of sloppy identity in English Sluicing between Ross (1969) and Merchant (2001, 2008). Merchant makes use of the comparative ungrammaticality in English Sluicing as in (ib) to argue that VP-ellipsis and Sluicing obey an economy constraint, called the MaxElide, regulating that "if ellipsis targets an XP containing an A'-trace, XP must not be properly contained in any YP that is a possible target for deletion". Hence, that is the reason why VP-ellipsis in (ia) is licit, while Sluicing in (ib) is unacceptable.

(i) a. Ben knows who he invited, but Charlie doesn't. (strict/sloppy)
   b. ??Ben knows who he invited, but Charlie doesn't know who. (strict/sloppy)

However, according to Ross's (1969) judgment, such a difference does not exist. Even though we have found that Mandarin does not have such a judgment contrast between VP-ellipsis and Sluicing (like Ross's) and does not obey the MaxElide, yet in Mandarin VP-ellipsis, the existence of the *wh*-correlate plays no role in the derivation of the sloppy identity, unlike that of Sluicing. Thus, we conclude that sloppy identity in Sluicing has nothing to do with that in VP-ellipsis. Since the argument of this scenario is based on a set of disputable data and there exist essential differences between the two structures, to avoid any confusion and the weakening of the main argument, we delete it from the text.

[13] Merchant's (2001) Focus entailment condition on IP-ellipsis is based on the definition of e-GIVEN in (i) and is stated in (ii).

(i) e-GIVENness
   An expression E counts as e-GIVEN iff E has a salient antecedent A and, module $\exists$-type shifting,
   a. A entails F-clo(E), and
   b. E entails F-clo(A).

(ii) Focus condition on IP-ellipsis
   An IP α can be deleted only if α is e-GIVEN.

Take (iii) for example, in which both the correlate clause and sluice clause are mutually entailed as illustrated in (iv). Therefore, the IP-deletion with sluicing is licit in (iii).

(14) a. They're jealous, but it's unclear of who.

　　b. *They're jealous, but it's unclear who.

Chung (2005) claims that "the choice between pied-piping and preposition stranding is not normally thought to have semantic (true-conditional) consequences" (2005:10). Hence, the sluicing examples in the pairs such as (14a) and (14b) ought to be "semantically equivalent". That is to say, under Merchant's semantic conditions, (14b) should be legal as (14a). However, this is not borne out. To compensate for this weakness, in addition to Merchant's entailment condition, she proposes an extra lexico-syntactic requirement as in (15), demanding that "except for the moved interrogative phrase, the lexical items from which the sluice is constructed must be a subset of the lexical items from which the antecedent CP is constructed" and ensuring that "the ellipsis in sluicing involves no "return to the lexicon"" (2005:11). Let's see how it works on (14). Given the PF-deletion approach, at the end of the syntactic derivation, (14) will be represented as in (16).

(15)　Every lexical item in the numeration of the sluice that ends up (only) in the
　　　elided IP must be identical to an item in the numeration of the antecedent CP.

(16) a. They're jealous, but it's unclear [of who [they're jealous --]].

　　b. *They're jealous, but it's unclear [who [they're jealous **of** --]].

In (16a), the items in the numeration of the sluice includes *of*, *who*, *they*, *be*, and *jealous*, three of which end up in the elided IP (*they*, *be*, *jealous*) and are each identical to an item in the numeration of the antecedent CP. Thus, it is licit. In contrast, in (16b), there is an item *of*, which ends up (only) in the elided IP, but which fails to be identical to an item in the numeration of the antecedent CP. Hence, it is out.

　　Remember that what Chung's lexico-syntactic requirement in (15) and Merchant's (2001) entailment conditions on ellipsis regulate is the legitimacy of sluicing, not the licensing of sloppy identity. For instance, (3a) and (8), as reduplicated together in (17), are predicted to be licit, since they satisfy not only (15) but also the entailment condition. In (17a), at the end of the syntactic derivation after overt focus movement,

---

(iii) She loves someone, but I don't know who.

(iv) a. $IP_A' = \exists x$ [she loves x],　　F-clo(IP_E)= $\exists x$ [she loves x]
　　b. $IP_E' = \exists x$ [she loves x],　　F-clo(IP_A)= $\exists x$ [she loves x]

In fact, Chung (2005) adopts Romero's (1998) idea that the antecedent must entail the nonfocused portion of the reduced constituent. That is, she only keeps one half of Merchant's mutual entailment condition but without giving convincing reasons. In this work, we still use Merchant's definitions.

whether the *wh*-correlate *weishenme* 'why' exists or not, every lexical item in the numeration of the sluice that ends up (only) in the elided IP, inclusive of *ta* 'he', *bei* 'PASS', and *ma* 'scold', is identical to an item in the numeration of the antecedent CP. On the other, at the level of LF, as shown in (17b), the antecedent IP entails the elided IP, and vice versa as formulated in (18a, b). It implies that the lexico-syntactic requirement and entailment conditions are only responsible for the licensing of sluicing and that the derivation of sloppy identity in (3a) needs more restrictive constraints to account for the lexical identity property. Otherwise, (3a) and (8) will be undistinguishable.

(17) a. Zhangsan bu zhidao [ta (weishenme$_i$) bei ma], dan Lisi zhidao (shi) weishenme$_i$ [ta -- bei ma].[14]

    b. Zhangsan bu zhidao (weishenme$_i$) [ta (t_i) bei ma], dan Lisi zhidao (shi) weishenme$_i$ [ta t_i bei ma].

(18) a. IP$_A$' = $\exists$ x[ta x bei ma],   F-clo(IP$_E$)= $\exists$ x[ta x bei ma]

    b. IP$_E$' = $\exists$ x[ta x bei ma],   F-clo(IP$_A$)= $\exists$ x[ta x bei ma]

Rooted in the lexical identity between the *wh*-correlate and *wh*-remnant, we propose that sloppy identity relies on a more refined version of identity requirement than (15); that is, every lexical item including the *wh*-remnant in the numeration of the sluice clause must be identical to an item in the antecedent CP as in (19).

(19) Every item in the numeration of the sluice clause (including the *wh*-remnant) must be identical to an item in the numeration of the antecedent CP.

The main difference between (15) and (19) lies in the domain of identity. The former is only within the elided IP, not including the *wh*-remnant, while the latter covers the whole sluice CP clause.

    Let's first check the typical sluicing examples with sloppy identity in (3a) and (6) to see if (19) works. As repeated in (20a, b), every item in the sluice clause including the *wh*-remnants has a parallel counterpart in the correlate clause. In addition, it seems that (19) can also predict that the examples in (10), as reproduced in (21), lack sloppy identity.

(20) a. Zhangsan bu zhidao [ta **weishenme** bei ma], dan Lisi   zhidao (shi) **weishenme**$_i$ [ta t_i bei ma].

---

[14] The trace or lower copy of the moved *wh*-phrase is represented by a dash as in (17).

b. Zhangsan zhidao [**shei** zai piping ta], dan Lisi bu zhidao shi **shei**$_i$ [t$_i$ zai piping ta].

(21) a. Zhangsan$_i$ zhidao [ta **weishenme** bei ma], dan Lisi bu zhidao (shi) (**wei-le)-shenmeliyou**$_j$ [ta t$_j$ bei ma].
'Zhangsan$_i$ knows why he$_i$ was scolded, but Lisi$_j$ doesn't know for what reason Zhangsan$_i$ was scolded.' (strict)

b. Zhangsan zhidao [ta yinggai nian **na-yi-ben-shu**$_i$], dan Lisi bu zhidao (shi) **sheide shu**$_i$ [$_{IP}$ ta yinggai nian t$_i$].
'Zhangsan knows which book he should read, but Lisi doesn't know whose book.' (strict)

c. Zhangsan zhidao [**shei**$_i$ zai piping ta], dan Lisi bu zhidao (shi) **weishenme**$_j$ [**t$_i$** t$_j$ zai piping ta].
'Zhangsan knows who is criticizing him, but Lisi doesn't know why.' (strict)

In (21a), the *wh*-remnant is distinctive from its corresponding *wh*-word in lexical form. It is this lexical mismatch that fails to derive the sloppy identity, even though the entailment conditions are satisfied. By the same token, the divergence in form also causes the two *wh*-words in (21b) to be unable to derive the sloppy identity, despite the satisfaction of entailment conditions. In (21c), the loss of identity between the *wh*-remnant and the *wh*-correlate violates (19). In fact, in this case, the *wh*-trace left by *shei* 'who' is actually unbound in the second conjunct. Generally, the unbound trace would lead to ungrammaticality. However, it is still licit. To solve this problem, Merchant (2001:200-208) makes use of Fiengo and May's (1994) "vehicle change" to explain the similar phenomenon in English by analyzing the *wh*-trace (t$_1$) in the second conjunct in (22a) as an E-type Pronouns *it* in (22b). He assumes that the E-type pronoun can be translated as a variable. Given this, both the variable and the E-type pronoun are realized by the same rule as g(2) within entailment conditions as shown in (22c-d). Thus, the Focus condition is satisfied. By the same token, we propose that in (21c) the *wh*-trace (t$_j$) anaphoric to the *wh*-correlate *shei* 'who' is also an E-type pronoun and that the sentence satisfies the Focus condition as well.

(22) a. The report details [$_{CP}$ what$_1$ [$_{IP}$ IBM did t$_1$]] and [$_{CP}$ why$_2$ [$_{IP}$ ~~IBM did t$_1$t$_2$~~].

b. The report details what$_1$ IBM did and why IBM did it$_1$.

c. IP$_E$' = F-clo(IP$_E$)= IBM did g(2)

d. IP$_A$'= F-clo(IP$_A$)= IBM did g(2)

Merchant himself (2001:207) has noted that his Focus condition is defined on entailments, not on structures: "the set quantified over by the *wh*-phrase (its trace) should be the set picked out by the donkey pronoun in the deleted IP". Along this line, he further concludes that the Focus condition is insensitive to the distinctions between "regular" pronouns and donkey pronouns. From these statements, the reason why (21c) is licit despite its lack of the sloppy identity reading becomes transparent. It is because it satisfies the Focus condition but does not meet the requirement of sloppy identity. Thus, we can deduce the fact that the sloppy identity requires another stricter identity requirement, which should syntactically discriminate the E-type pronoun from the *wh*-correlate *shei* 'who'. It can be concluded that vehicle change, just like lexico-syntactic requirement (15) and Merchant's entailment condition, may be closely related to the licensing of sluicing but is not essential to the emergence of sloppy identity, which requires a stricter lexical parallelism, as will be specified below.

A reviewer kindly pointed out that (19) is not a sufficient condition that can satisfactorily license the sloppy reading, since the example such as (23) may pose a serious problem to it. For the pronominal *ta* 'him' in the sluice clause is not identical to the counterpart *wo* 'I' in the antecedent CP, which is obviously against (19) and is predicted to be short of the sloppy identity. But, contrary to the fact, the sloppy reading does exist.

(23) **Wo** bu   zhidao **wo** weishenme bei   ma,   danshi Lisi zhidao   weishenme
I   not know I   why   PASS scold but   Lisi know   why
(**ta** bei   ma).
he PASS scold
'I don't know why I was scolded, but Lisi knows why he was scolded.' (sloppy)

I propose that this dilemma can be resolved by specifying the nature of the 1st person pronouns and further refining (19). Déchaine and Wiltschko (2002) have argued that the 1st and 2nd person pronouns belong to a different syntactic category from the 3rd person pronouns in English. Their main empirical argument lies in the claim that English 1st and 2nd person pronouns cannot be used as bound variables to admit a sloppy identity reading in VP-ellipsis sentences, unlike the 3rd person pronouns as shown in (24). Nevertheless, Rullmann (2004) is skeptical of this claim and gives empirical evidence to support the fact that the variable use of sloppy reading is indeed possible in English as in (25).

(24) **I** know that John saw **me** and Mary does too.   (strict)

(25) a. I got a question **I** understood, but John didn't.   (strict/sloppy)

    b. I hope that **I** will win, but of course you do too. (strict/sloppy)

    c. I know that John saw **me** but Mary does too.   (strict/sloppy)

Furthermore, the 1st and 2nd person pronouns as bound variables can be strengthened by the example given by Kratzer (1998) in (26), with the proposition that the speaker of the sentence is the only person who has the property λx [x got a question that x understood]. In addition, Rullmann (2004) asserts that the plural pronouns in the bound variable reading in (27a) and (28a) represent a variable ranging over individuals rather than pluralities, which are impossible for a logical reason in (27b) or owing to world knowledge in (28b), respectively.

(26) Only **I** got a question that **I** understood.

(27) a. We *each/all* think **we**'re the smartest person in the world.

    b. #We're the smartest person in the world.

(28) a. Al and I both believed **we** were going to be elected president.

    b. #We were going to be elected president.

From the above argument, we propose that the bound variable use of the 1st pronoun can be applied to the *wo* 'I' in (23). That is to say, the *wo* 'I' and the 3rd pronoun *ta* 'he' in the elided clause are both used as variables at the level of LF. These variables can be bound by the nearest NP subjects to derive sloppy identity as shown in (29).

(29) … [weishenme$_i$ [x t$_i$ bei ma]], … [weishenme$_i$ [x t$_i$ bei ma]]

It means that the requirement of the purely lexical identity in licensing sloppy identity as depicted in (19) has to be modified to cover the identity of the every item, covert or overt, between the correlate clause and the sluice clause at the level of LF as in (30).

(30) Every item in the sluice clause (including the *wh*-remnant) must be identical to an item in the antecedent CP at the level of LF.[15]

---

[15] A reviewer casts doubt on how the lexico-syntactic requirement is satisfied at LF without violating the Interpretability principle on the conditions that after SPELL-OUT, the phonetic features are illegitimate at LF and only the semantic features interpretable at LF remain at LF. Obviously, the reviewer implies that the revised lexico-syntactic requirement in (30) may directly involve the phonetic features and should be dealt with at PF in one way or another. In this paper, we propose that the items with lexical identity are interpreted at the semantic interface, since the LF parallelism

The advantages of this revision are as follows. First, it still retains the ability to explain the deficiency of sloppy identity in (21). In (21a, b), it is the lexical inconsistency between the *wh*-elements in question that violates (30), even though the other members are the same. As to (21c), it is the differences in the *wh*-elements and the number of variables between the two conjuncts that cause the violation of (30) as illustrated in (31).

(31) … [shei$_i$ [t$_i$ zai piping x]], … [weishenme$_j$ [E-type *pro*$_i$ t$_j$ zai piping x]]

Second, (30) can explain why the example in (32) merely contains the strict reading only, which is also raised by one of the reviewers.

(32) Lao Li$_i$ bu zhidao [ta$_k$ weishenme bei   ma], danshi Lao Wang$_j$ zhidao
       old Li not know   he why   PASS scold but   old Wang   know
       [weishenme ta~~$_{k/*i/*j}$~~   ~~bei~~   ~~ma~~].
        why   he   PASS   scold
       'Old Li$_i$ doesn't know why he$_k$ was scolded, but Old Wang$_j$ know why he$_{k/*i/*j}$ was scolded.' (strict)

It follows that (32) confirms to the requirement of (19); therefore, it is predicted to obtain both a strict and a sloppy reading; however, this prediction is not borne out, for (32) denotes only the strict reading. The problem lies in the fact that the pronoun *ta* 'he' here refers to the person other than *Lao Li* 'Old Li' and *Lao Wang* 'Old Wang.' When this kind of discourse "external" reference occurs, it is impossible to have the typical sentence-internal strict or sloppy identity. Here, it reveals that the index of the pronoun seems to play a role in determining the presence or absence of the sloppy identity but (19) fails to predict this distribution in (32). As a matter of fact, we will show that it is the status of pronoun that affects the emergence of sloppy reading rather than the index of pronoun. The latter is a result of the former. We propose that the licensing of sloppy identity in (30) should be adopted instead. Accordingly, in line with Rullmann's (2004) pronominal analysis, the status of pronoun *ta* 'he' can be either a variable or a non-variable deictic pronoun in the logical form. In the case of the variable use of the pronoun, the condition (30) is met as (29) has illustrated; as a result, the sloppy reading is derived. As to the deictic use of the pronoun, when the pronoun *ta* 'he' internally refers to the same person of the correlate pronoun, *Lao Li*,

---

of (30) plays crucial roles in deriving the sloppy identity. In other words, the lexical dependency (Fiengo and May 1994), as will be elaborated below, is interpretable at LF. As to the phonetic interface, it is responsible for the deletion of IP (Merchant 2001). Therefore, the lexico-syntactic requirement will not pose a theoretical or conceptual problem to this analysis.

the internal strict reading is derived. On the other hand, both of them may externally refer to the person other than *Lao Li* and *Lao Wang*. In this case, the external strict reading is generated. In other words, by discriminating status of the pronouns at the level of LF, the problem posed by (32) can be explained.

So far, it is certain that the satisfaction of (30) ensures the possibility of sloppy identity, but how is it specifically interpreted?[16]

Suppose that sloppy identity hinges on the LF parallelism of (30), the sluice structure will be identical to its corresponding clause when the bound variable use of pronoun is at work. Below, we propose that a modified Dependency Theory (Fiengo and May 1994) can be used to explain this phenomenon. The basic notions of Dependency Theory are as follows: (i) An occurrence of an index may be independent of other occurrences or dependent on another. The former is called α-occurrence, and the latter β-occurrence. Hence, pronouns anaphoric on elements outside their phrase markers (the second conjuncts) must bear independent α-occurrences; in contrast, β-occurrences cannot be structurally resolved outside their structures (the second conjuncts). (ii) An indexical dependency *ID* is any triple consisting of a sequence of elements, an index, and a structural description: $<(c^{\alpha}_1, c^{\beta}_2, \dots, c^{\beta}_n), I, SD>$ and (iii) indexical dependencies ID and ID' are *i-copies* iff ID and ID' vary from each other in at most the value of I.[17]

From the above definitions, it follows that the sloppy identity can be derived only when the dependent β-occurrences are licensed in virtue of the identical syntactic relation holding between the elements bearing β-occurrences and their antecedents. Within this paper, the notion of (i) and (ii) will be adopted, while that of (iii) will be merged with (30) to fit the unique properties of sloppy identity in sluicing. Take the

---

[16] To derive strict/sloppy identity, Sag (1976) and Williams (1977) adopt Partee's (1973) Derived VP Rule, in which VP is turned into a lambda notation as in (i). The Variable Rewriting Rule in (ic) makes the sloppy identity possible in (id) by variable binding. In contrast, without the step (ic), the Derived VP rule in (ib) will directly derive strict identity via VP rule in (id) by pronominal reference.

(i) a. John visits his children on Sunday and Bill does too.
    b. Derived VP Rule: John [λx(x visits his children)] and Bill does too.
    c. Variable Rewritting Rule: John [λx(x visits x's children)] and Bill does too.
    d. VP Rule: John [λx(x visits x's children)] and Bill does [λx(x visits x's children)] too.

Since all these analyses are mainly designed for VP-ellipsis and the literature lacks similar analyses on Sluicing, we will try to approach the sloppy interpretation from another direction.

[17] An anonymous reviewer has pointed out that Fiengo and May's (1994) Dependency Theory adopts the reconstruction analysis at the level of LF. In fact, Fiengo and May analyze the elided VP phrases by using reconstruction just like Williams (1977) and Chao (1987). But their notion of reconstruction does not in itself imply any notion of antecedence in terms of "deletion under identity" or "copying" as those of Williams' and Chao's. In their terms (Fiengo and May 1994:192), "reconstruction is an identity condition within the theory of structural representation; it defines what are occurrences of the same phrase marker." That is to say, it is a notion of syntactic dependency relationship, as will be elaborated below.

sloppy identity in (33) for example. The structural description between the antecedent *Zhangsan* and the pronoun *ta* 'he' in the first conjunct is represented as <NP, V, C, NP> in (33a), since the *wh*-word *weishenme* 'why' will move to C position at LF. Obviously, (33a) is identical to that of the second conjunct in (33b) under the full-fledged LF structure of the deletion approach. Further, the indexical dependencies ID and ID' in (33a, b) are considered to be *i-copies*, since they vary from each other in at most the value of *I* (1, 2). At this stage, we speculate that to derive sloppy identity in sluicing, the syntactic-identity requirement in (30) has to be triggered to ensure the syntactic identity of each member between the sluice clause and the antecedent clause as listed in (33c). As a consequence, the licensing of β-occurrence for sloppy identity requires a stricter syntactic dependency at LF. In (33), the modified dependency relationship is licensed to derive the sloppy reading via the indexical type β-occurrences on the bound pronouns *ta* 'he', which requires its indexical value to be anaphoric on either the antecedents *Zhangsan* or *Lisi* in the same conjunct, respectively.[18]

---

[18] A reviewer has pointed out that the modified Dependency Theory cannot guarantee the correct sloppy reading in (i). In addition, it is also unclear why the pronoun *ta* 'him' in the second conjunct cannot be bound by the embedded subject *Lisi*. We suggest that even if the pronoun occurs at the position of object in (i), the sloppy reading can still be derived as follows. The structural description between the antecedent *Zhangsan* and the target pronoun *ta* 'he' in the first conjunct is represented as <NP, V, C, NP, V, NP> in (ia), which is identical to that of (ib). ID and ID' in (ia, b) are considered as *i-copies*, since they vary from each other in at most the value of *I* (1, 2). Finally, to derive sloppy identity in sluicing, the syntactic-identity requirement in (30) has to be triggered to ensure the syntactic identity of each member between the sluice clause and the antecedent clause (ic). As a result, the modified dependency relationship is licensed to derive the sloppy reading via the indexical type β-occurrences on the bound pronouns *ta* 'he', which requires its indexical value to be anaphoric to either the matrix subjects *Zhangsan* or *Wangwu*, respectively. However, the pronoun with β-occurrence cannot refer to the embedded subject *Lisi*, since in Fiengo and May's (1994) model, it is still a pronoun, not a variable, even though in a sense, the indexical type β-occurrence is just like a bound variable use (cf. Sag (1976) and Williams (1977)). Thus, to avoid violating Binding Principle B, it cannot be bound with the embedded subject *Lisi*.

(i) Zhangsan$_i$ bu zhidao Lisi$_j$ weishenme piping   ta$_{i/*j}$, dan Wangwu$_k$ zhidao weishenme ~~Lisi$_j$~~
   Zhangsan not know Lisi why   criticize him but Wangwu know why   Lisi
   ~~piping   ta$_{k/*j}$~~.
   criticize him
   'Zhangsan$_i$ didn't know why Lisi$_j$ criticized him$_{i/*j}$, but Wangwu$_k$ knew why Lisi$_j$ criticized him$_{k/*j}$.'
   a. ID = <(Zhangsan, ta), 1, <NP, V, C, NP, V, NP>>
   b. ID' = <(Wangwu, ta), 2, <NP, V, C, NP, V, NP>>
   c. The sloppy identity condition (30) is satisfied.

(33) Zhangsan$_1$ bu zhidao [ta$^\beta_1$ **weishenme** bei ma], dan Lisi$_2$ zhidao [(shi)
weishenme$_j$ [ta$^\beta_2$ t$_j$ bei ma]]. (sloppy)
   a. ID = <(Zhangsan, ta), 1, <NP, V, C, NP>>[19]
   b. ID' = <(Lisi, ta), 2, <NP, V, C, NP>>
   c. The sloppy identity condition (30) is satisfied.

In addition, the sentence can also ambiguously make use of independent
α-occurrence to derive the strict reading as in (34). In the sense of Fiengo and May's
(1994) interpretation, the sluice clause will be realized as a reconstruction of IP;
however, given PF-deletion, it is a full-fledged structure derived by merging. The
strict reading is considered a result of pronominal reference via α-occurrence, which
is anaphoric on elements outside the second conjunct. In this case, the pronoun *ta* 'he'
is anaphoric to its antecedent *Zhangsan* in the first conjunct.

(34) Zhangsan$_1$ bu zhidao [ta$^\alpha_1$ **weishenme** bei ma], dan Lisi$_2$ zhidao [(shi)
weishenme$_j$ [ta$^\alpha_1$ t$_j$ bei ma]]. (strict)

When the lexical mismatch occurs as in (21), the lexico-syntactic dependency
relationship of β-occurrence fails to be achieved, as shown in (35). In (35a), (30) is
violated due to the lexical variation in *wh*-words, even if the syntactic dependency is

---

[19] In (33), the second conjunct differs from the first one in that the former contains negation *bu* 'not'.
As a reviewer has pinpointed, are these two *SD*'s still identical? Fiengo and May (1994:52) define
the structural description *SD* as specifying "the structure that connects the elements that bear
occurrences of the index". In line with the notions originally defined by Chomsky (1955), they let a
structural description *SD* be an ordered string <*term$_1$*, *term$_2$*, …, *term$_n$*> and let a phrase marker *P* be
a set of *n*-ary linear factorizations, <*category$_1$*, *category$_2$*, …, *category$_n$*>. Then a factorization *F* of
P satisfies *SD* if and only if *category$_1$* is a *term$_1$*, *category$_2$* is a *term$_2$*, …, *category$_n$* is a *term$_n$*.
Further, they let a part of a factorization *F* be any contiguous substring of factors <*category$_i$*, …,
category$_j$> of *F*. The indexical dependencies are linked to structures by the following definition: A
phrase marker *P* realizes an indexical dependency *ID* if and only if:

(i)   for some *f*, *f* part of a factorization *F* of *P*, *f* satisfies *SD* of *ID*.

(ii) the factors of *f* bearing *I* of *ID* are (c$^\alpha_1$, c$^\beta_2$, …, c$^\beta_n$), the elements of *ID*,

(iii) there is no *f'* for which (ii) holds that has fewer factors than *f*.

When the β-occurrences are structurally resolved, the definition is as follows: c$^\beta_i$ is *resolved* in *P* if
and only if c$^\beta_i$ is an element of an *ID* realized in *P*.
   From the above definitions, it seems that they have not taken the structures such as negation
into account. This can be reconfirmed by the representations of (iv) (p.169). In (ivd), there is also
no place for negation.

(iv) a. Max$_1$ thinks he$^\beta_1$ is strong, Oscar$_2$ thinks he$^\beta_2$ is strong, but his$^\alpha_2$ father doesn't think he$^\beta_2$ is
       strong.
    b. <(Max, he), 1, <NP, V, NP>>
    c. <(Oscar, he), 2, <NP, V, NP>>
    d. <(his, he), 2, <NP, N, V, NP>>

satisfied. Likewise, in (35b), although the *wh*-words with the same indexical value refer to the same entity and the syntactic dependency is satisfied, their lexical forms differ, defying (30). As to (35c), the difference in the syntactic form of the *wh*-elements also violates (30), making β-occurrence impossible. For all these cases, only the independent α-occurrence is allowed to derive the referential strict reading.[20]

(35) a. Zhangsan$_1$ zhidao [ta$^{\alpha}_1$ **weishenme** bei ma], dan Lisi$_2$ bu zhidao (shi) (**wei-le)-shenmeliyou**$_j$ [ta$^{\alpha}_1$ t$_j$ bei ma]. (strict)

   b. Zhangsan$_1$ zhidao [ta$^{\alpha}_1$ yinggai nian **na-yi-ben-shu**$^{\alpha}_2$], dan Lisi$_3$ bu zhidao (shi) **sheide shu**$^{\alpha}_2$ [ta$^{\alpha}_1$ yinggai nian t$_2$]. (strict)

   c. Zhangsan$_1$ zhidao [**shei**$_2$ zai piping ta$^{\alpha}_1$], dan Lisi$_3$ bu zhidao (shi) **weishenme** [t$_2$ zai piping ta$^{\alpha}_1$]. (strict)

    Finally, as to the property of *na* 'that' effect, the fact that the occurrence of *na* 'that' in front of the *wh*-remnant hinders sloppy identity poses a serious problem to the PF-deletion analysis, since it is impossible to have the sequence [*na (yi-ben-shu) shi na-yi-ben*] 'which book is that' reconstructed in the sluice clause and paralleled in the antecedent clause, violating the syntactic parallelism (Fox and Lasnik 2003) as shown in (36). It implies that the hindrance of sloppy identity of the *na*-effect cannot be explained by the deletion approach. It may belong to another kind of sluicing structure.

---

[20] Since the lst person and the 2nd person pronoun can be used as bound variables (Rullmann 2004), which can be bound by the nearest NP subjects to derive sloppy identity, one of the reviewers points out that the sentence in (i) may pose a problem to this analysis. More specifically, these two pronouns are β-occurrences and under the lexico-syntactic requirement, (i) should be predicted to have sloppy identity, contrary to the fact.

(i) Zhangsan zhidao wo$^{\beta}$ weishenme bei   ma,   dan Lisi bu   zhidao weishenme ~~wo$^{\beta}$ bei   ma~~.
    Zhangsan know I   why   PASS scold but Lisi not know why   I   PASS scold
    'Zhangsan knows why I was scolded, but Lisi doesn't know why I was scolded.'

Even though (i) satisfies both Chung's lexico-syntactic requirement and Merchant's e-GIVENness condition, we still do not think that the *wo*'s 'I' here can be β-occurrences, bound by the nearest subject *Zhangsan* and *Lisi*, respectively. From (25)-(28), we can easily observe that the variable use of the lst person and the 2nd person pronoun requires their antecedents to have the same person value. That is, this variable function is strictly antecedent-dependent in the sense of person-to-person consistency or feature-checking. Thus, the 3rd-to-lst person pairing in (i) does not conform to this requirement and contributes to its lack of sloppy identity.

(36) *Zhangsan zhidao [ta   yinggai nian na-yi-ben-shu],   dan   Lisi bu zhidao
     Zhangsan know   he   should   read which-one-CL-book but   Lisi not know
     na (yi-ben-shu) *(shi) na-yi-ben   [~~ta   yinggai nian   t~~].
     that one-CL-book   be   which-one-CL   he   should   read
     'Zhangsan$_i$ knows which book he$_i$ should read, but Lisi$_j$ does not know which
     book he$_{i/*j}$ should read.' (strict/*sloppy)

In brief, the deletion approach can successfully account for the c-commanding and lexical identity of sloppy identity in Mandarin sluicing, but it fails to explain the *na*-effect. Below, we will turn to the *pro* sluice analysis (Adams 2003, Wei 2004) to see how it works.

3.2 The *pro* sluice analysis

Since Adams's (2003) *pro* sluice analysis does not recognize the existence of sloppy identity in Mandarin sluicing, we will only focus on Wei's (2004) base-generated sluice clause analysis, [*pro* (*shi*) *wh*-remnant], in which the sluice is simply composed of a subject *pro* and a predicate, (*shi*)-*wh*-remnant. The *pro* can be analyzed as a nominal *pro* or an event *pro*, depending on the nature of *wh*-remnant. *Wh*-argument is predicated of nominal *pro* and *wh*-adjunct is predicated of event *pro* as in (37a, b), respectively. He further asserts that only *wh*-adjuncts anaphoric to event *pro* can generate the sloppy identity, while *wh*-arguments referential to nominal *pro* cannot. Obviously, the second part of this claim has already been falsified by (37a).

(37) a. Zhangsan$_i$ zhidao [shei   zai   piping   ta$_i$], dan Lisi$_j$ bu zhidao [*pro* shi
        Zhangsan know   who   PROG criticize him but Lisi not know   be
        shei].
        who
        'Zhangsan knows who is criticizing him, but Lisi$_j$ doesn't know who.'
        (strict/sloppy)
     b. [Zhangsan$_i$ bu   zhidao [ta$_i$ *weishenme* bei   ma]], dan Lisi$_j$ zhidao
         Zhangsan not   know   he   why   PASS scold but Lisi know
        [*pro* (shi) *weishenme*].
              be   why
        'Zhangsan$_i$ didn't know why he$_i$ was scolded, but Lisi$_j$ knows why he$_{i/j}$ was
        scolded.' (strict/sloppy)

Starting from the first c-commanding property, it is obvious that the *pro* sluice analysis can not faithfully verify this requirement due to its simplex structure within sluice clause. Second, how can this analysis account for the lexical identity between *wh*-correlate and *wh*-remnant? We suggest that the unselective binding analysis (Heim 1982, Nishigauchi 1990, Tsai 1994, Cheng and Huang 1996, and Lin 1996) and E-type pronoun analysis (Evans 1980, Tomioka 1999) may be the candidates. The former ensures the satisfaction of lexical matching requirement, and the latter derives sloppy identity. Given the *pro* sluice analysis, the structure of sluicing in question can be simply illustrated as below.

(38) … [*Wh*$_i$…], … [*pro*…*Wh*$_i$]

The sloppy identity relies on the lexical identity between the *wh*-correlate and *wh*-remnant. From the point of view of syntactic parallelism, the identity is hard to acquire under the simplex sluice analysis. However, it is reminiscent of an unselective binding analysis in dealing with Mandarin bare conditional clause, which requires a necessity operator, denoting the force of a universal quantifier, to bind the two *wh*-indefinite variables simultaneously as illustrated in (39a, b) (Cheng and Huang 1996 and Lin 1996). The two *wh*-variables must be uniform in surface form; otherwise, bare conditionals are disallowed. By analogy, the lexical identity in (3a) and (6) can be rewritten in (39c), showing that unselective binding may be a prerequisite of sloppy identity. The two identical *wh*-words are bound by an existential closure (Heim 1982 and Diesing 1992), not a universal quantifier due to the uniqueness in sluicing. Thus, we can predict that the example (10) lacking lexical identity between *wh*-words will show the strict reading only due to its failure to apply the unselective binding.[21]

(39) a. **Shei** xian lai,   **shei** xian chi.
       who first come   who first eat
       'If X comes first, X eats first.'
    b. NEC$_x$ [x comes first] [x eats first]
       Q$_x$ restriction   nuclear scope
    c. [OP($\exists$ x)$_i$[…….[x_i……]], [….[*pro*….x_i]]]

Moreover, the unselective binding can explain why the scope of interpretation is only confined within the embedded clause when sloppy reading is deduced, for the variable in the first conjunct only ranges over the embedded clause; hence, it is

---

[21] We will evaluate the drawbacks of this analysis in Section 4.

impossible to have matrix reading in the case of "donkey sluicing". Besides, this approach ensures that in donkey sluicing the *wh*-correlate has to be overt and be lexically identical to the *wh*-remnant, respecting the Revised Version of the Parallelism Constraint on Operator Binding (PCOB) proposed by Cheng and Huang (1996).

(40) Revised PCOB

In a tripartite structure of quantification Q[A][B], $[X_1, X_2, \ldots, X_n]$ (where $n \geq 1$) are variables in A. For every variable in A, there must be an identical variable in B.

Under Revised PCOB, both the *wh*-correlate and *wh*-remnant are located in restrictive clause and nucleus scope, respectively, and are required to be overt and identical in form. Once the lexical matching requirement is lost, the structure in question will not be counted as a parallel "donkey sluicing" because of the failure of unselective binding. In this case, the *pro*, now realized as either event *pro* or nominal one, seems to dominate the interpretation in sluicing. The *pro* in (37b), an event one, can refer to the embedded event argument or relate to the whole event. The *pro* of (37a), a nominal one, is supposed to refer to the previous NP-antecedent. Note that all the nominals in front of *pro*, including the matrix subject *Zhangsan*, *shei* 'who', *ta* 'he' and even the matrix subject of the second conjunct *Lisi*, are not the appropriate NP-correlates, mostly because of the anomaly caused by the coreference. Though unselective binding might ensure the matching requirement in donkey sluicing, it cannot give rise to sloppy identity; to be worse, the construal of *pro* is also problematic in deriving the sloppy reading.[22]

Therefore, in addition to the requirement of lexical identity, we can further assume that the *pro* is actually an E-type *pro*, being responsible for the derivation of sloppy identity. As we have seen above, the identity of *pro* as being nominal or eventive fails to explain the phenomenon of sloppy identity. What is the identity of *pro* in this case? In the *pro* sluice analysis, *pro* is the subject of the following *wh*-predicate, which, along with the *wh*-correlate in the first conjunct, is bound by an existential operator simultaneously via unselective binding. Through predication or agreement, the *pro* is anaphoric to the following *wh*-remnant, which is further bound by the operator coupled with *wh*-correlate. That is, the complex chain [wh_i, pro_i, wh_i] enables the *pro*

---

22 Lin (1996) observes that bare conditionals tolerate *wh*-adjuncts except *weishenme* 'why'. Interestingly, Mandarin sluicing allows almost all adjuncts except *zenme(yang)* 'how', which particularly needs verbal support, differing from the other *wh*-elements. Additionally, the sluicing data are episodic (uniqueness) and close to the one-case bare conditional (Kadmon 1987) in this respect.

to refer to the antecedent *wh*-correlate (variable). In this case, *pro* as a pronominal element might have two possible interpretations: (i) an empty pronoun, and (ii) a null E-type pronoun.

The first possibility can be ruled out by the various studies of Weak Crossover Effect, including Chomsky's (1976) "Leftness Condition", Higginbotham's (1980) "Accessibility Condition", and other different formulations by Koopman and Sportiche (1982) (Bijection principle), Safir (1985), etc. In line with Cheng and Huang (1996), this option is excluded via the Higginbotham's Accessibility Condition, regulating that a pronoun can take a variable as its antecedent only if the variable is *accessible* to it. The accessibility is defined as below.

(41) A is accessible to B iff
     a. A is an empty category strongly accessible to B or
     b. A is an empty category whose container $\gamma B(A)$ is accessible to B; or
     c. A is not an empty category, and for some C, A is coindexed with C and C is accessible to B, where strong accessibility is defined as follows:
     A is strongly accessible to B iff
     (i) A is an empty category that c-command B; or
     (ii) A is not an empty category, and for some C, A is coindexed with C and C is strongly accessible to B.

As shown in (39c), even though the pro(nominal) indirectly coindexes with the *wh*-variable in the antecedent clause via predication and complex chain binding, it still does not conform to the Accessibility Condition. The *wh*-word in donkey sluicing is not accessible to the pronoun in the second conjunct, first because it does not c-command the pronoun, and secondly because none of its containers (e.g., the antecedent clause) is accessible. The antecedent clause is not accessible because it is not an empty category and is not coindexed with any empty category (C). Therefore, *pro* as an empty pronoun in donkey sluicing violates the phenomenon of Weak Crossover. Accordingly, when the overt pronoun *ta* 'him' in (42) occurs, the strict/sloppy identity can be ruled out by the same token.

(42) Zhangsan zhidao [shei zai   piping   ta], dan Lisi bu zhidao **ta** shi shei.
     Zhangsan know   who PROG criticize him but Lisi not know   he be who
     'Zhangsan$_i$ knows who$_k$ is criticizing him$_i$, but Lisi$_j$ doesn't know who he$_{*i/*j/k}$ is.'

The second possibility is the null E-type pronoun. Posited that unselective binding is active in donkey sluicing, the E-type *pro* seems to be ruled out for it also falls

within the scope of related operator, which binds the *wh*-remnant at the same time. Here along the vein of Chierchia (1992), it can be postulated that the unselective binder, a polyadic quantifier, always binds the same n-tuples of variables in its restriction and scope, respectively. In other words, once the operator is satisfied, it has no effects on the E-type *pro*, which unlike pronouns can independently exert its function within donkey sluicing. If E-type *pro* analysis is on the right track, donkey sluicing is expected to pass the tests provided by Evans (1980) and Cheng and Huang (1996); one is the negative quantifier, *meiyou* 'have not' test and the other indefinite *you* 'have' test.

Evans (1980) asserts that an E-type pronoun cannot refer to a negative quantifier, such as *no one*, *nobody*, etc. as in (43a). It seems that Mandarin donkey sluicing shows the same effect as in (43b), which resembles the E-type pronoun analysis in *Ruguo*-conditionals in (43c) (Cheng and Huang 1996). Moreover, in (43d), when the same negative quantifier appears in front of NP-correlate, the sentence is still out, indicating that the effect may be a general phenomenon in Mandarin sluicing.

(43) a. *No* congressmen admire Kennedy, and they are very junior.
   b. *Zhangsan$_i$ zhidao [*meiyou   shei* zai   piping ta$_i$], dan Lisi$_j$ bu
      Zhangsan know   not-have who PROG criticize him but Lisi   not
      zhidao *pro* shi   *shei*.
      know   be   who
      'Zhangsan knows no one is criticizing him, but Lisi doesn't know who the one that is criticizing Zhangsan is.'
   c. *Ruguo meiyou   shei   ma   ni,   ni   jiu jiao ta   lai   jian wo.
      if   not-have who   scold you you   then call him/her come see   me
      'If no one scolds you, then you ask him/her to come see me.'
   d. *Zhangsan$_i$ zhidao [*meiyou*   ren   zai   piping ta$_i$], dan Lisi$_j$
      Zhangsan know   not-have person PROG criticize him but Lisi
      bu zhidao *pro* shi *shei*.
      not know   be who
      'Zhangsan knows there is no one criticizing him, but Lisi doesn't know who the one that is criticizing Zhangsan is.'

In addition, the existential verb/marker *you* 'have' can appear in the antecedent clause in (44a), showing that the first *wh*-antecedent, as an indefinite quantifier, has been satisfied within the tripartite structure, just like Cheng and Huang's (1996) analysis of *dou/ruguo*-conditionals in (44b). This gives evidence to the assumption that the *pro* is an E-type pronoun, being able to refer to a non-c-commanding

wh-correlate. Note that when *you* 'have' is inserted in front of *wh*-correlate, the sloppy reading disappears; that is, the sentence in question is not the donkey sluicing, which requires identical *wh*-elements in both restrictive and nucleus clause according to Revised PCOB. Here, *shei* 'who' in (44a) is interpreted as an indefinite *wh*-word 'someone', not an interrogative, which along with (43d) implies that the nominal *pro* is actually an E-type *pro*.

(44) a. Zhangsan$_i$ zhidao [*you*   *shei* zai   piping ta$_i$], dan Lisi$_j$ bu zhidao
       Zhangsan know   have who PROG criticize him but Lisi   not know
       pro shi *shei*.
          be   who
       'Zhangsan knows who is criticizing him, but Lisi doesn't know who the one that is criticizing Zhangsan is.'

    b. Ruguo you   shei qiao   men, ni   jiu jiao ta   jin-lai.
       if   have who knock door you then ask him/her come.in
       'If someone knocks on the door, you'll ask him/her to come in.'

Given the E-type pronoun analysis coupled with unselective binding, how is the strict/sloppy identity derived? Take (6) for example, as reinterpreted in (45a). We propose that the definite description of the donkey *pro* will be realized as [the one [who is criticizing *x*]]. The variable *x* can refer to the matrix subject in the first conjunct, *Zhangsan*, deducing strict reading, or the index of *x* is left unspecified and is coindexed with *Lisi*, the matrix subject in the second conjunct, giving rise to sloppy reading.[23] Note that E-type *pro* does not only relate to previous *wh*-variable, but also

---

23 The idea of blank index is similar to Tomioka's (1999:231) LF identity in dealing with the derivation of sloppy reading within VP ellipsis construction, which prohibits an elided VP and its antecedent VP from having different lexical material except for possible differences in indices. However, such analysis may run into a problem of generating some unexpected interpretations, for instance, with x referring to persons other than the matrix subjects in the first and second conjunct. To solve this problem, Tomioka adopts Rooth's (1985, 1992a,b) Focus Constraint on VP ellipsis. The main idea is that focusing will elicit "a set of alternatives" to the meaning of the focused element. Below, Rooth defines the contrastiveness in VP ellipsis by using focus semantic values.

  (i) a. A phrase dominating an elided VP must contrast appropriately with a phrase dominating the antecedent VP.
     b. A constituent α contrasts appropriately with a constituent β iff for all g:
       (i) $[[α]]^g \neq [[β]]^g$ and
      (ii) $[[α]]^g$ is a member of the focus semantic value of β (i.e., $[[β]]^{f,g}$) with respect to g.

  I suggest that this analysis may apply to the sloppy identity in Mandarin sluicing. For example, within (6), the contrastive element *Lisi* in the second conjunct assumes the prosodic prominence and is marked with the focus feature F in (ii).

  (ii) . . . dan   [Lisi]$_F$ bu   zhidao [E-type pro{the one that is criticizing him} shi shei.]
          but   Lisi   not know   be who

the event associated with *wh*-variable. Likewise, the donkey sluicing in (3a) is interpreted in (45b).

(45) a. Zhangsan$_i$ zhidao [shei zai   piping ta$_i$], dan Lisi$_j$ bu zhidao [E-*pro*
       Zhangsan   know   who PROG criticize him but Lisi   not know
       shi   shei].
       be   who
       'Zhangsan$_i$ knows who is criticizing him$_i$, but Lisi$_j$ doesn't know who the one
       that is criticizing him$_{i/j}$ is.' (strict/sloppy)

   b. [Zhangsan$_i$ bu zhidao [ta$_i$ weishenme bei   ma]], dan Lisi$_j$ zhidao
       Zhangsan not know   he why   PASS   scold but Lisi   know
       [E-*pro* (shi) weishenme].
              be   why
       '(lit.)Zhangsan$_i$ didn't know why he$_i$ was scolded, but Lisi$_j$ knows why the
       event that he$_{i/j}$ was scolded occurred.' (strict/sloppy)

So far, unselective binding and E-type pronoun analysis seemingly can cooperate to interpret donkey sluicing. The former monitors *wh-to-wh* lexical correspondence, overt antecedent requirement, and embedded scope requirement, while the latter encodes the derivation of sloppy identity. Accordingly, only the formation of the

---

In the LF representation (ii), the pronoun *him* has no index, failing to be interpreted. Here, there are four possibilities as shown in (iii), which lead to four different focus semantic values as in (iv). Here, I will follow Tomioka's (1999:232-33) re-interpretation of Rooth focus condition by taking the indexing of trace and pronoun achieved by QR-raising as one of the alternatives, which essentially differs from Rooth's in-situ interpretation approach for focus, as pointed out by one of the reviewers.

(iii) a. [Lisi]$_{F2}$ [t$_2$ does not know [who the one that is criticizing him$_2$ is]]. (QR-raising)
     b. [[Lisi]$_{F2}$ does not know [who the one that is criticizing him$_2$ is]].
     c. [[Lisi]$_{F2}$ does not know [who the one that is criticizing him$_{1(Zhangsan)}$ is]].
     d. [[Lisi]$_{F2}$ does not know [who the one that is criticizing him$_5$ is]].

(iv) a. {p: ∃x [P = that x does not know who the one that is criticizing x is]}
     (sloppy reading)
     b. {p: ∃x [P = that x does not know who the one that is criticizing Lisi is]}
     c. {p: ∃x [P = that x does not know who the one that is criticizing Zhangsan is]}
     (strict reading)
     d. {p: ∃x [P = that x does not know who the one that is criticizing Laowang is]}

In (iii) and (iv), the denotation of the first conjunct cannot be regarded as a member of (b) and (d), unlike (a) and (c), which derive sloppy and strictly reading, respectively. The analysis is parallel to Tomioka's analysis on VP-ellipsis. Sluicing also requires two-tier conditions: one condition on the LF identity and the other on the focus structure of the constituents. Indices on pronouns are not subject to the LF identity condition, and any illegal indexing is filtered out by the focus condition.

triplet chain [wh$_i$, pro_i, wh$_i$] can guarantee the sloppy identity. The sluices lacking it such as (8) and (10) cannot produce the target reading.

Unsurprisingly, *na* 'that' as a hindrance of sloppy identity can get a better account under *pro* sluice analysis than the IP-ellipsis account mainly because of the similar simplex subject-predicate structure. *Na* is always followed by the copular *shi* 'be', an identification verb, linking both the subject and complement. Besides, *na* is only anaphoric to the previous nominal or event-related adjunct due to its strong referential properties. Structurally, the demonstrative *na* always precedes an omitted NumP or ClP, which is actually the 'core' of *wh*-antecedent, for example, *yi-ben-shu* 'a book' in (46a) and *ge-yuanyin* 'a reason' in (46b). Functionally, the whole [*na* [N̶u̶m̶P̶/̶C̶l̶P̶]] pairs with nominal *pro* or event *pro*. In (46a), *na* refers to the nominal *wh*-correlate *na-yi-ben-shu* 'which book', while in (46b) it ambiguously relates to either matrix event or embedded event, deducing the matrix or embedded strict reading.

(46) a. Zhangsan zhidao ta   yinggai nian *na-yi-ben-shu*,   dan Lisi bu
      Zhangsan know him should read which-one-CL-book but Lisi not
      zhidao [na   (y̶i̶ ̶b̶e̶n̶ ̶s̶h̶u̶)] *(shi) *na-yi-ben*.
      know   that one-CL-book   be   which-one-CL
      'Zhangsan knows which book he should read, but Lisi doesn't know which book that is.'

    b. [Zhangsan$_i$ bu   zhidao [ta$_i$ *weishenme* bei   ma]], dan Lisi$_j$ zhidao
       Zhangsan not know he   why   PASS scold but Lisi   know
      [[na (g̶e̶ ̶y̶u̶a̶n̶y̶i̶n̶)] *(shi) *weishenme*].
        that CL-reason   be   why
      'Zhangsan doesn't know why he is scolded, but Lisi knows why Zhangsan is scoleded.' (Embedded strict)
      'Zhangsan doesn't know why he is scolded, but Lisi knows why Zhangsan doesn't know why he is scolded.' (Matrix strict)

To summarize, the *pro* sluice analysis gives some accounts on the *na* effect and the lexical correspondence, but it fails to identify the c-commanding effect.

4. Concluding remarks

In the literature, strict/sloppy identity in Mandarin sluicing has not been seriously debated in comparison with the abundant research on that of the VP-ellipsis. In this paper, we have tried to investigate the derivation of sloppy identity from the

perspectives of the two popular solutions on sluicing, the PF-deletion analysis and the *pro* sluice analysis, and obtain the following results.

(47)

	C-commanding	*Wh-Wh* identity	*Na* effect
PF-deletion	yes	yes	no
Pro sluice	no	yes?	yes

As tabulated in (47), neither the deletion analysis nor the *pro* sluice analysis can justify all the issues concerning the sloppy identity in Mandarin sluicing. However, with careful scrutiny, we find that the weakness of the deletion account is merely on the *na*-effect, the simplex structure of which is obviously distinctive from the fully represented structure of the deletion analysis. To recapitulate, the *na*-sluice is much closer to the simplex sluice clause embraced by the *pro* sluice analysis. That is the reason why the latter can cope with this issue with ease. Let's turn to the other traits in the chart, c-commanding and lexical identity between *wh*-correlate and *wh*-remnant. Apparently, they can be satisfactorily explained under the deletion account in terms of the syntactic identity requirement (30) and the modified Dependency Theory (Fiengo and May 1994). Comparatively, the *pro* sluice analysis is incapable of dealing with c-commanding, even if it seems quite successful on the issue of *wh*-identity, which is elucidated by the theories of unselective binding (Tsai 1994, Cheng and Huang 1996, and Lin 1996) and E-type pronoun (Evan 1980). However, two theory-internal problems arise.

In the first place, sluicing actually differs from the bare conditionals in lacking a universal quantifier to bind the *wh*-variables. Even though an existential closure is postulated to satisfy the binding requirement (Prohibition against vacuous quantification, Kratzer 1989), it still cannot guarantee the emergence of sloppy reading, which, in turn, has to further rely on the E-type *pro*. We have to admit that the licensing of sloppy identity within the complex triplet chain is quite dubious from the theory-internal point of view, since the linkage of unselective binding and E-type *pro* via agreement or predication is too weak to ensure the desired result. This casts doubt on the *pro* sluice analysis, especially its capacity for dealing with sloppy identity. That is the reason why we put a question mark on the *Wh-Wh* identity with respect to the *pro* sluice analysis in (47). Second, given Heim's (1982) theory, the *wh*-words in question, which are bound by the Existential Closure, should be interpreted as being indefinite with meanings such as *anyone*, *someone*, *any reason*, etc. (cf. Huang 1982, Cheng 1991). However, from the point of view of the argument selection, sluicing is allowed only when the sluice clause is subcategorized by the

verbs such as *xiangzhidao* 'wonder' and *zhidao* 'know', but not by the verbs such as *renwei* 'think' and *xiangxin* 'believe'. The former can select an interrogative clause, whereas the latter cannot as in (48). It follows that these *wh*-words must be interrogative, not indefinite, contrary to the prediction of Heim's theory.[24]

(48)   Zhangsan xiangzhidao/ zhidao/*renwei/*xiangxin shenme-ren da ta,
         Zhangsan wonder   know   think   believe   what-person hit he
         Lisi ye   xiangzhidao/ zhidao/*renwei/*xiangxin shenme-ren.
         Lisi also wonder   know   think   believe   what-person
         'Zhangsan wonders/knows/*thinks/*believes what person hit him, and Lisi also wonders/knows/*thinks/*believes what person.'

Now that the deletion analysis succeeds in explaining the properties of strict/sloppy ambiguity except for the *na*-effect and the *pro* sluice analysis merely stands its ground on the *na*-effect, we can conclude that sloppy identity might be a reflection of parallelism regulated by a syntactic requirement rather than a result of *pro* anaphora. In other words, the sloppy reading is derived from a full-fledged syntactic structure, but not from a base-generated empty category.

To reiterate the scope of this study, the result of the survey on the sloppy identity cannot be used to infer that all the phenomena in Mandarin sluicing will be analyzed by the same approach as the sloppy identity in sluicing is, since there are still some other sluice issues, such as those involve the distribution of *shi* 'be' and a left-branching modifier, needed to be taken into account. The first potential problem that the deletion analysis has to face is the distribution of *shi* 'be', which is obligatory in front of *shei* 'who' and *shenme* 'what' and optional in front of the other *wh*-elements. Wang (2002) and Wang and Wu (2006) have proposed a solution in terms of the deletion analysis, assuming that the *shi* is inserted at PF. Obviously, this analysis fails to predict its overall distribution. Although the PF-deletion analysis is more tenable on the sloppy issue, there is no denying that the distribution of *shi* still poses a serious problem to it.[25] So far, we have no good answers. However, this

---

[24] We would like to thank the reviewer for pointing out this line of thought.

[25] Given the deletion approach, the distribution of *shi* is left unsolved in this paper. As pointed by a reviewer, the PF-insertion of *shi* actually violates the idea of "no return to the lexicon" proposed by Chung (2005). We have to admit that so far no approach can satisfactorily account for all the phenomena relating to sluicing. For instance, regarding sloppy identity, it turns out that the deletion approach is more adequate than the *pro* sluice analysis. However, as to the distribution of *shi*, the *pro* sluice analysis (Wei 2004) offers a more consistent explanation, arguing that the distribution of the copula hinges on the predicational ability of a *wh*-phrase in Mandarin Chinese. The simplex *wh*-phrases, *shei* 'who' and *shenme* 'what', are the only two *wh*-phrases lacking the predicational ability. In this case, the presence of *shi* is required as being an identificational copula. In contrast, *shi* in sluicing with other complex predicative *wh*-phrases is an emphatic marker, which occurs optionally. Here, the dual functions of *shi* seem to partially answer the second question raised by the

defect will not affect the result of this study if we adopt a more flexible notion of sluicing. Given the fact that each language may have its own ways to express sluices, Principles and Parameter theory does not actually contain any specific rules for a sluicing construction (Merchant 2001, Potsdam 2007). In line with this idea, it is feasible to claim that sloppy identity may be derived from a full-fledged structure of the PF-deletion analysis, while the *na*-effect may be derived from the simplex *pro* sluice (Audrey Li p.c.). The notion of flexible sluices is also partially supported by a set of data proposed by a reviewer, who has raised the following problem: since for some native speakers, (49a) in lack of *shi* can get a sloppy reading, while (49b) with *shi* cannot, is it possible that the two sentences are derived from two different constructions? The answer is positive.

(49) a. Zhangsan$_i$ bu zhidao [ta$_i$ weishenme bei   ma],   dan Lisi$_j$ zhidao
Zhangsan not know   he why   PASS scold   but Lisi know
weishenme.
why
'Zhangsan$_i$ does not know why he$_i$ was scold, but Lisi$_i$ knows why he$_{i/j}$ was scolded.'

   b. Zhangsan$_i$ bu zhidao [ta$_i$ weishenme bei   ma],   dan Lisi$_j$ zhidao shi
Zhangsan not know   he why   PASS scold but Lisi know   be
weishenme.
why
'Zhangsan$_i$ does not know why he$_i$ was scold, but Lisi$_j$ knows why he$_{i/*j}$ was scolded.'

Suppose that (49) represents some native speakers' intuition, the discrepancy in the sloppy identity between (49a) and (49b) reveals that each may has its own idiosyncratic structure, since it is the presence of *shi* in (49b) that affects the emergence of the sloppy identity. We can postulate that for these speakers the absence of *shi* in (49a) ensures the syntactic identity and dependency across the two conjuncts, which makes sloppy identity possible, as proposed in this paper. On the other hand, we can also assume that *shi* with its focal meaning in (49b) is base-generated; therefore, the loss of the lexical identity between *weishenme* 'why' and *shi weishenme* 'be why' prevents it from deriving sloppy identity. From this perspective, the base-generated *shi* in (49b) is a manifestation of the *pro* sluice analysis.

Further, the deletion analysis has to face another intriguing problem as in (50).

---

reviewer: "Does it [*shi*] contribute any meaning for the sentence?" As we can see, under the *pro* sluice analysis, *shi* can be an identificational verb or a focus marker, which, to be sure, conveys different meanings.

(50) Zhangsan zhidao [taziji   you yi-ge-**ji-sui**-de   xiaohai],
　　 Zhangsan know   he.himself has one-CL-how.many-age-DE child
　　 dan Lisi bu zhidao（shi） **ji-sui**.
　　 but Lisi not know   be   how.many-age
　　 'Zhangsan knows what age his child is, but Lisi doesn't know what age.'
　　 (strict/*sloppy)

The example in (50) satisfies the syntactic identity for sloppy identity in (30) and should be predicted to ambiguously show strict/sloppy identity, even if its *wh*-remnant seems to violate Left Branching Condition (Ross 1967), which requires that no NP which is the leftmost constituent of a larger NP can be reordered out of this NP by a transformational rule. However, it turns out that only strict identity is permissible. It is possible that (50) is like another unparallel strict-reading-only structure as in (51), which contains no *wh*-correlate. Note that (51) violates the entailment conditions (Merchant 2001) as its English counterpart in (52a), due to their failure of mutual entailment between antecedent proposition (IP_A') and the F-closure of the deleted IP (F-clo(IP_E)) in (52b).[26] However, (51) is licit just like (50), while (52) is not. It indicates that the deletion-based entailment condition may not be universal enough to capture all the phenomena in Mandarin sluicing.

(51) Zhangsan zhidao [tajizi   you yi-ge   xiaohai], dan Lisi bu zhidao
　　 Zhangsan know   he.himself has one-CL child   but Lisi not know
　　（shi） **ji-sui**.
　　 be   how.many-age
　　 'Zhangsan knows that he has a child, but Lisi doesn't know what age.'
　　 (strict/*sloppy)

(52) a. *He wants a list, but I don't know how *detailed*.
　　 b. IP_A'= he wants a list, F-clo(IP_E)= $\exists$ d[he wants a d-detailed list]

To summarize, even though the deletion analysis cannot explain the *na*-effect, the *shi* distribution, and the left-branching modifier, as far as the occurrence of sloppy identity is concerned, the deletion approach is still more tenable than the *pro* sluice analysis.

---

[26] (52b) shows that it is the degree quantifier *how* that is focused in the second conjunct. In this case, the antecedent clause (*he wants a list*) does not entail the following proposition (*he wants a detailed list*). Therefore, the Focus condition on ellipsis (Footnote 13, (ii)) is not satisfied.

References

Adams, Perng Wang. 2003. The structure of sluicing in Mandarin Chinese. *Proceedings of Pennsylvania Linguistics Colloquium 27*, 1-16. Philadelphia: University of Pennsylvania.

Chao, Wynn. 1987. On Ellipsis. Doctoral dissertation, University of Massachusetts, Amherst.

Cheng, Lisa Lai-Shen. 1991. On the Typology of *Wh*-Questions. Doctoral dissertation, Massachusetts Institute of Technology.

Cheng, Lisa Lai-Shen, and Cheng-Teh James Huang. 1996. Two types of donkey sentences. *Natural Language Semantics* 4:121-163.

Chierchia, Gennaro. 1992. Anaphora and dynamic binding. *Linguistics and Philosophy* 15:111-183.

Chomsky, Noam. 1955. *The Logical Structure of Linguistic Theory*. New York: Plenum Press.

Chomsky, Noam. 1976. Conditions on rules of grammar. *Linguistic Analysis* 2:303-351.

Chung, Sandra. 2005. Sluicing and the lexicon: The point of no return. Ms. University of California, Santa Cruz.

Chung, Sandra, William A. Ladusaw, and James McCloskey. 1995. Sluicing and logical form. *Natural Language Semantics* 3:239-282.

Déchaine, Rose-Marie, and Martina Wiltschko. 2002. Decomposing pronouns. *Linguistic Inquiry* 33:409-442.

Diesing, Molly. 1992. *Indefinites*. Cambridge, Massachusetts: The MIT Press.

Evans, Gareth. 1980. Pronouns. *Linguistic Inquiry* 11:337-362.

Fiengo, Robert, and Robert May. 1994. *Indices and Identity*. Cambridge, Massachusetts: The MIT Press.

Fox, Danny, and Howard Lasnik. 2003. Successive-cyclic movement and island repair: The difference between sluicing and VP-ellipsis. *Linguistic Inquiry* 34:143-154.

Fukaya, Teruhiko, and Hajime Hoji. 1999. Stripping and sluicing in Japanese and some implications. *Proceedings of West Coast Conference on Formal Linguistics 18*, 145-158. Somerville: Cascadilla Press.

Heim, Irene Roswitha. 1982. The Semantics of Definite and Indefinite Noun Phrases. Doctoral dissertation, University of Massachusetts, Amherst.

Higginbotham, James. 1980. Pronouns and bound variables. *Linguistic Inquiry* 11:679-708.

Hoji, Hajime. 1990. Theories of anaphora and aspects of Japanese syntax. Ms. University of Southern California.

Hoji, Hajime. 1997a. Sloppy identity and formal dependency. *Proceedings of West Coast Conference on Formal Linguistics 15*, 209-223. Stanford: CSLI Publications

Hoji, Hajime. 1997b. Sloppy identity and principle B. *Atomism and Binding*, ed. by H. Bennis, P. Pica, and J. Rooryck, 205-234. Foris: Dordrecht.

Hoji, Hajime. 1998. Null object and sloppy identity in Japanese. *Linguistic Inquiry* 29:127-152.

Hoji. Hajime. 2003. Surface and deep anaphora, sloppy identity, and experiments in syntax. *Anaphora: A Reference Guide*, ed. by A. Barss, 172-236. Cambridge: Blackwell.

Huang, Cheng-Teh James. 1982. Logical Relations in Chinese and the Theory of Grammar. Doctoral dissertation, Massachusetts Institute of Technology

Huang, Cheng-Teh James. 1988a. Comments on Hasegawa's paper. *Proceedings of Japanese Syntax Workshop: Issues on Empty Categories*, 77-93. New London: Connecticut College.

Huang, Cheng-Teh James. 1988b. Verb-second in German and some AUX phenomena in Chinese. *The Null Subject Parameter*, ed. by O. Jaeggli and K. Safir, 185-214. Dordrecht: Kluwer.

Huang, Cheng-Teh James. 1991. Remarks on the status of the null object. *Principles and Parameters in Generative Grammar*, ed. by R. Freidin, 56-76. Cambridge, Massachusetts: The MIT Press.

Kadmon, Nirit. 1987. On Unique and Non-Unique Reference and Asymmetric Quantification. Doctoral dissertation, University of Massachusetts, Amherst.

Kim, Soowon. 1999. Sloppy/strict identity, empty objects, and NP ellipsis. *Journal of East Asian Linguistics* 8:255-284.

Koopman, Hilda, and Dominique Sportiche. 1982. Variables and the bijection principle. *The Linguistic Review* 2:139-160.

Kratzer, Angelika. 1989. Individual-level vs. stage-level predicate. *Papers on Quantification*, ed. by E. Bach, A. Kratzer, and B. Partee, 42-45. Amherst: University of Massachusetts, Amherst.

Kratzer, Angelika. 1998. More structural analogies between pronouns and tenses. *Proceedings from Semantics and Linguistic Theory VIII*, 92-110. Ithaca, N.Y.: Cornell University, CLC Publications.

Kuwabara, Kazuki. 1997. On the properties of truncated clauses in Japanese. *Report (1) Researching and Verifying an Advanced Theory of Human Language*, ed. by K. Inoue, 61-84. Chiba: Kanda University of International Studies.

Lin, Jo-Wang. 1996. Polarity Licensing and *Wh*-Phrase Quantification in Chinese. Doctoral dissertation, University of Massachusetts, Amherst.

Liu, Liping. 2006. Sluicing in Chinese. Doctoral dissertation, Beijing Language University.

Merchant, Jason. 2001. *The Syntax of Silence: Sluicing, Islands, and Identity in Ellipsis*. Oxford: Oxford University Press.

Merchant, Jason. 2008. Variable island repair under ellipsis. *Topics in Ellipsis*, ed. by Kyle Johnson, 132-153. Cambridge: Cambridge University Press.

Nishigauchi, Taisuke. 1990. *Quantification in the Theory of Grammar*. Dordrecht: Kluwer.

Nishiyama, Kunio, John Whitman, and Eun-Young Yi. 1996. Syntactic movement of overt *wh*-phrases in Japanese and Korean. *Japanese/Korean Linguistics 5*, 337-351. Stanford: CSLI Publications.

Otani, Kazuyo, and John Whitman. 1991. V-raising and VP-ellipsis. *Linguistic Inquiry* 22:345-358.

Partee, Barbara. 1973. Some transformational extensions of Montague grammar. *Journal of Philosophy Logic* 2:509-534.

Potsdam, Eric. 2007. Malagasy sluicing and its consequences for the identity requirement on ellipsis. *Natural Language and Linguistic Theory* 25:577-613.

Romero, Maribel. 1998. Focus and Reconstruction Effects in *Wh*-Phrases. Doctoral dissertation, University of Massachusetts, Amherst.

Rooth, Mats. 1985. Association with Focus. Doctoral dissertation, University of Massachusetts, Amherst.

Rooth, Mats. 1992a. A theory of focus interpretation. *Natural Language Semantics* 1:75-116.

Rooth, Mats. 1992b. Ellipsis redundancy and reduction redundancy. *Proceedings of the Stuttgart Ellipsis Workshop, Report Series, Sprachtheoretische Grundlagen für die Computerlinguistik, No. 29, SFB 340*, ed. by Steve Berman and Arild Hestvik, 1-26. Heidelberg: IBM Heidelberg.

Ross, John Robert. 1967. Constraints on Variables in Syntax. Doctoral dissertation, Massachusetts Institute of Technology.

Ross, John Robert. 1969. Guess who? *Proceedings of the Fifth Regional Meeting of the Chicago Linguistic Society*, 252-286. Chicago: University of Chicago.

Rullmann, Hotze. 2004. First and second person pronouns as bound variables. *Linguistic Inquiry* 35:159-168.

Safir, Kenneth J. 1985. *Syntactic Chains*. Cambridge: Cambridge University Press.

Sag, Ivan A. 1976. Deletion and Logical Form. Doctoral dissertation, Massachusetts Institute of Technology.

Takahashi, Daiko. 1994. Sluicing in Japanese. *Journal of East Asian Linguistics* 3:265-300.

Tomioka, Satoshi. 1999. A sloppy identity puzzle. *Natural Language Semantics* 7:217-241.

Tomioka, Satoshi. 2008. A step-by-step guide to ellipsis resolution. *Topics in Ellipsis*, ed. by Kyle Johnson, 210-228. Cambridge: Cambridge University Press.

Tsai, Wei-Tien Dylan. 1994. On Economizing the Theory of A-Bar Dependencies. Doctoral dissertation, Massachusetts Institute of Technology.

Wang, Chyan-an Arthur. 2002. On Sluicing in Mandarin Chinese. MA thesis, National Tsing Hua University.

Wang, Chyan-an Arthur, and Hsiao-hung Iris Wu. 2006. Sluicing and focus movement in *wh*-in-situ languages. *Penn Working Papers in Linguistics* 12:375-387.

Wei, Ting-Chi. 2004. Predication and Sluicing in Mandarin Chinese. Doctoral dissertation, National Kaohsiung Normal University.

Williams, Edwin S. 1977. Discourse and logical form. *Linguistic Inquiry* 8:101-139.

Graduate Institute of Taiwanese Cultures and Languages
National Kaohsiung Normal University
Kaohsiung, TAIWAN
Ting-Chi Wei: tingchiwei@nknu.edu.tw

論漢語切割句鬆散語意之衍生

魏廷冀

國立高雄師範大學

　　本文依據漢語切割句鬆散語意的三種特性，來討論 PF-刪除分析及 pro 切割分析的適切性。我們發現，有完整結構呈現的 PF-刪除分析，可以完全掌握前行語與代名詞之間的 C-統制關係，並解釋前行語疑問詞和遺留疑問詞之間的詞彙一致性現象，但無法解釋爲何「那-效應」只允許嚴格語意的產生。相較之下，雖然 pro 切割分析，可輕易地處理「那-效應」，也可從「無擇約束」及「事件型空號代詞」的照應，詮釋鬆散語意之衍生，但是對於 C-統制及詞彙一致性的問題，卻無法用其不平行的句法特質來解決。因此，我們根據 Fiengo and May (1994)的句法平行要求，提出「修正的依存理論」（Modified Dependency Theory），規定鬆散語意的產生，必須藉由嚴謹的句法平行對稱才有可能；換言之，切割句的鬆散語意是一種句法平行的完整呈現，而非 pro 指涉的結果。

關鍵詞：切割句、鬆散語意、嚴格語意、PF-刪除、pro 切割分析