Ellipsis or *Pro*-Form: Reconstruction Effects of Sluicing in Mandarin Chinese

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1. Introduction

The goal of this paper is to argue that sluicing in Mandarin Chinese involves clausal ellipsis rather than a small *pro* and the ellipsis site is associated with *full-fledged* syntactic structure. To this end, we present new evidence from reconstruction effects, which we show are captured by the *movement-and-ellipsis* approach, but not readily captured by the *empty pronominal approach*.

Mandarin Chinese, a *wh*-in-situ language (e.g., Huang 1982), has a construction similar to English sluicing, shown in (1).[1] We will refer to this construction as "Mandarin sluicing". Throughout this paper, we adopt the following terminology for the different subparts of the examples. We refer to the CP immediately dominating the embedded interrogative phrase as the "sluice" and the preceding clause as the "antecedent" for the sluice. We refer to the interrogative phrase in the sluice clause as the "remnant" and the indefinite DP in the antecedent clause as the "correlate".[2]

(1) *Yuehan yudao-le mouren, dan wo bu jide [shi shei].*
    John   meet-PERF someone but 1SG NEG remember SHI who
    'John met someone, but I don't remember who.'

What structure underlies the sluice clause in (1)? With respect to this question, there are two approaches to Mandarin sluicing in the literature. The movement-and-ellipsis approach (e.g., Wang and Wu 2006, Murphy 2014) claims that the sluice clause in (1) is derived from focus movement of the *wh*-remnant to the left periphery followed by TP-ellipsis as in (2a). The empty pronominal approach (e.g., Adams and Tomioka 2012, Li and Wei 2014) claims that Mandarin sluicing employs *no* movement and clausal ellipsis. Instead, the sluice clause in (1) is a reduced copular clause that includes a subject empty pronominal, a copula *shi*, and an in-situ *wh*-phrase as in (2b). Note that the empty pronominal can be spelled out as the demonstrative *na* "that" (e.g., Adams 2004) or considered an E-type pronoun (e.g., Wei 2009, 2011, Adams and Tomioka 2012, Li and Wei 2014).

(2) *Yuehan yudao-le mouren, dan wo bu jide ...*
    John   meet-PERF someone but 1SG NEG remember
    a. ...[CP *shi* [FocP *shei₁* FOC [TP ~~Yuehan yudao-le t₁~~]]].   (*movement-and-ellipsis*)
            SHI   who   John   meet-PERF
    b. ...[CP *pro shi shei*].   (*empty pronominal*)
            SHI who
    'John met someone, but I don't remember who.'

The two accounts thus differ in (i) whether Mandarin sluicing involves ellipsis and (ii) how much syntactic structure, if any, there is in the ellipsis site. Based on novel data from Binding Condition C

[1] The abbreviations used in this paper are glossed as follows: 1SG = first person singular, 3SG = third person singular, CL = classifier, DEM = demonstrative, EXP = experiential aspect marker, GEN = genitive marker, NEG = negative marker, PERF = perfective aspect marker, REL = relative marker.
[2] See appendix A for discussion about the morpheme *shi* in Mandarin Chinese.

reconstruction effects and idiom reconstruction effects, we argue that Mandarin sluicing has the structure in (2a). Furthermore, we show that the reconstruction effects are captured by the movement-and-ellipsis approach, but not readily captured by the empty pronominal approach.

2. Binding Condition C Reconstruction

This section is concerned with Binding Condition C reconstruction in Mandarin sluicing contexts. Based on observations that Mandarin shows Binding Condition C reconstruction effects in declarative sentences, *wh*-in-situ constructions, and *wh*-fronting constructions (see also Cheung 2008, 2014), we provide novel data in which sluicing parallels *wh*-fronting constructions in terms of Binding Condition C reconstruction effects.

2.1. Binding Condition C

It is well-known that an R-expression must be A-free, i.e. Binding Condition C (henceforth BCC, Chomsky 1981, 1986). In (3), the R-expression *Yuehan* "John" is c-commanded by the pronoun *ta* "he", and therefore they cannot corefer with each other. In (4), when we switch the positions of the R-expression and the pronoun, no disjoint reference effects are observed, in that the R-expression is no longer c-commanded by the pronoun.[3] The contrast in (3) and (4) indicates that, like in English, BCC operates on c-command relations in Mandarin Chinese.

(3) * ***Ta$_1$*** *kandao-le san-zhang **Yuehan$_1$** de   zhaopian.*
    3SG see-PERF   three-CL   John   GEN   picture
    '*He$_1$ saw three pictures of John$_1$.'

(4) ***Yuehan$_1$*** *kandao-le san-zhang **ta$_1$** de   zhaopian.*
    John   see-PERF   three-CL   3SG GEN   picture
    'John$_1$ saw three pictures of him$_1$.'

2.2. Binding Condition C effects and wh-in-situ

Mandarin Chinese is a *wh*-in-situ language in which *wh*-phrases stay in-situ rather than undergo overt movement to [Spec, CP]. Like declarative sentences in (3) and (4), *wh*-in-situ constructions in Mandarin Chinese show BCC effects. In (5), the R-expression *Yuehan* "John" embedded inside the in-situ *wh*-phrase is commanded by the pronoun *ta* "he", and therefore they cannot co-refer with each other. In (6), when we switch the positions of the R-expression and the pronoun, no disjoint reference effects are observed, in that the R-expression is no longer c-commanded by the pronoun.

(5) * ***Ta$_1$*** *zui   xihuan [na-zhang **Yuehan$_1$** de   zhaopian]?*
    3SG most   like   which-CL   John   GEN   picture
    '(lit.) *He$_1$ likes which picture of John$_1$ most?'

(6) ***Yuehan$_1$*** *zui   xihuan [na-zhang **ta$_1$** de   zhaopian]?*
    John   most like   which-CL   3SG GEN   picture
    '(lit.) John$_1$ likes which picture of him$_1$ most?'

2.3. Binding Condition C, reconstruction, and wh-fronting

While Mandarin Chinese is a *wh*-in-situ language, *wh*-phrases can be fronted to the left periphery (e.g., Hoh and Chiang 1990, Cheng 2008, 2014, Pan 2014). *Wh*-fronting constructions in Mandarin

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[3] Note that the coreference of the R-expression and the pronoun cannot be shown by embedding the pronoun inside a possessor DP due to the sub-command condition in Mandarin Chinese (e.g., Huang 1982, Tang 1989, Pan 1998, Huang et al 2009). See appendix B for more details.

Chinese show BCC reconstruction effects (see also Cheung 2008, 2014). In (7), when the fronted *wh*-phrase contains an R-expression *Yuehan* "John", the R-expression cannot corefer with the pronoun *ta* "he" in the subject position. The disjoint reference effects between the R-expression and the pronoun stems from a BCC violation induced by reconstruction (Chomsky 1993, 1995).

(7) * *[CP (Shi) [DP na-zhang **Yuehan₁** de zhaopian]₂ [TP **ta₁** zui xihuan t₂]]?*
      SHI   which-CL John   GEN picture   3SG most like
   '(lit.) *Which picture of John₁ (is it) that he₁ likes most?'

In (8), when we switch the positions of the R-expression and the pronoun, the R-expression can corefer with the pronoun, in that the R-expression is not c-commanded by the pronoun at any point of the derivation. The contrast in (7) and (8) may be attributed to BCC effects under reconstruction.

(8) *[CP (Shi) [DP na-zhang **ta₁** de zhaopian]₂ [TP **Yuehan₁** zui xihuan t₂]]?*
      SHI   which-CL 3SG GEN picture   John   most like
   '(lit.) Which picture of him₁ (is it) that John₁ like most?'

2.4. Binding Condition C reconstruction effects in sluicing

Turning to Mandarin sluicing, we observe that in (9) the pronoun *ta* "he" in A's utterance cannot corefer with the R-expression *Yuehan* "John" in B's utterance. However, when we switch the positions of the R-expression and the pronoun as in (10), they can corefer with each other. We claim that the contrast in (9) and (10) indicates that Mandarin sluicing parallels *wh*-fronting constructions in terms of BCC reconstruction effects. We will discuss this observation further in section 4.

(9) Speaker A: ***Ta₁** kandao-le [san-zhang Mali de zhaopian].*
               3SG see-PERF   three-CL Mary GEN picture
               'He₁ saw three pictures of Mary.'
    Speaker B: * *Dui, dan wo bu zhidao (shi) [duoshao-zhang **Yuehan₁** de zhaopian].*
                 yeah but 1SG NEG know SHI   how.many-CL John   GEN picture
                  '*Yeah, but I don't know how many pictures of John₁.'

(10) Speaker A: ***Yuehan₁** kandao-le [san-zhang Mali de zhaopian].*
                John   see-PERF   three-CL Mary GEN picture
                'John₁ saw three pictures of Mary.'
     Speaker B: *Dui, dan wo bu zhidao (shi) [duoshao-zhang **ta₁** de zhaopian].*
                 yeah but 1SG NEG know SHI   how.many-CL 3SG GEN picture
                 'Yeah, but I don't know how many pictures of him₁.'

3. Idiom Reconstruction

Reconstruction effects are also observed with [verb + object] idiom chunks in Mandarin Chinese (e.g., Cheung 2008, 2014). In (11a), the in-situ *wh*-phrase *shei de cu* "whose vinegar" is the object of the [verb + object] idiom chunk *chi shei de cu* "(lit.) eat whose vinegar" (idiomatic: be jealous of whom). In (11b), when the *wh*-phrase is fronted to the left periphery, the idiomatic reading still remains, indicating that the fronted *wh*-phrase can reconstruct into its base-generated position.

(11) a. *Lisi changchang [VP chi [DP **shei de cu**]]?*
        Lisi often   eat   who GEN vinegar
        '(lit.) Lisi is often jealous of who(m)?'
     b. *[CP (Shi) [DP **shei de cu**]₁ Lisi changchang [VP chi t₁]]?*
         SHI   who GEN vinegar Lisi often   eat
        '(lit.) Who (is it) that Lisi is often jealous of?'   (Cheung 2008)

We observe that Mandarin sluicing, like its English counterpart (Rottman & Yoshida 2013), shows idiom reconstruction effects. In (12), the object DP *mouren de cu* "someone's vinegar" of the VP idiom chunks *chi mouren de cu* "(lit.) eat someone's vinegar" (idiomatic: be jealous of someone) in A's utterance serves as the correlate for the remnant DP *shei de cu* "whose vinegar" (idiomatic: who) in B's utterance. We claim that the idiomatic reading of the remnant DP in B's utterance is attributed to idiom reconstruction effects, which we will discuss further in section 4.

(12) Speaker A: *Lisi changchang [*VP* chi [*DP* **mouren de cu**]].*
    Lisi often   eat   someone GEN vinegar
    'Lisi is often jealous of someone.'

   Speaker B: *Dui, dan wo bu zhidao (shi) [*DP* **shei de cu**].*
    yeah but 1SG NEG know SHI   who GEN vinegar
    'Yeah, but I don't know who.'

4. Sluicing in Mandarin Chinese: Ellipsis or *Pro*-Form

4.1. *The movement-and-ellipsis approach*

In what follows, we show that the reconstruction effects of Mandarin sluicing follow straightforwardly from the movement-and-ellipsis approach, in that the ellipsis site is associated with silent syntactic structure parallel to that of the antecedent clause under this approach.

Consider BCC reconstruction effects. In (13), the reconstruction of the *wh*-remnant containing the R-expression *Yuehan* "John" into its base-generated position in the ellipsis site violates BCC, leading to the disjoint reference effects. In (14), the *wh*-remnant containing the pronoun *ta* "he" does not c-command the R-expression in the ellipsis site under reconstruction, so no disjoint reference effects are observed.

(13) Speaker A: ***Ta₁** kandao-le [*DP* san-zhang Mali de zhaopian].*
    3SG see-PERF   three-CL Mary GEN picture
    'He₁ saw three pictures of Mary.'

   Speaker B: * *Dui, dan wo bu zhidao*
    yeah but 1SG NEG know
    *[*CP* (shi) [*DP* duoshao-zhang **Yuehan₁** de zhaopian]₂ [*TP* ~~ta₁ kandao le t₂~~]].*
    SHI   how.many-CL John GEN picture   3SG see-PERF
    '*Yeah, but I don't know how many pictures of John₁.'

(14) Speaker A: ***Yuehan₁** kandao-le [*DP* san-zhang Mali de zhaopian].*
    John   see-PERF   three-CL Mary GEN picture
    'John₁ saw three pictures of Mary.'

   Speaker B: *Dui, dan wo bu zhidao*
    yeah but 1SG NEG know
    *[*CP* (shi) [*DP* duoshao-zhang **ta₁** de zhaopian]₂ [*TP* ~~Yuehan₁ kandao le t₂~~]].*
    SHI   how.many-CL 3SG GEN picture   John see-PERF
    'Yeah, but I don't know how many pictures of him₁.'

Turning to idiom reconstruction effects, in (15) the remnant DP *shei de cu* "who's vinegar" can reconstruct into the object position of the elided TP, giving rise to the idiomatic interpretation "who".

(15) Speaker A: *Lisi changchang [*VP* chi [*DP* **mouren de cu**]].*
    Lisi often   eat   someone GEN vinegar
    'Lisi is often jealous of someone.'

   Speaker B: *Dui, dan wo bu zhidao*
    yeah but 1SG NEG know
    *[*CP* (shi) [*DP* **shei de cu**]₁ [*TP* ~~Lisi changchang chi t₁~~]].*
    SHI   who GEN vinegar   Lisi often   eat
    'Yeah, but I don't know who.'

To sum up, the reconstruction effects provide support for the claim that Mandarin sluicing involves ellipsis and the ellipsis site is associated with silent syntactic structure at some point in the process of ellipsis resolution, which are captured by the movement-and-ellipsis approach.

4.2. The empty pronominal approach

Mandarin Chinese has been considered a *pro*-drop language (e.g., Huang 1984, 1989). Given the missing materials in Mandarin sluicing, it is natural to analyze the silent materials as an empty pronominal. The empty pronominal approach appeals to this language-specific property. We show that the reconstruction effects of Mandarin sluicing are not readily captured by the empty pronominal approach due to its lack of the silent syntactic structure in the ellipsis site.

Adams (2004) claims that the empty pronominal approach "is corroborated by the fact that this hidden pronoun can be spelled out as the *pro*-form *na* 'that'". In (16), when we spell out the empty pronominal as *na* "that", the R-expression *Yuehan* "John" can corefer with the pronoun *ta* "he", in contrast with the disjoint reference effects observed in Mandarin sluicing. In (17), when we spell out the empty pronominal as *na* "that", the idiomatic interpretation is no longer available. Instead, the sluice clause has the literal interpretation "whose vinegar that is".

(16) Speaker A: ***Ta_1** renwei [$_{CP}$ zhe shi [$_{DP}$ san-zhang Mali de zhaopian]].*
                   3SG think   DEM SHI   three-CL Mary GEN picture
                   'He$_1$ thinks that these are three pictures of Mary.'
  Speaker B: *Dui, dan wo bu zhidao*
               yeah but 1SG NEG know
               *[$_{CP}$ na shi [$_{DP}$ duoshao-zhang **Yuehan_1** de zhaopian]].*
                    DEM SHI   how.many-CL John   GEN picture
               'Yeah, but I don't know (lit.) those are how many pictures of John$_1$.'

(17) Speaker A: *Lisi changchang [$_{VP}$ chi [$_{DP}$ **mouren de cu**]].*
                   Lisi often   eat   someone GEN vinegar
                   'Lisi is often jealous of someone.'
  Speaker B: *Dui, dan wo bu zhidao [$_{CP}$ na shi [$_{DP}$ **shei de cu**]].*
               yeah but 1SG NEG know   DEM SHI   who GEN vinegar
               'Yeah, but I don't know (lit.) that is whose vinegar.'

Wei (2009, 2011), Adams and Tomioka (2012), and Li and Wei (2014) propose that the empty pronominal is an E-type pronoun à la Evans (1980).[4] Consider Adams and Tomioka's (2012) examples (with minor modifications) in (18). In (18a), the empty pronominal has meaning akin to a pronoun that takes as its antecedent an indefinite DP that does not have the pronoun in its scope. In (18b), the empty pronominal can be treated as an event-denoting pronoun (Wei 2011 à la Davidson 1967 and Parsons 1990), or a sentential *pro*, whose denotation can be either an event or a proposition (Adams and Tomioka 2012). According to Adams and Tomioka, the semantics of the sentential *pro* is more complicated than just an event-denoting pronoun, in that it is still up for debate whether causation is a relation between eventualities or propositions (cf. Kratzer 1998).

(18) a. *Dawu gei mouren yishu hua, danshi wo bu zhidao [$_{CP}$ **pro**$^{E\text{-}type}$ shi shei].*
     Dawu give someone one-CL flower but   1SG NEG know   SHI who
     'Dawu gave someone a bouquet, but I don't know (lit.) *pro* was who.'
  b. *Zhangsan shefa tongguo-le ceshi, dan Lisi haishi wufa xiangxi **pro**$^{E\text{-}type}$.*
     Zhangsan manage pass-PERF exam but Lisi still   cannot believe
     'Zhangsan managed to pass the exam, but Lisi still cannot believe it.   (A & T 2012)

Consider (19) and (20). We predict that the R-expression *Yuehan* "John" cannot corefer with the pronoun *ta* "he" if the E-type pronoun, which is anaphoric to the indefinite DP in (19) and the entire

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[4] We thank an anonymous reviewer for pointing out the E-type pronoun analysis.

preceding sentence in (20), exhibits the BCC reconstruction effects. Note that in (19) the R-expression is embedded inside the prenominal relative clause within the indefinite DP. However, our prediction is not borne out, indicating that the E-type pronoun does not capture the BCC reconstruction effects.

(19) Speaker A: *Wo xihuan [$_{DP}$ [**Yuehan$_1$** de pengyou zhanshi de] yizhang zhaopian].*
　　　　　　　1SG like 　　　John 　　GEN friend 　show 　REL one-CL 　picture
　　　　　　　'I like a picture that John$_1$'s friend showed.'
　　Speaker B: ***Ta$_1$** ye xihuan* **pro$^{E\text{-}type}$**.
　　　　　　　3SG also like
　　　　　　　'He$_1$ also likes it.'

(20) Speaker A: **Yuehan$_1$** *tongguo-le ceshi.*　　　　　Speaker B: **Ta$_1$** *tingshuo-le* **pro$^{E\text{-}type}$**.
　　　　　　　John 　　　pass-PERF exam 　　　　　　　　　　3SG hear-PERF
　　　　　　　'John$_1$ passed the exam.' 　　　　　　　　　　'He$_1$ heard about it.'

We predict that in (21) the matrix VP has the idiomatic interpretation if the E-type pronoun, which is anaphoric to the object of the [verb + object] idiom chunk, exhibits the idiomatic reconstruction effects. Note that in (21) the idiom chunk is embedded inside the prenominal relative clause within the subject DP. Again, our prediction is not borne out, indicating that the E-type pronoun does not capture the idiom reconstruction effects.

(21) *[$_{DP}$ [ai chi bieren de cu de] Yuehan] zuotian you chi-le* **pro$^{E\text{-}type}$**.
　　　　love eat other.people GEN vinegar REL John 　　yesterday again eat-PERF
　　'John who loves being jealous of other people ate again yesterday.'

To sum up, the reconstruction effects are not captured by the empty pronominal approach under which the empty pronominal can be spelled out as the demonstrative *na* "that" or considered an E-type pronoun. This is partly due to the lack of ellipsis and the silent syntactic structure in the ellipsis site.

5. Conclusion

This paper presents new evidence from reconstruction effects to address the question of whether sluicing exists in Mandarin Chinese. Based on novel data, we argue that Mandarin sluicing *does* involve clausal ellipsis rather than an empty pronominal, and the ellipsis site is associated with *full-fledged* syntactic structure, which supports the structural approaches to ellipsis, i.e. there is syntactic structure that is unpronounced in ellipsis sites throughout the derivation.

Appendix A: The Morpheme *Shi*

The most noticeable difference between Mandarin sluicing and its English counterpart is the presence of the morpheme *shi* before the *wh*-remnant in the sluice clause. *Shi* is a multi-function element. In (22), *shi* links subject and complement, i.e. it is a copula. In (23), *shi* marks cleft focus in the preverbal domain, i.e. it is a focus marker. The "floating" property of *shi* in the *shi…(de)* focus construction has been discussed in details by Cheng (2008) and Paul and Whitman (2008).

(22) *Na* **shi** *wo de pengyou.*
　　DEM SHI 1SG GEN friend
　　'That is my friend.'

(23) a. **Shi** *Zhangsan zuotian zuo huoche qu Beijing.* 　　　　　　　　　　(*subject*)
　　　　SHI Zhangsan yesterday sit train 　go Beijing
　　　　'It was Zhangsan that went to Beijing by train yesterday.'
　　b. *Zhangsan* **shi** *zuotian zuo huoche qu Beijing.* 　　　　　　　　　　(*temporal adverb*)
　　　　Zhangsan SHI yesterday sit train 　go Beijing
　　　　'It was yesterday that Zhangsan went to Beijing by train.'

   c. *Zhangsan zuotian **shi** zuo huoche qu Beijing.*   (*instrumental adverb*)
      Zhangsan yesterday SHI sit   train   go Beijing
      'It was by train that Zhangsan went to Beijing yesterday.'
   d. *Zhangsan zuotian   zuo huoche **shi** qu Beijing.*   (*lexical verb/VP*)
      Zhangsan yesterday sit   train   SHI go Beijing
      '(lit.) It was going to Beijing that Zhangsan did by train yesterday.'
   e. **Zhangsan zuotian   zuo huoche qu **shi** Beijing.*   (*object)
      Zhangsan yesterday sit   train   go SHI Beijing
      Int. 'It was Beijing that Zhangsan went to by train yesterday.'

Analyses of *shi* in Mandarin sluicing divide into two groups. While the movement-and-ellipsis approach argues that *shi* is a focus marker, the empty pronominal approach argues that *shi* is a copula (see Song 2016 and references therein for more details).

Appendix B: The Sub-Command Condition

Unlike English, Mandarin exhibits disjoint reference effects not only with the pronoun in c-commanding position, but also with the pronoun that does not *directly* c-command the R-expression (e.g., Huang 1982). In (24), even though the R-expression *Yuehan* "John" is not directly c-commanded by the pronoun *ta* "he" embedded inside a possessor DP, they cannot corefer with each other.

(24) * ***Ta$_1$** de   pengyou xihuan **Yuehan$_1$**.*
    3SG GEN friend   like   John
    'His$_1$ friend likes John$_1$.'

Importantly, the depth of embedding, a hierarchical notion, is irrelevant in sentences like (24). Consider (25) (adopted from Huang 1982). The pronoun embedded inside the possessor cannot corefer with the R-expression no matter how deeply embedded the pronoun is.

(25) * ***Ta$_1$** de   mama de   pengyou de   didi   de   laoshi xihuan **Zhangsan$_1$**.*
    3SG GEN mother GEN friend   GEN brother GEN teacher like   Zhangsan
    'His$_1$ mother's friend's brother's teacher likes Zhangsan$_1$.'

Some linguists working on Chinese languages claim that the pronoun sub-commands (sometimes also called "cyclic c-command" or "weak c-command") the R-expression in (24) and (25) (e.g., Huang 1982, Tang 1989, Pan 1998, Huang et al 2009). The notion of sub-command is defined in (26) (adopted from Tang 1989). Note that (25) is a recursive definition of sub-command.

(26) β sub-commands α iff
   a. β c-commands α, or
   b. β is an NP contained in an NP that c-commands α or that sub-commands α, and any
      argument containing β is in subject position.

Keine (2012) observed that Hindi exhibits disjoint reference effects in sentences like (24). He claims that certain restrictions on coreference do not depend on c-command but linear precedence, and these restrictions are genuine and not reducible to BCC effects (cf. Barss & Lasnik 1986, Jackendoff 1990, Bruening 2014). Because (i) BCC in its classical form (Chomsky 1981) operates on c-command relations, and the contrast in (3) and (4) indicates that Mandarin Chinese exhibits BCC effects, and (ii) it is unclear whether or not the disjoint reference effects in (24) and (25) are BCC effects, we will set aside possessor DP cases for future research.

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