

Non-local matching of adjectival modifiers in Mandarin stacked relative clauses

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Abstract. Bhatt (2002) argues for a head-raising analysis (HRA) of relative clauses based on the interpretation of certain adjectival modifiers on the head. This paper evaluates Bhatt's argument in the configurations of stacked relative clauses (SRCs) in Mandarin and argues that the internal interpretation of adjectival modifiers on the head is not a sufficient argument for HRA. We show that adjectival modifiers on the external head of SRCs can receive an internal interpretation when reconstruction is not possible. We propose that the internal reading can instead be derived by non-local matching between the adjectival modifier and its internal representation.

Keywords. stacked relative clauses; head raising analysis; matching analysis; Mandarin

1. Introduction. There has been a long-standing debate on the analysis of restrictive relative clauses among three competing analyses. The head external analysis (HEA), advocated by Partee (1975), Chomsky et al. (1977) and Jackendoff (1972), among others, is an early generative approach to relative clauses. This approach proposes that a head noun is base-generated externally to a relative clause, which involves A'-movement of an overt or covert relative operator, as in (1a). The head raising analysis (HRA), however, assumes that a relative NP is originally generated within a relative clause and then moves directly to its surface position (Brame 1968; Schachter 1973; Vergnaud 1974). Different from HEA, there is a transformational relationship between the relative clause internal trace position and the head, as in (1b). The matching analysis (MA), originally proposed by Lees (1960, 1961) and Chomsky (2014) and extended by Sauerland (1998), is a mixed approach of HEA and HRA. As is shown in (1c), the external head noun is base-generated outside of a relative clause, while the internal head originated together with a relative operator in a position within a relative clause and moved along with the relative operator to the specifier position of a CP. The internal head is phonologically deleted under identity with the external head.

- (1) a. the book [_{CP} Op_i/which_i John likes t_i]
 b. the [book]_j [_{CP} [Op/which t_j]_i John likes t_i]
 c. the [book] [_{CP} [Op/which ~~book~~]_i John likes t_i]

Previous studies have argued for the need to assume both HRA and MA, whose choice may depend on certain semantic properties of the head and of the variable found within the relative clause (Carlson 1977; Heim 1987; Grosu & Landman 1998; Cinque 2015). Bhatt (2002) provides a new argument for HRA based on the interpretation of certain adjectival modifiers on the head of a relative clause. He maintains that the internal interpretation of superlatives or ordinals as in (2a) can only be generated by reconstructing the head into the relative clause, which requires a movement chain between the external head and its internal representation, as in (2b).

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- (2) The longest/first book that John said that Tolstoy has written. (Bhatt 2002)
- a. internal reading: ‘x is the longest/first book that Tolstoy wrote’
 - b. the ~~[longest book]_i~~ [~~Op~~ ~~[longest book]_i]_j that John said [~~Op~~ ~~[longest book]_j~~ that Tolstoy has written [Op longest book]_j]]~~

This paper evaluates Bhatt’s argument in the configurations of stacked relative clauses (SRCs) in Mandarin and argues that the internal interpretation of adjectival modifiers on the head is not a sufficient argument for HRA. We show that adjectival modifiers on the external head of SRCs can receive internal interpretation when reconstruction is not possible. We propose that the internal reading can instead be derived by non-local matching between the adjectival modifier and its internal representation.

The rest of this paper is organized as follows. Section 2 reviews Bhatt’s argument for HRA from adjectival modification. Section 3 evaluates his argument against SRCs and demonstrates that while HRA is compatible with SRCs with adjectival modifiers in English, it is insufficient to generate internal readings of adjectives in Mandarin SRCs. Section 4 argues that MA can be adjusted to derive the internal reading by assuming non-local matching. Section 5 concludes.

2. Bhatt’s (2002) argument for HRA. Previous studies provide evidence for a division of labor between HRA and MA. Arguments for HRA come from environments where the reconstruction of the relative clause head is required such as idioms, narrow scope reading of a relative clause head, and binding a reflexive in the head by a quantifier in the relative clause. On the other hand, the absence of reconstruction effect such as extraposition requires MA.

Bhatt (2002) presents a new argument for HRA based on the interpretation of certain adjectival modifiers on the head of a relative clause. As is shown in (3), a relative clause with a head NP modified by the ordinals like *first*, and *only*, or superlatives such as *longest*, involves two readings, characterized as a high and low construal of the adjective modifier, shown in (3a) and (3b), respectively.

- (3) The first/only/longest book that John said that Tolstoy has written. (Bhatt, 2002)
- a. high reading: ‘x is the first/only/longest book about which John said that Tolstoy had written x’
 - b. low reading: ‘x is the first/only/longest book that Tolstoy wrote’

Bhatt argues that HEA can only generate the high reading via intersective modification. The low reading cannot be generated because there is no way to reconstruct the head inside the relative clause. In contrast, HRA is compatible with both readings. Given that the external head originates inside the relative clause and moves to its surface position, we have the option to decide which copy of the head NP to interpret. (4a) and (4b) illustrate the LF of two readings after Copy Deletion, Trace Conversion, and *-est* Movement.

- (4) the [longest book]_i [_{CP} longest book_i that [John said [_{CP} longest book_i that [Tolstoy had written longest book_i]]]]
- a. High reading: interpret the highest CP-internal copy
the λx [-est λd [d-long book x]] [John said that [Tolstoy wrote]]

- b. Low reading: interpret the lowest CP-internal copy
 LF after Copy Deletion, Trace Conversion, and -est Movement:
 the λx [John said that -est λd [Tolstoy wrote [the d-long book x]]]

MA also involves a movement chain. However, Bhatt claims that MA cannot generate the low readings properly because the external head is not related to the internal head by movement and thus must be interpreted in a relative clause external position, as in (5). Unattested reading will be generated if John has been making claims that vary from time to time.

- (5) LF of the low reading after -est Movement:
 the λx [-est λd [d-long book x]] λx [John said that -est λd [Tolstoy had written [the d-long book x]]]

But Bhatt mentions in footnote 14 that one possibility to make the structure interpretable is to assume that matching between the external and the internal head applies at LF so that there is no -est in the external head. We will see that this possibility must be allowed to generate the proper readings of SRCs in Mandarin when reconstruction is not possible.

3. HRA is incompatible with SRCs in Mandarin.

3.1. SRCs IN MANDARIN. A stacked relative clause employs one head noun shared by two or more relative clauses. When the head noun is modified by adjectives, such as (6), the meaning is ambiguous as *first* can either refer to the place Mary visited (6a) or the place Bill knew (6b). Different from English where relative clauses are head-initial, in Mandarin, both the adjectives and restrictive relative clauses are prenominal, and their ordering is relatively free. As in (7), the English phrase in (6) has three meaning-equivalent counterparts in Mandarin. Following Xu (2009), we analyze the relativizer *de* as the head of the relative clause CP. The adjectival modifier *diyige* ('first') can occur before two stacked relative clauses (7a), after them (7c), or in between (7b). In all three configurations, the whole phrase involves two readings, where the adjective can either be interpreted within the inner relative clause *Mali qu de*, as in (6a), or within the outer relative clause *Bier zhidao de*, as in (6b).

- (6) the first place [that Mary visited] [that Bill knew]
 - a. the first place that Mary visited among what Bill knew
 - b. the first place that Bill knew among the places Mary visited

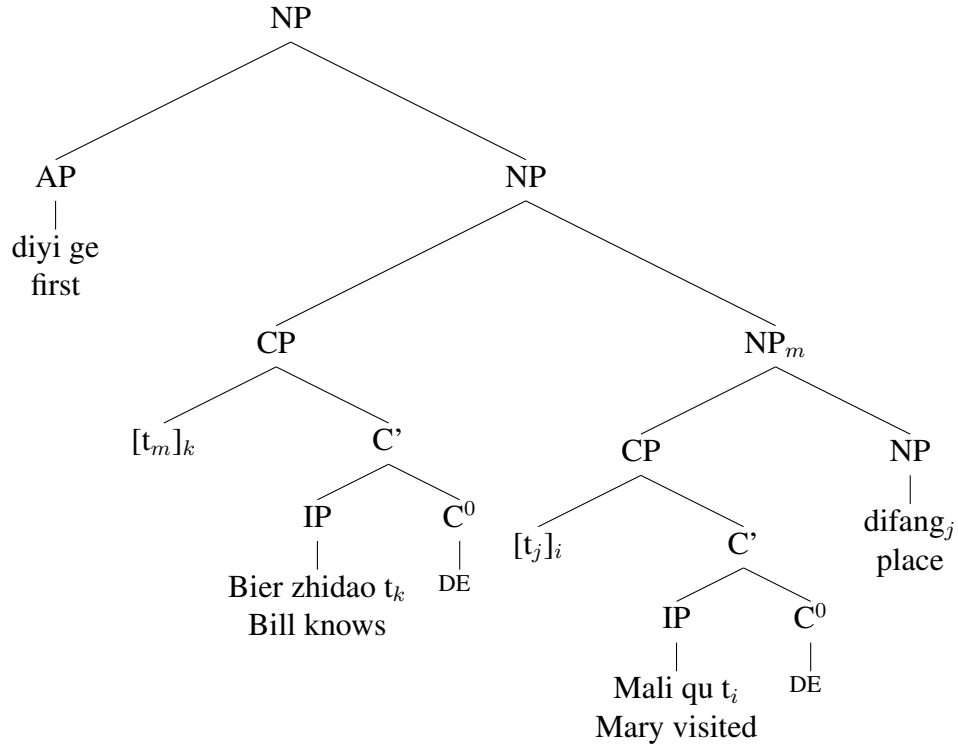
- (7) a. *diyige* [Bier zhidao de] [Mali qu de] difang
 first Bill knew REL Mary visited REL place
- b. [Bier zhidao de] *diyige* [Mali qu de] difang
 Bill knew REL first Mary visited REL place
- c. [Bier zhidao de] [Mali qu de] *diyige* difang
 Bill knew REL Mary visited REL first place

3.2. INTERPRETING SRCs WITH HRA. We show that HRA is incompatible with the internal interpretation of adjectives in Mandarin SRCs. Szabolcsi (1986) and Heim (1995) claim that superlative *-est* can only associate with a focus that it c-commands at LF such as ‘*-est* λd Bill_F wanted [PRO to get the d-few letters].’, and the association with focus is constrained by syntactic islands such that while *-est* can move out of a subjunctive clause, it cannot move out of a finite clause. Bhatt (2002) claims that their analysis of superlative carries over to ordinals like *first*. As is shown in (8a-d), to derive the internal reading (6a) of the SRC in (6), the adjective *first* needs to be reconstructed into the inner relative clause *that Mary visited* by applying Copy Deletion and Trace Conversion (Fox 2002) twice. After reconstruction, *first* moves to the c-commanding position of the inner relative clause, as in (8e).

- (8) a. the $[[\text{first place that Mary visited}]_i [[\text{Op first place that Mary visited}]_i]_j$ that Bill knew
 $[\text{Op first place that Mary visited}]_j]$
 b. ιx [that Bill knew ιy [first place y that Mary visited $\wedge y = x$]]
 c. ιx [that Bill knew ιy $[[\text{first place } y]_i [[\text{Op first place } y]_i]_j$ that Mary visited
 $[\text{Op first place } y]_j] \wedge y = x$]
 d. ιx [that Bill knew ιy [that Mary visited ιz [first place $z \wedge z = y$] $\wedge y = x$]]
 e. ιx [that Bill knew ιy [that first Mary visited ιz [place $z \wedge z = y$] $\wedge y = x$]]

However, in Mandarin SRCs such as (7a), the internal reading (6a) cannot be derived by reconstructing the adjectival modifier into the inner relative clause. As shown in (9), the adjective *diyige* is merged outside the inner relative clause and does not form a constituent with the head noun *difang*. Since only the head noun can be reconstructed, there is no internal interpretation of *diyige*, and it must be interpreted outside the inner relative clause, making the internal interpretation of (7a) unavailable with HRA.

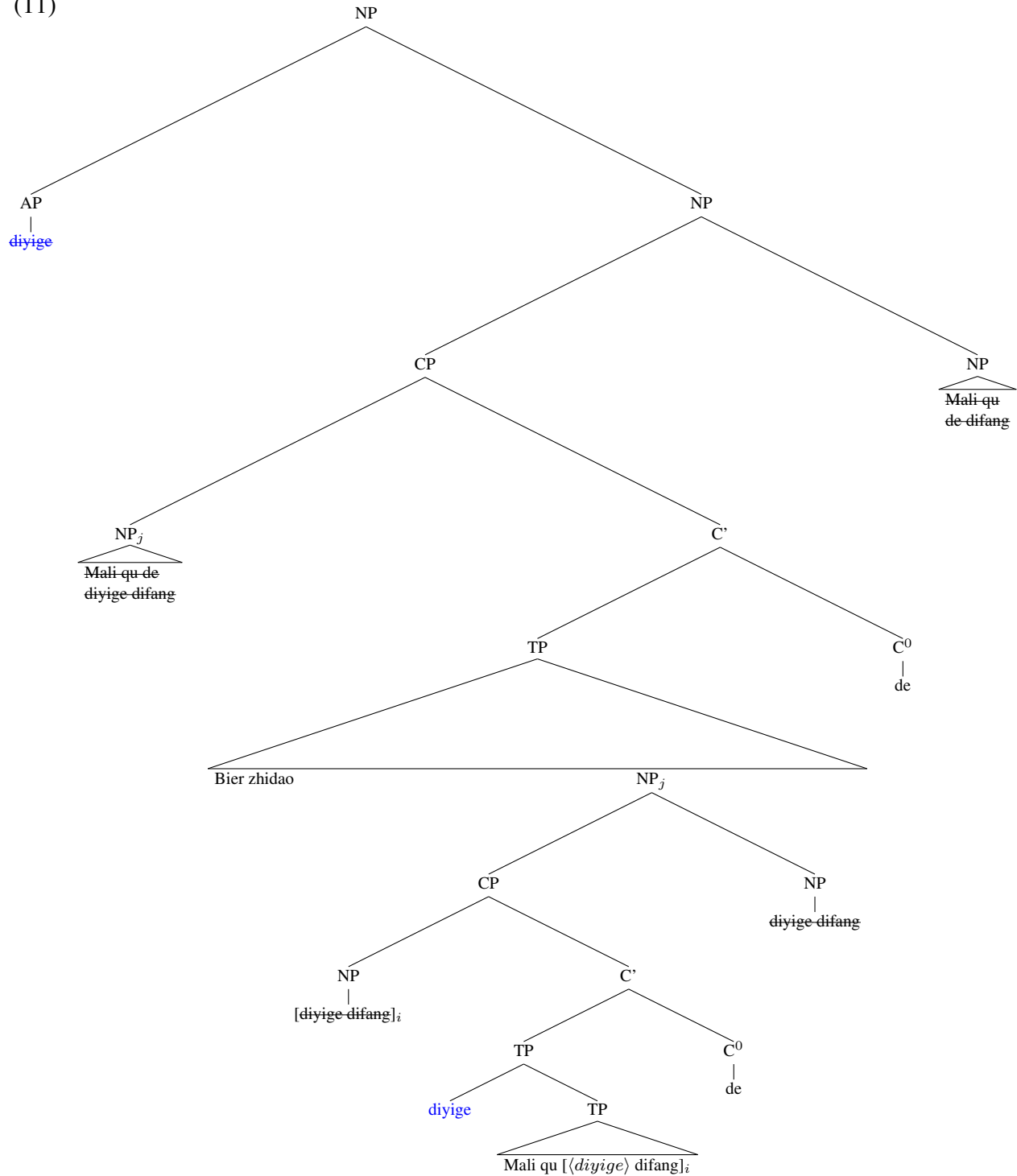
(9)



4. MA is compatible with SRCs in Mandarin. We propose that the internal reading (6a) of (7a) can instead be derived with MA by assuming non-local matching of adjectival modifiers in Mandarin SRCs. Different from HRA which assumes the external head moves from clause internal position, MA postulates that the external head and its internal representation are matched under identity. We assume that matching applies at both PF and LF. While the internal representations are deleted at PF after matching, the external head is deleted at LF. Take (7a) as an illustration, repeated in (10). Its LF is in (11). To generate the reading in (6a), after Copy Deletion, the internal representation of *diyige* undergoes *-est* Movement, moving from the complement of the verb *qu* to the c-commanding position of the inner relative clause. The adjectival modifier outside the relative clause is non-locally matched with the lowest internal representation and deleted under identity at LF.

(10) *diyige* [Bier zhidao de] [Mali qu de] difang
first Bill knew REL Mary visited REL place
the first place that Mary visited that Bill knew

(11)



5. Conclusion. This paper argues that the relative clause internal interpretation of adjectival modifiers on the head is an insufficient argument for HRA by showing that in Mandarin SRCs the internal interpretation of adjectives is allowed while the reconstruction is impossible. We propose that MA can be adjusted to derive the internal reading by assuming non-local matching.

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