Economy determines movement type in the Mandarin *lian...dou* construction

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Abstract This paper examines the syntactic properties of the *lian...dou* construction in Mandarin Chinese (also known as the Chinese *even*-construction). I observe that despite constant syntactic and semantic effects, DP foci undergo A-movement while VP and CP foci are derived by Ā-movement. To account for this, I argue that movement types are not always tied to the agreeing feature(s) involved (cf. van Urk 2015), but can also be determined by economy. The agreeing feature involved in the *lian...dou* construction is identified as the [ScalarAdd] feature, which triggers movement of the focused phrase but does not specify the movement type. I show that the divergence in movement types follows from economy and the constraint on the interpretation of A-chains, without resorting to the [ScalarAdd] feature. An explicit economy calculus implies that A-chains are arguably less costly than Ā-chains, resulting in a preference for A-chains. However, A-chains are restricted to abstraction over individual-type variables (type $<e>$). VP/CP foci cannot undergo A-movement because they are expressions of higher types (e.g., type $<e,t>$ and $<s,t>$). Consequently, while DP foci undergo A-movement due to economy, only Ā-movement is available for VP/CP foci.

Keywords: the *lian...dou* construction; Mandarin Chinese; the *even*-meaning; phrasal movement; the A/Ā distinction; economy

1 Introduction

One of the key discoveries in linguistic theory is the identification of two distinct types of phrasal movement: A- and Ā-movement (Postal 1971; Chomsky 1977; 1981 and subsequent work). Table 1 summarises some of the widely acknowledged distinctions between A- and Ā-movement, also known as the A/Ā distinction.

Properties	A-movement	Ā-movement
Is short/long-distance	Mostly short	Long
Is restricted to arguments	Yes	No
Assigns case	Yes	No
Binds an anaphor	Yes	No
Is the subject of a depictive	Yes	No
Induces weak crossover (WCO) effect	No	Yes
Reconstructs for binding and scope	Limited	Mostly yes

Table 1: The A/Ā distinction

Since the GB era, the A/Ā distinction has been linked to properties of the landing sites, which are classified into inherent A- and Ā-positions (Chomsky 1981; Déprez 1989; Mahajan 1990; Miyagawa 2010). More recently, there has been a tendency to define it in terms of the feature that triggers movement (Chomsky 2007; Obata & Epstein 2011; Abels 2012; van Urk 2015). On the latter approach, properties of movement are solely derived from properties of the agreeing

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feature(s) involved. Features inherent in nominals (e.g., ϕ-features) trigger A-movement, and those optionally present (e.g., *wh*-feature) trigger Ā-movement.[1]

In this paper, I argue that movement types are not always tied to agreeing features or landing sites, but can also be determined independently. This argument is based on a detailed empirical investigation of the *lian…dou* construction in Mandarin Chinese. Descriptively, despite constant syntactic and semantic effects across fronted categories, DP foci undergo A-movement while VP/CP foci involve Ā-movement. For illustration, consider the following examples.

(1) Wǒ lián Zhāngsān$_k$ dōu cóng tā-zìjǐ$_k$ de   jiā   lǐ gǎnzǒu le   t$_k$.
     I   lian Zhangsan dou from s/he-self POSS home in dislodge ASP
     'I dislodged even Zhangsan$_k$ from his$_k$ own house.'

Example (1) shows that fronted DPs can bind an anaphor, which is a typical property of A-movement.[2] Although researchers generally agree that fronted DPs in the *lian…dou* construction undergo A-movement (Shyu 1995; Badan 2008; Badan & Del Gobbo 2015), fronted VPs and CPs in this construction are little studied. I will introduce novel reconstruction data that fronted DPs do not reconstruct but fronted VPs/CPs do. In example (2), the anaphor *tā-zìjǐ* within the fronted DP cannot be bound under reconstruction. By contrast, when the anaphor is embedded in the fronted VP in (3) and the fronted CP in (4), it is bound by a structurally lower argument, namely, *Zhangsan*.[3] This indicates that reconstruction is available in the cases of fronted VP and CP.

(2) *Wǒ lián [$_{DP}$ tā-zìjǐ$_k$ de   fángzi]$_i$ dōu bī   Zhāngsān$_k$ màidiào le   t$_i$.
     I   lian [$_{DP}$ s/he-self POSS house] dou force Zhansgan sell   ASP
     Intended: 'I forced Zhangsan$_k$ to sell even his$_k$ own house.'

(3) Wǒ lián [$_{VP}$ màidiào tā-zìjǐ$_k$ de   fángzi]$_i$ dōu bī   Zhāngsān$_k$ zuò le   t$_i$.
     I   lian [$_{VP}$ sell   s/he-self POSS house] dou force Zhangsan do ASP
     'I even forced Zhangsan$_k$ to sell his$_k$ own house.'

(4) Wǒ lián [$_{CP}$ tā-zìjǐ$_k$ de   érzi chū chēhuò   le]$_i$ dōu méi gàosù Zhāngsān$_k$ t$_i$.
     I   lian [$_{CP}$ s/he-self POSS son have car-accident SFP] dou NEG tell   Zhangsan
     'I didn't even tell Zhangsan$_k$ that his$_k$ own son had a car accident.'

I argue that movements in the *lian…dou* construction are consistently motivated by a [Scalar$_{Add}$] feature, which attracts the focused phrase to its scope position. However, the [Scalar$_{Add}$] feature differs from typical agreeing features in that it does not determine movement type. The A/Ā distinction between DP and non-DPs is determined by economy and the constraint on the interpretation of A-chains. Under the copy theory of movement (Chomsky 1993; 1995), movement chains are standardly interpreted via abstraction of different types (Sauerland 1998; 2004; Ruys 2000; van Urk 2015; Branan & Erlewine 2021; Keine & Poole 2023; Poole 2024). A-chains trigger abstraction over individual variables. On the other hand, Ā-chains trigger abstraction over choice function variables, accompanied by distributed deletions of copies. All else being equal, economy prefers A-chains over Ā-chains because Ā-chains trigger more operations. However, A-chains of VPs/CPs are not possible because these categories are higher-type expressions (e.g., type $< e,t >$ and $< s,t >$). Consequently, while DP foci undergo A-movement due to economy, VP/CP foci are compelled to head Ā-chains.

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[1] A third logical possibility is that properties of the moving phrases determine the A/Ā distinction, see Safir (2019) as an implementation.

[2] All judgments are either taken from the literature or from my consultants. The core observation has been verified by 17 native speakers from mainland China. Their judgments are unanimous. Some reconstruction readings are slightly hard to access without context. Due to space limits, I provide contexts in English. Original Chinese data is provided in Appendix A.

[3] I follow Shyu (1995) in assuming that *zuò* 'do' is a dummy verb, similar to supportive *do* in English.

The argumentation proceeds as follows. Sect. 2 provides an overview of the *lian*. . . *dou* construction. In Sect. 3, I demonstrate that the semantic and syntactic effects of the *lian*. . . *dou* construction are constant across fronted categories. Sect. 4 presents the core observation that fronted DPs exhibit A-properties while fronted VPs and CPs have Ā-properties. In Sect. 5, I argue that movement in the *lian*. . . *dou* construction is driven by the focus-sensitive operator *lian*, which is syntactically encoded as a [ScalarAdd] feature. Sect. 6 develops an economy-based analysis of the multiple movement types in the *lian*. . . *dou* construction. Sect. 7 concludes.

2   An overview of the *lian*. . . *dou* construction

In Mandarin Chinese, two particles are used to express the meaning of *even*: *dou* and *lian*, as in (5). *Dou* is obligatory, occupying a preverbal position. *Lian* is optional. It combines with a focused phrase that is associated with the *even*-meaning. The combination of *lian* and the focused phrase (the *lian*-phrase) must c-command *dou*.

(5)   (lián) Zhāngsān *(dōu) chí-dào   le.
      lian Zhangsan   dou late-arrive SFP
      'Even Zhangsan arrived late.'

(6)   a. *Zhāngsān dōu gǎn chī lián [$_{DP}$ chóngzi].
          Zhangsan dou dare eat lian [$_{DP}$ insect]
      b. Zhāngsān lián [$_{DP}$ chóngzi]$_i$ dōu gǎn chī t$_i$.
          Zhangsan lian [$_{DP}$ insect]   dou dare eat
          'Zhangsan dares to eat even insects.'

Therefore, a focused object must be fronted above *dou*, inducing the SOV order in (6b). As noted by Shyu (1995), VP and CP foci must also be fronted above *dou*:[4]

(7)   Zhāngsān lián [$_{VP}$ chī chóngzi]$_i$ dōu gǎn zuò t$_i$.
      Zhangsan lian [$_{VP}$ eat insect]   dou dare do
      'Zhangsan even dares to eat insects.'

(8)   Zhāngsān lián [$_{CP}$ dìqiú shì yuán-de]$_i$ dōu bù   xiāngxìn t$_i$.
      Zhangsan lian [$_{CP}$ earth COP round-ADJ] dou NEG believe
      'Zhangsan does not even believe that the Earth is round.'

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[4] Fronted foci occur in a post-subject position (internal *lian*-phrases) or a pre-subject position (initial *lian*-phrases), associated with distinct interpretations and syntactic properties (Shyu 1995; Badan 2008; Badan & Del Gobbo 2015). For example, an initial *lian*-phrase can take a topic maker *a* or a resumptive pronoun *ta*, but an internal *lian*-phrase is incompatible with either:

(i)   Zhāngsān lián [Li jiàoshòu]$_i$ (*a) dōu bù xìnrèn (*tā)$_i$.
      Zhangsan lian [Li professor] TOP dou NEG trust s/he

      'Zhangsan does not trust even Professor Li.'

(ii) lián [Li jiàoshòu]$_i$ (a) Zhāngsān dōu bù xìnrèn (tā)$_i$.
      lian [Li professor] TOP Zhangsan dou NEG trust s/he

      'Even Professor Li, Zhangsan does not trust (him/her).'

It will take us too far afield to consider initial *lian*-phrases and properties of internal *lian*-phrases are sufficient to illustrate the multiple types of movement in the *lian*. . . *dou* construction.

These fronted categories are derived by phrasal movement because of their sensitivity to locality constraints (Shyu 1995; Badan & Del Gobbo 2015).[5] Take DP foci for illustration. Example (9) is ungrammatical because extracting the DP from the relative clause violates the locality constraint on complex NPs (Ross 1967).

(9)   Zhāngsān lián Qiaomusiji$_k$ dōu bù   xǐhuān [$_{NP}$ [t$_k$ xiě t$_i$ de]   shū$_i$].
        Zhangsan lian Chomsky   dou NEG like   [$_{NP}$ [t$_k$ write t$_i$ COMP] shu]
        Intended: 'Zhangsan does not like the book that even Chomsky wrote.'

3 The syntactic and semantic effects of the *lian*. . . *dou* construction

3.1 The syntactic effect: all categories are fronted to the same position

Preverbal adverbials in Mandarin Chinese obey the same constraint on the order of adverbials as do all other languages with a well-studied adverbial system (Cinque 1999; Ernst 2004; 2014). The order of adverbials in Mandarin Chinese is schematised in (11).

(10)   (Ernst 2014: 52)
        Discourse-oriented > Evaluative > Epistemic > Subject-orientated > Manner/degree

In fronted foci cases, *dou* is lower than subject-orientated adverbs but higher than manner adverbs. Example (11) shows that *dou* must be higher than the manner adverb *dàshēng-de*. The adverb *cōngmíng-de* is ambiguous between a manner and a subject-oriented interpretation. It has the subject-oriented interpretation when it precedes the fronted *lian*-phrase, as in (12a). But in example (12b) where it follows *dou*, it only has the manner interpretation.[6] Assuming that subject-orientated adverbs adjoin to IP and manner adverbs adjoin to the lexical VP, these examples suggest that *dou* sits lower than IP but higher than the lexical VP.

(11)   Zhāngsān <*dàshēng-de> lián lǎoshī$_i$ dōu <dàshēng-de> mà   le   t$_i$.
        Zhangsan   loudly-ADV lian teacher dou loudly-ADV scold ASP
        'Zhangsan scolded even the teacher loudly.'

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[5] Cheng & Vicente (2013) argue that examples like (i) are derived by head movement, which has the peculiar property of allowing Spell-Out of more than one copy. However, the head movement analysis seems untenable. First, doubled verbs can take distinct objects, as in (ii). Second, Sect. 4.2 shows that movement of VPs reconstructs. If VP doubling is derived by movement, it is surprising that the higher VP does not reconstruct, as in (iii). Following the analysis of VP doubling by Hsu (2008; 2013) and Yin (2023), I assume that in these examples, an adjunct VP focus is base-generated above *dou*.

(i)   Tā lián hē   dōu bù yuànyì hē.
       s/he lian drink dou NEG willing drink
       "S/he is not willing to even drink (anything).'

(ii)   tā lián hē   shuǐ dōu zhǐ hē Bǎilì-shuǐ.
       s/he lian drink water dou only drink Perrier-water
       'S/he drinks only Perrier even when s/he just needs to drink some water'

(iii)   Lǐsì lián [$_{VP}$ niàn mǒu-ge   xuéshēng de   míngzi] dōu yǒu liǎng-cì [$_{VP}$ niàn-cuò   le].
       Lisi lian [$_{VP}$ spell some-CLF student   POSS mingzi] dou have two-CLF [$_{VP}$ spell-wrong ASP]
       some > two: 'For some students, Lisi even mispronounced their names twice.'
       *two > some: 'There are two occasions on which Lisi even mispronounced the names of some (different) students.'

[6] The position in between the *lian*-phrase and *dou* is not possible because of the adjacency effect, see discussions in the following paragraphs.

(12)   a.   Zhāngsān hěn cōngmíng-de lián [jìzhě   zuì-nán-de   wèntí]$_i$ dōu
               Zhangsan very smart-ADV   lian [reporter most-difficult-ADJ question] dou
               huíbì   le   t$_i$.
               sidestep ASP

       b.   Zhāngsān lián [jìzhě   zuì-nán-de   wèntí]$_i$ dōu hěn cōngmíng-de
               Zhangsan lian [reporter most-difficult-ADJ question] dou very smart-ADV
               huíbì   le   t$_i$.
               sidestep ASP

               (12a): 'Zhangsan is smart in that he sidestepped even the most difficult question from the reporter.

               (12b): 'Zhangsan sidestepped even the most difficult question from the reporter in a smart way.'

As for fronted categories, they must be adjacent to *dou*. This adjacency effect rules out examples like (13)-(15), in which the fronted categories are separated from *dou* by adverbials.[7]

(13)   *Zhāngsān lián [$_{DP}$ xīzhǔrèn]$_i$ **zuótiān** dōu mà   le   t$_i$.
       Zhangsan lian [$_{DP}$ dean]   yesterday dou scold ASP
       Intended: 'Zhangsan scolded even the dean yesterday.'

(14)   *Zhāngsān lián [$_{VP}$ chī guòqī-de   shíwù]$_i$ **chángcháng** dōu bī   Lǐsì zuò t$_i$.
       Zhangsan lian [$_{VP}$ eat expired-ADJ food]$_i$ usually   dou force Lisi do
       Intended: 'Zhangsan usually forces Lisi even to eat the expired food.'

(15)   *Zhāngsān lián [$_{CP}$ Lǐsì shì jiàndié]$_i$ **yìzhí** dōu bù   zhīdào t$_i$.
       Zhangsan lian [$_{CP}$ Lisi is   spy]   always dou NEG know
       Intended: 'Zhangsan has never even realised that Lisi is a spy.'

Note that, in example (16), the focused subject can be separated from *dou* by the evaluative adverb *jūrán*.

(16)   Lián Zhāngsān **jūrán**   dōu chídào   le.
       lian Zhangsan surprisingly dou late-arrive SFP
       'Surprisingly, even Zhangsan arrived late.'

I argue that example (16) does not void the overarching argument that foci in the *lian. . . dou* construction have uniform distribution across all categories. This adverb can also intervene between focused VPs/CPs and *dou* if they function as subjects:

(17)   Lián [$_{VP}$ PRO qí   zìxíngchē] **jūrán**   dōu yào kǎo   jiàzhào   le.
       lian [$_{VP}$ PRO ride bicycle]   surprisingly dou must apply drive-license SFP
       'Surprisingly, even riding bicycles requires a driving license.'

(18)   (Zài gǔ-dài),   lián [$_{CP}$ dānshēn qīngnián   zìyóu yuēhuì] **jūrán**   dōu bù
       (at ancient-times), lian [$_{CP}$ single   young_people freely date]   surprisingly dou NEG
       kěyǐ.
       allow
       '(In ancient times), surprisingly, even young men and women freely dating was not allowed.'

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[7] I will not explain the adjacency effect here, but it is implied by my syntactic analysis in which fronted foci and *dou* are in a Spec-head relation. I am developing a semantic account in another paper.

This parallel indicates that with respect to this adverb, there is no difference in distribution among subject foci of different categories. Notably, in examples (19)-(21) where the adverb *jūrán* is replaced by the aspectual adverb *yǐjīng*, the adjacency effect shows up again.

(19)   Lián Zhāngsān <dōu> **yǐjīng** <*dōu> chídào   le.
         lian Zhangsan dou already   dou late-arrive SFP
         'Even Zhangsan has already arrived late.'

(20)   Lián [VP PRO qí   zìxíngchē] <dōu> **yǐjīng** <*dōu> yào kǎo   jiàzhào   le.
         lian [VP PRO ride bicycle]   dou already   dou must apply drive-license SFP
         'Even riding bicycles already requires a driving license.'

(21)   (Zài gǔ-dài),   lián [CP dānshēn qīngnián   zìyóu yuēhuì] <dōu> **yǐjīng**
         (at   ancient-times), lian [CP single   young_people freely date]   dou already
         <*dōu> bèi   shèhuì jiēshòu le
           dou   PASS society accept   ASP
         '(In ancient times), even young men and women have already been accepted to date freely.'

These examples suggest that the distributional differences should be tied to what is focused (e.g., the subject versus the object), not to syntactic categories. Descriptively, the adjacency effect between subject foci and *dou* is exempted for some high adverbs, whereas the same effect blocks any adverbs in between fronted foci and *dou*. What is crucial is that all eles equal, all syntactic categories behave in the same way. Regarding fronted foci, I take their adjacency to *dou* as evidence that all categories are fronted to the same position.

3.2   The semantic effect: the same focus interpretation of *lian*-phrases

According to Rooth's (1985; 1992) focus semantics, a focused element introduces a set of alternatives of the same semantic type. As for *even*, it introduces an additive presupposition and a scalar presupposition (Horn 1969; Fauconnier 1975; Karttunen & Peters 1979; Rooth 1985; Krifka 1991; Crnič 2011). The additive presupposition states that an alternative proposition distinct from the prejacent (the semantics of the sentence without *even*) is true. The scalar presupposition says that for every true alternative proposition, the likelihood of that proposition exceeds the likelihood of the prejacent.

In the *lian…dou* construction, it is generally assumed that the presuppositions of *even* are encoded by the semantics of *lian* and *dou*, and movement of *lian*-phrases is uniformly motivated by this particular focus interpretation (Shyu 1995; 2004; 2016; 2018; Badan 2008; M. Xiang 2008; Constant & Gu 2010; Liao 2011; Z. Chen 2019; Zhao 2019; Y. Xiang 2020).[8] The focus particle *lian*, just like *only* and *even*, requires 'association with focus' (Jackendoff 1972; Rooth1985; 1992 and subsequent works). It can combine with different categorie, such as a DP in (22), a VP in (23) and a CP in (24). However, the *lian*-phrase in each case contains the same focused element, namely, *laoban* 'boss'.[9] The focus interpretation in each example is also roughly the same: compared to criticising others, criticising the boss is less likely to happen with *Zhangsan*. This suggests that as long as the alternative-generating focus remains the same, the focus interpretation is constant across fronted categories. In other words, differences in syntactic categories do not affect the focus interpretation.

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[8] Given that *lian* is optional, I follow previous researchers in assuming that *lian* is always present, covertly or overtly (Kuo 2003; M. Xiang 2008; Shyu 2016; Z. Chen 2019)

[9] I use '__F' to indicate the alternative-generating focus. For simplicity, I describe fronted categories as focused phrases. However, what is fronted is essentially the category to which the squiggle operator attaches. It can be the focus or contain the focus. This complication has no bearing on the argumentation.

(22) Zhāngsān lián [$_{DP}$ duì   lǎobǎn$_F$ de   pīpíng]$_i$ dōu gǎn dāng-miàn tí-chūlái   t$_i$.
     Zhangsan lian [$_{DP}$ against boss   COMP criticism] dou dare at-face   put-forward
     'Zhangsan dares to criticise even the <u>boss$_F$</u> face to face.'

(23) Zhāngsān lián [$_{VP}$ dāngmiàn pīpíng   lǎobǎn$_F$]$_i$ dōu gǎn zuò t$_i$.
     Zhangsan lian [$_{VP}$ at-face   criticise boss] dou dare do t
     'Zhangsan even dares to criticise the <u>boss$_F$</u> face to face.'

(24) Lǐsì lián [$_{CP}$ Zhāngsān dāngmiàn pīpíng   le   lǎobǎn$_F$]$_i$ dōu bù   zhīdào t$_i$.
     Lisi lian [$_{CP}$ Zhangsan at-face   criticise ASP boss]   dou NEG know
     'Lisi did not even know that Zhangsan criticised the <u>boss$_F$</u> face to face.'

Moreover, sentences are uniformly infelicitous if foci are construed as at the higher end of a likelihood scale, regardless of their syntactic categories. In examples (25)-(27), the focused phrases introduce a scale of water and its alternatives. However, under the context in (25), water is unlikely to be ranked lower on a likelihood scale.

(25) *Context: people must keep themselves hydrated, particularly during sweltering days.*

     #Lǐsì lián [$_{DP}$ <u>shuǐ$_F$</u>]$_i$ dōu jīngcháng hē   t$_i$.
       Lisi lian [$_{DP}$ water] dou always   drink

     'Lisi always drinks even <u>water$_F$</u>.'

(26) #Lǐsì lián [$_{VP}$ he   shuǐ$_F$]$_i$ dōu jīngcháng zuò t$_i$.
     Lisi lian [$_{VP}$ drink water] dou always   do
     'Lisi always even drinks <u>water$_F$</u>.'

(27) #Lǐsì lián [$_{CP}$ rén   xūyào hē   shuǐ$_F$]$_i$ dōu zhīdào t$_i$.
     Lisi lian [$_{CP}$ people need   drink water] dou know
     'Lisi even knows that people need to drink <u>water$_F$</u>.'

4   The A/Ā distinction within the *lian...dou* construction

Although the syntactic and semantic effects are constant across fronted categories, DPs and non-DPs are derived by movement of different types. The findings are summarised in Table 2.[10] I will show that fronted DPs have typical A-properties. As for VPs and CPs, the consensus in the literature is that they generally do not undergo A-movement but show typical Ā-properties. Although most of the tests for A/Ā-properties cannot be applied to VPs/CPs, I will show that fronted VPs and CPs reconstruct while DPs do not.

4.1   A-properties of fronted DPs

4.1.1   Fronted DPs can bind an anaphor

As the launching site of *Lǐsì* in (28) is too low to bind the anaphor *tā-zìjǐ*—the binding relation in (29) must involve the landing site. Movement of the *lian*-DP renders the anaphor bound by *Lǐsì*, suggesting that the focused object undergoes A-movement.

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[10] The additive particle *ye* 'also' can replace *dou* and cooccurs with *lian*-phrases. However, the use of *ye* does not change the syntactic properties of fronted categories. The choice between them is largely determined by pragmatic effects (C.-F. Chen 2004; L. Chen 2008; Wang 2008; Badan 2012).
    Shyu (1995) has shown that preverbal movement of DPs is clause-bound, does not reconstruct and does not induce WCO effect. This paper presents novel data that confirm the A-nature of fronted DPs and show the A/Ā distinction between fronted DPs and VPs/CPs.

Properties	DPs	VPs/CPs
Binds an anaphor	Yes	Not Applicable (NA)
Is the subject of a depictive	Yes	NA
Induces WCO effect	No	NA
Reconstructs for anaphor binding and scope	No	Yes

Table 2: The A/Ā distinction in the *lian. . . dou* construction

(28) *Wǒ bī   tā-zìjǐ$_k$ de   érzi chūmài le   Lǐsì$_k$.
      I   force s/he-self POSS son betray ASP Lisi
      Intended: 'I forced his$_k$ own son to betray Lisi$_k$.'

(29) Wǒ lián Lǐsì$_k$ dōu bī   tā-zìjī$_k$ de   érzi chūmài le   t$_k$.
      I   lian Lisi dou force s/he-self POSS son betray ASP
      'Even Lisi$_k$, I forced his$_k$ own son to betray him$_k$.'

Similarly, the anaphor *tāmen-zìjǐ* is bound when the universal is fronted above *dou* in (30b), yielding a reading in which the choice of office varies with the choice of manager.

(30) a. *Wǒ zài tāmen-zìjǐ$_k$ de   bàngōngshì lǐ pīpíng le měi-gè   jīnglǐ$_k$ yi-dun.
          I   at they-self   POSS office   in criticise $_{asp}$ every-CLF manager one-CLF
          Intended: 'I criticized every manager$_k$ in their$_k$ own offices.'
      b. Wǒ lián [měi-gè   jīnglǐ]$_k$ dōu zài tāmen-zìjǐ$_k$ de   bàngōngshì lǐ pīpíng le
          I   lian [every-CLF manager] dou at they-self   POSS office   in criticise $_{asp}$
          t$_k$ yi-dun.
             one-CLF
          'I criticised even every manager$_k$ in their$_k$ own offices.'

4.1.2 Fronted DPs can be the subject of a depictive

Movement of DPs in the *lian. . . dou* construction can create novel interpretations for depictive predicates. In example (31a), the object *Mǎlì* cannot be associated with the preverbal depictive *luǒ-zhe*. When the object is fronted, however, example (31b) becomes ambiguous, with *Mǎlì* construed as the subject of the depictive.

(31) a. Zhāngsān$_k$ luǒ$_{k/*n}$-zhe bào le   Mǎlì$_n$ yī-xià.
          Zhangsan nude-zhe   hug ASP Mary one-CLF
          'Zhangsan$_k$ hugged Mary$_n$ nude$_{k/*n}$.'
      b. Zhāngsān$_k$ lián Mǎlì$_n$ dōu luǒ$_{k/n}$-zhe bào le   t$_n$ yī-xià.
          Zhangsan lian Mary dou nude-zhe hug ASP   one-CLF
          'Zhangsan$_k$ hugged even Mary$_n$ nude$_{k/n}$.'

Although there is an ongoing debate about the character of *-zhe*, Djamouri and Paul (2017) have argued that *-zhe* marks secondary predicates or "[. . .] the dependent status of the verbal projection" in their own term. Example (32) is an ex-situ cleft sentence, which involves an Ā-dependency (see Pan 2017 and references there).[11] In contrast to (31b), it cannot create a novel interpretation of *luǒ-zhe*. Therefore, the novel interpretation of *luǒ-zhe* in example (31b) indicates that DPs in the *lian. . . dou* construction undergo A-movement.

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[11] The ex-situ cleft construction systematically contrasts with the *lian. . . dou* construction in terms of A/Ā distinction. For example, the ex-situ cleft construction shows reconstruction effects and induces WCO effect; see Appendix B for relevant data.

(32)   Shì Mǎlì_n, Zhāngsān_k luǒ_{k/*n}-zhe bào le   t_n yīxià.
          COP Mary, Zhangsan nude-zhe hug ASP   one-CLF
          'It is Mary_n that Zhangsan_k hugged nude_{k/*n}.'

4.1.3 Fronted DPs do not induce WCO effect

In example (33), the grammaticality of the bound-variable interpretation suggests that the universal *měi-gè zhǎngguān* can bind the pronoun *tā* and its own trace at its landing site, without inducing WCO effect.

(33)   Mǎlì lián [měi-gè   zhǎngguān]_k dōu bī   tā_k de   shìbīng chūmài le   t_k.
          Mary lian [every-CLF commander] dou force s/he POSS soldier betray   ASP
          "Even every commamder_k, Mary forced their_k soldiers to betray them_k.'

4.1.4 Fronted DPs do not reconstruct

Fronted DPs do not reconstruct for anaphor binding. Although the launching site is lower than *Zhāngsān*, the anaphor *tā-zìjǐ* in (34) cannot be bound by *Zhāngsān* under reconstruction. This sentence is ungrammatical as the anaphor is unbound at the landing site.

(34)   *Wǒ lián [_{DP} tā-zìjǐ_k de   fángzi]_i dōu bī   Zhāngsān_k màidiào le   t_i.
          I   lian [_{DP} s/he-self POSS house] dou force Zhansgan sell   ASP
          Intended: 'I forced Zhangsan_k to sell even his_k own house.'

Reconstruction for scope is not possible either. Example (35) is unambiguous. The pronoun *tā* cannot be construed as a variable bound by the universal *měi-gè māmā*.

(35)   *Wǒ lián [_{DP} tā_k de   háizi]_i dōu dāying le měi-gè   māmā_k zhàogù   hǎo t_i.
          I   lian [_{DP} she POSS child] dou promise ASP every-CLF mother look_after well
          Intended: 'I promised every mother_k that I will look after even their_k children.'

Example (36) only has the surface scope reading that *Zhāngsān* gave the same book to every student. The reversed scope reading is unavailable, indicating that the fronted DP does not reconstruct into the scope of the universal *měi-gè xuéshēng*.

(36)   Zhāngsān lián [_{DP} yì-běn Qiáomǔsījī de shū]_i dōu gěi le   měi-gè   xuéshēng t_i.
          Zhangsan lian [_{DP} one-CLF Chomsky   ADJ book] dou give ASP every-CLF student
          $\exists > \forall$: 'Even a book of Chomsky, Zhangsan gave it to every student.'
          *$\forall > \exists$: 'Zhangsan gave each student a (different) book of Chomsky.'

As shown in Table 1, reconstruction is a typical property of Ā-movement.[12] Based on their A-properties and the absence of reconstruction effects, I argue that focused DPs undergo A-movement.

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[12] A-movement in Mandarin Chinese generally does not reconstruct. In Mandarin Chinese, objects can undergo A-movement preverbally without any particles (Qu 1994; Ernst & Wang 1995; Shyu 1995; 2001; J.-i. J. Li 1996; Paul 2002; Sybesma 2021). Similar to the *lian. . . dou* construction, fronted objects in SOV sentences do not reconstruct. In example (i), the anaphor *tā-zìjǐ* cannot be bound under reconstruction. In example (ii), the fronted direct object must be construed with wide scope over the universal *xuéshēng*.

(i)   (Shyu 1995: 104)

      * Wǒ [nàxiē tā-zìjǐ_k de   shū]_i yǐjīng jiào Zhāngsān_k xiān ná-zǒu   le   t_i
        I   [those s/he-self POSS book] already ask Zhangsan first take-away ASP

      'I have asked Zhangsan_k to take away his_k own books.'

4.2 Ā-properties of fronted VPs

As literature reports, fronted VPs generally show obligatory reconstruction to their base positions (Barss 1986; 2001; Huang 1993; Heycock 1995; Takano 1995; Sauerland & Elbourne 2002; Kobele 2012). For example, while topicalisation of a DP bleeds Condition C, as in (37a), a topicalised predicate feeds Condition C in the same structural environment, as in (37b). The contrast between fronted DPs and VPs suggests that fronted VPs obligatorily reconstruct to their base positions, where Binding Condition C is evaluated.

(37)   (Takano 1995: 331-332)

    a.   [$_{DP}$ The student that John$_k$ taught]$_i$, he$_k$ said Mary criticized t$_i$.
    b.   *[$_{VP}$ Criticize the student that John$_k$ taught]$_i$, he$_k$ said Mary did t$_i$.

Fronted VPs in the *lian…dou* construction also show obligatory reconstruction for binding and scope. In (38), the anaphor *tā-zìjǐ* is bound by a PRO under reconstruction. As the matrix object obligatorily controls the PRO, the anaphor is co-referential with *Zhāngsān*. By contrast, under the same context, example (34) is ungrammatical.

(38)   *Context: Zhangsan owes me a lot of money. In order to make him pay back the debt, I forced him to sell his wife's jewellery and gave me his car. But it is far from enough.*

Wǒ lián [$_{VP}$ màidiao tā-zìjǐ$_k$ de fángzi]$_i$ dōu bī Zhāngsān$_k$ zuò le PRO$_k$ t$_i$.
I lian [$_{VP}$ sell s/he-self POSS house] dou force Zhangsan do ASP PRO

'I forced Zhangsan$_k$ to even sell his$_k$ own house.'

In example (39), the pronoun *tā* is bound by the universal *měi-gè māmā* under reconstruction. This contrasts with example (35), where the bound-variable interpretation is not possible in this context. Example (40) is unambiguous: *yī-bǎi-kuài* must be interpreted in the scope of the universal phrase *měi-gè háizi*, with the property of the fronted VP distributing over the universal.

(39)   *Context: Zhangsan and I work at the Women's Federation. Our job is to help each single mother find a suitable job. To get a promotion opportunity faster, I am willing to do more for them.*

Wǒ lián [$_{VP}$ zhàogù hǎo tā$_k$ de háizi]$_i$ dōu dāying le měi-gè māmā$_k$ t$_i$.
I lian [$_{VP}$ look_after well she POSS child] dou promise ASP every-CLF mother

'I promised every mother$_k$ that I will even look after their$_k$ children.'

(40)   Zhāngsān$_k$ lián [$_{VP}$ gěi tā$_k$ yī-bǎi-kuài]$_i$ dōu bī měi-gè háizi zuò le t$_i$.
Zhangsan lian [$_{VP}$ give s/he one-hundred-yuan] dou force every-CLF child do ASP
∀ > ∃: 'Zhangsan$_k$ forced each student even to give him$_k$ one hundred yuan.'
*∃ > ∀: 'Zhangsan$_k$ forced every child even to give him$_k$ one hundred yuan (in total).'

(ii)   Zhāngsān yuànyì [yì-běn Qiáomǔsījī de shū]$_i$ sònggěi měi-gè xuéshēng t$_i$.
Zhangsan willing [one-CLF Chomsky ADJ book] give every-CLF student
∃ > ∀: 'A book of Chomsky, Zhangsan is willing to give it to every student.'
*∀ > ∃: 'Zhangsan is willing to give each student a (different) book of Chomsky.'

One may contend that the PRO in (38) moves with the fronted VP, so the anaphor can be bound without reconstruction, as in (41). I argue that example (41) still involves reconstruction but on the basis of different considerations. That is, to determine the interpretation of PROs, the obligatory control verb must c-command its complement via reconstruction of the latter.

(41)   Wǒ lián [PRO$_k$ [$_{VP}$ màidiao tā-zìjǐ$_k$ de   fángzi]]$_i$ dōu bī   Zhāngsān$_k$ zuò le   t$_i$.
        I   lian [PRO [$_{VP}$ sell   s/he-self POSS house]] dou force Zhangsan do   ASP
        'I forced Zhangsan$_k$ to even sell his$_k$ own house.'

4.3   Ā-properties of fronted CPs

4.3.1   CPs do not undergo A-movement

Like VPs, CPs generally do not undergo A-movement. Observations that go back to Koster (1978) show that sentential subjects cannot reside in the canonical subject position where DP arguments occupy. For example, CPs, unlike argument DPs, cannot occur in the ECM subject position:

(42)   (Alrenga 2005: 185)

        a.   *John believes [$_{CP}$ that the cult members cloned a human baby] to be true.
        b.   John believes [$_{DP}$ their claim] to be true.

These facts have led researchers to argue that CP fronting must be derived by a mechanism involving Ā-movement to a position above the subject. A DP argument, covert or overt, is the true subject in these sentences (Koster 1978; Alrenga 2005; Takahashi 2010; among many others). In Dutch, the pronoun *data* may occur in between the sentential subject and the verb phrase, as in (43). A similar English example (44) is also acceptable when the pronoun *that* (*much*) bears sufficient emphatic stress.

(43)   (Alrenga 2005: 181)

        Dat hij komt   (data) is duidelijk.
        hat he comes that   is clear

        'That he will come is clear.'

(44)   (Alrenga 2005: 181)
        That the Giants lost the World Series, THAT (MUCH) is now clear.

However, the behaviour of fronted CPs is more complicated than that of fronted VPs. One of the generalisations people have made from fronted CPs is given in (45) (for an overview of the evidence for (45) accumulated in the past literature, see Alrenga 2005).

(45)   *The DP Requirement* (Moulton 2013: 257)
        The gap of a fronted CP (sentential subject or topic) must be a DP.

This generalisation also holds in the *lian. . . dou* construction. Namely, only those verbs that can select a DP allow their clausal complements to be fronted. Example (46a) shows that the verb *rènwéi* does not take a DP complement. As predicted by *the DP Requirement*, the CP complement of *rènwéi* cannot be fronted, as in (46b).[13]

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[13] CP complements can bear the *even*-meaning, when modified by the focus adverb *shènzhì* 'even':

(46)   a. *Zhāngsān rènwéi [_DP_ [Lǐhuá shì jiàndié de] shì].
            Zhangsan think [_DP_ [Lihua COP spy   COMP] matter]
            Intended: 'Zhangsan thinks about the matter that Lihua is the spy.'
    b. *Zhāngsān lián [_CP_ Lǐhuá shì jiàndié]_i dōu rènwéi t_i.
            Zhangsan lian [_CP_ Lihua COP spy]   dou think
            Intended: 'Zhangsan even thinks that Lihua is the spy.'

In contrast, the verb *zhīdào* can take a DP complement, as in (47a). Its CP complement can be fronted, as in (47b).

(47)   a. Zhāngsān bù zhīdào [_DP_ [Lǐhuá shì jiàndié de] shì].
            Zhangsan NEG know [_DP_ [Lihua COP spy   COMP] matter]
            Intended: 'Zhangsan does not know the matter that Lihua is the spy.'
    b. Zhāngsān lián [_CP_ Lǐhuá shì jiàndié]_i dōu bù zhīdào t_i.
            Zhangsan lian [_CP_ Lihua COP spy]   dou NEG know
            'Zhangsan even does not know that Lihua is the spy.'

One account of *the DP requirement* (which I will reject later) assumes that fronted CPs are embedded in a null DP shell and the gap position is created by movement of this DP (Rosenbaum 1965; Emonds 1972; Davies & Dubinsky 2001; 2009; Takahashi 2010):

(48)   (Alrenga 2005: 182)
    [_DP_ [_CP_ That the Giant would lose]]_i John never expected t_i.

Adopting this approach for the *lian. . . dou* construction suggests that, like fronted DPs, fronted CPs should not reconstruct. However, the next section will show that fronted CPs do reconstruct. This seems to present a paradox. On the one hand, *the DP requirement* suggests that fronted CPs share properties of DPs. On the other hand, if CPs are embedded in a null DP shell, it is surprising that fronted CPs behave differently from real DPs in reconstruction. In fact, this paradox arises only if we superficially tie movement types to syntactic categories (of the gap position). In Sect. 6, I will argue that fronted DPs and CPs are derived by movement of different types because their semantic types differ: while DPs are of type $<e>$ as standardly assumed, CPs are of type $<e,t>$ (Kratzer 2006; Moulton 2009; 2015).

4.3.2 Reconstruction of fronted CPs

Fronted CPs behave differently from fronted DPs in that they show reconstruction effects. Recall that A-movement in Mandarin Chinese never reconstructs, reconstruction of fronted CPs suggests that they are not derived by A-movement. In example (49), the embedded subject *tā-zìjǐ* is bound by *Zhāngsān* under reconstruction.

(49)   Wǒ lián [_CP_ tā-zìjǐ_k de érzi chū chē-huò le]_i dōu méi gàosu Zhāngsān_k t_i.
        I   lian [_CP_ s/he-self POSS son have car-accident SFP] dou NEG tell   Zhangsan
        'I didn't even tell Zhangsan_k that his_k own son was in a car accident.'

Bound-variable interpretations are also attested. The pronoun *tā* in (50) can be bound under reconstruction even if the CP is fronted above the universal *měi-gè jìngpìngzhě*.

(i)   Zhāngsān shènzhì rènwéi [_CP_ Lǐhuá shì jiàndié].
        Zhangsan even   think [_CP_ Lihua COP spy]
        'Zhangsan even thinks that Lihua is the spy.'

(50)   *Context: The company plans to recruit a new researcher. Applicants must have a doctoral degree, and those with work experience will be given priority. As the head of human resources, I am responsible for conducting background checks on candidates. At first, each candidate only admitted that he had no work experience. But with convincing evidence,*

Wǒ lián [$_{CP}$ tā$_k$ de   bóshì bìyè-zhèng shì jiǎ-de]$_i$ dōu ràng měi-gè
I   lian [$_{CP}$ s/he POSS doctor diploma   COP fakeADJ] dou make every-CLF
jìngpìnzhě$_k$ chéngrèn le   t$_i$.
candidate admit   ASP

'I even made every candidate$_k$ admit that their$_k$ PhD diplomas are fake.'

In sum, fronted DPs exhibit typical A-properties and do not reconstruct, but fronted VPs and CPs do reconstruct. Given that A-movement in Mandarin Chinese does not reconstruct, I argue that DP foci undergo A-movement while VP foci undergo Ā-movement. As for CP foci, complications come from *the DP requirement*. In Sect. 6, I will introduce the null operator analysis of CP fronting (Koster 1978), which accounts for *the DP requirement* and aligns with our claim that fronted CPs do not undergo A-movement.

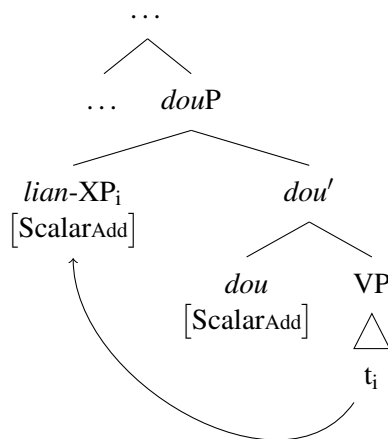# 5   The trigger of movement: a [Scalar_Add] feature across A- and Ā-movement

I assume that all phrasal movement results from the successive application of Agree and Merge (e.g., Chomsky 1995).[14] Specifically, a probe carrying a feature F searches for the (closest) phrase that bears the same feature, resulting in an Agree relation. It is followed by (internal) Merge of the goal phrase with the probe head.

(51)

                lian-DP
         [ScalarAdd, D, 3SG]

    PRT   DP
  [ScalarAdd]   [Category: D]
     | [ϕ: 3SG]
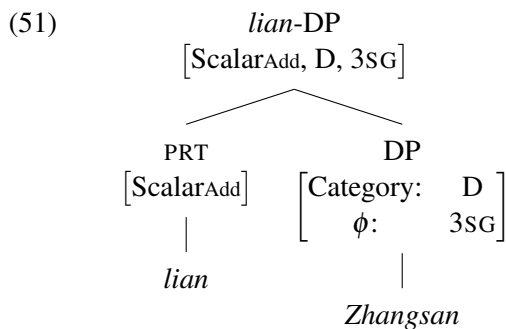
   lian |
             Zhangsan

Regarding the *lian. . . dou* construction, I assume that movement of different categories is uniformly due to a [ScalarAdd] operator, overtly realised by *lian*. In a *lian*-phrase, the particle *lian* adjoins to a maximal projection XP that is or contains the focus, with formal features of *lian* and its sister XP projecting to their mother. For example, in (51), *lian* adjoins to the focused DP *Zhangsan*. The resulting *lian*-DP will project the [ScalarAdd] feature of *lian* and features of the DP *Zhangsan*, such as the category [D] and its ϕ-features.

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[14] An alternative view is to have Merge precede Agree (e.g., Bošković 2007). Nothing in this paper hinges on this.

(52)

```
              ...
             /  \
          ...    douP
                /    \
       lian-XPᵢ         dou'
      [ScalarAdd]      /   \
                    dou     VP
                 [ScalarAdd]  △
                              tᵢ
```

The structure of the *lian...dou* construction is depicted in (52). I treat *dou* as a functional head with an uninterpretable [ScalarAdd] feature.[15] As the result of the application of Agree and Merge, a matching *lian*-phrase gets attracted to the specifier projected by *dou*. The resulting movement essentially places the *lian*-phrase in its scope position, where it quantifies over focus alternatives computed in its complement.[16]

In the feature-based approach to movement types (Obata & Epstein 2011; Abels 2012; van Urk 2015), movement types are solely derived from properties of the agreeing feature(s) involved. Agreeing features are classified into morphosyntactic features inherent in nominals, such as [Case] and ϕ-features, and interpretive features that are optionally present, such as *wh*-feature. Instances of the former trigger A-movement, while instances of the latter trigger Ā-movement. However, the [ScalarAdd] feature in the *lian...dou* construction does not fit into this classification. It triggers A-movement in DP cases and Ā-movement in VP/CP cases.

Some non-trivial questions arise if one adheres to the feature-based approach to the *lian...dou* construction. Given that the semantic and syntactic effects are constant across all fronted categories, it would be unparsimonious to assume two different [ScalarAdd] features for DP and VP/CP foci. An alternative within the feature-based approach is to assume that the trigger in the *lian...dou* construction is a composite probe consisting of an A- and an Ā-feature (Aldridge 2004; Coon & Bale 2014; van Urk & Richards 2015; Bossi & Diercks 2019; Branan & Erlewine 2024). However, this alternative also raises questions that are not easy to answer. Suppose that the composite probe is [ϕ, ScalarAdd], with [ϕ] responsible for A-properties of DPs and [ScalarAdd] for the focus interpretation. First, it is unclear why the [ScalarAdd] feature, as an Ā-feature, selectively induces reconstruction of fronted VPs/CPs but not of fronted DPs. Second, it is standardly assumed that ϕ-features are inherent features of nominals and must be valued. It is unclear how the [ϕ] feature can be valued in VP/CP cases.

Therefore, I argue that the [ScalarAdd] feature triggers movement but does not determine movement type. This amounts to the core claim of this paper. Namely, movement types are not always tied to

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[15] In Chinese grammar, *dou* is treated as an adverb given its syntactic distribution (Li & Thompson 1981; Lee 1986; Cheng 1995; Cao 2012). However, to keep close to standard minimalist assumptions, I follow previous works in assuming that *dou* is a functional head (Shyu 1995; 2018; Constant & Gu 2010; P. Li 2020). An alternative analysis that is compatible with the main claim in this paper is that movement is motivated by semantics, not by agreeing features, which creates a configuration necessary for the computation of the focus interpretation. On such analysis, *dou* can be analysed as a semantic operator with adverbial status. I will explore this option in future research.

[16] The *lian...dou* construction closely resembles operator movement in the sense of Cable (2007; 2010) and Horvath (2007), who argue that quantification-motivated movement is driven by pertinent semantic operators.

agreeing feature(s) but can also be determined independently. In the next section, I will argue that the independent determinant of movement type is economy: A-chains are less costly than Ā-chains.

6   An economy-based analysis of the *lian. . . dou* construction

The peculiar characteristic of the *lian. . . dou* construction is that fronted DPs do not reconstruct, but fronted VPs and CPs do. I contend that their divergence in reconstruction reveals the role of economy in the interpretation of movement chains. Researchers have argued that A- and Ā-chains differ semantically, at least in the types of abstraction they trigger at LF (Sauerland 1998; 2004; Ruys 2000; van Urk 2015; Branan & Erlewine 2021; Keine & Poole 2023; Poole 2024). I propose that the costs associated with A- and Ā-chains can also be attributed to the types of abstraction they trigger. In a nutshell, A-chains are less costly than Ā-chains because the type of abstraction in A-chains requires fewer operations. I will show that the A/Ā distinction in terms of reconstruction results from two distinct types of abstraction over movement chains (Sect. 6.1), and that an explicit calculus of economy implies that A-chains are arguably less costly than Ā-chains (Sect. 6.2). At the same time, although economy prefers A-chains over Ā-chains, the constraint that A-chains must abstract over individual-type variables rules out A-chains of VP and CP foci (Sect. 6.3).

6.1   Two types of movement chains

A- and Ā-movement are known to show distinct properties in terms of reconstruction. Namely, reconstruction in A-movement is more limited than that in Ā-movement (see Sportiche 2017 for a recent overview). Under the copy theory of movement (Chomsky 1993; 1995), reconstruction is explained by how the copies in a movement chain are modified for interpretation. I assume that in movements motivated by semantic effects, the pertinent semantic operator must be interpreted at the landing site, where it takes scope. Suppose that a semantic operator OP of category [D] undergoes overt movement, as in (53):

(53) $[_{DP}$ OP [NP]]. . . $[_{DP}$ OP [NP]]

Given that A-movement in Mandarin Chinese does not reconstruct, I assume that there are only two possible semantic representations of (53). It can be translated into an A-chain by abstraction over individual variables (54) or into an Ā-chain via abstraction over choice function variables (55). The latter, but not the former, allows reconstruction.[17]

(54) $[_{DP}$ OP [NP]] λx_e. . . $[x_e]$

(55) $[_{DP}$ OP [~~NP~~]] λf_{cf}. . . $[f_{cf}(NP)]$

In the A-chain (54), Trace Conversion proposed by Fox (2002) converts the lower copy into an individual variable of type $<e>$ (see also Sauerland 1998; 2004; Elbourne 2005).[18] Following Heim & Kratzer (1998), I assume the e-type variable is bound by a λ-operator inserted immediately below the landing site, which receives the same interpretation as that conventionally assigned to

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[17] One issue is reconstruction in A-chains in other languages (May 1977; Barss 1986; Hornstein 1995; Fox 1999; Lebeaux 2009). Given that reconstruction in A-chains is by far more restricted than what syntactic reconstruction predicts, I assume reconstruction effects in A-chains can be attributed to semantics (Cresti 1995; Rullmann 1995; Lechner 1998; 2013; 2018; Sternefeld 2001; Ruys 2015; Keine & Poole 2023; cf. Romero 1997; 1998; Fox 1999; 2000; Poole 2024). I do not know how semantic reconstruction would enter into the economy calculation. However, it is irrelevant to the case here because A-chains in Mandarin Chinese do not reconstruct.

[18] Throughout the paper, I will abstract away from intensionality and use λ-operator-variable notation as in (54) to conveniently indicate the semantic type of the variable that the lower copy will be translated into.

traces.[19] The resulting A-chain (54) forms a predicate abstracting over individuals, taking the head of the chain as its external argument. As Chomsky (1995) argues, A-chains of this sort allow properties associated with argument-hood to be interpreted at the head of the chain, such as scope and binding, while leaving its trace to be theta-marked.[20]

By contrast, an Ā-chain forms an operator-variable chain via abstraction over choice function variables. In the Ā-chain depicted in (55), a counterpart operation of Trace Conversion replaces the lower OP with a choice function variable, e.g., Quantificational Copy Conversion proposed by van Urk (2015). In addition to this, the higher OP is converted into a quantifier over choice functions and its NP complement is deleted.[21]

An upshot of embracing abstraction over choice function is that it predicts that the non-operator part of the moved phrase must reconstruct. As argued by Sauerland (1998; 2004) and Ruys (2000), if the NP complement in (55) does not reconstruct, the choice function OP will be applied to a set of individuals denoted by the NP. Undesirably, the output will be an individual, which cannot be interpreted in an operator position. A typical instance of Ā-chains is *wh*-movement. Assuming that *wh*-phrases are semantically *wh*-operators, the *wh*-question in (56) would have the simplified LF structure in (57), in which the *wh*-operator and its NP complement are disassociated.[22] At the head of the chain, everything but the *wh*-operator is deleted. At the launching site, the lower copy of the *wh*-operator is converted into a choice function variable, abstracted over by *wh*-movement. The bound variable interpretation of the anaphor indicates that the complement of *which* is computed via the lower copy.

(56)   Which picture of herself$_k$ does no woman$_k$ like?

(57)   [which [~~picture of herself$_k$~~$_k$]] λf_{cf}... no woman$_k$ ... [f_{cf}(picture of herself$_k$)]

Our characterisation regarding A- and Ā-chains implies that, in principle, the focus interpretation of the *lian...dou* construction can be achieved by both types of movement. That is, both A- and Ā-chains allow the focus particle *lian* to quantify over its scope, written as lambda expressions in (58). The A-chain (58a) and the Ā-chain (58b) only differ in where the fronted category is interpreted. However, the facts documented in Sect. 4 suggest that the A-chain (58a) is not available for VPs/CPs, and the Ā-chain (58b) is not available for DPs. If they were, then DP foci should reconstruct while VP/CP foci should not. I will argue that Ā-chains of DPs are ruled out by economy and A-chains of VPs/CPs are ruled out for type mismatch.

(58)   a.   A-chains:[*lian*-XP] λx_e *dou*... [x_e]
         b.   Ā-chains:[*lian*-~~XP~~] λf_{cf} *dou*... [f_{cf}(XP)]

---

[19] It has been argued that traces are actually complex semantic objects, namely, bound definite descriptions (Engdahl 1980; 1986; Sauerland 1998; 2004; Fox 1999; 2002; 2003). Whether traces are complex or not is orthogonal to their semantic type. For the sake of simplicity, I will continue to present traces as simplex variables.

[20] A stronger claim would be that all properties of an argument, including its theta-role, are valued at the head of A-chains (Williams 1987; 1994; Neeleman & van de Koot 2002; 2010)

[21] It is beyond the scope of this paper to discuss how exactly an operator should be made computable with a predicate of choice functions but see Sauerland (1998: Chapter 5) and Abels & Martí (2010) for relevant issues and some possible solutions.

[22] The exact computation of constituent-question semantics is not crucial for our purpose. First, abstraction over choice functions is motivated independently from constituent-question semantics (Reinhart 1997; Winter 1997; Ruys 2000; Kurafuji 2019). Second, most influential theories of constituent-question semantics are compatible with our claim that the non-operator part of the *wh*-phrase must reconstruct (Engdahl 1980; 1986; Reinhart 1997; Romero 1998; Beck 2006; Beck & Kim 2006; Cable 2007; 2010; Kotek 2014; Heim 2019).

6.2 Economy and movement costs

Most works in linguistic theory share the idea that the principles of grammar should include principles of economy. One formulation of this idea is the Last Resort condition:

(59)   (Chomsky 1995: 194)
        "If the derivation converges without the application of some operation, then that application is disallowed."

In other words, derivations must avoid any superfluous applications of operations. Regarding the interpretation of movement chains, modifications of copies are necessary to render movement chains interpretable. However, A-chains and Ā-chains differ in the number of operations involved due to the different types of abstraction they trigger. As illustrated above, A-chains involve Trace Conversion. By contrast, Ā-chains not only trigger a comparable conversion operation but also require distributed deletion.[23] I argue that it is precisely the additional deletion operation that makes Ā-chains more costly. According to (59), such deletion operations should apply as few times as possible. Therefore, with A- and Ā-chains being equal in interpreting the operator in its scope position, an A-chain is less costly than an Ā-chain:

(60)   a.   A-chains: [*lian*-XP] λx_e *dou*...[x_e]   (prefered by economy)
        b.   Ā-chains: [*lian*-~~XP~~] λf_{cf} *dou*...[f_{cf}(XP)]

6.3 Deriving the A/Ā distinction between DP and non-DPs

We have seen that in Mandarin Chinese, a movement chain is tightly restricted in how it can be interpreted: abstraction over individual variables (A-chains) or abstraction over choice function variables plus reconstruction (Ā-chains). At the same time, economy prefers A-chains over Ā-chains because the former is costless under the Last Resort condition.

   However, not all categories can undergo A-movement. DPs can undergo A-movement because their semantic type is compatible with individual-type variables. As for VPs and CPs, their semantic types are not compatible with an individual-type variable. A-chains are blocked because the resulting LF structure fails to converge. In the following, I will show that the A/Ā distinction between DPs and VP/CPs in the *lian...dou* construction results from economy and the constraint on the interpretation of A-chains.

(61)   a.   A-chains: [*lian*-DP$_e$] λx_e *dou*...[x_e]
        b.   Ā-chains: [*lian*-~~DP~~] λf_{cf} *dou*...[f_{cf}(DP)]   (ruled out by economy)

   DPs undergo A-movement due to economy. As argued in the previous section, in the Ā-chain (61b), the lower copy of *lian* is converted into a choice function variable. In addition, the higher DP must be deleted. On the other hand, the A-chain (61a) only requires Trace Conversion on the lower copy. Therefore, the Ā-chain of DP foci is excluded for applying more operations than its A-chain counterpart.[24]

   By contrast, VPs and CPs are higher-type expressions. VPs are traditionally treated as predicates of type $< e, t >$. Alternatively, they are taken to denote propositions of type $< s, t >$ based on the

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[23] I assume that individual variables and choice function variables are the results of conversion operations with equal costs. If there are concerns, it is conceivable that conversion to a higher-type expression is more costly. This means that a choice function variable (e.g., type $< et, e >$) incurs more costs than an individual-type variable (type $< e >$).

[24] This does not imply that in long-distance movement, intermediate movement should consist of A-chains as long as locality allows it. Economy imposes two requirements: (i) forming a single chain and (ii) forming it in the most economical way. If long-distance movement consists of mixed A- and Ā-chains, it is actually separate chains being linked together. However, economy always prefers a single chain over a mixed one.
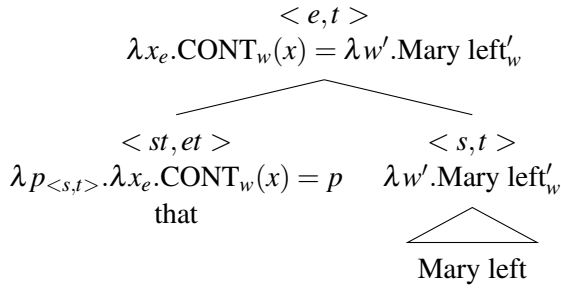
VP-internal Subject Hypothesis or the assumption of *v*P projection.[25] Nevertheless, what is crucial is that the semantic type of VPs is not compatible with an *e*-type variable. Therefore, unlike DPs, movement of VPs cannot be translated into an A-chain. It can only be translated into an Ā-chain, forcing VPs to reconstruct to their base positions:[26]

(62) a. *A-chains: $[lian\text{-}VP_{<e,t>}] \lambda x_e \ dou \ldots [x_e]$ or $[lian\text{-}VP_{<s,t>}] \lambda x_e \ dou \ldots [x_e]$
      b. Ā-chains: $[lian\text{-}\overline{VP}] \lambda f_{cf} \ dou \ldots [f_{cf}(VP)]$

As for CPs, I adopt the predicate analysis of CPs that finite CP arguments are predicates of propositional content (type $< e,t >$) (Kratzer 2006; 2013; 2014; Moulton 2009; 2015; Elliott 2016; Bochnak & Hanink 2022). Moulton (2015) follows Kratzer (2006) in assuming that the complementizer C selects a proposition $< s,t >$ and identifies this proposition as the content of a set of individuals, as in (63). A finite CP would have the simplified LF structure in (64).

(63) $[\![C]\!] = \lambda p_{<s,t>}.\lambda x_e.\text{CONT}_w(x) = p$

(64) . . . that Mary left

$$< e,t >$$
$$\lambda x_e.\text{CONT}_w(x) = \lambda w'.\text{Mary left}'_w$$

$$< st,et > \qquad\qquad < s,t >$$
$$\lambda p_{<s,t>}.\lambda x_e.\text{CONT}_w(x) = p \qquad \lambda w'.\text{Mary left}'_w$$
$$\text{that}$$

$$\text{Mary left}$$

The ban on A-movement of CPs follows from the same rationale as that of VPs. Namely, the semantic type of CPs is not compatible with an individual-type variable, as in (65).

(65) *A-chains: $[lian\text{-}CP_{<e,t>}] \lambda x_e \ dou \ldots [x_e]$

Recall that CP fronting is subject to *the DP requirement*. To account for this, I adopt the null operator analysis proposed by Koster (1978) and further developed by Alrenga (2005). More importantly, this analysis fits well with our conclusion that CPs cannot undergo A-movement. The LF structure of fronted CPs is depicted in (66). The fronted CP is base-generated above *dou*. *The DP requirement* is satisfied by the null operator chain, which leaves an individual variable at the CP's base position. Following Moulton (2015), the CP and the operator chain compute via Predicate Modification, with the individual variables bound by an existential quantifier, as in (67).

(66) $[lian\text{-}CP_{<e,t>}] [OP_e \ \lambda x_e \ dou \ldots [x_e]]$

(67) $lian \ [\exists x_e[[\text{CONT}_w(x_e) = p] \ \& \ [dou \ldots [x_e]]]]$

Notice that (66) is semantically convergent even if the semantic type of the fronted CP does not match the individual variable. The LF structure in (65) is not convergent because a fronted CP cannot head an A-chain itself. But in (66), the semantic link between the fronted CP and its base position is mediated by the null operator.

Moulton (2013) introduces novel reconstruction data that support Koster's analysis. One of his examples is given in (68).

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[25] Once taking tense and aspect into consideration, VPs can also be taken to denote predicates of time $< i, st >$ or of event $< v, st >$.

[26] The semantic types of choice function variables in Ā-chains of DPs and VPs are different, e.g., $< et, e >$ in DP cases and $< et, et >$ in VP cases. I will not delve into this question here.

(68)   (Moulton 2013: 254)
         But that he_i might be too old for Mrs. Brown_k, I don't think she_k would want any man_i to believe.

It is standardly assumed that syntactic reconstruction exhibits Condition C connectivity because the moved phrase reconstructs to its launching site, where Condition C is evaluated. Therefore, the bound variable interpretation in (68) cannot be attributed to syntactic reconstruction. Otherwise, *Mrs. Brown* would be c-commanded by the co-referential pronoun *she* at LF, causing a violation of Condition C. Moulton (2013) takes it as evidence that CPs do not move leftwards. The fronted CP in (68) is base-generated at the left periphery and semantically linked to the complement of *believe* by movement of a null operator, as in (69). As for the bound variable interpretation, Moulton (2013) proposes a semantic mechanism that does not require extra syntactic reconstruction of the fronted CP.[27]

(69)   [that he_i might be too old for Mrs. Brown_k]_n [OP_n I don't think she_k would want any man_i to believe t_n]

The null operator analysis predicts an asymmetry between fronted VPs and CPs in the *lian. . . dou* construction. Namely, fronted VPs, but not fronted CPs, should exhibit Condition C connectivity in an environment similar to example (68).[28] This is indeed borne out. Fronted VPs do exhibit Condition C connectivity. Example (70) shows that in fronted VP cases, the bound-variable interpretation is not possible even if the context allows it.[29] This is because, under syntactic reconstruction of the fronted VP, the R-expression *Mǎlì* is c-commanded by its coreferential pronoun, leading to Condition C violation.[30]

(70)   *Context: Every student borrowed some money from Mary to buy textbooks for the new semester. Now, Mary urgently needs this money to pay her own tuition fees. To ease Mary's burden, I not only helped cover part of her tuition,*

         *Wǒ lián [_VP huán-gěi   Mǎlì_k [[tā_n qiàn de]   qián]]_i   dōu dāying le   tā_k tì
          I   lian [_VP return-give Mary [[s/he owe COMP] money]] dou promise ASP she for
         měi-gè   xuéshēng_n zuò t_i.
         every-CLF student   do

         Intended: every > he: I promised Mary_k that I would even pay for each student_n the money that he_n owes her_k.'

By contrast, fronted CPs lack Condition C connectivity. In example (71), the bound-variable interpretation is possible even if a co-referential pronoun c-commands the CP's base position.

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[27] Due to the space limit, I will not elaborate on it. However, Moulton (2013) also treats finite CPs as predicates (type $< e,t >$). Therefore, a coherent analysis explaining why CPs do not undergo A-movement and reconstruct semantically is within reach. I will leave such elaboration for future research.

[28] Recent experimental studies report mixed results on whether Ā-moved DPs exhibit Condition C connectivity (Adger et al. 2017; Bruening & Al Khalaf 2019; Salzmann & Wierzba & Georgi 2023; Stockwell & Meltzer-Asscher & Sportiche 2021; 2022). However, this ongoing debate does not extend to movement of VPs, for which judgment about Condition C connectivity is shaper and more agreed upon.

[29] The bound-variable interpretation is possible when *Mǎlì* and its coreferential pronoun swap their positions, see Appendix B for relevant data.

[30] Example (70) also rules out the possibility that movement of VPs leaves a higher-type trace (e.g., type $< e,t >$). Otherwise, a higher type trace would allow semantic reconstruction of fronted VPs, without violating Condition C.

(71)   *Context: there are many boys who want to date Mary. Mary is too shy to reject them face to face, so she just puts their phone number in her backlist. However, I visited every boy.*

Wǒ	lián	[CP tā_n	bèi	Mǎlì_k	lāhēi	le]_i	dōu	tì	tā_k	gàosu	le	měi-gè	nánhái_n	t_i.
I	lian	[CP he	PASS	Mary	blacklist	ASP]	dou	for	she	tell	ASP	every-CLF	boy	

'Even that they_n are on Mary_k's blacklist, I told every boy_n on behalf of her_k.'

7 Conclusion

In this paper, I showed that different types of movement are triggered in the *lian...dou* construction, depending on the syntactic category being fronted. Specifically, DP foci undergo A-movement, whereas VP/CP foci are derived by Ā-movement. The main theoretical point of this paper is that movement types are not always tied to the agreeing feature involved, but can also be determined by economy. I argued that economy constrains how movement chains are interpreted in the translation from syntax to semantics. Given that A-movement in Mandarin Chinese does not reconstruct, A-chains are restricted to abstraction over individual variables. On the other hand, Ā-chains always trigger abstraction over choice function variables. The costs of A- and Ā-movement are attributed to the operations involved in the type of abstraction they trigger. All else being equal, A-chains are favoured over Ā-chains in terms of economy because reconstruction in Ā-chains, which is absent in A-chains, involves more operations. However, VP and CP foci cannot undergo A-movement because their semantic types do not match. As a result, while DP foci undergo A-movement due to economy, VP and CP foci must be derived via Ā-movement.

Abbreviations

3SG = third person singular, ADJ = adjective, ADV = adverb(ial), ASP = aspect marker, CLF = classifier, COMP = complementizer, COP = copula, NEG = negation, PASS = passive, SFP = sentence-final particle, TOP = topic

Supplementary files

- Appendix A. Reconstruction data supplied with context.
- Appendix B. Ā-properties of the ex-situ cleft construction in Mandarin Chinese.

Competing interests

The author has no competing interests to declare.

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