Label-driven Movement-Derived Mechanism on Mandarin Non-dangling Topic Construction

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Abstract

Mandarin topic construction is much more flexible and diverse in form compared to topicalization in other languages, and thus is of high research value. How to generate Mandarin non-dangling topic constructions has been a highly controversial issue. Based on the review of the past research, this paper points out many weaknesses of both the base-generated view and the traditional movement-derived view. Also, many results of psychology experiments, like an ERP study recently, tend to support it's derived through movement, but they usually lack theoretical analysis to support it. Thus, after the investigation of the characteristics of Mandarin non-dangling topic constructions, including their special movement performance and TOP and REL's independent properties, the study proposes a new label-driven mechanism for deriving non-dangling topic constructions in Mandarin, under the latest research results of Minimalist Program. It argues that TOP and REL are two noun phrases, differing from each other structurally only in functional layers. They are merged as {NP, NP} first in the same position, i.e. vP's complement position, thus assigned the same thematic roles, the same case, etc., which is equivalent to {argument, predicate} construction. This symmetric stable construction cannot be syntactically labeled, so TOP has to be moved to T-edge position to achieve labeling, thus generating Mandarin non-dangling topic construction. In addition, label proceeds phase by phase: TOP goes to T-edge position in the second phase CP via vP-edge in the first phase vP, thus exactly explaining the special cases of this topic construction this study found before, i.e. providing more possibilities for Mandarin non-dangling topic constructions, including compounding objects restriction on topicalization, special Mandarin non-dangling topic constructions with a resumptive pronoun, etc. Finally, other cross-linguistic examples are given in an attempt to verify the rationality and generality of this derivation process. The study to some extent remedies the weaknesses of the traditional movement-derived view and validates some ideas in Minimalist Program. And also importantly, it provides some much more convincing theoretical supports for the results of some psychological experiments.

1   Introduction

Mandarin topic constructions can be simply defined as follows: the topic, usually a noun phrase or a structure equivalent to a noun phrase, and the comment clause form the topic construction, with the topic appearing before the comment clause. And the topic is closely related to a position in the subsequent comment clause. (Shi, 1998)[1]

There are different assertions on the classification of Mandarin topic constructions among linguistic scholars. Xu and Liu (2007) classified Mandarin topic constructions into four categories based on the semantic relationship between the topic and the comment clause: argument co-reference topic constructions, domain topic constructions, copy topic constructions and clause topic construction. Chen (1996) proposed three categories of Mandarin topic constructions, based on syntactic relations: topicalized topic constructions, left-dislocated topic constructions and dangling topic constructions. The first type—topicalized topic constructions own a "gap" in the comment clause, with the topic referring to this gap, as shown in example (1a). The second type—left-dislocated topic construction is characterized by the fact that there is no gap but a compound pronoun in the comment clause and the topic refers to the this pronoun, as shown in example (1b). As for the third type, there is neither a gap nor a related pronoun in the comment clause, as shown in example (1c). Huang et al. (2009) argued that "he" is a "resumptive pronoun" in the left-dislocated topic constructions, which accordingly means that (1b) has a gap in the comment clause as well. Therefore, Mandarin topic constructions are divided into dangling topic constructions and non-dangling topic constructions according to the presence or absence of empty gap in the comment clause. To be specific, non-dangling topic constructions are "gap" topic constructions, shown in example (2), while dangling topic ones are "gapless" topic constructions, as in example (3). (See Chao 1968, Li & Thompson 1976, 1981, Tang 1979, Teng 1974, Tsao 1982, etc.) Besides, Mandarin non-dangling topic constructions are usually considered as a common type, existing in English and many other world languages (although there are some differences between them), and the dangling topic constructions are rarely seen in other languages. [2] The present study explores the

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[1] Linguistic researchers define Chinese topic diversely. I will focus on the nominal topics, the one agreed by most studies. There are also some arguments on topic constructions related to PP, VP and IP topics. Please see more in Li (2000), Gasde and Paul (1996), Xu and Langendoen (1985), and Xu (2000) for a full scope of topic constructions in Chinese.

[2] The dichotomous view of Mandarin non-dangling topic constructions and dangling topic ones is similar to the description of "English-style topic constructions" and "Chinese-style topic constructions" by Chafe (1976) and Gundel (1988). They defined English-style topic constructions and Chinese-style topic constructions as follows: if

universally-existing non-dangling topic constructions in Mandarin based on the dichotomy of Mandarin topic constructions.

（1）a. Shu$_i$, wo xihuan du   e$_i$

　　Book, I   like   read   e$_i$

　　'As for book, I like to read them.'

　b. Zhangsan$_i$, wo gei ASP   ta$_i$ liang CL book

　　Zhangsan$_i$,   I give ASP him$_i$ two   CL books

　　'As for Zhangsan$_i$, I gived him two books.'

　c. Shuiguo, wo DEG[3] xihuan xiangjiao

　　Fruit, I   DEG   like banana

　　'As for fruits, I like bananas best.'

（2）Yuyanxue$_i$, I zai xuexiao xuexi ASP e$_i$

　　Linguistics, I in school study ASP e$_i$

　　'As for linguistics, I studied e$_i$ in school.'

（3）Na CL huo, xingkui   xiaofangdui lai   DE kuai

　　That CL fire, thanks to firemen   come DE quickly

　　'as for that fire, thanks to the firemen who came to the fire quickly'

（Huang et al.，2009）

No unified definition of Mandarin non-dangling topic constructions is given in this research fields. This investigation adopts the definition as follows: a construction where a single noun phrase is divided into two positions on the surface. And the one, usually in the left periphery of the clause, is the topic (TOP), while the other is in the clause, as the relevance part (REL).

The syntactic derived mechanism is a hot spot in researches on Mandarin non-dangling topic construcitons (see J. Huang 1982/1998; Xu & Langendoen 1985; Shi 2000; Huang et al. 2009, among others). Under the framework of generative grammar, the movement-derived view (e.g., J. Huang 1982/1998; Shi 2000; Huang et al. 2009) and the base-generated view (e.g., Xu & Langendoen 1985; Xu 1986; Liejiong Xu and Danqing Liu 2007 [1998]) confronted each other in the long term.

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there is a syntactic gap or a component co-referring to the topic in the comment clause, then it's English topic constructions; if there is neither a syntactic gap nor a compound component in the comment clause, it's Chinese topic constructions. In other words, they named the dangling topic constructions, specific to Mandarin, as Chinese topic constructions, and the ones common to both English and Mandarin, i.e., the non-dangling topic ones, as English topic constructions.

[3] "DEG"refers to Degree marker. "CL" refers to Classifier. "ASP" refers to Aspect marker.

The base-generated view holds that TOP of dangling topic constructions is base-generated in the left periphery of the comment clause, while REL is also a noun construction base-generated independently in the comment clause, and then undergoes Anaphoric Ellipsis (AE), similar to what happens in generating interrogative clauses, i.e. the deletion of the part of the second phrase (located in the backward position in this linear sentence, without displacement), which is same to the part in the first phrase. The process is denoted by (4). On the other hand, the movement-derived view considers that TOP is base-generated in the comment clause and then moved to the initial position of this clause, and the remaining part in the comment clause is REL. This process can be simply represented by (5).

（4） Pingguo, wo chi ASP yi CL (~~pingguo~~)
　　　 Apple, I eat ASP one CL (~~apple~~)
　　　 'As for apple, I ate one'

（5） $Pingguo_i$, wo chi ASP yi CL e_i
　　　 $Apple_i$,　 I　eat ASP one CL e_i
　　　 'As for apple, I ate one'

Both views of deriving Mandarin non-dangling topic constructions are found to be problematic in this study. First, the Anaphoric Ellipsis operation in the base-generated view is unreliable and relatively cumbersome. And more importantly, external merge is to satisfy thematic role relation Chomsky (2007, 2008). Thus, if the topic is base-generated in the left position of the clause, its thematic role is doubtful. In addition, TOP and REL often show the same thematic role. Therefore, the base-generated view can be largely considered as unreasonable. Second, it's known that island condition, unbounded dependency, and reconstruction effect are all typical and important means to detect whether the constructions are movement-generated or not. A large number of island constraints show up, indicating that numerous Mandarin non-dangling topic constructions are generated through movement, thus negating the traditional base-generated view. Third, the traditional movement-derived view assumes this movement is subextraction in essence, but tons of examples show disagreement with it.

Besides, apart from the syntactic derivation researches, many empirical psychology experiments concerning syntactic phenomena begin to emerge recently, with topicalization an understudied area in Mandarin sentence processing research. In particular, recent studies (Dong Z et al., 2021) support Mandarin non-hanging topic constructions are derived through movement. To be specific, in Dong(2021)'s study, following the paradigm of Traxler and Pickering's 1996 study, this ERP study tests whether island constraints are actively observed during online processing of the Mandarin "gap-type" topic construction (i.e. "non-dangling topic construction" in present study), finding that the parser is sensitive to island constraints in online processing of the Mandarin non-dangling topic structure, assuming the movement analysis for Mandarin topicalization. However, there is an obvious weakness for these

experiment studies that most of results of psychology experiments tend to support it's derived through movement but they usually particularly lack theoretical analysis to support it.

Thus, based on the studies of Ott (2011, 2012, 2015a, 2015b) and Zamparelli (2000), this research analyzes and explores various manifestations of Mandarin non-dangling topic constructions further, asserting its movement-derived nature but not a subextraction movement, and finding the independence of TOP and REL. And at the same time, some psychological experiments regarding Mandarin sentence processing lend support to movement view of Mandarin non-dangling topic construction (Dong Z et al., 2021). Ultimately, within the framework of Minimalist Program, a new label-driven derived mechanism is proposed on Mandarin non-dangling topic constructions, agreeing with Ott's claim that TOP serves as a logical predicate for REL in the underlying syntactic structure. The two directly form {argument, predicate} structure. i.e. TOP and REL are merged as $\{NP_2, NP_1\}$, similar to the familiar argument-predicate structure $\{DP, vP\}$. This symmetric structure cannot be syntactically labeled, so NP_1 (TOP), which is the predicate, must be moved to the edge of T to achieve labeling. To put it in a nutshell, this is the movement-derived process of Mandarin non-dangling topic constructions, represented as Figure (6), where NP_1 is TOP and NP_2 is REL. Meanwhile, label proceeds phase by phase: TOP goes to T-edge position via vP-edge position, providing more possibilities for Mandarin non-dangling topic constructions, including compounding objects restriction on topicalization, special Mandarin non-dangling topic constructions with a resumptive pronoun proposed by Huang (2009), etc. It can be represented as Figure (7).

（6）$[_{TP}...[_{vP}\{NP_2, NP_1\}]] \rightarrow [_{TP} NP_1... [_{vP}\{NP_2, NP_1\}]]$

(7) $[_{CP}[_{TP}...[_{vP}\{NP_2, NP_1\}]]] \rightarrow [_{CP}[_{TP}... [_{vP} NP_1 [_{vP}\{ NP_2, NP_1\}]]]] \rightarrow [_{CP}[_{TP} NP_1... [_{vP}[_{vP}\{NP_2, NP_1\}]]]]$

Finally, from a cross-linguistic perspective, topic construction is prevalent in most human languages. As a special syntactic structure encoding "topic-comment structure", topic constructions has become an important entry to exploring the relationship between form and meaning in language (see Hockett 1985; Gundel 1974, 1985; Chafe 1976; Prince 1981, 1999. Davison 1984; Vallduvi 1992; Gundel & Fretheim 2004, etc.). This study will address a large number of weaknesses of the previous two derivation views and present a new view of the movement-derived mechanism of Mandarin non-dangling topic constructions driven by labeling. And other cross-linguistic examples will be given to try to verify the rationality and generality of this derivation process. And psychological experimental results also further support it.

2   Literature Review

Research on Mandarin non-dangling topic constructions has focused on exploring its syntactic generative mechanisms. On the one hand, from the performance of island constraint, unbounded dependency and reconstruction effect, most linguists believe that a large number of Mandarin non-dangling topic constructions are derived through movement, the nature of which is subextraction. Here, subextraction refers to the movement of the underlying continuous structure to generate the surface discontinuous linear structure (Riemsdijk 1989, Molnar & Winkler 2010). Thus, the mechanism of subextraction-movement on Mandarin non-dangling topic constructions can be simply stated as follows: the noun phrase as the topic is base-generated in the "gap" in the comment clause, and then moved to the left periphery of the clause, as in example (8).

（8）Jiaozi$_i$,　　wo DEG　xihuan　niurouxian　DE　e$_i$
　　 Dumpling$_i$，I　DEG　like　　beef　　　DE　e$_i$
　　 'As for dumplings, I like beef dumplings best.'

As for some special instances violating movement-derived view, Huang (1984), Li (1990) and Huang et al. (2009) explained them by Generalized Control Rule (GCR). They believe that the topic movement is subject to island condition, but some sentences behave exceptionally. For example, (9) violates Left Branch Condition but is still legal. Accordingly, Huang (1984), Li (1990), and Huang et al. (2009) suggest that these sentences have a null pronoun pro inserted in the null position (Gap), and the distribution of pro is governed by Generalized Control Rule. This rule indicates that the null pronoun co-refers to the nearest noun. (Huang 1984:552) Since this rule is not subject to island conditions, (9) is legal.

（9）Zhangsan$_i$,　〔〔e$_i$ baba〕DEG youqian〕
　　 Zhangsan$_i$,　〔〔e$_i$ father〕DEG rich〕
　　 'As for Zhangsan$_i$, his father is very rich.'
　　　　　　　　　　　　　　　　　（Huang 1984：563）

On the other hand, there still exists another view (Xu & Langendoen, 1985; Xu 1986, 2006); Xu & Liu, 2007; Xu, 2003) that Mandarin non-dangling topic constructions are base-generated, such as (10), where NP$_1$ "apple" and NP$_2$ "some" are both generated in situ.

（10）[$_{NP1}$Pingguo]，wo chi ASP [$_{NP2}$ yixie]
　　　 [$_{NP1}$Apple]，　I　eat ASP [$_{NP2}$ some]
　　　 'As for apple, I ate some apples.'

According to Xu and Liu (2007: 51), topicalization does not necessarily mean a process where movement has actually occurred; on the contrary, selecting a certain number of words from the lexicon to form a unit, then placed in the position of the topic, which can be understood as topicalization. Based on the diagnostic condition (island condition), Liu (2003) determines that argument split topic constructions do not involve

syntactic movement (e.g., Example 11), and thus should be treated as base-generation. And he then attributes it to the semantic chain between the left-periphery topic and the object.

（11） a. Chenshan$_i$，[yixiazi mai san CL e$_i$ DE] ren bu duo
T-shirt$_i$，[once buy three CL e$_i$ DE] people not many
'As for T-shirt, people who buy three T-shirts once are not many.'

b. Chenshan$_i$，[yixiazi mai san CL e$_i$] DEG hesuan
T-shirt$_i$，[once buy three CL e$_i$] DEG worthwhile
'As for T-shirt, to buy three T-shirts once are most worthwhile.'

Nevertheless, this study argues that there are in fact a bunch of argument split topic constructions that cannot violate island condition, as example (12). Also if we investigate other types of topic constructions, the non-dangling topic sentences sensitive to island condition abound.

(12) *Ren$_i$，[xihuan yi CL e$_i$] DEG xinku
Person$_i$，[love one CL e$_i$] DEG hard
'As for person, to love a person is very hard.'

In addition, still a small number of scholars take a neutral view, only regarding the movement-derived view as evidence to correspond to the generation of one type of topic structures, thus distinguishing the difference between discourse topics and comparison topics(see Tsai 1994). At the same time, he explains the topic-comment relationship through semantic relevance (Aboutness), i.e the comment is about the topic (Huang, Li & Li 2007: 203), which is represented in (13).

(13) [S' X [S... Y...]], where X is a main category and Y (possibly empty) is related to X.

(Xu & Langendoen 1985: 20)

In summary, this study conclude that both the base-generative view and the movement-derived view are problematic, and therefore the derivation of Mandarin non-dangling topic constructions is in need of further investigation.

All in all, this study mainly investigates the syntactic derivation mechanism of Mandarin non-dangling topic constructions. Specifically, there are problems with both the base-generative view and the traditional movement-derived view of it: the ellipsis operation in former view has no reliable theoretical basis and is relatively cumbersome, while the subextraction operation of the latter view cannot explain all phenomena, showing a large number of counterexamples. Also, many results of psychology experiments focusing on this field tend to support it's derived through movement, but severely lacking theoretical analysis to support it. In view of the problems in the

previous studies, by analyzing the performance of Mandarin non-dangling topic constructions, a huge amount of evidence prove that it's derived by movement, with the topic (TOP) and the construction in the related position (REL) in the comment clause displaying as independent components. Thus, based on Ott's (2011, 2012, 2015a, 2015b) and Zamparelli's's (2000) proposals, this study expects to propose a new syntactic movement-derived mechanism for Mandarin non-dangling topic constructions, and tries to confirm its universality and rationality, as well as to explore some properties of this mechanism to explain some unique performance of this topic constructions.

3 Move or not

3.1 Judgments on Movement

For one thing, theoretically, Chomsky (2007, 2008) in Minimalist Program argues that external merge aims at satisfying thematic relations while internal merging satisfying discourse-related "surface" requirements. If the topic is base-generated on the left side of the comment clause, its thematic status is doubtful. Meanwhile, it's found that TOP and REL often bear the same thematic role.

For another, we focus on further judgments on instances. Three classical approaches for syntactic movement judgments are known as: unbounded dependence, island conditiont, and reconstruction effect. (Chomsky, 1986; Huang et al., 1984, 2009; Xu and Langendoen, 1985) Investigations are then made in turn as below.

First, it is found that Mandarin non-dangling topic constructions show the property of unbounded dependency, i.e, TOP is able to be moved across the boundaries of multiple definitive clauses. As in example (14), which is consistent with the property of unbounded dependency and proves that movement occurs.

（14）Zhangsan$_i$, wo zhidao Lisi juede nimen dou hui xiguan e$_i$
Zhangsan$_i$, I   know Lisi think you   all   will like e$_i$
"As for Zhangsan, I know that Lisi thinks that you all like him."

Second, Mandarin non-dangling topic constructions are sensitive to island effect, which means that the dependency between TOP and REL is subject to local conditions and cannot cross the boundary of the island structure. For example, a, b, c, d, and e in example (15) respectively demonstrate that TOP of a non-dangling topic construction cannot be moved from complex noun phrase island, adjunct island, wh-island, subject island, and left branch condition island. In example a, "Lisi" cannot be moved from the complex noun "henduo Lisi xihuan DE people"(many people Lisi likes). In sentence b, "mama"(mother) cannot be moved from the conjunct clause "zai songbie e$_i$ hou"(after sending his mother off). In sentence c, "Zhangsan" cannot be moved from the wh-phrase " shenmeshihou e$_i$ hui qu shangchang"(when he will go to the shop). And as for example d, "Zhangsan" is unable to be moved from the subject "na CL guanyu e$_i$ DE shi"(that event about him). Similarly in sentence e, the modifier "Lisi" cannot be moved from the left

branch position of the noun "baba"(father) in the noun phrase " e_i baba"(Lisi's father). Therefore, the non-dangling topic constructions are sensitive to island condition, and thus non-argument movement happen in these sentences.

（15） a. * Lisi$_i$，wo renshi [henduo e_i xihuan DE ren]
Lisi$_i$，I　know [many e_i like DE people]
"As for Lisi, I know many people he likes."

b. * mama$_i$，Zhangsan [zai songbie e_i hou] ku ASP
mother$_i$，Zhangsan [after send-off e_i] cry ASP
'As for Zhangsan's mother, Zhangsan cried after sending his mother off.'

c. * Zhangsan$_i$，wo xiang zhidao [shenmeshihou e_i hui qu shangchang]
Zhangsan$_i$，I　want　know [when　　　　e_i will go shop]
'As for Zhangsan, I want to know when he will go to the shop.'

d. * Zhangsan$_i$，[na CL guanyu e_i DE shi] DEG gaoxiao
Zhangsan$_i$，[that CL about e_i DE event] DEG funny
'As for Zhangsan, that event about him is very funny.'

e. * Lisi$_i$，wo kanjian ASP [e_i baba]
Lisi$_i$，I　see ASP [e_i father]
'As for Lisi, I saw his father.'

Third, non-dangling topic structure has reconstruction effect, another evidence of movement. Chomsky (1993) It's seen from the examples above that TOP can be reconstructed to REL position in the comment clause for semantic interpretation, so it can be argued that a non-argument movement occurs.

One particular point needs to be made about reconstruction effect. Like the Mandarin non-dangling topic in example (16), TOP part appears to have an additional set of "count+classifier" components, since here TOP "yi CL$_1$ juzi"(one orange) are unable to be reconstructed to REL position "yi CL$_2$ ~~juzi~~"(one piece of ~~orange~~) to form *"yi yi CL$_1$ yi CL$_2$ juzi". It seems that there is no empty gap and thus no reconstruction effect. However, in fact, the reconstruction effect is shown from the scope feature of TOP　In fact, we can see the regrouping effect from the jurisdictional feature of TOP "yi CL$_1$ juzi":"mei"(every) in the subject "mei CL haizi"(every child) acts on TOP "yi CL$_1$ juzi".

（16） yi CL$_1$ juzi$_i$，mei CLhaizi zhi neng chi [yi CL$_2$ e_i]
one CL$_1$ orange$_i$，every CL child only can eat [one CL$_2$ e_i]
'As for one orange, every child only can eat one piece of it.'

All in all, all the above illustrate the seeming existence of a "parasitic gap" (Ott,

2015) in the non-dangling topic construction, regardless there is an obvious gap in REL or not, providing the possibility of non-argument dependencies. The above three types of typical movement judgments are obviously indicating a fact that Mandarin non-dangling topic constructions are derived through movement.

3.2 Special Attributes of Movement

Furthermore, three special performance also show in the movement of Mandarin non-dangling topic constructions

First, restriction on form.

The movement of Mandarin non-dangling topic constructions exhibits some restrictions in form. An obvious one is that the topics cannot be moved out of the comment clause when the clause's object part is a compound component. In detail, In example sentence (17), (17)a is a typical standard Mandarin sentence; (17)b is the non-dangling topic construction to which (17)a corresponds; (17)c is a similar normal Mandarin sentence corresponding to (17)a, except that the object part is replaced by the compound structure formed by two noun phrases; (17)d is the non-dangling topic construction to which (17)c corresponds. Comparing (17)b and (17)d, it's easy to find a problem that a corresponding non-dangling topic construction cannot be produced when there are two noun components(i.e., "yi CL_1 gou"(a dog) and "yi CL_2 mao" (a cat)) compounded by a conjunction "he"(and) in the object position. In other words, (17)d is not legal. The complexity of this movement constraint may well indicate that syntactic derivation of topics in Mandarin non-dangling topic construction is not simple subextraction.

（17）a. ta baba mai ASP yi CL gou
　　　　 his father buy ASP one CL dog
　　　　 'His father bought a dog.'

　　　 b. gou, ta baba mai ASP yi CL
　　　　 dog, his father buy ASP one CL
　　　　 'As for dog, his father bought a dog.'

　　　 c. ta baba mai ASP yi CL_1 gou he yi CL_2 mao
　　　　 his father buy ASP one CL_1 dog and one CL_2 cat
　　　　 'His father bought a dog and a cat.'
　　　　（Shi 2000）

　　　 d．*gou, mao, ta baba mai ASP yi CL_1 he yi CL_2
　　　　　 dog, cat, his father buy ASP one CL_1 and one CL_2
　　　　 'As for dog and cat, his father bought a dog and a cat.'

Second, special construction.

The first section mentioned that Huang et al. (2009) considered left-dislocated topic constructions, referring to the topic constructions in which the empty gap is occupied by the resumptive pronoun, is also a special type of Mandarin non-dangling topic constructions. Taking (19) as an example, it is obvious that in example (19), the two noun phrases TOP "Zhangsan" and REL "he" are both related to the same position in the comment clause, but TOP "Zhangsan" cannot be extracted from the noun phrase REL "he".

Therefore, left-dislocated topic constructions, a particular type of non-dangling topic, also indicates that the movement happening in Mandarin non-dangling topic constructions may not be a simple extraction shift.

(19) Zhangsan$_i$, wo gei ASP   ta$_i$ liang   CL book
     Zhangsan$_i$,   I give ASP him$_i$ two   CL books
     'As for Zhangsan$_i$, I gived him two books.'

The above attributes concerning Mandarin non-dangling topic constructions seem to further indicate that the nature of movement derivation of non-dangling topics is not a simple subextraction process.

4   Differences and Similarities on TOP and REL

The third section finds that Mandarin non-dangling topic constructions satisfy several typical conditions of movement, and shows that the movement has some restriction in form, some non-restriction of landing site position and some special structures, all of which reflect that the essence of this movement does not seem to be a simple subextraction one. Then, in order to further explore how non-hanging topics are moved specifically, in this part, it is necessary to further observe the features and connections between TOP and REL in Mandarin non-dangling topic constructions.

4.1 Differences: Structural Variability

The most obvious feature between TOP and REL is that the structures of the two components differ from each other under many conditions. The study finds at least three evidence, namely, "number asymmetry", "quantifier repetition" and "adjective word order confliction", as manifested in turn as below.

First, TOP and REL are not symmetrical in morphology, especially in the aspect of number. For example, in (20), TOP is "zhexie taozi"(these peaches) and REL is "yi CL (taozi)" (a peach). Obviously, TOP is a plural noun phrase syntactically, while REL is a singular noun phrase, showing the structure variability on two constructions.

（20）zhexie taozi, wo chi yi CL
     those peach, I eat one CL
     'As for those peaches, I eat one of them.'

Second, TOP and REL could be preceded by a "number + classifier" structure respectively, which are different from each other. Meanwhile, it's known that one of the characteristics of Mandarin noun phrases is that there can only be one set of " number + classifier " structure before a noun. (Cheng 2012; Cheng&Yang 2022) Thus, in example (21), TOP is "yi CL_1 juzi" (an orange) and REL is "yi CL_2 (juzi)"(a piece of orange). Also, if exploring further, when TOP is reconstructed to REL, it forms the structure "yi CL_2 yi CL_1 juz " , which is not legal. It means that TOP cannot be reconstructed to REL in the comment clause.

（21）yi CL_1 juzi, mei CL haizi zhi neng chi yi CL_2
      one CL_1 orange, every CL child only can eat one CL_2
      'As for one orange, every child only can eat one piece (of it).'

Third, TOP and REL show confliction their adjective order after reconstruction. In the first place, it's known that in Mandarin, when there are multiple adjectives in front of a noun, there is a requirement for the order of these adjectives.(Cheng 2006; Xu 2006; Cheng 2012; Cheng&Yang 2022) And it is found that the adjective order in the noun phrase structure, formed by TOP if it is reconstructed to REL, does not match with the conventional requirement. For example, in (22), the sentence (22)a is the standard Mandarin sentence, where the order of the adjectives in the basic structure should be "ni song wo DE naxie Sichuan lajiao"(those Sichuan chili peppers you gave me). The sentence (22)b is a non-dangling topic construction corresponding to (22)a. Here TOP is "ni song wo DE naxie lajiao"(those chili peppers you gave me) , and REL is "sichuan DE (lajiao)"(Sichuan chili peppers). When the TOP is reconstructed to the REL, it forms the structure ""(Sichua DE ni song wo DE naxie lajiao), where the adjective order does not match the standard Mandarin, so it is illegal.
It also means that TOP cannot be reconstructed to REL in the comment clause.

（22）a. wo xihuan ni song wo DE naxie Sichuan lajiao
        I like you give me DE those Sichuan chili pepper
        'I like those chili peppers you give me.'
     b. ni song wo DE naxie lajiao, wo xihuan Sichuan DE
        you give me DE those chili pepper, I like Sichuan DE
        'As for those chili peppers you give me, I like Sichuan (chili peppers).'

To sum up, TOP and REL structures have differences, which not only confirms that the movement happening in Mandarin non-dangling topic constructions is not simply a subextraction naturally, but also shows it seems that TOP and REL are two independent components with some autonomy in morphology and syntax.

4.2 Similarities: Same Binding Effect

TOP and REL are subject to the same binding condition. For example, in (23), TOP is "Lisi_i DE liwu"(Lisi_i's gift) and REL is "yi CL (Lisi_i DE liwu)"(one Lisi_i's gift)".

We thus find that the person in the TOP is Lisi, which is co-referring to the person in the REL but not to the subject "ta"(he) in the comment clause. Again, in example (24), the subject is left out in the sentence after the non-dangling topic construction, but the subject could be "zhexie"(these), referring to the TOP "xiangjiao"(bananas), or "zhe CL"(this one), referring to the REL "yi CL (xiangjiao)"(one banana). Both are legal. It thus means that the subsequent clause following this non-dangling topic construction has two semantic interpretations, one reading "bananas is delicious in general" while the other reading 'the banana I ate is delicious in particular".

（23）Lisi$_i$ DE liwu, ta$_{j/*i}$ zhi shou ASP yi CL
　　　　Lisi$_i$ DE gift, he$_{j/*i}$ only receive ASP one CL
　　　　'As for Lisi$_i$'s gift, he$_{j/*i}$ only received one (Lisi$_i$'s gift)"

(24）xiangjiao, wo chi ASP yi CL, (zhe CL/ zhexie) DEG haochi DE
　　　　banana, I eat ASP one CL. (this CL/ they) DEG tasty DE
　　　　'As for bananas, I ate one (of them). (This one/ They)' is/are tasty.'

In addition, the study also found a large number of examples indicating that both TOP and REL have semantic relevance (Aboutness), are assigned the same case, and perform the same government effect of universal/existential quantifiers.

In summary, the similarities exhibited by TOP and REL further indicate that TOP and REL are somehow related and generated in the same position syntactically.

5　Label-driven Derived Mechanism

In the third and fourth sections, we found that a large number of Mandarin non-dangling topic constructions fit the three typical judgment means of movement, so this study considers the non-dangling topic constructions to be moved-generated. At the same time, TOP and REL are subject to the same binding condition, have semantic relevance, same case features and the same universal/existential quantifier governing effect, etc., so the two have connections, seeming to be generated in the same position. Meanwhile, the specificity of movement in 3.2 and the difference between TOP and REL in 4.1 suggest that they are two independent components and thus TOP is not simply subextracted from the comment clause. In conclusion, this study concludes that neither the base-generated view nor the traditional movement-derived view could explain the derivation process of Mandarin non-dangling topic constructions.

At this point, it is tentatively inferred that in all typical Mandarin non-dangling topic constructions, TOP is base-generated from the vP-internal structure and then moved to the left periphery position of this clause. This study boldly makes the hypothesis that TOP and REL are two independent components occupying the same base position.

So, why and how exactly is TOP moved? Before answering this question, here are some ideas of Minimalist Program theory and the characteristics of Mandarin noun

phrases.

5.1 Stable Structures and Label

Minimalist Program is a grammar based on merge, where the product of merging is a number of linearly disordered combinations that Chomsky argues become ordered when mapped to the phonological interface (Kayne 2010). Chomsky (2008) argues that the head is not specified but computed, a computation called the Labeling Algorithm, and posits that the head of the set is determined by Minimal Search, which means if one of the two merged items is explored as a lexical item, then the lexical item is the head of the set. Therefore, the condition for labeling is that the structure merged by two items is asymmetry, i.e. it's a locally unstable construction. Thus, what if two identical components (two same lexical items or two same non-lexical items) merge to form a symmetric stable structure? Do we need to label it and how?

Chomsky (2013) points out that not all merged components need to be labeled, and there is no final conclusion in the academic circle on when exactly label is necessary. The present study agrees with (Ott 2011, 2015b), see (25), that labeling must occur when the arguments or the appositives of a phase vP are merged, because the syntactic components must be definite and unambiguous when it enters into the semantic relation.

(25) Labeling conjecture (Ott 2011, 2015b:173)
Labels are required for thematic interpretation: for a syntactic object Z to be interpreted as an element of the thematic domain, Z must be labeled.

Thus, two phrases merged, without labeling, cannot form an accurate thematic relation, and therefore must be labeled. Again based on two basic ideas: one is the theta-criterion (Chomsky 1981) that only a single XP can appear in the positions of argument/semantic appositive, and the other is that merge occurs freely (Chomsky 2004, Boeckx 2010). Therefore, for the purpose of the need of labeling, a movement must occur in one phrase when two phrases are merged.

5.2 Definition of Mandarin Noun Phrase

Here it's necessary to briefly explore Mandarin noun phrases. Boškovic (2008, 2012) divides world languages into DP-languages and NP-languages, and Mandarin Chinese belongs to the latter, where only NP exists.

To be specific, Boškovic (2008, 2012) argues that there is (a structural difference in nominal phrases between languages with definite articles and languages without definite articles. His main argument is based on a number of cross-linguistic generalizations that he establishes, including (1) only languages without definite articles may allow Left Branch Extraction of an adjective out of a nominal phrase; (2) only languages without definite articles may allow adjunct extraction out of a nominal phrase; (3) only languages with definite articles allow the majority superlative reading. Therefore, he proposes that languages with definite articles have DP in the nominal

domain (DP-language), whereas languages without definite articles lack DP (NP-language), thus a two-way distinction of DP- and NP-languages: a. Languages with definite articles (e.g., English), where DP projects (DP-languages") b. Languages without definite articles (e.g., Chinese), where DP does not project ("NP-languages").

Accordingly, we assume that both TOP and REL components in the structure of Mandarin non-dangling topic constructions are NPs, and their difference only lies in the functional layers such as (non-)definite property and modification.
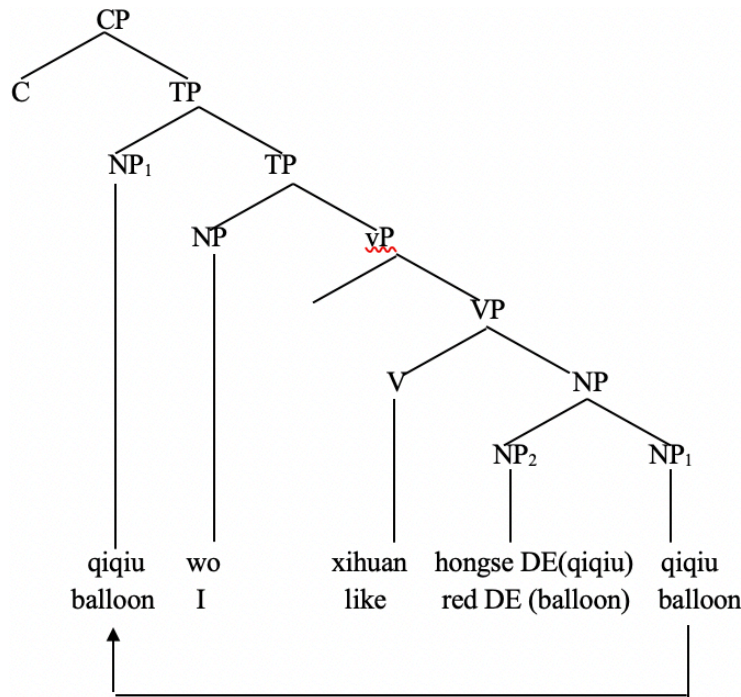
5.3 Mechanism for Non-dangling Topic Derivation

Ott (2011, 2012, 2015a, 2015b) and Zamparelli (2000) respectively, propose a symmetry-breaking analysis in Moro's (2000) sense for split-topicalization in German and ne-cliticization in Italian. They consider the topic and the relevant part is base-generated in the comment clause, with the topic a predicate of the relevant, then experiencing left-dislocation. Meanwhile, this study adopts Boškovic's view that noun phrases in Mandarin Chinese are NPs. Therefore, based on Ott (2011, 2012, 2015a, 2015b) and Zamparelli (2000), the study proposes the syntactic derivation process of Mandarin non-dangling topic constructions according to the theory of Label Algorithm in Minimalist Program. The derivation process is as follows.

TOP and REL in a non-dangling topic construction first merge in the same position, i.e. vP-internal position, receiving the same θ-role and the same case from the verb. In the base structure, TOP is performed as the logical predicate of REL, and the two directly form the set {argument, predicate}. That is, TOP and REL are merged, represented as {NP, NP}, similar to the familiar argument-predicate structure {DP, vP}. This symmetric structure cannot be syntactically labeled, so the NP (i.e., TOP), which is the predicate, must be moved to the edge position of T to realize labeling. This is the movement-derived process of Mandarin non-dangling topic constructions. It can be represented as the following figure (26), where NP_1 is TOP, NP_2 is REL. And also see the specific example (27) as well as its according syntactic tree.

(26) $[_{TP} NP_1 \ldots [_{vP} \{NP_2, NP_1\}]]$ → $[_{TP} NP_1 \ldots [_{vP} NP_2]]$

(27) qiqiu, wo xihuan hongse DE e_i
     balloon, I like red DE e_i
     'As for balloon, I like red balloons,'

CP
C   TP
    NP₁   TP
        NP   vP
                        VP
                    V   NP
                          NP₂   NP₁

qiqiu   wo   xihuan   hongse DE(qiqiu) qiqiu
balloon   I   like   red DE (balloon) balloon

6 Discussion

6.1 Further Explanations on Special Attributes of Non-dangling Topics

The new label-driven movement-derived mechanism exactly explains the special cases of this topic construction this study found before in the third and fourth parts.

Firstly, the label-driven movement-derived mechanism of Mandarin non-dangling topic constructions provides evidence for the structural differences of TOP and REL. Since it's two noun phrases which are merged in this progress, the "number asymmetry", "quantifier repetition" and "adjective word order confliction" in 4.1 accordingly are explained. The examples in 4.1 are reproduced as follows, see (28). Accordingly, the syntactic merging operations in (29) occur for each of the three examples, where NP_1 is TOP and NP_2 is REL. And the movement processes after NP_1 merging due to the need for labeling are respectively illustrated in (30) for each of the three sentences.

(28) a. zhexie taozi, wo chi yi CL
　　　 those peach, I eat one CL
　　　 'As for those peaches, I eat one (of them).'

　　 b. yi CL_1 juzi, mei CL haizi zhi neng chi yi CL_2
　　　 one CL_1 orange, every CL child only can eat one CL_2
　　　 'As for one orange, every child only can eat one piece (of it).'

　　 c. ni song wo DE naxie lajiao, wo xihuan Sichuan DE
　　　 you give me DE those chili pepper, I like Sichuan DE
　　　 'As for those chili peppers you give me, I like Sichuan (chili peppers).'

(29) a. {NP$_2$, NP$_1$} → {yi CL (taozi), zhexie taozi}

b. {NP$_2$, NP$_1$} → {yi CL$_2$ (juzi), yi CL$_1$ juzi}

c. {NP$_2$, NP$_1$} → {Sichuan DE (lajiao), ni song wo DE naxie lajiao}

(30) a. [$_{TP}$ zhexie taozi… [$_{vP}$ { yi CL (taozi), zhexie taozi }]] → [$_{TP}$ zhexie taozi…[$_{vP}$ yi CL (taozi)]]
b. [$_{TP}$ yi CL$_1$ juzi… [$_{vP}$ { yi CL$_2$ (juzi), yi CL$_1$ juzi }]] → [$_{TP}$ yi CL$_1$ juzi…[$_{vP}$ yi CL$_2$ (juzi)]]
c. [$_{TP}$ ni song wo DE naxie lajiao… [$_{vP}$ { Sichuan DE (lajiao), ni song wo DE naxie lajiao }]] → [$_{TP}$ ni song wo DE naxie lajiao…[$_{vP}$ Sichuan DE (lajiao)]]

Secondly, this mechanism can explain the phenomenon that when the object part in a clause are two components, which are compounded by conjunction, it does not generate the corresponding non-dangling topic constructions. The example sentence (17) in the first part of 3.2 is now reproduced in (31). Thus, the following merge process occurs in (31)b: {NP$_2$, NP$_1$} → { yi CL (gou), gou}, then TOP "dog" is moved to the edge position of T, i.e., the initial position of the sentence linearly, driven by labeling, resulting in the legal sentence b. However, as for (32)c, when the two noun phrases in the object part of the clause are connected by the conjunction "and", since the merger of NP$_2$, NP$_1$ does not occur, the symmetric structure set is not generated, no label is required, and thus no movement is induced. Accordingly, no non-dangling topic construction is derived, i.e., sentence (32)d is not legal.

(31) a. ta baba mai ASP yi CL gou
  his father buy ASP one CL dog
  'His father bought a dog.'

b. gou, ta baba mai ASP yi CL
  dog, his father buy ASP one CL
  'As for dog, his father bought a dog.'

c. ta baba mai ASP yi CL$_1$ gou he yi CL$_2$ mao
  his father buy ASP one CL$_1$ dog and one CL$_2$ cat
  'His father bought a dog and a cat.'
  （Shi 2000）

d. *gou, mao, ta baba mai ASP yi CL$_1$ he yi CL$_2$
  dog, cat, his father buy ASP one CL$_1$ and one CL$_2$
  'As for dog and cat, his father bought a dog and a cat.'

Thirdly, this label-driven movement-derived mechanism also offers an

explanation for the particular structure of Mandarin non-dangling topic constructiond, i.e., left-located topic construction, whose gap is occupied by a resumptive pronoun "ta$_i$" in the example (19) in 3.2, reproduced here in (34). In this case, tobe specific, "Zhangsan$_i$" is merged with "ta$_i$" first, and then moved to the edge of T due to the need for labeling, as shown in (35).

（34）Zhangsan$_i$, wo gei ASP　ta$_i$　liang　CL book
　　　Zhangsan$_i$,　I give ASP him$_i$ two　CL books
　　　'As for Zhangsan$_i$, I gived him two books.'

　　　　　　　　　　　　　　　　　　　　　Huang et al.(2009)

(35) a. merge: {NP$_2$, NP$_1$} → { ta$_i$, Zhangsan$_i$}
　　　b. move: [$_{TP}$ Zhangsan$_i$… [$_{vP}$ { ta$_i$, Zhangsan$_i$ }]] → [$_{TP}$ Zhangsan$_i$…[$_{vP}$ ta$_i$]]

To sum up, this new movement process exactly accounts for the special cases of this topic construction this study found before. For one, the two noun phrases merging operation explains the differences between TOP and REL as well as some special attributes of its movement, like compounding objects restriction on topicalization, special Mandarin non-dangling topic constructions with a resumptive pronoun, etc. And they base-generated in the same place explains the similarity of TOP and REL. For another, their movement via the first phase vP's edge also explains some special attributes of its movement.

6.2 Advancement

Ott (2011,2012,2015a,2015b) assume the stranded part (DP) and the topic (NP) are sisters in the base position, the former being the subject and the latter being the predicate. This creates a symmetry problem, so the topic NP has to move to resolve it. The predication relation captures subset-superset relation, explained by Ott in a pragmatic way as frame-setting. Crucially, he also finds it's syntactically possible for DP to move, but he doesn't find a better explanation to solve it.

The current proposal regarding Mandarin non-dangling topic construction sheds light on a better explanation, indicating the stranded part (REL) and the topic (TOP) are the same type, both NPs in Mandarin or possibly both DPs in DP-languages, as long as with the two just sisters with special subject-predicate relation. This progress also satisfies Ott's pragmatic explanation.

At the same time, this study also agrees with Ott, verifying "multiple agree", assuming NP$_1$ and NP$_2$ in {NP$_2$, NP$_1$} have the same case since they are base-generated in the same case position, assigned case through Multiple Agree. (see 36)

(36)
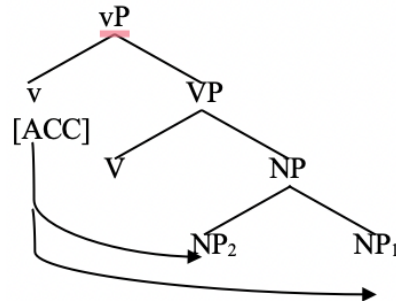
6.3 Cross-linguistic Evidence

Human languages have the requirements of universality. (Cheng, 1999) This section of the study finally observes other languages, trying to find evidence to further verify the rationality and universality of this new proposed mechanism for derivating Mandarin non-dangling topic constructions.

There are a large number of split topic constructions in German, and a typical structure is shown in example (37). The label-driven movement-derived mechanism is able to explain the derivation process of this sentence. To be specific, the two noun phrases "Bücher" (book) and "drei gute" (three good) are merged to form the structure { drei gute, Bücher}, and then "Bücher" is moved to the left periphery position of the sentence, due to the need to break the symmetry of this stable structure and thus to label it.

（37） Bücher   hat Peter leider   erst   drei   gute gelesen.
        books   has   Peter unfortunately only three good read
        'As for books, Peter has unfortunately only read three good ones.'

(Ott 2011)

Moreover, Chinese is not rich in morphological forms, but we can more easily find evidence to prove the universality of the mechanism by observing morphological markers in other languages. For instance, similar structures exist in Hungarian, see example (38). To be specific, TOP and REL reflect consistency in case marking. Sentence (38)b is a corresponding topic construction of sentence (38)a. In (38)a, only the noun "bicikliket" (bike.ACC) is assigned a object case, while in (38)b both the noun "bicikliket" (bike.ACC) at the initial position of the sentence and the adjective after the verb "nagyokat" (big.ACC) have the object case markers. It most likely indicates 38(b) has two noun phrases "nagyokat" (big.ACC) and "bicikliket" (bike.ACC) , both based-generated in the same position, i.e. the object position of the clause, thus assigned the

same object case. They are merged as {nagyokat, bicikliket}. Then, for the sake of breaking asymmetry to label, "bicikliket" is moved.

（38）a. Láttam nagy bicikliket.
        I saw big bike.$_{ACC}$
    b. Bicikliket láttam nagyokat.
        bike.$_{ACC}$ I saw big.$_{ACC}$
        'I saw a big bike.'

(Fanselow & Fery 2006)

Besides, a similar structure is also found in Nogai. Its TOP and REL reflect consistency in their repetition markers, as shown example (31).

（39）a. Köp noRaj kitapdy ul aldy.
        many Nogai book.$_{SG}$ he bought
    b. **NoRaj kitaplardy** ul **köp** aldy**.**
        Nogai book.$_{PL}$ he many bought
        'He bought many Nogai books.'

（Fanselow & Fery 2006）

All the above three languages provide evidence for the label-driven movement-derived mechanism of Mandarin non-dangling topic constructions proposed in this study, which proves its rationality and universality to some extent.

7 Conclusion

This study first provides an overview of the definition and the previous syntactic studies of Mandarin non-dangling topic constructions, pointing out the weaknesses of the two derivation views—the base-generated view and the movement-derived view. Simply speaking, as for the former view, external merge is to satisfy thematic role, thus base-generated topic's thematic role is doubtful, while as for the latter view, the traditional movement's nature is subextraction, but many examples doubt it. Moreover, it also finds many psychology experiments focusing on this field tend to support it's derived through movement, but severely lacking theoretical analysis to support it.

Thus, after exploring whether movement occurs in non-dangling topic constructions from multiple perspectives, including theoretical analysis, practical verification through three typical approaches—unbounded dependency, island condition, reconstruction effect—and syntactic psychological experiment proof, the topic TOP is considered as being derived through movement. Successively, the special attributes of its movement are analyzed, and the similarities and differences between TOP and REL are also investigated, the findings including their obvious structural differences, same binding performance, semantic relevance, same case, same government effect of universal/existential quantifiers, etc.)

Based on the above analysis, the study applies the latest findings of Minimalist

Program (mainly Label Algorithm and Phase Theory), and based on Ott (2011, 2012, 2015a, 2015b) and Zamparelli (2000), proposes a new mechanism for the derivation of Mandarin non-dangling topic constructions. It's assumed that TOP and REL are two noun phrases, differing from each other structurally only in their functional layers such as (non-)definite property and modification. They are merged as {NP, NP} first in the same position, i.e. vP's complement position, thus assigned the same thematic roles, the same case, etc. Then, agreeing with Ott's claim that TOP acts as a logical predicate of REL in the base structure, the two constructions directly form the structure {argument, predicate}. To be specific, TOP and REL are merged as {NP, NP}, similar to the argument-predicate structure {NP, vP}, which is more familiar to us. Meanwhile, it's assumed that labeling is necessarily required for thematic interpretation. Since {NP, NP}, this symmetric stable structure, cannot be syntactically labeled, so the NP (i.e., TOP), which is the predicate, must be moved to the edge of T to realize labeling. This is exactly the movement-derived process of Mandarin non-dangling topic constructions. Moreover, labeling happens under the phase level. Under this condition, the study considers that TOP is moved through the edge of the first phase vP to the edge of T in the second phase CP. This mechanism thus exactly account for the special cases of this topic construction this study found in the former part, i.e. provideing more possibilities for non-dangling topic constructions, including the independency of TOP and REL, compounding objects restriction on topicalization, special Mandarin non-dangling topic constructions with a resumptive pronoun, etc. Finally, the study also further presents other cross-linguistic evidence from German, Hungarian, and Norge, in an attempt to verify the rationality and generality of this label-driven movement derivation process.

Mandarin topic constructions are extremely flexible and diverse, compared to other languages, and hence are of high research value. The present study exerts the extensive analysis theoretically and practically, continuing to provide evidence for the movement view of its derivation process, and more importantly, the study proposes a label-driven movement-derived mechanism for Mandarin non-dangling topic constructions, which to some extent compensates for the deficiencies of the traditional movement-derived view. What's more, the inquiry process slightly validates and promotes the ideas related to Minimalist Program. And also more importantly, it provides some much more convincing theoretical supports for the results of some psychological experiments.

Last, there are two main directions for further research in the future. One is that the expository process initially corroborates the rationality of the new movement-derived mechanism within the framework of Labeling Algorithm in Minimalist Program, but this study fails to discuss the related theoretical issues much. Therefore, exploring more details or talking about it under Phase Theory would work well in explaining this derivation mechanism of Mandarin non-dangling topic constructions. Second, the most unique topic construction in Mandarin compared with other languages is dangling topic construction, which could also be explained by the derivation mechanism driven by labeling to a certain extent, so further verification and exploration are necessarily needed.

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