

UNIVERSITY OF CALGARY

Investigating extra-sentential factors' roles in interpreting Mandarin *ziji*:  
the interaction of extra-sentential (co)reference and intra-sentential coreference

by

Peng Han

A THESIS

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## Abstract

This thesis addresses two problems concerning the studies of Mandarin reflexive *ziji*: the lack of studies on *ziji*'s extra-sentential (co)reference, and the disregard for extra-sentential factors' effects on *ziji*'s interpretation. Through reviewing previous studies, this thesis sorted out three broad uses of *ziji* predicting *ziji*'s extra-sentential (co)reference, i.e., logophoric *ziji* (attitudinal *ziji* and empathy *ziji*), contemplative *ziji* (discursive contemplative *ziji* and contextual contemplative *ziji*), and indexical *ziji*. To verify the predicted uses, a corpus study of sentence-initial *ziji* was conducted. While logophoric *ziji* and contemplative *ziji* were validated, Anand's indexical *ziji* was not. This thesis also proposed a shiftable indexical analysis for contemplative *ziji*: contextual contemplative *ziji* is analyzed as an indexical referring to the perspective center in the utterance context; the use of discursive contemplative *ziji* arises from a shift of the circumstances to evaluate *ziji*, from the utterance context to the situation where the relevant thought was produced. This analysis is different from Anand's, where *ziji* is treated as an indexical referring to the speaker. Turning back to the validated uses, they demonstrate the extra-sentential (co)referential potentials introduced by discourse and context. These potentials can interfere with *ziji*'s intra-sentential coreference. As evidenced in an experiment testing the blocking effect in various contexts, the context "contemplation" can enhance *ziji*'s intra-sentential coreference with 1st person antecedents because *ziji* in "contemplation" allows a contextual contemplative use and its reference to the contemplator coincides with the reference derived from the 1st person antecedents. Moreover, discourse and context can affect *ziji*'s intra-sentential coreference by directly acting on the variables involved in *ziji*'s empathy use, e.g., increasing a referent's empathy level and making the referent more likely to be empathized with. There are other extra-sentential factors affecting *ziji*'s interpretation. It was hypothesized that written stimuli activate more of *ziji*'s contextual contemplative readings than oral stimuli, though this effect from modality was not confirmed by experiment results, possibly due to the interference from the way that acceptability judgments were made. Despite this, another effect from modality was revealed, which is proposed to arise from written stimuli's constant accessibility in contrast to oral stimuli's evanescence.

# Preface

This thesis is an original work by the author. No part of this thesis has been previously published.

# Acknowledgements

While the thesis writing is coming to an end, it is finally the time to look back on who and what has made this thesis possible and express my thanks.

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Finally, this thesis is in memory of my time that has lapsed over the past five years.

*To all the time I've wasted...*

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# List of Symbols, Abbreviations and Nomenclature

Symbol or abbreviation	Definition
✓	check mark
*✓	strong check mark indicating inviolability
X	x mark
*	marking syntactic unacceptability
#	marking unacceptability in a specific context
?	marking marginal acceptability or uncertainty
φ	grammatical gender, person and number features
ACC	accusative
ADDR	addressee
arb	arbitrary reading
ASP	aspect
AUTH	author
AUX	auxiliary
BA	a light verb followed by object and then verb
<i>ziji</i> <sub>cc</sub>	<i>ziji</i> with a cross-clausal antecedent
CL	classifier
COP	copula
CP	complementizer phrase
DAT	dative
DRS	discourse representation structure
DRT	discourse representation theory
HON	honorific
IND-Mandarin	a Mandarin dialect with <i>ziji</i> as a shiftable indexical
INFL	nodes marking inflection in syntactic trees
IP	phrases headed by INFL
LDA	long distance anaphora
LDA <i>ziji</i>	<i>ziji</i> as a long distance anaphor
LF	logical form
LOG	logophor
LOG-Mandarin	a Mandarin dialect with <i>ziji</i> as a logophor
NEG	negation
N°	a bare noun head

NOM	nominative
NP	noun phrase
OP <sub>AUTH</sub>	author shifting operator
OP <sub>LOG</sub>	logophoric operator
P-center	perspective center
PASS	passive
PNMM	pre-nominal modification marker
POSS	possessive
P-PRED	perspective-predicate
PRES	present
PROG	progressive
PST	past
Q	question marker
RC	relative clause marker
REP	reportative
RM	resultative marker
RT	reaction time
SFP	sentence-final particle
SG	singular
S-structure	surface structure
TOP	topic marker
V <sup>o</sup>	a bare verb head
VP	verb phrase

# Epigraph

*The four steps in dealing with any problem: face it, accept it, deal with it, let it go.*

- Master Sheng yen, *108 adages of wisdom*

# Chapter 1

## Introduction

### 1.1 The Mandarin reflexive form *ziji*'s multiple (co)referential possibilities

The Mandarin *ziji* has often been characterized as a reflexive. Just as the English reflexive *himself* in *John likes himself* corefers with its antecedent *John*, *ziji* as a reflexive also allows an antecedent in the local clause containing *ziji*. However, *ziji*'s (co)reference potential is not limited to its local clause.<sup>1</sup> As will be introduced below, the reflexive form *ziji* also allows cross-clausal coreference or even extra-sentential (co)reference. With multiple (co)referential possibilities, *ziji* can hardly be characterized with the existing terms like “reflexive”, “anaphor”<sup>2</sup> or “indexical”. Before reaching any conclusion on the categorization of *ziji*, this thesis simply labels *ziji* as a reflexive form, which implies the most widely known use of *ziji*.

---

<sup>1</sup>The term (co)reference is used to include both reference and coreference. The distinction of reference and coreference follows from the idea that coreference associates *ziji* with a linguistic expression (e.g., a discursive antecedent), while reference links *ziji* to a particular individual in the physical context.

<sup>2</sup>“Anaphor” used in this thesis adopts its literal meaning, rather than the sense with reference to local binding in Chomsky (1981).

### 1.1.1 Local coreference and cross-clausal coreference

*Ziji*'s coreference with a local antecedent is an instance of local binding, if the local antecedent c-commands *ziji*. Local binding is a property typical of reflexives. As specified in Chomsky's (1981) Binding Theory (specifically Condition A), reflexives must be bound in their binding domains, which roughly correspond to the smallest clauses containing the reflexives. However, this seems to apply to English reflexives (e.g., *himself*), which are bound by local antecedents, but not to *ziji*. The contrast between *himself* and *ziji* is demonstrated in (1). While *himself* in (1a) can only have the local subject *Harry* as its antecedent, *ziji* in (1b) has three antecedent options, namely, the local subject *Wangwu*, the intermediate subject *Lisi* and the highest subject *Zhangsan*. That is, in addition to local coreference, *ziji* can also corefer with an antecedent in higher clauses, hence allowing cross-clausal coreference. *Ziji*'s cross-clausal coreference is called long distance binding in some previous studies (e.g., Battistella and Xu (1990), Xu (1993), and Pan (2001)), to contrast with the notion of local binding generalized for reflexives in the Binding Theory.

- (1) a. Tom<sub>i</sub> thinks Bill<sub>j</sub> knows Harry<sub>k</sub> likes himself<sub>\*i/\*j/k</sub>.  
b. Zhangsan<sub>i</sub> renwei Lisi<sub>j</sub> zhidao Wangwu<sub>k</sub> xihuan ziji<sub>i/j/k</sub>.  
Zhangsan think Lisi know Wangwu like self  
'Zhangsan<sub>i</sub> thinks Lisi<sub>j</sub> knows Wangwu<sub>k</sub> likes self<sub>i/j/k</sub>.'

(Cole and Sung, 1994, p. 355)

### 1.1.2 Extra-sentential (co)reference

Cross-clausal coreference characterizes *ziji* with an antecedent beyond the local clause, but within the sentence containing *ziji*. In this sense, *ziji* with local coreference and *ziji* with cross-clausal coreference both have intra-sentential antecedents. Beyond this, *ziji* also allows extra-sentential (co)reference, i.e., coreference with an antecedent in previous discourse or direct reference to an individual in the context.<sup>3</sup> The example sentence in (2a) is part of a biographical narration of

---

<sup>3</sup>“Context” used in this thesis refers to the physical context only, whereas “discourse” in this thesis refers to linguistic context unless indicated otherwise.

*John*'s life, and *ziji* here corefers with *John* mentioned in preceding sentences. *Ziji*'s coreference with an antecedent in previous discourse is termed "discursive coreference". As for (2b), there is no previous discourse, but *ziji* can access the speaker for interpretation. The direct reference (i.e., without the use of discursive coreference as a medium) to an individual in the context is termed "contextual reference".

- (2) a. The following is part of a biographical narration of *John*'s life.

lingdao de   biaoyang   dui **ziji** shi yi-ge   biance  
 leader   POSS compliment to   self COP one-CL impetus

'The leader's compliment was an encouragement to self<sub>John</sub>.'

(Anand 2006, p. 137)

- b. Background information: Zhangsan just proposed an idea in a meeting. The following sentence is what Zhangsan thought to himself.

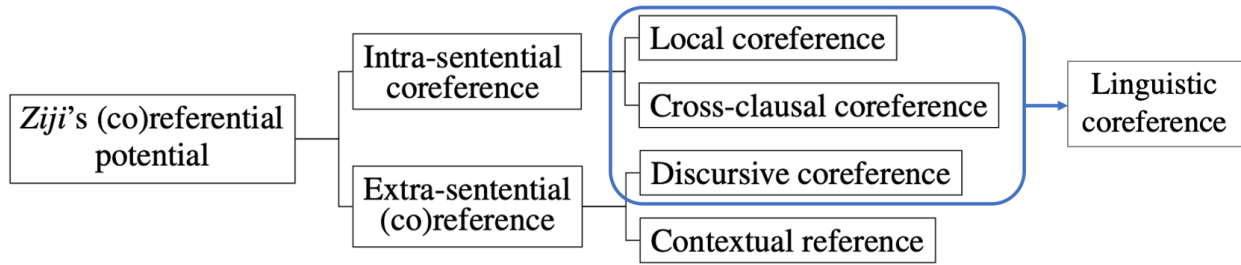
chule **ziji**, zhiyou san-ge   ren   zancheng zhe-ge xiangfa.  
 besides self only   three-CL people approve   this-CL idea

'Besides myself, only three other people agree with this idea.'

Adapted from Yu (1992, p. 291)

As seen above, *ziji* has multiple (co)referential possibilities, coreference with a local antecedent, coreference with a cross-clausal antecedent (i.e., an antecedent beyond the local clause but within the local sentence), coreference with a discursive antecedent and direct reference to an individual in the context. While the first two (co)referential possibilities represent *ziji*'s intra-sentential coreference, the latter two characterize *ziji*'s extra-sentential (co)reference. The figure below illustrates the different (co)referential possibilities of *ziji* and the relations among them.

Figure 1.1: The multiple (co)referential possibilities of *ziji*

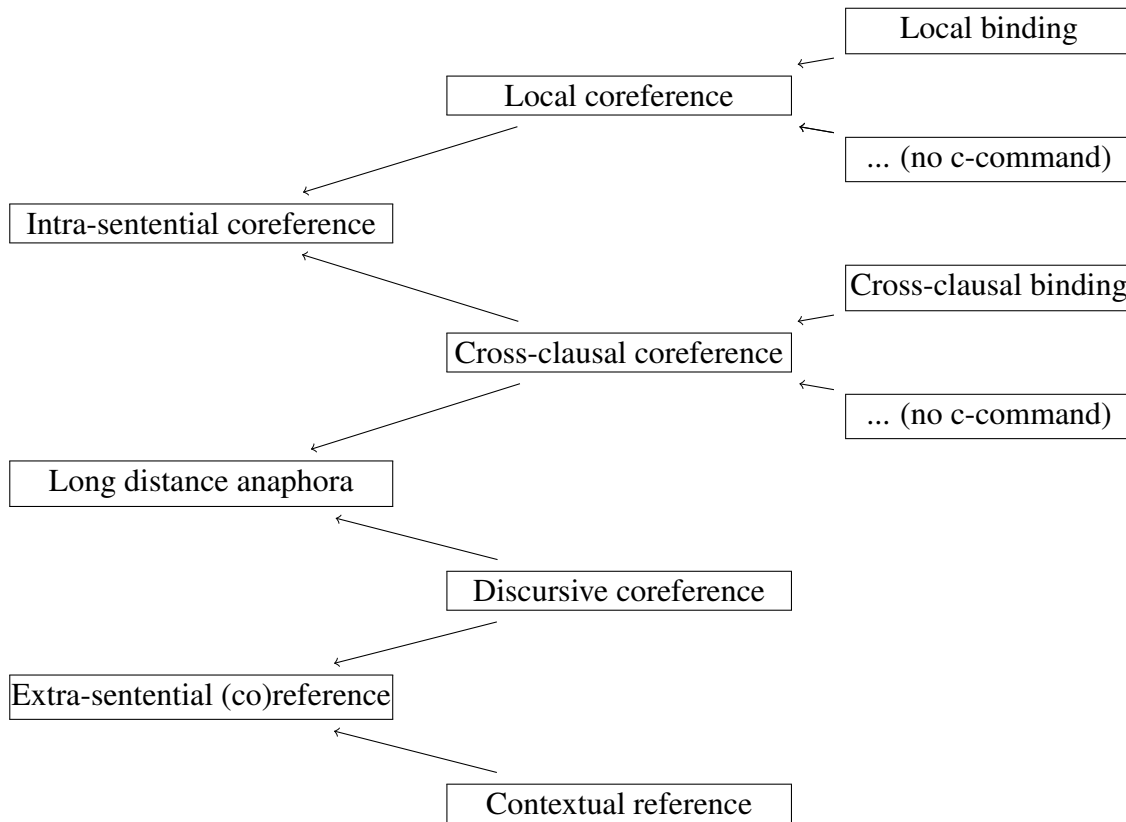


## 1.2 Two problems concerning the status quo of studies of *ziji*

### 1.2.1 *Ziji*'s extra-sentential (co)reference: Under-explored

Mandarin *ziji* is not the only reflexive form that violates Condition A of the Binding Theory; reflexive forms in some other languages also exhibit cross-clausal coreference, e.g., Italian *se* (Giorgi, 1984), Icelandic *sig* (Thrainsson, 1976), Japanese *zibun* (Takako, 1994), etc. To name the phenomenon that a reflexive form has an antecedent beyond its local clause, the previous section has mentioned the term “long distance binding”. However, this thesis abstains from the use of long distance binding, as there is not always a binding relation between a reflexive form and its long distance antecedent. Long Distance Anaphora (hereafter LDA), without implying binding, is thus a more precise term to characterize the phenomenon in question, with the reflexive forms allowing LDA called long distance anaphors. Following the literal sense of LDA, both *ziji* with cross-clausal coreference and *ziji* with discursive/extra-sentential coreference should be set within the scope of LDA studies, though *ziji*'s direct reference to a contextual individual still represents a separate phenomenon from LDA. Note that the terms “local binding” and “cross-clausal binding” also appear in this thesis from time to time; they are used when a reflexive form not only corefers with an antecedent, but is structurally c-commanded by the antecedent. Figure 1.2 illustrates how the aforementioned terms relate to one another and where they are situated within the studies of *ziji*.

Figure 1.2: Situating the relevant terms in studies of *ziji*



Previous studies of *ziji* beyond local binding have focused more on *ziji* with cross-clausal coreference, with little attention to discursive coreference and contextual reference (together as extra-sentential (co)reference). There are five main approaches dealing with *ziji* beyond local binding, where *ziji* is treated alternatively as a reflexive undergoing syntactic movements, a logophorically bound element, an empathy marker, a shifted indexical, and a pronominal referring to contemplators present in the context or mentioned in previous discourse. The analyses using syntactic movements are only concerned with *ziji* with cross-clausal binding/coreference; the analyses taking a logophoric approach, an empathy approach or an indexical approach are mostly intended for cross-clausal coreference; only the analysis that interprets *ziji* as a contemplator was originally proposed for extra-sentential (co)reference. Currently, there is a lack of comprehensive studies on

*ziji*'s extra-sentential (co)reference.

### 1.2.2 The disregard for extra-sentential factors' roles in interpreting *ziji*

*Ziji*'s extra-sentential (co)reference is independent from the sentence containing *ziji*, and relies on either context or discourse for interpretation. Extra-sentential (co)reference thus embodies the effects on *ziji*'s interpretation from two extra-sentential factors, context and discourse. These extra-sentential factors should apply equally, whether *ziji* in a sentence is oriented to intra-sentential coreference or extra-sentential (co)reference. Nevertheless, extra-sentential factors' roles have long been overlooked in previous studies of *ziji*. In sentence (3), *ziji* is in subject position, but previous studies have mixed interpretations of *ziji* in this position. Following Huang and Liu (2001), *ziji* without any intra-sentential antecedent has a default reference to the speaker, so *ziji* in (3) should refer to the speaker. Pan (2001) holds that *ziji* in this case can also refer to an addressee. In Anand (2006), *ziji* in (3) is allowed to refer to a 3rd person perspective center (i.e., the focused individual from whose viewpoint a discourse is narrated), provided that previous discourse provides rich background information.

- (3) **ziji** weishenme bu qu ne?  
self why not go Q  
'Why didn't self<sub>(I, you, he, she)</sub> go?'

(Pan, 2001, p. 296)

The mixed interpretations in (3) may result from a failure to take into account all potential effects from extra-sentential factors, specifically, all the extra-sentential (co)referential possibilities. As no intra-sentential antecedent is available, *ziji* in (3) has to resort to the context or previous discourse for successful interpretation, otherwise sentence (3) would be incomprehensible.

Extra-sentential factors' effects are also manifested in their interference in *ziji*'s potential for intra-sentential coreference (including local coreference and cross-clausal coreference). For instance, *ziji*'s potential for cross-clausal coreference should allow *ziji* in (4) to corefer with the respective matrix subjects, i.e., *Lisi* in (4a) and *wo* 'I' in (4b). Nonetheless, the coreference with

*Lisi* in (4a) is unacceptable, and the coreference with *wo* in (4b) is only marginally acceptable. The unacceptability or marginal acceptability of cross-clausal coreference in (4) is attributed by Tang (1989) to the conflicting person specifications between matrix subjects and local subjects, with the local subjects blocking *ziji*'s coreferential potential beyond the local clauses. In addition, Pan (2001) notes a person asymmetry, that is, the blocking from a 1st person pronoun to a 3rd person DP is stronger than that from a 3rd person DP to a 1st person pronoun.

- (4) a. *Lisi*<sub>i</sub> *zhidao* *wo*<sub>j</sub> *bu* *xihuan* ***ziji***<sub>\*i/j</sub>.  
 Lisi know I not like self  
 'Lisi knows that I do not like myself.'
- b. *wo*<sub>i</sub> *zhidao* *Lisi*<sub>j</sub> *bu* *xihuan* ***ziji***<sub>i/j</sub>.  
 I know Lisi not like self  
 'I know that Lisi did not like me/himself.'

(Pan, 2001, p. 283)

Despite being a property of cross-clausal coreference, the asymmetric person blocking may be rooted in extra-sentential factors' effects. The interpretation judgments in (4) were derived from introspection, which may induce *ziji*'s interpretation in contemplation contexts, where *ziji* can refer to the relevant speakers. The interpretation of *ziji* in contemplation contexts can secure *ziji*'s cross-clausal coreference with 1st person antecedents and thus mitigate the blocking from conflicting person specifications in (4b) but not in (4a), explaining the differentiated blocking levels.

As will be discussed in the next chapter, the data and claims on the properties characterizing *ziji*'s cross-clausal coreference (i.e., subject orientation and the blocking effect) are unclear or even contradictory, leading to various analyses. It is likely that all the controversies clouding these properties result from the disregard for extra-sentential factors' roles. Thus, it is necessary to tease out these extra-sentential factors' effects before settling the controversies over subject orientation and the blocking effect and finally reaching a plausible account capturing these properties. Moreover, when extra-sentential factors' effects are taken into consideration, intra-sentential factors (e.g., syntax) can be partially relieved of the burden of accounting for the disputes relating to *ziji*'s cross-clausal coreference. Therefore, figuring out these extra-sentential factors and their effects is of the

utmost importance for studies of *ziji*.

### **1.3 An investigation into the extra-sentential factors in interpreting *ziji* and their effects**

This thesis aims to address the aforementioned problems by investigating *ziji*'s extra-sentential (co)reference and learning about extra-sentential factors' effects. An investigation of *ziji*'s extra-sentential (co)reference can help figure out what roles extra-sentential factors (i.e., context and discourse) play in achieving extra-sentential (co)reference, which partially addresses the second problem. To this end, I first look at the existing accounts of *ziji* beyond local binding and sort out the analyses that allow discursive coreference and/or contextual reference in Chapter 2. The analyses include Charneval's (2017, 2019) and Park's (2018) logophoric analyses, Wang and Pan's (2012, 2014) empathy analysis, Anand's (2006) shiftable indexical analysis, and Li's (1991) contemplative analysis with *ziji* referring to contemplator. The use of *ziji* predicted in each analysis is thus termed after the corresponding analyses, i.e., logophoric *ziji*, empathy *ziji*, indexical *ziji* and contemplative *ziji*. As empathy *ziji*'s referent, "empathy locus", is a type of logophoric center, empathy *ziji* is treated as a subcategory of logophoric *ziji*. For logophoric *ziji* that refers to the other type of logophoric center, "attitude holder", it is attitudinal *ziji*. Moreover, contemplative *ziji* distinguishes contextual from discursive use based on where its reference is obtained. Therefore, there are five predicted uses of *ziji* that allow extra-sentential (co)reference, including attitudinal *ziji*, empathy *ziji*, contextual contemplative *ziji*, discursive contemplative *ziji* and indexical *ziji*. Note that attitudinal *ziji* and empathy *ziji* are subcategories of logophoric *ziji*, whereas contextual contemplative *ziji* and discursive contemplative *ziji* are subcategories of contemplative *ziji*.

In order to verify the predicted uses of *ziji*, Chapter 3 is devoted to a corpus study of sentence-initial *ziji*, which is generally free from the interference from intra-sentential coreference. It turns out that both subcategories of logophoric *ziji* and both subcategories of contemplative *ziji* are validated, though indexical *ziji* is not. Correspondingly, the analyses that predict the validated uses

are supported, including Charnavel's (2017, 2019) and Park's (2018) logophoric analyses, Wang and Pan's (2012, 2014) empathy analysis, and Li's (1991) contemplative analysis. Chapter 3 also examines whether Kuno and Kaburaki's (1977) empathy hierarchies hold in the current corpus study. The corpus results support surface structure empathy hierarchy, humanness hierarchy and topic empathy hierarchy, but not the speech-act participant empathy hierarchy, which may arise from the fact that data in this corpus study is limited to only including *ziji* with extra-sentential (co)reference. Furthermore, as Li's analysis does not specify what kind of pronominal contemplative *ziji* is, Chapter 3 will also present a shiftable indexical analysis for contemplative *ziji*, different from Anand's shiftable indexical analysis. In this proposal, contemplative *ziji* is a shiftable indexical with a default reference to the perspective center in the context, representing the use of contextual contemplative *ziji*; but when a context shift operator acts on the indexical, contemplative *ziji*'s reference is shifted to the perspective center mentioned in previous discourse, demonstrating the use of discursive contemplative *ziji*. As contextual contemplative *ziji*'s referent, the perspective center in the context, is simultaneously the speaker, contextual contemplative *ziji* seems to have a default reference to the speaker, which may have prompted Anand to treat *ziji* as a shiftable indexical with the denotation "AUTHOR(c)". However, contextual contemplative *ziji* is interpretable only in contexts with definitive perspective centers (e.g., in a context of contemplation), which poses a problem to Anand's indexical analysis (with AUTHOR(c)) that predicts unconditional reference to the speaker in any context.

Chapter 4 presents an experimental study of how the extra-sentential factor "context" affects *ziji*'s coreference with an intra-sentential antecedent. It was predicted that *ziji*'s cross-clausal coreference with a 1st person antecedent can be saved from the blocking caused by conflicting person specifications in a context of contemplation, because *ziji* in this context can refer to the contemplator (also the speaker), which coincides with the reference derived from the cross-clausal coreference. The contextual effect from *ziji*'s contextual contemplative readings was justified, but this is not the only contextual effect involved in this experiment. Contexts can also impact *ziji*'s cross-clausal coreference by interfering with the cross-clausal antecedent's empathy level.

Cross-clausal coreference with 1st/2nd person antecedents is preferred or strengthened because these antecedents' referents are discourse participants with inherently higher empathy levels than 3rd person individuals. This demonstrates contexts' direct effect on variables involved in intra-sentential coreference.

In the investigation of *ziji*'s reference to contextual contemplators, it was hypothesized that stimuli in the written mode are more likely to activate *ziji*'s contextual contemplative readings than those in the oral mode. If so, modality, as an extra-sentential factor, should have an effect on *ziji*'s interpretation. Modality's effect matters more to *ziji* in a standalone sentence (i.e., isolated from any surrounding discourse and the context), which is one of the most common forms that a stimulus takes in syntacticians' introspection and participants' judgments in experiments. As will be seen in Chapter 5, an experiment was conducted to test modality's potential effect. The results found that the modality effect relating to *ziji*'s contextual contemplative readings was not supported, but modality did exert an influence on the acceptability of sentences with *ziji*, possibly owing to written stimuli's constant accessibility to participants.

Chapter 6 is a conclusion chapter that summarizes the extra-sentential factors and their effects on *ziji*'s interpretation. Contextual/discursive factors play roles by bringing in extra-sentential (co)referential potentials, or interfering with variables manipulating *ziji*'s intra-sentential coreference. In terms of non-contextual/discursive factors like modality, their influence is much less predictable. Moreover, Chapter 6 discusses this thesis's contributions and limitations, and lists some future research orientations.

## Chapter 2

# Sorting out the analyses that allow *ziji*'s extra-sentential (co)reference

This chapter begins with a review of previous studies of *ziji* beyond local binding. As will be seen, *ziji* has been analyzed with various approaches, including syntactic movements, logophoric binding, the speaker's empathy, and indexical shift. Moreover, there is an account that was originally proposed for *ziji*'s extra-sentential (co)reference, and *ziji* in this account is said to refer to a contemplator mentioned in previous discourse or present in the context. This review examines whether the previous analyses can predict cross-clausal binding, extra-sentential (co)reference, subject orientation and the blocking effect (with person asymmetry or not). In addition to the deficiencies in each specific analysis, recall that the introductory chapter pointed out two general problems facing studies of *ziji*: the inadequacy of studies on *ziji*'s extra-sentential (co)reference and the disregard for extra-sentential factors' effects. With these two problems in mind, I sort out those analyses that allow discursive coreference and those that allow contextual reference, because context and discourse represent two separate extra-sentential factors. This chapter will conclude with three broad uses of *ziji* predicted to allow extra-sentential (co)reference, including logophoric *ziji*, contemplative *ziji* and indexical *ziji*.

## 2.1 Previous approaches to *ziji* beyond local binding

### 2.1.1 *Ziji* as a reflexive undergoing movements

Many researchers (e.g., Battistella (1989), Cole et al. (1990), Huang and Tang (1991), Sohng (2004)), have focused on *ziji* with cross-clausal binding/coreference. Henceforth, this type of *ziji* will be referred to as *ziji<sub>cc</sub>*, with “*cc*” standing for “cross-clausal”. These researchers do not take *ziji<sub>cc</sub>* as a violation of Chomsky’s (1981) local binding requirement which characterizes reflexives, and have tried various movement analyses to transform the cross-clausal binding/coreference into a series of local binding/coreference relations.

#### Movement to INFL: Battistella (1989)

Following the “movement-to-INFL” analysis developed in Chomsky (1986), Battistella (1989) provides a movement analysis of *ziji*, to capture cross-clausal coreference and the relevant properties, including subject orientation and the blocking effect. According to Battistella, *ziji* is a “subject-oriented” reflexive anaphor, just like its counterparts in Japanese and Korean, i.e., *zibun* and *caki* respectively. *Ziji*’s coreferential orientation to subjects is illustrated in (1), where the indirect object *Lisi* c-commands *ziji* but cannot serve as *ziji*’s antecedent.

- (1) Zhangsan<sub>i</sub> gaosu Lisi<sub>j</sub> **ziji**<sub>i/\*j</sub> kaoshi de-le manfen.  
Zhangsan tell Lisi self examination receive-PERF full-marks  
‘Zhangsan<sub>i</sub> told Lisi<sub>j</sub> that self<sub>i/\*j</sub> got full marks on the exam.’

(Battistella, 1989, p. 988)

Subject orientation is not unique to *ziji<sub>cc</sub>*. Locally bound *ziji* also exhibits subject orientation, as exemplified below.

- (2) Zhangsan<sub>i</sub> song Lisi<sub>j</sub> **ziji**<sub>i/\*j</sub> de shu.  
Zhangsan give Lisi self POSS book  
‘Zhangsan<sub>i</sub> gave Lisi<sub>j</sub> self’<sub>s<sub>i/\*j</sub></sub> book.’

(Battistella, 1989, p. 988)

The blocking effect is another restriction on the coreferential potential of  $ziji_{cc}$ , as pointed out in Tang (1989). A descriptive generalization of the blocking effect is stated as follows: “cross-clausal binding of  $ziji$  is possible only in case all c-commanding subjects agree in person” (Battistella and Xu, 1990, p. 211). As seen in sentence (3a),  $ziji$ ’s binding by the matrix subject *wo* ‘I’ is blocked as this matrix subject has a person feature different from that of the local subject. Blocking is not limited to long distance subjects with distinct person specifications. In (3b), the highest subject *Zhangsan* has the same person specification as the lowest subject *Lisi*, but  $ziji$ ’s binding by the highest subject *Zhangsan* is still blocked by the intervening subject with a different person specification, i.e., *ni* ‘you’.

- (3) a.  $wo_i$  *juede*  $ni_j$  *dui*  **$ziji_{*i/j}$**  *mei* *xinxin*.  
 I think you toward self not confidence  
 ‘I<sub>i</sub> think you<sub>j</sub> have no confidence in self<sub>\*i/j</sub>.’
- b.  $Zhangsan_i$  *zhidao*  $ni_j$  *juede*  $Lisi_k$  *dui*  **$ziji_{*i/*j/k}$**  *mei* *xinxin*.  
 Zhangsan know you think Lisi toward self not confidence  
 ‘Zhangsan<sub>i</sub> knows that you<sub>j</sub> think that Lisi<sub>k</sub> has no confidence in self<sub>\*i/\*j/k</sub>.’

Adapted from Battistella (1989, p. 996)

In Battistella’s analysis,  $ziji$  is a bare/simplex reflexive, different from complex reflexives like *himself* in English or *ta-ziji* ‘himself/herself’ in Mandarin. At LF,  $ziji$  as an  $N^0$  head, can move into INFL of each clause successively, from the local clause up to the highest clause. In order to motivate the movement to INFL, it is firstly stipulated that  $ziji$  may not remain in its S-structure position at the level of LF. With the assumption that the head INFL is sufficiently nominal as it includes AGR features,<sup>1</sup>  $ziji$ ’s movement to INFL instead of somewhere else is justified by a structure-preserving principle (Emonds, 1976), which requires that movements should not produce forms that are not possible without movements. Following this analysis, subject orientation is readily accounted for by INFL’s agreement with its specifier (i.e., grammatical subject); in the meantime, the specifier-head agreement also endows  $ziji$  with person, gender and number features.

<sup>1</sup>Battistella assumes that agreement checking is part of universal grammar, hence can appear in the grammar of Mandarin at no cost, despite the lack of overt reflexes of agreement in Mandarin.

In (3a), *ziji* acquires a 2nd person feature when it moves to INFL of the local clause. But when *ziji* makes a further move to the matrix's INFL, the previously acquired person feature conflicts with the matrix subject's 1st person feature, causing the derivation to be ruled out. As for (3b), it is seen that the movements to INFLs stop once a DP with a conflicting person feature intervenes, which strongly suggests that movements to INFL occur successively from a clause to its immediately higher clause; otherwise, *ziji* in (3b) should have had the potential to be bound by the matrix subject *Zhangsan*.

### **Movement to INFL: Cole, Hermon, and Sung (1990); Cole and Sung (1994)**

Cole, Hermon, and Sung (1990) propose a similar movement analysis of *ziji<sub>cc</sub>*, inspired by approaches to wh-movements and Battistella's (1987) analysis. Between *ziji* and its cross-clausal antecedent, there seems to be an unbounded syntactic dependency, which resembles the unbounded dependency in English between a wh-element and a deeply embedded trace. Now that the unbounded dependency in wh-movements turns out to be composed of a sequence of local dependencies, *ziji<sub>cc</sub>* can be approached likewise. With this analogy in mind, Cole, Hermon, and Sung claim that *ziji* also moves to C(omplementizer) heads, in addition to its movement to INFL. In other words, unlike the INFL-to-INFL movement in Battistella (1989), Cole, Hermon and Sung adopt INFL-to-C-to-INFL movement.

Recall that *ziji* is a simplex form, and there are also complex reflexives like *ta-ziji* 'himself/herself'. Cole and Sung (1994) reiterate the morphological distinction between the two types of reflexive forms and further generalize that reflexive forms allowing cross-clausal binding are monomorphemic  $X^0$  elements whereas reflexives locally bound are polymorphemic  $X^{\max}$  elements (i.e., XP), based on previous observations in Pica (1984, 1987) and Yang (1989). In the case of Mandarin, *ziji* is an  $X^0$ , and *ta-ziji* in the form of "pronoun + *ziji*" is an  $X^{\max}$ . For instance, sentence (4) and sentence (5) are exactly identical except for their reflexive forms; but when the polymorphemic reflexive *ta-ziji* is used, only local binding is allowed, as shown in (5).<sup>2</sup>

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<sup>2</sup>Later researchers (e.g., Pan (1998), Dillon et al. (2016), etc.) point out that *ta-ziji* also allows cross-clausal binding, which is consistent with my introspective judgment.

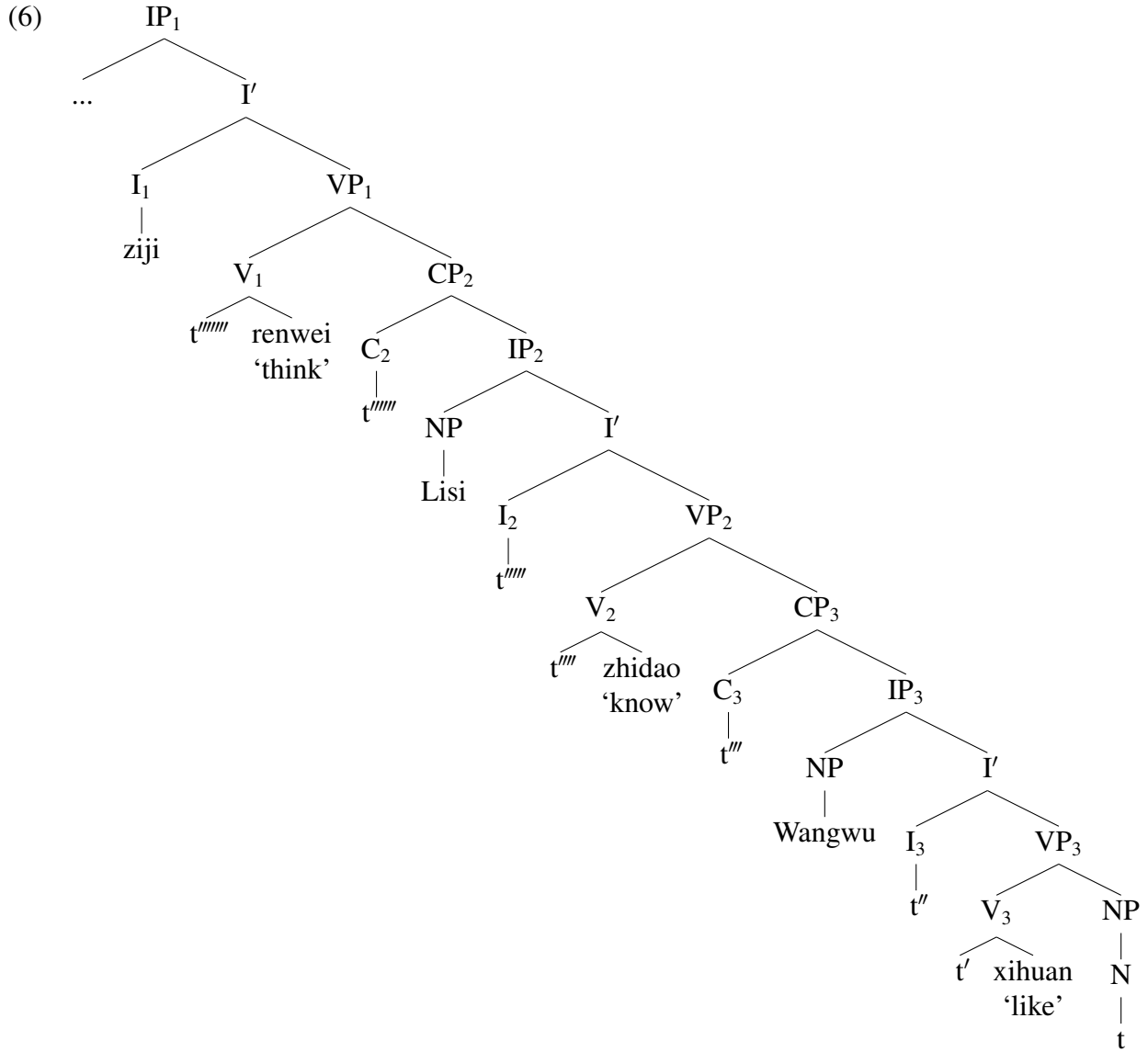
- (4) Zhangsan<sub>i</sub> renwei [Lisi<sub>j</sub> zhidao [Wangwu<sub>k</sub> xihuan **ziji**<sub>i/j/k</sub>]].  
 Zhangsan thinks Lisi knows Wangwu like self  
 ‘Zhangsan<sub>i</sub> thinks that Lisi<sub>j</sub> knows that Wangwu<sub>k</sub> likes self<sub>i/j/k</sub>.’

(Cole, Hermon, and Sung, 1990, p. 3)

- (5) Zhangsan<sub>i</sub> renwei [Lisi<sub>j</sub> zhidao [Wangwu<sub>k</sub> xihuan **ta-ziji**<sub>\*i/\*j/k</sub>]].  
 Zhangsan think Lisi know Wangwu like him-self  
 ‘Zhangsan thinks Lisi knows Wangwu likes himself.’

(Cole and Sung, 1994, p. 357)

In Cole and Sung (1994), the distinction of reflexives based on morphological forms is employed to explain cross-clausal binding and the two properties, subject orientation and the blocking effect. Unlike  $X^0$  reflexives (e.g., *ziji*),  $X^{\max}$  reflexives (e.g., English *himself*) are not allowed to undergo head movements, thus cannot realize cross-clausal binding via successive and cyclic movements. Moreover, Cole and Sung take a modified analysis of movements. The diagram in (6) demonstrates the modified movement path involved in the derivation of sentence (4): *ziji* moves from its base-generated position to  $V_3$  and then passes through  $I_3$ ,  $C_3$ ,  $V_2$ ,  $I_2$ ,  $C_2$  and  $V_1$  successively, before finally reaching the  $I_1$  position. Additional stopovers at  $V^0$  heads are introduced because Cole and Sung assume the head movement constraint (Travis, 1984; Baker, 1988), which requires a head to move to the closest head position.



Adapted from Cole and Sung (1994, p. 388-389)

However, Cole and Sung immediately realize that movement via V to I and C may allow  $ziji_{cc}$  to be immediately c-commanded by objects and fails to predict subject orientation. In order to satisfy subject orientation, they then stipulate that reflexive forms cannot terminate the derivation after adjoining to V and need to move to the next head position, though the stipulation lacks independent motivation. In terms of the blocking effect, a typological distinction is proposed in terms of the presence/absence of inherent person features at INFL heads, which depends on whether

verb inflection in a language has overt marking for person features. The absence of inherent person features at INFL makes it possible for a reflexive's person feature to percolate to an INFL head, causing potential conflicts of person feature with the DP in [Spec, IP] and hence blocking the reflexive's movement to this INFL. Take Mandarin for instance. Neither INFL in Mandarin nor the reflexive form *ziji* has an inherent person feature. But once *ziji* adjoins to an INFL head, it obtains a person feature from the DP in [Spec, IP] via Spec-head agreement. After movement to a higher INFL head, *ziji* can percolate the person feature obtained from the DP in the lower [Spec, IP] to the higher INFL. If the person feature percolated (to the higher INFL) conflicts with the person feature of the DP in the higher [Spec, IP], Spec-head agreement will fail, which should make the relevant derivation (i.e., *ziji*'s movement to the higher INFL) crash. As movements happen cyclically, *ziji*'s subsequent movements to even higher INFL heads are also blocked. Putting it simply, *ziji*'s adjoining to a higher INFL will not be licensed unless the DP in the lower [Spec, IP] and the DP in the higher [Spec, IP] have matching features, as the person feature percolated to the higher INFL has its origin from the DP in the lower [Spec, IP]. Cole and Sung also cite Korean as another language whose INFL has no inherent person feature, so that the Korean reflexive form *casin* confronts similar blocking.<sup>3</sup> As for languages like Italian and Icelandic, they represent the type of languages whose INFL heads do possess inherent person features; long distance anaphors in these languages thus disallow feature percolation, incurring no blocking. In brief, Cole and Sung (1994) resort to the morphological complexity of reflexive forms and the presence/absence of person feature at INFL heads to account for cross-clausal binding and the blocking effect.

### **IP-adjunction: Huang and Tang (1991)**

Before developing their own analysis, Huang and Tang (1991) point out two problems facing the head movement analyses introduced in previous subsections. Firstly, the analyses with head movement to INFL cannot account for cross-clausal coreference in the following two sentences. In (7a) and (7b), *ziji* is embedded in an adjunct clause and a complex DP respectively. Following the

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<sup>3</sup>*Casin* is a different reflexive form from *caki* in Korean. Unlike *casin* and *ziji*, *caki* has an inherent 3rd person feature, and thus is immune to the blocking effect.

head movement analyses, for *ziji* to be bound by a matrix subject requires *ziji* to be moved to the corresponding matrix INFL. However, the adjunct clause in (7a) is an adjunct island that hinders *ziji*'s movement to the matrix INFL, and the complex DP in (7b) is a DP island that prevents *ziji* from moving out.

- (7) a. Zhangsan<sub>i</sub> shuo [ruguo Lisi<sub>j</sub> piping **ziji**<sub>i/j</sub>], ta jiu bu qu.  
 Zhangsan say if Lisi criticize self he then not go  
 'Zhangsan<sub>i</sub> said that if Lisi<sub>j</sub> criticized himself<sub>i/j</sub>, then he would not go.'
- b. Zhangsan<sub>i</sub> bu xihuan [naxie piping **ziji**<sub>i/j</sub> de ren<sub>j</sub>].  
 Zhangsan not like those criticize self RC person  
 'Zhangsan<sub>i</sub> does not like those people<sub>j</sub> who criticize self<sub>i/j</sub>.'

(Huang and Tang, 1991, p. 271)

Second, a DP that does not c-command *ziji* may also serve as an antecedent of *ziji*, though strictly speaking, *ziji*'s coreference with such an antecedent cannot be categorized as binding. In sentence (8), *ziji* seems to be c-commanded by [<sub>DP</sub> *wo de jiaobao*] 'my pride', but the interpretation derived from *ziji*'s coreference with 'my pride' is odd and incomprehensible. In that case, *wo* 'I', the DP embedded in [<sub>DP</sub> *wo de jiaobao*] appears as *ziji*'s antecedent. In order to characterize the relationship between *wo* and *ziji* in (8), Tang (1989) introduces the notion *sub-command*, " $\beta$  sub-commands  $\alpha$  iff  $\beta$  is contained in an NP that c-commands  $\alpha$  or that sub-commands  $\alpha$ , and any argument containing  $\beta$  is in subject position." (Tang, 1989, p. 101) It is specified that sub-commanding DPs can also bind *ziji*, but there is no further information on how this binding is realized.

- (8) [wo<sub>i</sub> de jiaobao]<sub>j</sub> hai-le **ziji**<sub>i/\*j</sub>.  
 I POSS pride hurt-PERF self  
 '[My<sub>i</sub> pride]<sub>j</sub> hurts self<sub>i/\*j</sub>.'

(Huang and Tang, 1991, p. 265)

To address the first problem, Huang and Tang (1991) propose a different movement analysis, IP-adjunction. They agree that *ziji* can pick up a remote antecedent via successive-cyclic movement at LF, but the movement proposed is not head-to-head, but IP-adjunction, in which *ziji* is

adjoined to IP cyclically. IP-adjunction is similar to Quantifier Raising in May (1985), and classified as a type of A'-movement. Based on the now outdated framework with barriers and proper government (Chomsky 1986a), Huang and Tang have deduced that IP-adjunction can cross islands that head movements cannot. However, such a deduction involves arbitrary stipulations; if arbitrary stipulations are allowed, head movements can equally break through the island boundaries (Charnavel et al., 2017).

Huang and Tang also distinguish monomorphemic reflexives (e.g., *ziji*) and polymorphemic reflexives (e.g., *ta-ziji* 'himself/herself'), but only the former can undergo IP-adjunction. They propose that all NPs, except for quantifiers, must have  $\phi$  features and R-features (i.e., referential features). Polymorphemic reflexives have  $\phi$  features and no referential features, while monomorphemic reflexives have neither  $\phi$  features nor referential features. When the Binding Theory applies at S-structure, polymorphemic reflexives have their referential features licensed but monomorphemic reflexives only get  $\phi$  features licensed. In terms of monomorphemic reflexives' referential features, they need to be valued at LF. Take the derivation of sentence (9) for instance.

- (9) Zhangsan<sub>i</sub> shuo Lisi<sub>j</sub> chang piping **ziji**<sub>*i*<sub>j</sub></sub>.  
 Zhangsan say Lisi often criticize self  
 'Zhangsan<sub>i</sub> said that Lisi<sub>j</sub> often criticized self<sub>*i*<sub>j</sub></sub>'

(Huang and Tang, 1991, p. 275)

As seen in (10a), the S-structure of sentence (9) only licenses *ziji*'s  $\phi$  index with the value "3" via local binding. When it comes to sentence (9)'s LF-structure, there are two options presented, i.e., (10b) and (10c). The two options differ in whether IP-adjunction happens. Following the LF-structure I in (10b) without IP-adjunction, the Binding Theory applies locally so *ziji* is assigned the R-index of *Lisi*. But when *ziji* gets adjoined to the local IP as in (10c), the binding domain of *ziji* is extended from the local clause to the matrix, because only elements in the matrix can fully c-command *ziji*. In this way, *ziji* is assigned the R-index of *Zhangsan*.

- (10) a. S-structure:

Zhangsan<sub>( $\phi(3), R(i)$ )</sub> shuo [Lisi<sub>( $\phi(3), R(j)$ )</sub> chang piping **ziji**<sub>( $\phi(3), R(0)$ )</sub>].

b. LF-structure I:

Zhangsan<sub>( $\phi(3), R(i)$ )</sub> shuo [Lisi<sub>( $\phi(3), R(j)$ )</sub> chang piping **ziji**<sub>( $\phi(3), R(j)$ )</sub>].

c. LF-structure II:

Zhangsan<sub>( $\phi(3), R(i)$ )</sub> shuo [<sub>IP</sub> **ziji**<sub>( $\phi(3), R(i)$ )</sub> [<sub>IP</sub> Lisi<sub>( $\phi(3), R(j)$ )</sub> chang piping t<sub>( $\phi(3), R(i)$ )</sub>]].

In order to account for sub-commanding antecedents of *ziji*, Huang and Tang (1991) claim that a nominal that sub-commands a reflexive can bind the reflexive as long as there is no intervening potential binder. In the case of sentence (8), the intervening nominal *jiaobao* ‘pride’ is not a potential binder so the sub-commander becomes *ziji*’s antecedent. Sub-commanding antecedents can equally invoke blocking, e.g., the blocking of *ziji*’s coreference with *Zhangsan* by *wo* ‘I’ in (11); to account for this, Huang and Tang further propose that the set of potential blockers includes any potential binder of *ziji*.

- (11) Zhangsan<sub>i</sub> shuo [wo<sub>j</sub> de jiaobao]<sub>k</sub> hai-le **ziji**<sub>\*i/j/\*k</sub>.  
 Zhangsan say I POSS pride hurt-PERF self  
 ‘Zhangsan<sub>i</sub> said that [my<sub>j</sub> pride]<sub>k</sub> hurt self<sub>\*i/j/\*k</sub>’

(Huang and Tang, 1991, p. 269)

Despite its intention to solve problems facing previous head movement analyses, the analysis of IP-adjunction has its own problems. First, it fails to predict subject orientation. For *ziji* to be bound by antecedents in a higher clause, *ziji* is adjoined to the local IP, which renders the entire higher clause the local domain of *ziji*. There is thus no restriction to prevent object DPs in higher clauses from binding *ziji*. Second, there is no detailed account of why and how blocking occurs, except for the generalization that any potential binder can serve as a blocker as long as the binder has a  $\phi$  feature different from the one assigned to *ziji* at S-structure.

### A Minimalist feature movement analysis: Sohng (2004)

Sohng (2004) distinguishes the Korean reflexive form *caki* and the Mandarin *ziji* in a number of ways and attempts to account for cross-clausal binding in the Minimalist framework (Chomsky, 1995). In Sohng (2004), Korean *caki* and Mandarin *ziji* are different in behaviors related to subject

orientation and the blocking effect. *Ziji* is claimed to manifest strong subject orientation, but as for *caki*, Sohng's work follows Moon (1995) and assumes that *caki* manifests weak subject orientation, i.e., objects are also possible antecedents, though subject antecedents are preferred. Moreover, *caki* is different from *ziji* in that *caki* is not subject to the blocking effect.

Cross-clausal binding (especially that of *caki* and *ziji*) is explained as LF feature movement in the Minimalist framework. Both *caki* and *ziji* are categorized as monomorphemic  $X^0$  elements in contrast to polymorphemic  $X^{\max}$  elements, though *caki* has an inherent  $\phi$  feature whereas *ziji* does not. Following Y.-S. Kim (1999) and K.-H. Kim (2000),  $X^0$  reflexive forms are LF clitics with an intrinsic feature [Refl] and the functional category T(ense) may have an uninterpretable LF affixal feature [Refl] optionally assigned from the Lexicon. Driven by feature-checking,  $X^0$  reflexives in the form of N(oun), get raised through all intervening heads to T heads with [Refl] via successive-cyclic head movements. Following the reflexives' movements, both subjects and objects in higher clauses have the potential to bind  $X^0$  reflexives, since both can c-command the  $X^0$  reflexives locally. To explain *caki*'s weak subject orientation and *ziji*'s strong subject orientation, Sohng (2004) proposes two conditions: a) DPs merged with heads lacking [Refl] (e.g., object DPs) are potential antecedents only when all copies/members of  $X^0$  reflexives' A-chain have  $\phi$  features; b) reflexive forms prefer antecedents merged with heads possessing [Refl] features. *Ziji* does not allow object DPs to serve as antecedents because there is at least one copy of *ziji* (i.e., the lowest one) without  $\phi$  features due to *ziji*'s lack of inherent  $\phi$  features, failing the aforementioned condition a. *Caki* is not subject to condition a, because *caki* has an inherent 3rd person feature. Though *caki* allows being bound by either subject DPs or object DPs, subject DPs are preferred because they merge with T heads that possess [Refl] features. With regard to the blocking effect characterizing *ziji*, it arises from the  $\phi$  feature checking of *ziji* via Spec-head agreement at T heads; once *ziji* is assigned a feature, any conflicting feature in a higher [Spec, TP] will result in blocking. In Korean, however, *caki* has an inherent  $\phi$  feature; no LF Spec-head agreement is involved to assign/check *caki*'s  $\phi$  feature, triggering no blocking. While this analysis can capture the claimed differences between *caki*'s and *ziji*'s behaviors, too much stipulation is involved in this analysis,

especially in the conditions proposed to explain the contrast between weak subject orientation and strong subject orientation.

This section has introduced four movement analyses of cross-clausal binding/coreference; these analyses can be divided into two types, with one involving head movement and the other adopting IP-adjunction. Both types of movement analyses are confronted with some general challenges. Firstly, the movement analyses are not motivated well. As pointed out in Han and Storoshenko (2009), a reflexive's LF movement to higher clauses is not necessary, when a reflexive can be bound locally. Thus, strong motivation is needed for this movement, otherwise economy constraints should be violated. In other words, this movement is costly and should not happen for no reason.

Secondly, movement analyses rely on structural c-command so they cannot account for reflexive forms bound by non-c-commanding elements, e.g., *ziji* bound by a sub-commanding antecedent as in (8), and *ziji* bound by an extra-sentential antecedent. Huang and Tang (1991) try to accommodate the sub-commanding cases by claiming that sub-commanders can also bind reflexive forms if there are no closer potential binders; but this is more of an ad hoc stipulation, which is not integrated into their IP-Adjunction analysis. Moreover, Huang and Tang's analysis provides no clue to reflexive forms bound by discursive antecedents or referring to contextual individuals. Two relevant examples are provided in (12), involving Korean *caki* and Mandarin *ziji* respectively. Sentence (12a) is a reported proposition, as marked by the reportative marker *-tay*. *Caki* here is understood to be the reporter, *Swuyen*, who must have been mentioned in previous discourse. Sentence (12b) presents what a chess player whispered to themselves, and *ziji* in this sentence cannot be interpreted as locally bound as a chess move cannot ruin itself; despite the lack of c-commanders or sub-commanders for intra-sentential coreference, *ziji* can still receive interpretation by referring to the speaker.

- (12) a. **caki**-nun PD-ka            toy-ko            sip-tay-yo. [Korean]  
self-TOP producer-NOM become-AUX want-REP-HON  
'(Swuyen said) self wants to become a producer.'

(Han and Storoshenko, 2012b, p. 766)

- b. zhe bu qi fei hui-le **ziji** bu ke.  
 this move chess not ruin-PERF self not good  
 ‘This chess move will surely ruin self<sub>speaker</sub>’

(Xu, 1994. p. 124)

Thirdly, the movement analyses tend to predict strong subject orientation and obligatory blocking, but the two properties do not always obtain. For instance, Cole, Hermon, and Sung (1990) suggest that their analysis with head movement can also apply to reflexive forms in Japanese and Korean, so that subject orientation should also follow. However, reflexive forms allowing cross-clausal coreference in the two languages do not always take subject antecedents. In sentence (13), the Japanese reflexive *zibun* is bound by the indirect object *Taro*, which refers to the information source.

- (13) Hanako-wa Taro<sub>i</sub>-kara [**zibun**<sub>i</sub>-ga ka-ta] koto-o kii-ta. [Japanese]  
 Hanako-TOP Taro-from self-NOM win-PST fact-ACC hear-PST  
 ‘Hanako heard from Taro<sub>i</sub> that he<sub>i</sub> had won.’

(Oshima, 2004, p. 176)

In terms of the Korean reflexive *caki*, Han and Storoshenko’s (2012) experiment results show that *caki* has a preference for subject antecedents, but *caki* with a non-subject antecedent is also possible. It is thus concluded that a formal analysis of *caki* should be flexible enough to accommodate subject and non-subject antecedents. Even in Mandarin, a strong version of subject orientation cannot be maintained. Both sentences in (14) have the ditransitive verb *gaosu* ‘tell’, and *ziji* in the embedded clauses can only corefer with the matrix objects, because *ziji*’s binding by the inanimate matrix subjects will lead to incomprehensibility. Considering these facts, Xu (1994) suggests that subject orientation in Mandarin is at best “subject superiority”, a term that Xu uses to mean a referential bias towards subjects.

- (14) a. zhe-jian shi gaosu ta<sub>i</sub> yiqian **ziji**<sub>i</sub> de xiangfa bu yiding dui.  
 this-CL thing tell he previous self POSS idea not necessarily correct  
 ‘This tells him<sub>i</sub> that self’s<sub>i</sub> previous ideas were not necessarily correct.’

(Xu, 1994, p. 119)

- b. canku de shishi gaosu ta<sub>i</sub> **ziji**<sub>i</sub> you shibai-le.  
 cruel PNMM fact tell he self again fail-SFP  
 ‘The cruel fact told him<sub>i</sub> that self<sub>i</sub> failed again.’

There are more problems with the blocking effect. The aforementioned movement analyses follow Tang (1989) and assume unlike person blocking, that is, blocking occurs whenever a higher potential antecedent has a different person feature from a lower antecedent. These movement analyses are thus set to address unlike person blocking. However, Pan (1997, 2001) points out that there is a person asymmetry concerning the blocking facts, i.e., intervening 1st or 2nd person subjects can block cross-clausal binding by 3rd person antecedents, but intervening 3rd person subjects only partially block cross-clausal binding by 1st or 2nd person pronouns. This contrast is demonstrated in the following sentences.

- (15) a. a 3rd person matrix subject and a 1st/2nd person local subject

Zhangsan<sub>i</sub> danxin wo/ni<sub>j</sub> hui piping **ziji**<sub>\*i/j</sub>.  
 Zhangsan worry I/you will criticize self  
 ‘Zhangsan is worried that I/you might criticize myself/yourself/\*him.’

- b. a 1st person matrix subject and a 3rd person local subject

wo<sub>i</sub> danxin Zhangsan<sub>j</sub> hui piping **ziji**<sub>?i/j</sub>.  
 I worry Zhangsan will criticize self  
 ‘I am worried that Zhangsan will criticize ?me/himself.’

- c. a 2nd person matrix subject and a 3rd person local subject

ni<sub>i</sub> danxin Zhangsan<sub>j</sub> hui piping **ziji**<sub>?i/j</sub> ma?  
 you worry Zhangsan will criticize self Q  
 ‘Are you worried that Zhangsan will criticize ?you/himself?’

(Huang and Liu, 2001, p. 146)

Moreover, object DPs can also cause blocking, though they rarely serve as *ziji*’s antecedents. While both sentences in (16) demonstrate that object DPs cannot serve as *ziji*’s antecedents, they are different in that the object DP with a conflicting person feature (i.e., *wo* ‘me’ in (16a)) blocks *ziji*’s binding by the matrix subject *Zhangsan*, but the object DP with a matching person feature

(i.e., *Wangwu* in (16b)) does not. Unfortunately, most of the movement analyses fail to take into account the blocking exerted by object DPs.<sup>4</sup> Until the linguistic facts of subject orientation and the blocking effect are clarified, any account attempting to address the two properties will be in vain.

- (16) a. Zhangsan<sub>i</sub> gaosu wo<sub>j</sub> [Lisi<sub>k</sub> hen **ziji**<sub>\*i/\*j/k</sub>].  
 Zhangsan tell me Lisi hate self  
 ‘Zhangsan<sub>i</sub> told me<sub>j</sub> Lisi<sub>k</sub> hates self<sub>\*i/\*j/k</sub>.’

(Pollard and Xue, 1998, p. 301)

- b. Zhangsan<sub>i</sub> gaosu Wangwu<sub>j</sub> [Lisi<sub>k</sub> hen **ziji**<sub>i/\*j/k</sub>].  
 Zhangsan tell Wangwu Lisi hate self  
 ‘Zhangsan<sub>i</sub> told Wangwu<sub>j</sub> Lisi<sub>k</sub> hates self<sub>i/\*j/k</sub>.’

Adapted from Cole and Sung (1994, p. 355)

In Table 2.1, I compare the explanatory powers (predictions) of the four analyses in this section. The ✓ and ✗ symbols are used to mark whether an analysis predicts a certain property, and the use of ? means that it is unclear whether a relevant property is predicted. When \*✓ is used, it means the predicted property is inviolable, e.g., strong subject orientation. These symbols are used similarly throughout the thesis. All four movement analyses in this section can predict cross-clausal binding, but none of them addresses extra-sentential (co)reference. Battistella’s (1989) analysis involves direct movements to INFL, which renders *ziji* c-commanded by subjects in higher clauses only, predicting strong subject orientation. The movement analyses of Cole et al. (1990, 1994) and Sohng (2004) allow *ziji* to stopover at V(erb) heads, leaving objects in higher clauses as possible antecedents for *ziji*; however, both have made additional stipulations to derive strong subject orientation. Huang and Tang’s (1991) analysis allows *ziji* to be bound by objects in higher clauses, as *ziji*’s adjunction to a local IP makes a new binding domain, i.e., the immediately higher clause. In terms of the blocking effect, the four movement analyses assume unlike person blocking,

<sup>4</sup>Huang and Tang’s (1991) analysis alludes to blocking by object DPs, but cannot account for it. Following their analysis, *ziji* in (16a) is adjoined to the embedded clause’s IP so that *ziji* has the matrix subject *Zhangsan* and the matrix object *wo* ‘me’ within its local domain. In this way, both *Zhangsan* and *wo* are predicted to serve as *ziji*’s antecedent, which runs counter to the fact that *ziji*’s binding by the matrix subject *Zhangsan* is blocked.

without taking into account the person asymmetry. While all four analyses can predict blocking by subject DPs, but none of them can account for blocking by object DPs. As unlike person blocking in this thesis is assumed to include blocking by object DPs, none of the aforementioned analyses can fully account for unlike person blocking.

	Cross-clausal binding	Extra-sentential (co)reference	Subject orientation	Unlike person blocking	Asymmetrical person blocking
Movement to INFL: Battistella (1989)	✓	✗	*✓	✗	✗
Movement to INFL: Cole et al. (1990, 1994)	✓	✗	*✓	✗	✗
IP-adjunction: Huang and Tang (1991)	✓	✗	✗	✗	✗
A Minimalist analysis: Sohng (2004)	✓	✗	*✓	✗	✗

Table 2.1: Explanatory powers (predictions) of the four types of syntactic movement analyses

### 2.1.2 *Ziji* as a logophorically bound element

In this section, I turn from syntactic movement analyses to logophoric analyses. The term “logophoric” was first introduced to characterize a special class of pronouns in African languages such as Ewe; these pronouns are embedded in subordinate clauses but corefer with matrix constituents that represent sources of the embedded indirect speeches or reports (Hagège, 1974). Compare the two sentences (17a) and (17b) in Ewe, with the former using the logophoric pronoun *yè* and the latter using the 3rd person singular pronoun *e*. The logophoric pronoun *yè* refers to Kofi, who is both the agent of ‘leave’ and the agent of ‘say’ (i.e., the source of the proposition represented in the embedded clause), but the 3rd person pronoun *e* refers to any individual other than Kofi, the source.

- (17) a. Kofi be yè-dzo. [Ewe]  
 Kofi say LOG-leave  
 ‘Kofi<sub>i</sub> said that he<sub>i</sub> left.’
- b. Kofi be e-dzo. [Ewe]  
 Kofi say 3 SG-leave  
 ‘Kofi<sub>i</sub> said that he/she<sub>\*i/j</sub> left.’

(Clements, 1987, p. 150)

As *yè* in Ewe has distinct functions from both personal pronouns and reflexives, the category “logophor” is set up to characterize logophoric pronouns like *yè*. According to Clements (1975), a logophor is a pronoun fulfilling logophoric functions, i.e., referring to an individual “whose speech, thoughts, feelings or general state of consciousness are reported”. All languages face the need to fulfill a logophoric function, though only a small number of them have a distinct form for this function. As seen in (17a), the Ewe sentence with logophoric *yè* has an English gloss/counterpart, which uses the 3rd person singular pronoun *he* to serve a logophoric purpose. Reflexive forms like *ziji* are also possible forms for logophoric purposes; because of this, Clements (1975) expands the domain of logophors to include those forms which are originally reflexives.

Based on data of long distance anaphors in Icelandic, Italian and Japanese, Sells (1987) proposes that a logophor’s referent distinguishes three types of primitive roles, which are SOURCE, SELF and PIVOT, as exemplified in (18). All three roles are evaluated against a certain proposition, which often takes the form of embedded clauses.<sup>5</sup> The SOURCE role is assigned to the individual who produces the proposition. As seen in (18a), the proposition represented by the embedded clause is produced by the teller *Takasi*, which takes the role of SOURCE; *zibun* as a logophor in the embedded clause, is claimed to refer to *Takasi* with SOURCE. The role of SELF goes to the individual who possesses a certain mental state or attitude represented in a proposition. For instance, the mental state represented in the embedded clause of (18b) belongs to *Mitiko*, exemplifying SELF roles; accordingly, *zibun* in (18b)’s embedded clause is a logophor referring to *Mitiko* with SELF. In terms of PIVOT, it is assigned to the individual with respect to whose (time-space) location a

<sup>5</sup>Sells is not clear in whether the proposition involved here can be an entire sentence.

proposition is evaluated. In (18c), *zibun* corefers with the matrix subject *Takasi*, whose referent takes the role of PIVOT. This is evidenced by the verb *come*, which suggests a point-of-view center, with everything moving towards the center counted as coming.

(18) a. SOURCE:

Takasi<sub>i</sub>-wa Taroo-ni [Yosiko-ga **zibun**<sub>i</sub>-o nikundeiru] koto-o  
Takasi-TOP Taroo-DAT Yosiko-NOM self-ACC be-hating fact-ACC  
hanasita. [Japanese]  
told  
'Takasi<sub>i</sub> told Taroo that Yosiko hated him<sub>i</sub>.'

b. SELF:

[Yosiko-ga **zibun**<sub>i</sub>-o nikundeiru] koto-ga Mitiko<sub>i</sub>-o zetuboo e  
Yosiko-NOM self-ACC be-hating fact-NOM Mitiko-ACC desperation to  
oiyatta. [Japanese]  
drove  
'That Yosiko hated her<sub>i</sub> drove Mitiko<sub>i</sub> to desperation.'

c. PIVOT:

Takasi<sub>i</sub>-wa [Yosiko-ga **zibun**<sub>i</sub>-o tazunete-kita node] uresigatta. [Japanese]  
Takasi-TOP Yosiko-NOM self-ACC visit-came because happy  
'Takasi<sub>i</sub> was happy because Yosiko came to visit him<sub>i</sub>.'

(Sells, 1987, p. 453-454)

A logophoric referent can undertake one or more of the three primitive roles. According to Sells, there is an implicational relation among logophoric referents with different roles. A referent with the role of SOURCE must also take two other roles, SELF and PIVOT, as a clause reporting an individual's speech is also a clause reporting this individual's mental state from their own perspective. Similarly, a referent with the role of SELF must also take the role of PIVOT because mental states are reported from the perspectives of those with the mental states. However, a referent with the role of PIVOT only means that a report is made from the perspective of the referent, and this report does not necessarily entail the referent's mental state or speech. Based on the roles that a referent takes, three types of logophoric referents are distinguished, as listed in Table 2.2.

	SOURCE role	SELF role	PIVOT role
SOURCE referent	✓	✓	✓
SELF referent	✗	✓	✓
PIVOT referent	✗	✗	✓

Table 2.2: Three types of logophoric referents with their respective roles

With the above background of logophoricity, I will go into the details of several logophoric analyses, namely those proposed by Huang and Liu (2001), Y. Huang (2000), Anand (2006), Char-navel (2017, 2019) and Park (2018).

### ***Ziji* raised as a $\lambda$ -operator: Huang and Liu (2001)**

Huang and Liu (2001) make a distinction between the reflexive and the logophoric uses of anaphors; the former cover anaphors bound in their binding domains and are subject to Condition A of the Binding Theory, whereas the latter cover all the other uses (including anaphors bound cross-clausally), which are claimed to be subject to pragmatic conditions of logophoricity. Like *zibun* in Japanese, *ziji* seems to be also able to refer to three types of logophoric referents, i.e., SOURCE, SELF and PIVOT. As demonstrated in (19), *ziji* is in a different clause from its antecedent; it is logophoricity that realizes *ziji*'s coreference with its logophoric antecedent.

(19) a. SOURCE:

Lisi<sub>i</sub> shuo [Zhangsan chang piping **ziji**<sub>i</sub>].  
 Lisi say Zhangsan often criticize self  
 'Lisi<sub>i</sub> says that Zhangsan often criticize him<sub>i</sub>.'

b. SELF:

[Zhangsan kanbushang **ziji**<sub>i</sub>] de shi shi Lisi<sub>i</sub> hen shangxin.  
 Zhangsan look-down-upon self PNMM thing make Lisi very sad  
 'The fact that Zhangsan looks down upon self<sub>i</sub> saddens Lisi<sub>i</sub>.'

c. PIVOT:

[Zhangsan lai kan **ziji**<sub>i</sub>] zhiqian, Lisi<sub>i</sub> zhengzai kan shu.  
 Zhangsan come see self before Lisi at read book  
 ‘Before Zhangsan came to visit self<sub>i</sub>, Lisi<sub>i</sub> was reading.’

Adapted from Huang and Liu (2001, p. 156)

Huang and Liu claim that there is one more argument supporting a logophoric treatment of *ziji*: *ziji*'s obligatory *de se* interpretation, i.e., *ziji*'s referent is conscious that the events/states described in relation to *ziji* happened to themselves. Logophors in attitude reports are claimed to possess obligatory *de se* interpretations (Kuno, 1972; Chierchia, 1989; Pan, 1997; Schlenker, 1999). For instance, an obligatory *de se* interpretation happens to the Italian possessive reflexive *proprio* in sentence (20a). With the obligatory *de se* interpretation, sentence (20a) not only presents the idea that Pavarotti believes someone's pants are on fire, but suggests Pavarotti's awareness that the person with burning pants is Pavarotti himself. In other words, if Pavarotti spoke his belief out loud, he would utter: “My pants are on fire!”. The obligatory *de se* interpretation concerning *proprio* is seen more clearly when sentence (20b) is involved. (20b) is almost identical to (20a), except that *proprio* in (20a) is replaced with the possessive pronoun *suoi* ‘his’, which does not bring an obligatory *de se* interpretation. Following this replacement, (20b) allows an interpretation in which Pavarotti is unaware of the fact that the person with burning pants is Pavarotti himself, as evidenced by the felicity of uttering (20b) in this novel scenario: Pavarotti had his pants on fire and he noticed a man with burning pants in the mirror but did not realize that he was the man with burning pants.

- (20) a. Pavarotti crede che i **propri** pantaloni siano in fiamme. [Italian]  
 Pavarotti believe-3SG that the self-POSS pants are in flames  
 ‘Pavarotti believes that self's pants are on fire.’
- b. Pavarotti crede che i **suoi** pantaloni siano in fiamme. [Italian]  
 Pavarotti believe-3SG that the his pants are in flames  
 ‘Pavarotti believes that his pants are on fire.’

Adapted from Chierchia (1989, p. 24)

With respect to *ziji*, Huang and Liu hold that *de se* interpretations are available when *ziji* has

SOURCE or SELF referents, as demonstrated below. In (21a), *ziji* in the embedded clause corefers with the matrix subject *Zhangsan*, and this utterance is only compatible with S<sub>1</sub>, which entails Zhangsan’s awareness that his own purse is stolen. In (21b), *ziji* serves as the object in a subject clause; it refers to Lisi, who was in a mental state of surprise. Similarly, the production of (21b) is only compatible with S<sub>1</sub> with Lisi’s consciousness that Lisi himself got praised. According to Huang and Liu, the *de se* interpretations available for *ziji* with SOURCE or SELF referents arise from the fact that the SOURCE or SELF referents have the potential to be aware of their own utterances and mental states.

- (21) a. S<sub>1</sub>: Zhangsan says, “That pickpocket stole my purse!”  
 S<sub>2</sub>: Zhangsan says, “That pickpocket stole that purse!” (can’t see that it was his purse)

Zhangsan shuo pashou tou-le **ziji**-de pibao.  
 Zhangsan say pickpocket steal-PERF self-POSS purse

‘Zhangsan said that the pickpocket stole his purse.’ [✓ S<sub>1</sub>, # S<sub>2</sub>]

- b. S<sub>1</sub>: Lisi learned that he was praised by Zhangsan and got surprised.  
 S<sub>2</sub>: Lisi learned that a man was praised by Zhangsan and got surprised, without knowing the man praised was Lisi himself.

[Zhangsan kuajiang **ziji**<sub>i</sub>] xia-le Lisi<sub>i</sub> yi tiao.  
 Zhangsan praise self surprise-PERF Lisi one jump

‘That Zhangsan praised self<sub>i</sub> greatly surprised Lisi<sub>i</sub>.’ [✓ S<sub>1</sub>, # S<sub>2</sub>]

(Huang and Liu, 2001, p. 158)

As for *ziji* with PIVOT referents, Huang and Liu claim that *de se* interpretations may or may not obtain. For instance, as long as the speaker of sentence (19c) stands in the shoes of and empathizes with Lisi, sentence (19c) is acceptable (at least for some Mandarin speakers) even if the PIVOT referent Lisi knows nothing about Zhangsan’s visiting him, i.e., with *ziji* not interpreted *de se*. Here it is empathy that allows the speaker to “go proxy” for *ziji*’s referent in viewing the relevant event or state. *Ziji*’s referent is said to virtually obtain the consciousness of the event/state, which is originally represented in the speaker’s actual consciousness. In this way, PIVOT referents are claimed to allow virtual *de se* interpretations, unifying *ziji* with different types of logophoric referents.

Huang and Liu assume asymmetric person blocking. In sentence (22a), *ziji*'s coreference with the higher subject *Zhangsan* is blocked by the local subject *wo* 'I' with a different person feature. Huang and Liu claim that 1st/2nd person pronouns in an embedded clause make it obligatory to use the (utterance) context to evaluate the proposition represented by the embedded clause, which prevents *ziji* from being bound by a logophoric antecedent. But when there is an intervening 3rd person pronoun as in (22b), the proposition represented by the embedded clause is free to be evaluated in relation to the context or any other situation. This allows *ziji* in (22b) to be bound by a logophoric antecedent (e.g., the matrix subject *wo* 'I'). In this way, person asymmetry in the blocking effect is accounted for.

- (22) a. Zhangsan<sub>i</sub> juede wo<sub>j</sub> zai pingping **ziji**<sub>\*i/j</sub>.  
 Zhangsan think I at criticize self  
 'Zhangsan<sub>i</sub> thinks that I<sub>j</sub> am criticizing self<sub>\*i/j</sub>.'
- b. wo<sub>i</sub> zhidao Lisi<sub>j</sub> bu xihuan ziji<sub>i/j</sub>.  
 I know Lisi not like self  
 'I knew that Lisi did not like <sub>i</sub>me/himself.'

(Pan, 2001, p. 283)

Huang and Liu also explore the semantics and the LF syntax of logophoricity. Chierchia's (1989) semantic analysis of *de se* beliefs is used to derive the semantic representation of logophoricity. The *de se* readings concerning attitude reports represent a relation between a believer and a property; the believer (knowingly) ascribes a certain property to themselves. Semantically, a complement clause is represented as a secondary  $\lambda$ -predicate. For instance, the semantic representation of sentence (23) under a *de se* reading is provided in (24a), with logophoricity represented as variable binding. The representation of the same sentence under a *de re* reading is also provided for comparison, as in (24b). For *de re* readings, a relation between a believer and a proposition is expressed, with the believer holding the proposition to be true.

- (23) Pavarotti<sub>i</sub> believes that his<sub>i</sub> pants are on fire.

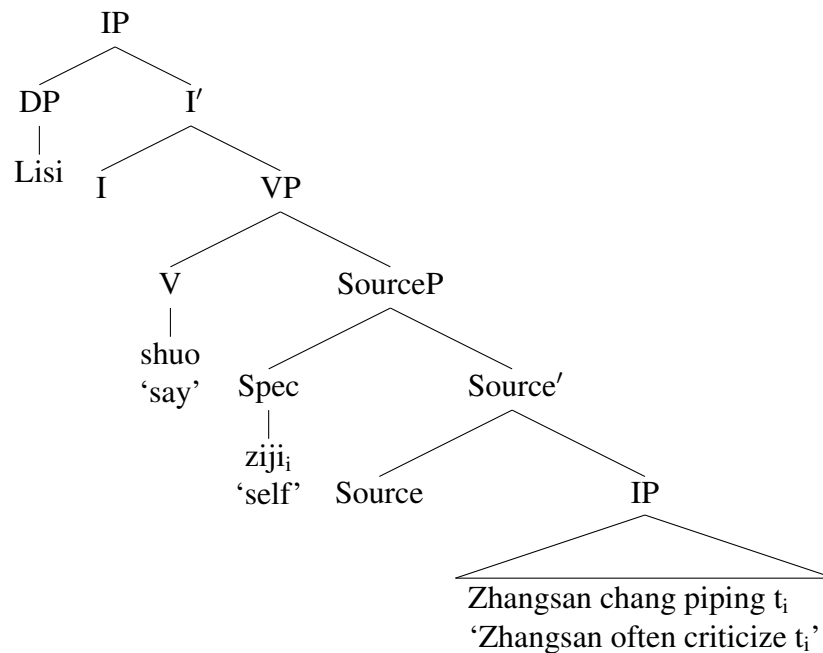
- (24) a. believe (Pavarotti,  $\lambda x$ [ x's pants are on fire])

b.  $\lambda x$ [ believe (x, x's pants are on fire)] (Pavarotti)

(Chierchia, 1989, p. 6)

Structurally, logophoric *ziji* is raised to the Specifier of a CP-layer functional category at LF. Assuming Rizzi's (1997) "split CP" hypothesis, the traditional CP can accommodate a number of functional categories, including Focus Phrases, Topic Phrases, etc. These categories help to mediate between syntax and discourse. It is hypothesized that there are distinct "Topic" Phrases for different types of logophoric referents, so that in the left periphery, there can be Source Phrases (SourceP), Self Phrases (SelfP) and Pivot Phrases (PivotP). Following this line, (19a), the sentence with logophoric *ziji* referring to a SOURCE, has an LF representation as below.

(25)



Adapted from Huang and Liu (2001, p. 177)

The LF structure in (25) is claimed to directly correspond to the semantic representation of *de se* readings following from Chierchia (1989). The raised logophor *ziji* functions as a  $\lambda$ -operator and its trace is a bound variable. With the help of "secondary predication" (Chierchia, 1984; Chomsky, 1986), which prescribes that each (secondary)  $\lambda$ -predicate must be predicated of its subject, *ziji* forms coreference with its antecedent.

### **Discourse representation theory: Y. Huang (2000)**

In approaching the notion of logophoricity, Sells (1987) not only distinguishes the three types of primitive roles, SOURCE, SELF and PIVOT; he also makes an attempt at the semantics of logophoricity within Discourse Representation Theory (DRT) (Kamp, 1982). DRT formulates abstract mental representations by using discourse representation structures, which help bridge meanings across sentence boundaries. Sells develops DRT by incorporating the aforementioned roles into DRT as discourse-semantic information. Y. Huang (2000) then applies the developed DRT to a logophoric analysis of the Mandarin *ziji*. Following Stirling (1993), Y. Huang takes a technical treatment of the three primitive roles, with each role fulfilled by an individual “to whom the current, external speaker linguistically assigns responsibility for validation of the truth of a proposition, the actuality of an event, and/or the accuracy of the linguistic expression used in asserting the proposition or describing the event.” In this sense, the primitive roles bring in values/indices that the speaker assigns to logophoric elements so that truth values of relevant sentences are calculable.

One of the issues that logophoric analyses should address is the coreference between a logophoric pronoun and its antecedent. In DRT, this coreference is formalized as an equation, which involves building Discourse Representation Structures (DRSs) algorithmically based on syntactic analyses. DRSs are comprised of discourse markers and conditions on discourse markers (DRS-conditions). Discourse markers are individuals and propositions in a sentence; individuals are usually represented by  $x$ ,  $y$ ,  $z$ ... and propositions are usually represented by  $p$ ,  $q$  and  $r$ . In DRSs, discourse markers are presented at the top of the representation, and below them are DRS-conditions. With the notations in (26), the DRSs involving the three types of logophoric referents can be represented.

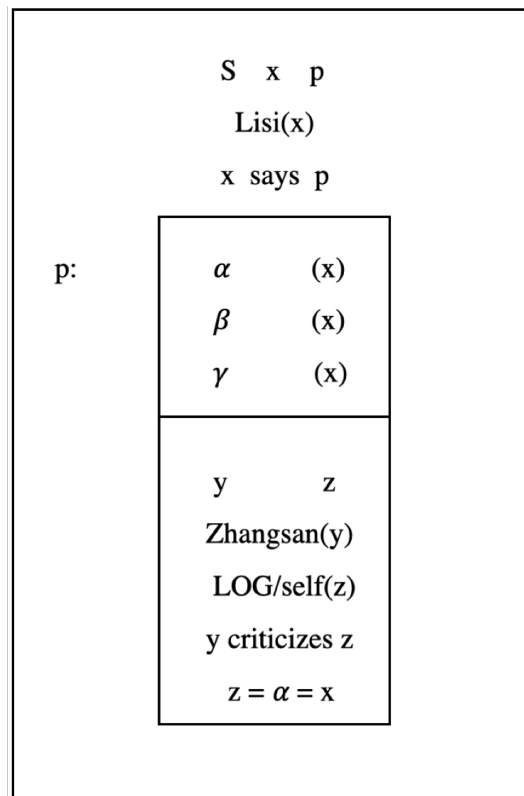
- (26)  $\alpha$  represents the validating SOURCE  
 $\beta$  represents the validating SELF  
 $\gamma$  represents the validating PIVOT  
S represents the current, external speaker

(Y. Huang, 2000, p. 201)

The following figures present the DRSs of the three sentences in (19) with different types of logophoric referents. In (27), the DRS of sentence (19a) is presented. This sentence involves the verb *say*, which has a special lexical property. It not only associates the individual  $x$  with the proposition  $p$ , but makes it obligatory that all three discourse-semantic roles (especially the SOURCE role) of the proposition  $p$  are realized by  $x$ . Moreover, there is an equation at the bottom, and this ensures the logophoric pronoun refers to the individual taking the SOURCE role. In this way, the link is built between the logophoric pronoun in the embedded clause and the matrix subject.

(27) The DRS of sentence (19a) with a SOURCE referent:

Lisi<sub>i</sub> says that Zhangsan<sub>j</sub> criticizes LOG<sub>i</sub>/self<sub>i</sub>.



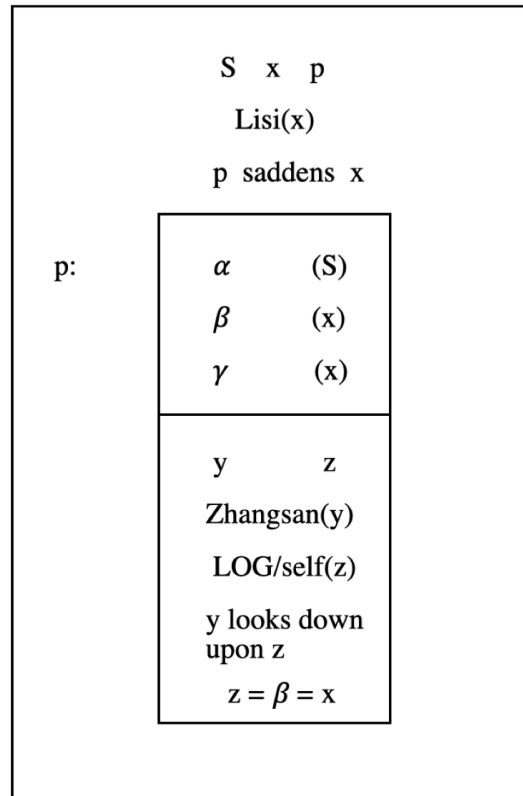
Adapted from Y. Huang (2000, p. 201)

The DRS of sentence (19b) is constructed in (28). In this case, the psych-verb *sadden* expresses a relation between the individual  $x$  and the proposition  $p$ , with  $p$  making  $x$  sad. In terms of the discourse-semantic roles, both SELF and PIVOT roles are taken by  $x$  realized as the matrix subject,

though the SOURCE role goes to the external speaker *S*. Again, with the equation “ $z = \beta$ ”, the logophoric pronoun gets bound by the matrix subject.

(28) The DRS of sentence (19b) with a SELF referent:

That Zhangsan<sub>i</sub> looks down upon LOG<sub>j</sub>/self<sub>j</sub> saddens Lisi<sub>j</sub>.

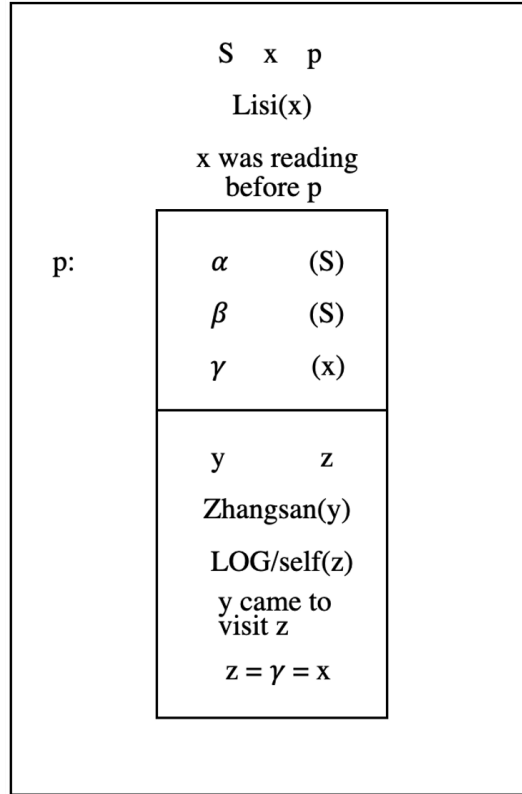


Adapted from Y. Huang (2000, p. 202)

When it comes to sentence (19c) with a PIVOT referent, the subordinate clause *Zhangsan came to visit LOG/self* only has the PIVOT role taken by Lisi, as demonstrated in (29). Consequently, the logophoric pronoun is bound by the matrix subject *Lisi*.

(29) The DRS of sentence (19c) with a PIVOT referent:

Before Zhangsan<sub>i</sub> came to visit LOG<sub>j</sub>/self<sub>j</sub>, Lisi<sub>j</sub> was reading.



Adapted from Y. Huang (2000, p. 202)

As acknowledged by Y. Huang, DRT analyses can provide the anaphoric link between an role-oriented anaphor (i.e., logophor) and its referent, but they do not make it clear what licenses a logophor and how to identify a logophoric referent, especially a PIVOT referent. The next subsection will see a purely compositional semantic analysis of logophoric *ziji*.

### **Binding by (non)-local logophoric operator: Anand (2006)**

Anand (2006) proposes that long distance anaphora in Mandarin should not be analyzed uniformly, as it is derived from logophoricity for some speakers but arises from indexical shift for others.<sup>6</sup> This dichotomous treatment is based on a series of divergences in judgments between speakers of Mandarin; these judgments were intended to test *ziji*'s potential for cross-clausal coreference in a

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<sup>6</sup>Indexical shift refers to the phenomenon that an indexical's denotation is shiftable with contexts (e.g., in an intensional context). Following such an account of *ziji*, sentence-free *ziji* (i.e., *ziji* with extra-sentential (co)reference) refers to the speaker; but when *ziji* is situated in an embedded clause, its reference can be shifted to an internal author represented as the matrix subject. More details of indexical shift are to be found in section 2.1.4.

range of different situations. (30) is one of the test sentences.

- (30) John<sub>i</sub> renwei Bill gaosu ta<sub>i</sub> Mary xihuan **ziji**<sub>i</sub>.  
 John think Bill tell him Mary like self  
 ‘John<sub>i</sub> thinks Bill told him<sub>i</sub> that Mary likes him<sub>i</sub>’ [\*LOG-Mandarin, ✓IND-Mandarin]

(Anand, 2006, p. 119)

29 native Mandarin speakers were consulted, and they were divided into two sets based on the test results. In the case of sentence (30), 16 speakers judged it as ungrammatical and they were classified as LOG-Mandarin speakers. For the remaining 13 speakers who considered (30) grammatical, they were classified as IND-Mandarin speakers. In LOG-Mandarin, *ziji*<sub>cc</sub> (i.e., *ziji* with a cross-clausal antecedent) is a logophoric pronoun but in IND-Mandarin, it is a shifted indexical. This subsection will only introduce Anand’s account of logophoricity; the account of indexical shift is left for a later section.

Anand (2006) agrees with the obligatory *de se* interpretation of *ziji*<sub>cc</sub>, especially in intensional contexts, e.g., when embedded in attitude reports. *Ziji* is considered as a *de se* variable with the feature [+log]; it needs to be bound by an individual abstractor labeled with OP<sub>LOG</sub> (i.e., an operator also with [+log]). OP<sub>LOG</sub> is introduced by attitude predicates that select clausal complements; it is located at the CP periphery immediately below the attitude predicates. In a sentence with multiple embeddings, e.g., *John<sub>i</sub> believes* [<sub>CP</sub> OP<sub>LOG-1</sub> *Bill<sub>j</sub> know* [<sub>CP</sub> OP<sub>LOG-2</sub> *that ziji<sub>ij</sub> will win*]], the logophor *ziji* can be bound by OP<sub>LOG-1</sub> or OP<sub>LOG-2</sub>. Because OP<sub>LOG</sub>, as the binder of *ziji*, is not necessarily within the local clause containing *ziji*, Anand’s approach to logophoricity is characterized as binding by (non)-local operators.

In order to demonstrate how attitude predicates with clausal complements introduce OP<sub>LOG</sub>, (31) presents the interpretation function of the predicate ‘believe’.

- (31)  $\llbracket \text{believe} \rrbracket^{c,i,g} = \lambda p_{\langle \kappa t \rangle}. [\lambda x. \forall i' \in \text{Believe}(x,i): p(i') = T]$ ,  
 where  $\text{Believe}(x, i) = \{ \langle y,z,l',t',w' \rangle \}$ : it is compatible with what *x* believes in *w*  
 at *l* at *t*, and *x* is *y* in *w'* at *t'* at *l'*

Adapted from Park (2014, p. 25)

Following Kaplan (1989), each interpretation function is relativized to a context  $c$ , an index  $i$  (point of evaluation), and an assignment function  $g$ . In the coordinates representing  $c$  or  $i$ , there are five parameters, namely  $\langle \text{author, hearer, time, location, world} \rangle$ . Following all these, a sentence like *John<sub>i</sub> believes ziji<sub>i</sub> likes Mary* can be represented as “ $\forall \langle x', y', t', l', w' \rangle \in \text{Believe}_{\text{John}, \langle x, y, t, l, w \rangle} : x' \text{ likes Mary at } t' \text{ at } l' \text{ at } w'$ ”. Such a representation can also account for *de se* interpretations of *ziji* embedded in attitude reports.

Binding of logophoric elements is syntactically licensed by  $\text{OP}_{\text{LOG}}$ , which contributes to logophoric binding’s sensitivity to *de re* blocking: when a *c*-commanding *de re* equivalent intervenes between a logophor and its binder  $\text{OP}_{\text{LOG}}$ , the binding by  $\text{OP}_{\text{LOG}}$  will be blocked and the relevant representation will be ill-formed. *De re* blocking arises from the irreconcilable contradiction in determining possible binders for a logophor. On the one hand, Fox’s (2000) economy of variable binding requires the *de re* element to be a new binder, because the intervening *de re* element is closer to the logophor and the new binder does not change the logophor’s reference. On the other hand, logophors are only allowed to be bound by [+log] operators. Actually, (30) is a sentence used to test *de re* blocking. In this sentence, *ziji* is supposed to be bound by  $\text{OP}_{\text{LOG}}$  introduced by the matrix attitude predicate *renwei* ‘think’, but a *de re* pronoun *ta* ‘him’ with the same reference intervenes and blocks the logophoric binding; thus, LOG-Mandarin speakers do not accept the interpretation co-indexed in (30). As will be seen in a later section, however, *ziji* as a shiftable indexical is not subject to *de re* blocking because it operates not via syntactically-mediated binding, but by overwriting the context parameter (Anand and Nevins, 2004). The distinct behaviors in terms of *de re* blocking help distinguish *ziji* as a logophor and *ziji* as shiftable indexical in Anand (2006).

Apart from logophoric binding by  $\text{OP}_{\text{LOG}}$  in the subordinate clauses of attitude verbs, Anand (2006) holds that logophoric *ziji* can also be bound by a covert referentially denoting element: P(erspectival)-center, which is a psychological point-of-view head high in the left periphery (Tenny and Speas, 2003; Anand and Hsieh, 2005). Although the P-center is represented in syntactic structures, its value is determined by context and/or discourse. That is why *ziji* can refer to the speaker

or the addressee, which are always contextually salient and thus can serve as point-of-view loci from which sentences are produced and interpreted. In (32), *ziji* is in sentence-initial position and there is no DP that can c-command or bind *ziji*; despite this, *ziji* seems to be able to resort to discourse participants for potential interpretation.

- (32) **ziji** weishenme bu qu ne?  
 self why NEG go Q  
 ‘Why didn’t self(I/you) go?’ (Anand, 2006, p. 137)

Logophoric *ziji* can also take on the perspective of a 3rd person individual mentioned in previous discourse, as long as the individual is discursively salient. In (33), the sentence about John’s life is narrated from the perspective of John; *ziji* here is claimed to refer to the salient perspective center John. Anand acknowledges *ziji*’s potential for reference to a contextual individual or coreference with a discursive antecedent, but no details are provided on how the extra-sentential (co)reference is realized, either semantically or syntactically. The account of logophoric *ziji* within attitude reports (i.e., *ziji* with cross-clausal coreference) cannot be directly applied to logophoric *ziji* with extra-sentential (co)reference.

- (33) The following is part of a biographical narration of John’s life.

lingdao de biao yang dui **ziji** shi yi-ge bian ce  
 leader POSS compliment to self COP one-CL impetus

‘The leader’s compliment was an encouragement to John.’

(Anand 2006, p. 137)

Furthermore, Anand’s logophoric analysis of *ziji<sub>cc</sub>* says nothing about subject orientation. As for the blocking effect, it cannot be directly derived from his analysis, and an additional restriction on the 1st and 2nd person forms as in (34) is needed. *Wo* and *ni* are the 1st and the 2nd person pronouns respectively, and banning the two pronouns within the scope of  $OP_{LOG}$  helps to account for the person asymmetry concerning the blocking effect. Despite this, this postulated restriction does not explain the underlying reason for blocking, and lacks theoretical motivations.

- (34) LOG-Mandarin INDEXICAL POLARITY  
*wo* and *ni* cannot be in the scope of an  $OP_{LOG}$ .

(Anand, 2006, p. 136)

**Binding by local logophoric operator: Charnavel (2017, 2019b) and Park (2018)**

Charnavel (2017, 2019) and Park (2018) also adopt analyses of logophoric binding by  $OP_{LOG}$ , but unlike Anand (2006), their analyses require  $OP_{LOG}$  to be located within the bound element's local domain. Charnavel follows Pollard and Sag (1992) in calling anaphors that are subject to Condition A of the Binding Theory (BT) plain anaphors. As for anaphors exempt from locality conditions imposed by Condition A of BT, they are exempt anaphors.<sup>7</sup> An exempt anaphor occurs in a constituent expressing one's perspective and it refers to the perspective holder (also logophoric center). Charnavel distinguishes two types of logophoric centers, attitude holder and empathy locus, both representing mental perspectives.<sup>8</sup>

- (35) *Taxonomy of logophoric centers*

- a. Attitude holder: intellectual center of perspective
- b. Empathy Locus: emotional center of perspective

(Charnavel, 2017, p.10)

Attitude holders are usually subjects of communicating predicates or attitude predicates, as long as these predicates introduce intensional contexts. Empathy loci are event participants that the speaker empathizes with (i.e., identifies with from an emotional perspective) so that the speaker takes the event participants' viewpoints in speaking. For instance, in sentence (19b), which I replicate as (36), the speaker empathizes with *Lisi* as if the speaker were the one looked down upon, making

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<sup>7</sup>According to Charnavel, the reflexive forms semantically bound by  $OP_{LOG}$  are not logophors; in essence, they are locally bound anaphors. As will be seen,  $OP_{LOG}$  introduces a covert logophoric pronoun  $pro_{log}$ , which is claimed to bind an exempt anaphor. In this way, exempt anaphors are also locally bound, enabling a unified analysis of plain anaphors and exempt anaphors.

<sup>8</sup>As will be shown later, some exempt anaphors referring to empathy loci do not demonstrate the empathy locus's mental perspective, e.g., (46a). By claiming that an empathy locus also represents a mental perspective, Charnavel stresses the fact that a speaker needs to emotionally empathize with the empathy locus.

*Lisi* the empathy locus. A more elaborate discussion of empathy and empathy locus is to be seen in the next subsection.

- (36) [Zhangsan kanbushang **ziji<sub>i</sub>**] de shi shi Lisi<sub>i</sub> hen shangxin.  
 Zhangsan look-down-upon self PNMM thing make Lisi very sad  
 ‘That Zhangsan looks down upon self<sub>i</sub> saddens Lisi<sub>i</sub>.’

Charnavel proposes a two-stage analysis of logophoricity. As shown in (37), an exempt anaphor is locally bound by a logophoric operator  $OP_{LOG}$ , which heads a logophoric projection  $LogP$  in the left periphery of a spellout domain. In the Minimalist framework (Chomsky, 1995), the derivation of a sentence involves the application of spell-out, which separates the LF structure from the PF structure and ships each to the relevant interface. There are several domains over which spell-out may apply, roughly, DP, vP/VP and TP.

- (37)  $[XP \dots [YP [LogP \text{ pro}_{log} OP_{LOG} [ \dots \text{ exempt anaphor } \dots ]]]]$   
 $\leftarrow \text{phase edge} \quad \leftarrow \text{spellout domain} \rightarrow$

(Charnavel, 2019, p. 215)

The logophoric operator  $OP_{LOG}$  has a rough denotation as in (38). Syntactically,  $OP_{LOG}$  introduces a silent element  $\text{pro}_{log}$  as its specifier; this  $\text{pro}_{log}$  is a logophoric pronoun that refers to a logophoric center. In this way, exempt anaphors are taken as variables semantically bound by  $OP_{LOG}$ . This two-stage treatment of logophoricity allows exempt anaphors to refer back to logophoric centers, including both attitude holders and empathy loci.

- (38) A rough denotation of  $OP_{LOG}$   
 $\llbracket OP_{LOG} \rrbracket = \lambda P. \lambda x. P \text{ from } x\text{'s perspective}$

(Charnavel, 2017, p. 7)

The empty category  $\text{pro}_{log}$  has unrestricted (co)referential potential. Long distance anaphora (including cross-clausal coreference and discursive coreference) in this analysis is actually realized by  $\text{pro}_{log}$ 's reference to a logophoric center, which is represented in a higher clause or previous discourse, or present in the context.

Sometimes, an exempt anaphor occurs in an island (e.g., DPs, adjunct phrases, etc.) while its antecedent is in a higher clause or a preceding sentence. This type of exempt anaphor may pose problems to movement analyses but not to the two-stage analysis, because  $pro_{log}$ 's unrestricted (co)reference does not rely on movement. Unfortunately, Charnavel (2017, 2019) mentions few details on how  $pro_{log}$  refers to a logophoric center.

Based on the two-stage analysis in Charnavel (2017, 2019), Park (2018) attempts an analysis of Korean *caki* that incorporates Anand (2006), aiming to account for *caki*'s obligatory reference to attitude holders when embedded in clausal complements of attitude verbs. Park takes  $OP_{LOG}$  as an individual abstractor that can turn a clause from a truth value type  $\langle t \rangle$  to a property type  $\langle e, t \rangle$ . A perspective predicate (P-PRED) then takes the property, enabling the subject of the predicate to saturate the property. In addition, the perspective predicate has a presuppositional meaning ascribed, i.e.,  $P(x)$  is true from  $x$ 's perspective. In this way, *caki* as an exempt anaphor, derives its interpretation from the perspective predicate's subject, which is realized as a null pronominal element *pro*. In (39), I follow Park's analysis and exemplify the LF structure of an adjunct clause with *ziji*.

- (39) [ $CP$   $pro_j$  $\langle e \rangle$  P-PRED $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$  [  $OP_{LOG_j}$  $\langle t, \langle e, t \rangle \rangle$  Before  $John_i$  criticized  $caki_j$ ]],  $Mary_j$  was busy on the phone.

Adapted from Park (2018, p. 220)

Mary, the referent of *caki* in (39), is an empathy locus. Exempt anaphors referring to empathy loci do not possess obligatory *de se* interpretations (Oshima, 2004; Park, 2018). For instance, a Korean counterpart of the sentence in (39) can be produced even if Mary does not know that John criticized her. Therefore, the LF structure in (39) only captures exempt anaphors referring to empathy loci, without obligatory *de se* interpretations. When it comes to exempt anaphors embedded in clausal complements of attitude predicates, the relevant null pronominal *pro* needs to possess an obligatory reference to the relevant attitude holder. It is thus stipulated that an attitude predicate can introduce another individual abstractor, e.g.,  $\lambda$  in (40). This abstractor  $\lambda$  then builds *pro*'s obligatory reference to the relevant attitude holder (e.g., *John* in (40)), which accounts for

*caki*'s *de se* interpretations in attitude reports.

(40) Exempt anaphors in clausal complements of attitude verbs:

John<sub>j</sub> thinks [<sub>CP</sub> λ *pro*<sub>j</sub> P-PRED [ OP<sub>LOG<sub>i</sub></sub> Mary<sub>i</sub> likes *caki*<sub>j</sub>]]

Adapted from Park (2018, p. 220)

In brief, the perspective predicate, along with OP<sub>LOG</sub> and its subject *pro*, is always projected, whether obligatory *de se* interpretations are involved or not. When an exempt anaphor refers to an empathy locus, *pro* is linked with the empathy locus via discourse/pragmatic coreference. But when attitude reports are involved, a separate individual abstractor is introduced, which links *pro* with a relevant attitude holder, ensuring obligatory reference to attitude holders.

In order to compare the different logophoric analyses introduced in this section, a summary of the explanatory powers of these analyses is provided in Table 2.3.

	Cross-clausal binding	Extra-sentential (co)reference	Subject orientation	Unlike person blocking	Asymmetric person blocking
<i>Ziji</i> raised as a λ-operator: Huang and Liu (2001)	✓	✗	✗	✗	✗
Discourse representation theory: Y. Huang (2000)	✓	✗	✗	✗	✗
(Non)-local OP <sub>LOG</sub> binds <i>ziji</i> : Anand (2006)	✓	✗	✗	✗	✗
Local OP <sub>LOG</sub> binds <i>ziji</i> : Charnavel (2017, 2019b); Park (2018)	✓	✓	✗	✗	✗

Table 2.3: Explanatory powers (predictions) of the four types of logophoric analyses

All the four types of analyses can account for cross-clausal binding, but only Charnavel (2017, 2019) and Park (2018) can predict extra-sentential (co)reference. Huang and Liu (2001) and Anand (2006) do mention the possibility of extra-sentential (co)reference, but do not include this in their analyses. As for subject orientation, none of the analyses addresses this property. Only Huang and Liu (2001) and Anand (2006) make an attempt at the blocking effect, assuming asymmetric person

blocking. Huang and Liu consider that an intervening 1st or 2nd person pronoun anchors the circumstances to evaluate *ziji*'s reference to the context, disallowing coreference with 3rd person internal authors (e.g., attitude holders represented as subjects of attitude predicates). However, their analysis is unclear about why an intervening 2nd person pronoun can blocking *ziji*'s binding by a 1st person pronoun, e.g., (41).

- (41)  $w_0$  zhidao  $n_i$  bu-xihuan **ziji**<sub>\*i/j</sub>.  
 I know you not-like self  
 'I know that you do not like yourself.'

Anand proposes a constraint that bans the 1st and the 2nd person pronouns in the scope of  $OP_{LOG}$ , as the two pronouns within an  $OP_{LOG}$ 's scope serve as blockers of logophoric binding. Unfortunately, Anand's analysis fails to capture matrix objects' blocking of binding by matrix subjects. For instance, in (42), replicated from (16a), *ziji*'s binding by the matrix subject *Zhangsan* is blocked by the matrix object *wo*, but the blocker *wo* is not within the scope of the relevant  $OP_{LOG}$ , challenging Anand's constraint.

- (42) Zhangsan<sub>i</sub> gaosu  $w_0$  [ $OP_{LOG}$  Lisi<sub>k</sub> hen **ziji**<sub>\*i/\*j/k</sub>].  
 Zhangsan tell me Lisi hate self  
 'Zhangsan<sub>i</sub> told me<sub>j</sub> Lisi<sub>k</sub> hates self<sub>\*i/\*j/k</sub>.'

(Pollard and Xue, 1998, p. 301)

### 2.1.3 *Ziji* as an empathy marker: Wang and Pan (2012, 2014)

The previous section has mentioned that Charnavel (2017) distinguishes two types of logophoric centers for an exempt anaphor's reference and they are attitude holder and empathy locus, but the notion "empathy" has not yet been formally introduced. In this research, empathy represents a phenomenon in language use: when speakers describe an event, the description can be made from the viewpoint of a certain individual; sometimes the viewpoint belongs to a participant in the event rather than the speaker; in this case, the speaker is claimed to embody empathy with that participant. There are certain lexical items that can encode the speaker's empathy, e.g., the

Japanese verbs *yaru* ‘give-PRES’ and *kureru* ‘give-PRES’. Despite the similarity in meanings, the two verbs suggest different perspectives.<sup>9</sup> As demonstrated in (43), the use of *yaru* suggests that the sentence/clause is reported from the viewpoint of the subject’s referent or a neutral (objective) point of view, but the use of *kureru* reflects the viewpoint of the dative object’s referent.

- (43) a. Taro-wa Hanako-ni okane-o yar-u.  
 Taro-TOP Hanako-to money-ACC give-PRES  
 ‘Taro gives money to Hanako. (from Taro’s or a neutral viewpoint)’
- b. Taro-wa Hanako-ni okane-o kure-ru.  
 Taro-TOP Hanako-to money-ACC give-PRES  
 ‘Taro gives money to Hanako. (from Hanako’s viewpoint)’

Adapted from Kuno (1987, p. 246)

Similarly, (44) includes two sentences that only differ in the use of *kureta* ‘give-PST’ vs. *yatta* ‘give-PST’; this suggests that the bracketed clause in (44a) is presented from the viewpoint of *zibun* whereas its counterpart in (44b) is reported from a neutral viewpoint or *Hanako*’s viewpoint.

- (44) a. Taro<sub>i</sub>-wa [Hanako-ga **zibun**<sub>i</sub>-ni kasite **kureta**] okane-o tukatte  
 Taro<sub>i</sub>-TOP Hanako-NOM self-to lending give-PST money-ACC spending  
 simatta. [Japanese]  
 ended-up  
 ‘Taro<sub>i</sub> has spent all the money that Hanako had lent to him<sub>i</sub>.’
- b. \*Taro<sub>i</sub>-wa [Hanako-ga **zibun**<sub>i</sub>-ni kasite **yatta**] okane-o tukatte simatta. [Japanese]

(Kuno and Kaburaki, 1977, p. 635)

Nevertheless, the different perspectives manifested cannot immediately account for the divergent acceptability of the two sentences. It is then proposed in Kuno and Kaburaki (1977) that *zibun* is an empathy marker, which embodies the speaker’s empathy with *zibun*’s referent. Therefore, the use of *zibun* in (44) also suggests a viewpoint, i.e., the viewpoint of *zibun*’s only referent, Taro<sub>i</sub>, because it is pragmatically infelicitous for Hanako to lend money to herself. In this way, the bracketed clauses in (44) have two viewpoints. For (44a), the two viewpoints introduced are *zibun*’s

<sup>9</sup>“Perspective” in this thesis means “viewpoint”, and is used interchangeably with “viewpoint”.

viewpoint and the viewpoint of *zibun*'s referent Taroo, which are identical in essence. But when it comes to (44b), distinct viewpoints are introduced, with *Taroo*'s viewpoint coming from the use of *zibun*, and *Hanako*'s viewpoint or a neutral viewpoint arising from the use of *yatta*. The distinct viewpoints lead to a clash, explaining the unacceptability of sentence (44b). Based on the contrast in (44), *zibun* is claimed to be able to embody the speaker's empathy with *zibun*'s referent (Kuno, 1987; Culy, 1997; Oshima, 2004, 2007). As acknowledged in Oshima (2004, 2007), empathy uses of reflexive forms (including *zibun*) are incorporated into logophoricity in Sells (1987), Huang and Liu (2001), Charnavel (2017, 2019b), etc.

Oshima (2004) further proposes that *zibun*'s referent "empathy locus" is the individual that receives the highest level of empathy from the speaker in an empathy domain. The empathy level of a DP's referent is determined by many factors. There are four hypothesized hierarchies proposed in Kuno and Kaburaki (1977) to help determine the empathy level of a DP's referent. The hierarchies take the form of ranking; the leftmost has the highest level of empathy as it is the easiest to empathize with, while the rightmost has the lowest empathy level. Put verbally, subject DPs' referents are more easily empathized with than non-subjects DPs' referents; speakers are more easily empathized with than addressees or 3rd person individuals; humans are more easily empathized with than animate nonhuman or inanimate things; discourse topics are more easily empathized with than elements that are not discourse topics. Despite all these, there are no details on how these hierarchies interact to determine a referent's overall empathy level.

(45) Surface Structure Empathy Hierarchy:

Subject  $\geq$  Object  $\geq$  ...  $\geq$  By-passive Agentive

Speech-Act Participant Empathy Hierarchy:

*Speaker* > *Hearer* > *3rd Person*

Humanness Hierarchy:

*Human* > *Animate Nonhuman* > *Thing*

Topic Empathy Hierarchy:

*Discourse-Topic* > *Non-Discourse-Topic*

Oshima (2004, 2007) does not have a clear definition of empathy domain, though it is claimed that an empathy domain accommodates empathy uses of reflexive forms and that everything within an empathy domain needs to be presented from the viewpoint of the relevant empathy locus. Moreover, some structures are presented to illustrate empathy domains, including possessive phrases, relative clauses, adverbial clauses. As Mandarin *ziji* also allows empathy uses in these structures (Wang and Pan, 2012, 2014), I use the data of Mandarin *ziji* in (46) to demonstrate possible empathy domains. It seems that empathy domains can be DPs or TPs, which correspond to the local domains specified for exempt anaphors in Charnavel (2019b). This is not surprising, because reflexive forms referring to empathy loci are treated as exempt anaphors in Charnavel's analysis. It is also suggested by Oshima that Condition A of the Binding Theory (BT) does not apply in empathy domains, which echoes Charnavel's categorization of exempt anaphors (i.e., exempt from Condition A of BT).

(46) a. Empathy domain: possessive phrase

[**ziji**<sub>i</sub> de haizi] zhangda-le, ta<sub>i</sub> ye biancheng-le yi-ge laotou.  
self POSS child grow-up-PERF, he also become-PERF one-CL old-man  
'Self<sub>i</sub>'s child has grown up, while he has become an old man.'

b. Empathy domain: relative clause

ta<sub>i</sub> nongdiu-le [qinqi jiegei **ziji**<sub>i</sub>] de suoyou qian.  
he lose-PERF relative lend self RC all money  
'He<sub>i</sub> lost all the money that relatives lent to self<sub>i</sub>.'

c. Empathy domain: adverbial clause

[Zhangsan lai kan **ziji**<sub>i</sub>] zhiqian, Lisi<sub>i</sub> zhengzai kan shu.  
Zhangsan come see self before Lisi at read book  
'Before Zhangsan came to visit self<sub>i</sub>, Lisi<sub>i</sub> was reading.'

In addition to the empathy uses of *ziji* in (46), Wang and Pan claim that empathy *ziji* can also appear in attitude reports. As opposed to Huang and Liu (2001) and Anand (2006), Wang and Pan

hold that *ziji* in some attitude reports (e.g., the clausal complement of *shuo* ‘say’) also allows a non-*de se* interpretation, suggesting an empathy use of *ziji*. Sentence (47) is replicated from (21a), which has been used to demonstrate the obligatory *de se* interpretation of *ziji* in attitude reports. Wang and Pan do not agree with the scenario judgment in (47), arguing that S<sub>2</sub> also allows the production of sentence (47) if the speaker knows that the stolen purse belongs to Zhangsan and empathizes with Zhangsan, i.e., taking Zhangsan’s point of view.

- (47) S<sub>1</sub>: Zhangsan says, “That pickpocket stole my purse!”  
 S<sub>2</sub>: Zhangsan says, “That pickpocket stole that purse!” (can’t see that it was his purse)

Zhangsan shuo pashou tou-le **ziji**-de pibao.  
 Zhangsan say pickpocket steal-PERF self-POSS purse

‘Zhangsan said that the pickpocket stole his purse.’ [✓ S<sub>1</sub>, # S<sub>2</sub>]

Following the reasoning above, empathy *ziji* seems to be able to appear in the clausal complements of certain attitude predicates. According to Wang and Pan, attitude predicates are not equally compatible with empathy uses of *ziji*. Speech predicates (e.g., “say” and “tell”) and psychological predicates (e.g., “sadden”) fully allow the non-*de se* interpretation from empathy *ziji*, but epistemic predicates (e.g., “think”) and knowledge predicates (e.g., “know”) only marginally allow this. For instance, if the predicate in (47) is changed from *shuo* ‘say’ to *renwei* ‘think’, S<sub>2</sub> with a non-*de se* interpretation should make the utterance of (47) either downgraded or unacceptable.

In terms of the properties characterizing *ziji* with cross-clausal binding/coreference, an empathy analysis can easily explain *ziji*’s subject orientation and asymmetric person blocking (Wang and Pan, 2014). Subject orientation of *ziji* derives from the surface structure empathy hierarchy in (45). When it comes to asymmetric person blocking, it involves the speech-act participant empathy hierarchy. A 1st/2nd person referent has a higher empathy level and a 3rd person referent, which makes it hard for a 3rd person referent to serve as an empathy locus in the presence of a 1st/2nd person pronoun. Following this, *ziji* in (48) cannot refer to Zhangsan as an empathy locus, demonstrating the blocking by the 1st person pronoun *wo*.

- (48) Zhangsan<sub>i</sub> shuo wo<sub>j</sub> piping-le      **ziji**<sub>\*i/j</sub>.  
 Zhangsan say I criticize-PERF self  
 ‘Zhangsan<sub>i</sub> said that I<sub>j</sub> criticized self<sub>\*i/j</sub>.’

In addition to cross-clausal coreference, empathy uses of reflexive forms can corefer with antecedents in previous discourse. As demonstrated by the English example in (49), *himself* in the second sentence refers to the empathy locus John, who is represented as the first sentence’s subject. Though the example sentences of empathy *ziji* in Wang and Pan (2012, 2014) only involve intra-sentential coreference, it is conceivable that empathy *ziji* also allows discursive reference and/or even contextual reference.

- (49) John<sub>i</sub> was going to get even with Mary. That picture of himself<sub>i</sub> in the paper would really annoy her, as would the other stunts he had planned.

(Pollard and Sag, 1992, p. 274)

Table 2.4 provides the explanatory powers of the current empathy analysis of *ziji*. Wang and Pan have demonstrated empathy *ziji* in intensional contexts, which roughly corresponds to cross-clausal binding, but it remains to be investigated whether empathy *ziji* allows extra-sentential (co)reference. Moreover, the empathy hierarchies in (45) specify that referents of subject DPs are preferred empathy loci for empathy *ziji*, predicting subject orientation. Considering the speech-act participant empathy hierarchy, 3rd person referents are less likely to serve as empathy loci in the presence of 1st/2nd person pronouns, but not vice versa. This helps account for person asymmetry in the blocking effect, though this analysis still leaves some blocking instances unexplained, e.g., 1st person pronouns’ blocking of *ziji*’s cross-clausal coreference with 2nd person pronouns.

Cross-clausal binding  
 Extra-sentential (co)reference  
 Subject orientation  
 Unlike person blocking  
 Asymmetric person blocking

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Empathy *ziji*: Wang and Pan (2012, 2014)    ✓    ?    ✓    ✗    ✗

Table 2.4: Explanatory powers (predictions) of empathy *ziji*

### 2.1.4 *Ziji* as a shifted indexical: Anand (2006)

Recall that Anand (2006) distinguishes two Mandarin dialects based on the behaviors of *ziji*<sub>cc</sub> (*ziji* with a cross-clausal antecedent), LOG-Mandarin and IND-Mandarin. For IND-Mandarin speakers, *ziji*<sub>cc</sub> is a 1st person shifted indexical, whose reference is manipulated by a context shift operator OP<sub>AUTH</sub> introduced with attitude predicates' clausal complements. When no OP<sub>AUTH</sub> appears to shift the context, *ziji* should refer to the speaker, as its denotation specifies a reference directly from the context *c*. Therefore, in IND-Mandarin, *ziji* in the absence of OP<sub>AUTH</sub> is semantically equivalent to the 1st person pronoun *wo*.

$$(50) \quad \llbracket ziji \rrbracket^{c,i} = \text{AUTH}(c) = \llbracket wo \rrbracket^{c,i}$$

When IND-Mandarin *ziji* is embedded in clausal complements of attitude predicates, context shift operators OP<sub>AUTH</sub> optionally occur. As demonstrated in (51), OP<sub>AUTH</sub> can overwrite *author* in the context *c* with *author* from the index *i*, which represents a point of evaluation embodied in the clausal complements. *Ziji*'s reference is thus changed from the speaker AUTH(*c*) to an internal author AUTH(*i*).

$$(51) \quad \llbracket \text{OP}_{\text{AUTH}} p \rrbracket^{c,i} = \llbracket p \rrbracket^{j,i}, \text{ where } j = \langle \text{AUTH}(i), \text{ADDR}(c), \text{TIME}(c), \text{LOC}(c), \text{WORLD}(c) \rangle$$

The evidence for an indexical shift analysis of *ziji* in IND-Mandarin comes from two phenomena. First, *ziji* in the absence of OP<sub>AUTH</sub> (e.g., without involving embedded clauses) refers to the

speaker. According to the investigation in Anand (2006), *ziji* in (52) can only refer to the speaker for IND-Mandarin speakers.

- (52) *luoxia de shitou zadao-le ziji.*  
 fallen PNMM stone hit-PERF self.  
 ‘A fallen stone hit self<sub>SPEAKER</sub>.’

Second, a shiftable indexical analysis of *ziji* is also evidenced by IND-Mandarin speakers’ insensitivity to *de re* blocking. Unlike the binding of logophoric *ziji*, the operation of context overwriting does not require syntactic mediation and is hence not subject to *de re* blocking. Turning back to sentence (30), replicated below as (53), *ziji* for IND-Mandarin speakers can corefer with the matrix subject *John*, despite the presence of an intervening *de re* counterpart *ta* ‘him’, which also corefers with *John*. The (in)sensitivity to *de re* blocking is one of the criteria used to tell indexical *ziji* from logophoric *ziji* in Anand (2006).

- (53) *John<sub>i</sub> renwei Bill gaosu ta<sub>i</sub> Mary xihuan ziji<sub>i</sub>.*  
 John think Bill tell him Mary like self  
 ‘John<sub>i</sub> thinks Bill told him<sub>i</sub> that Mary likes him<sub>i</sub>’ [\*LOG-Mandarin, ✓IND-Mandarin]

(Anand, 2006, p. 119)

When it comes to the blocking effect, Anand (2006) proposes a constraint similar to LOG-Mandarin Indexical Polarity. The stipulation of such a constraint is not helpful in accounting for the underlying mechanism for the blocking effect. Moreover, there are apparently counterexamples to this constraint of Indexical Polarity. In (55), whether the embedded clause involves a context shift operator  $OP_{AUTH}$  or a logophoric operator  $OP_{LOG}$ , the 1st person pronoun *wo* is within its scope, but this does not prevent *ziji* from being bound by the matrix subject *Zhangsan*.

- (54) IND-Mandarin INDEXICAL POLARITY  
*wo* and *ni* cannot be in the scope of a shifting operator.

(Anand, 2006, p. 131)

- (55) *Zhangsan<sub>i</sub> yiwei ziji<sub>i</sub> nong-teng-le wo.*  
 Zhangsan think self make-ache-PERF me  
 ‘Zhangsan<sub>i</sub> thought that self<sub>i</sub> hurt me.’

The explanatory powers of Anand’s indexical analysis of *ziji* is presented in Table 2.5. If indexical *ziji* experiences a context shift, *ziji* corefers with a cross-clausal antecedent. When no OP<sub>AUTH</sub> appears to shift reference, indexical *ziji* refers to the speaker and allows extra-sentential reference. This analysis makes no mention of subject orientation. Despite the constraint (as in (54)) proposed to account for person asymmetry in the blocking effect, this indexical analysis predicts nonexistent blocking and meanwhile fails to capture blocking by object DPs, just as Anand’s (2006) logophoric analysis does.

	Cross-clausal binding	Extra-sentential (co)reference	Subject orientation	Unlike person blocking	Asymmetric person blocking
<i>Ziji</i> as a shifted indexical: Anand (2006)	✓	✓	✗	✗	✗

Table 2.5: Explanatory powers (predictions) of indexical *ziji*

### 2.1.5 *Ziji* referring to contemplator: Li (1991)

In previous subsections about logophoricity, there are some instances of *ziji* that are free from intra-sentential coreference, e.g., (32) and (33). These instances suggest that *ziji* does not necessarily need an antecedent within the sentence containing it, and that extra-sentential (co)reference is also allowed. According to Li (1991), sentence-free *ziji* (i.e., *ziji* with extra-sentential (co)reference) refers to contemplator.<sup>10</sup>

Li (1991) proposes that sentence-free *ziji* appears in a passage of represented thought and refers to the corresponding contemplator, i.e., the person to whom the represented thought belongs.

<sup>10</sup>Sentence-free *ziji* in Li (1991) is used in situations where one contemplates on themselves and refers to the contemplator’s image projected in their own contemplation. That is, sentence-free *ziji* refers to an image of the contemplator rather than the contemplator themselves. However, as the reference to a contemplator or the contemplator’s image does not make a difference in comprehending the relevant discourse, this thesis simply takes “contemplator” as sentence-free *ziji*’s referent for ease of comprehension.

Represented thought is one of the ways of presenting one’s thoughts. It contrasts with direct thought and reported thought (Banfield, 1982).<sup>11</sup> When one contemplates, the thought experienced by the contemplator can be presented linguistically. Direct thought is a thought representation that presents the exact thought as experienced by the relevant contemplator in their mind. As seen in (56a), the bracketed sentence is an instance of direct thought; it is situated within quotation marks and replicates what the contemplator Zhangsan thought to himself. If the same thought is expressed in the form of reported thought, the thought should be embedded as a clausal complement of a thinking verb, as in (56b). As for represented thought, it embodies a dual voiced narrative technique that encodes both the thinking subject’s viewpoint and the narrating context’s perspective (Pascal, 1977).<sup>12</sup> Despite being part of a narrative, represented thought allows presentation of a contemplator’s conscious thought by taking this contemplator’s point of view. For instance, the contrast between (56a) and (56b) has suggested that “this thief” from the perspective of the contemplator was perceived as “that thief” from the reporter’s perspective. This perspective of the contemplator is maintained into the second sentence of (56c) (i.e., the represented thought counterpart of (56a)), as suggested by the use of ‘this thief’.

(56) a. Direct thought or Direct speech

Zhangsan xinxiang, [“zhe-ge xiaotou zhen kehen!”]  
 Zhangsan think this-CL thief indeed hatable  
 ‘Zhangsan thought, “This thief is so detestable!”’

b. Reported thought or Indirect thought

Zhangsan xinxiang [na-ge xiaotou zhen kehen].  
 Zhangsan think that-CL thief indeed hatable  
 ‘Zhangsan thought that thief was so detestable.’

<sup>11</sup>There are other terms for the various types of thought expression. For example, direct thought, reported thought and represented thought correspond to direct speech, indirect speech and free indirect speech respectively in Pascal (1977).

<sup>12</sup>In English represented thought texts, narrating contexts’ perspectives can be manifested in tense marking. For instance, the second sentence in “She stoped. Where the hell was she?” belongs to a represented thought text; however, it still maintains the narrating context’s perspective by using the past tense (Mildorf, 2008). As there is no overt marking for tenses in Mandarin, narrating contexts’ perspectives are not as apparently manifested in Mandarin represented thought texts as in their English counterparts.

c. Represented thought or Free indirect speech

Zhangsan youxie shengqi. [zhe-ge xiaotou zhen kehen!]

Zhangsan somewhat angry this-CL thief indeed hatable

‘Zhangsan was somewhat angry. This thief was so detestable!’

Adapted from Li (1991, p. 151)

Sometimes, the contemplator themselves is involved in their own thinking. The thought expressed in (57) involves the contemplator *Lisi*. It can be seen that the contemplator is encoded with *ziji* in all three types of thought expression. Therefore, Li (1991) claims that *ziji* has the potential to refer to a contemplator. For ease of reference, *ziji* with this potential is named contemplative *ziji* in this thesis.

(57) a. Direct thought or Direct speech

Lisi xinxiang, [“**ziji** weishenme hen xiaotou ne?”]

Lisi think self why hate thief Q

‘Lisi thought, “Why does self hate thieves?”’

b. Reported thought or Indirect speech

Lisi<sub>i</sub> zai xiang [**ziji**<sub>i</sub> weishenme hen xiaotou].

Lisi at think self why hate thief

‘Lisi<sub>i</sub> was wondering why self<sub>i</sub> hated thieves.’

c. Represented thought or Free indirect speech

Lisi<sub>i</sub> ye feichang bujie. [**ziji**<sub>i</sub> weishenme hen xiaotou ne?]

Lisi also very confused self why hate thief Q

‘Lisi<sub>i</sub> was also very confused. Why did self<sub>i</sub> hate thieves?’

(Li, 1991, p. 156)

As exemplified in (57c), contemplative *ziji* can be used to refer to a contemplator represented in previous discourse. Therefore, sentence-free *ziji* can corefer with a discursive contemplator. Li (1991) holds that the appearance of sentence-free *ziji* can even serve as an indication that the relevant sentence belongs to a text of represented thought. The text in (58) is excerpted from a piece of fiction; it is a narrative of how the protagonist *Fan* is feeling pain from her unreciprocated

love for a man. However, if both pronouns *ta* ‘she’ are replaced with *ziji*, the text will become a represented thought text of *Fan*, entailing that *Fan* was reflecting on her past, which brings a contemplative flavor to the text.

- (58) zheme chang shijian yilai, **ta** xiang shi aiqing shang de ze, zhuilazhuiqu,  
 such long time since she as-if COP love on PNMM thief pursue  
 qiulaiqiuqu, duolaiduoqu, **ta** shou gou le!  
 beg hide she suffer enough SFP  
 ‘For such a long time she’d been like a thief in the matter of love; pursue, beg, hide—enough sufferings!’

(Li, 1991, p. 118)

Contemplative *ziji* is also used in interactional discourse. For instance, sentence (59) is uttered in a conversation where the speaker is thinking intensely about what had happened, or even replaying the scene of the event in their mind. *Ziji* here refers to the speaker, who is simultaneously the contemplator.

- (59) **ziji** dangshi na le shubao jiu zou le, mei kanjian ta.  
 self then take PERF book-bag right-away leave SFP not see him  
 ‘Self at that time took (self’s) schoolbag and left right away, and didn’t see him.’

(Li, 1991, p. 139)

Li even claims that *ziji<sub>cc</sub>* (i.e., with a cross-clausal antecedent) can also be treated as a contemplative use, based on instances like (57b), where *ziji* refers to a contemplator represented in higher clauses. This treatment, however, has met with refutation from Pan (2001), because *ziji<sub>cc</sub>* does not necessarily involve contemplative consciousness. Consider (60) for example. The matrix verb *tingshuo* ‘hear’ may suggest John’s awareness that his own book was taken away, but there is no clue indicating John’s purposeful contemplation on the event happening to his book (Pan, 2001). Therefore, contemplative *ziji* cannot account for all instances of *ziji* with cross-clausal antecedents.

- (60) John<sub>i</sub> tingshuo Mary na-zou-le **ziji<sub>i</sub>** de shu.  
 John hear Mary take-gone-PERF self POSS book  
 ‘John<sub>i</sub> heard that Mary took away his<sub>i</sub> own book.’

Adapted from Pan (2001, p. 293)

In Table 2.6, I present the predictions following from Li’s contemplative treatment of *ziji*. Such a treatment can explain *ziji*’s extra-sentential (co)reference, and some instances of *ziji*<sub>cc</sub>. Li’s treatment does not address subject orientation; but in terms of the blocking effect, Li attempts to attribute person asymmetry in the blocking effect to the person hierarchy in perspective taking, i.e., 1st person > 2nd person > 3rd person. This attempt at the blocking effect does not make much sense, on account of the fact that the blocking effect is a property featuring *ziji*<sub>cc</sub> overall, but the current contemplative treatment can only account for some instances of *ziji*<sub>cc</sub>.

	Cross-clausal binding	Extra-sentential (co)reference	Subject orientation	Unlike person blocking	Asymmetric person blocking
Contemplative <i>ziji</i> : Li (1991)	✓	✓	✗	✗	✗

Table 2.6: Explanatory powers (predictions) of contemplative *ziji*

## 2.2 The uses of *ziji* predicted by various analyses that allow extra-sentential (co)reference

The previous section has introduced five main approaches to *ziji* beyond local binding, with their predictions summarized in tables (including Table 2.1, Table 2.3, Table 2.4, Table 2.5 and Table 2.6). As seen in the predictive tables, only Charnavel’s (2017, 2019) and Park’s (2018) logophoric analyses, Anand’s (2006) shiftable indexical analysis and Li’s (1991) analysis of contemplative *ziji* have definite predictions of *ziji*’s extra-sentential (co)reference. In terms of Wang and Pan’s (2012, 2014) empathy analysis, there is a great potential for empathy *ziji* to refer to an empathy locus mentioned in previous discourse or present in the context, enabling extra-sentential (co)reference. The four types of analyses mentioned above predict four uses of *ziji* allowing extra-sentential

(co)reference, including logophoric *ziji*, indexical *ziji*, contemplative *ziji*, and empathy *ziji*.<sup>13</sup> The four uses will be examined to see which of them allow discursive coreference and which allow contextual reference, as context and discourse represent two different extra-sentential factors involved in determining *ziji*'s interpretation. Through the examination, I will demonstrate that contemplative *ziji* with discursive coreference is so different from contemplative *ziji* with contextual reference that they should be treated separately. Moreover, empathy *ziji* predicted by Wang and Pan's analysis is included as a subcategory of logophoric *ziji* predicted by Charnavel (2017, 2019) and Park (2018).

### **2.2.1 The uses of *ziji* that are predicted to allow discursive coreference**

The analyses that can predict discursive coreference include Charnavel's and Park's logophoric analyses, Li's contemplative analysis, and possibly Wang and Pan's empathy analysis. In the following paragraphs, I discuss how uses of *ziji* predicted by these analyses allow discursive coreference.

While most of the logophoric analyses acknowledge that logophoric *ziji*'s reference can go beyond the sentence containing *ziji*, only Charnavel's and Park's logophoric analyses can exactly predict *ziji* with discursive reference. Both Charnavel and Park adopt two-stage analyses, i.e., an exempt anaphor is bound by a null element in the local domain, with the null element referring to a logophoric center. As the logophoric center can be represented in previous discourse, logophoric *ziji* in Charnavel (2017, 2019b) and Park (2018) is predicted to allow discursive coreference.

Empathy uses of reflexive forms may also allow discursive coreference. Oshima (2004, 2007) proposes that empathy uses of the Japanese *zibun* represent the fact that a speaker empathizes with a specific protagonist and *zibun* here refers to the protagonist, which is an empathy locus (Oshima, 2004, 2007).<sup>14</sup> As demonstrated in Wang and Pan (2012), the reflexive form *ziji* can fulfill em-

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<sup>13</sup>The use of logophoric *ziji* does not imply that logophoric *ziji* is a logophor. Following Charnavel's analysis, logophoric *ziji* is an exempt anaphor.

<sup>14</sup>"Protagonist" in this thesis takes the literal meaning to refer to the main character in a piece of text (mostly a story).

pathy functions in four different structures, namely, possessive phrases, relative clauses, adverbial clauses and clausal complements of certain predicates. Though Wang and Pan only demonstrate empathy *ziji* with an intra-sentential antecedent, it is worth noting that empathy uses of reflexives in other languages are not limited to intra-sentential coreference, e.g., the discursive coreference of the English *himself* in (49). Therefore, empathy *ziji* may also allow reference to an empathy locus mentioned in previous discourse or even present in the context, leading to discursive coreference and/or contextual reference. For instance, the possessor *ziji* in (61) refers to the empathy locus represented by *ta* ‘he’, which is within the same sentence containing *ziji*. When it comes to sentence (62) with a sentence-initial *ziji* in a relative clause, it is possible or even necessary for *ziji* here to resort to previous discourse or the context for reference, considering that there is no plausible intra-sentential antecedent for *ziji*.

(61) zai **ziji**<sub>i</sub> de fangjian zhaohuo de shihou, ta<sub>i</sub> zhengzai shuijiao.  
 at self POSS room catch-fire RC time, he in-course-of sleep  
 ‘While self’s<sub>i</sub> room was on fire, he<sub>i</sub> was sleeping.’

(62) **ziji** sheji de chanpin gei jiti dailai-le rongyu.  
 self design RC product to team bring-PERF honor  
 ‘The product that self designed brought great honor to the team.’

Contemplative *ziji* also allows discursive coreference because it can occur in represented thought passages and refer to a contemplator represented in previous discourse. Represented thought is a special literary style to present one’s contemplative consciousness in narratives. Represented thought passages are preceded by previous discourses, which introduce the corresponding contemplators (mostly protagonists in stories); otherwise, the represented thought passages are incomprehensible for lack of relevant contemplators. For example, *ziji* in the second sentence of (63) is an instance of contemplative *ziji* that refers to the contemplator *John* mentioned in the preceding sentence.

(63) John xian-ru-le chensi. **ziji** zenme caineng wancheng zhege renwu.  
 John fall-into-PERF meditation self how can finish this task  
 ‘John was lost in thought. How can self finish this task.’

## 2.2.2 The uses of *ziji* that are predicted to allow contextual reference

Mandarin *ziji* allows direct reference to individuals in the context. As mentioned, empathy *ziji* may allow direct reference to an empathy locus in the context. Considering that empathy *ziji* referring to an empathy locus is categorized as logophoric *ziji* in Charnavel (2017, 2019) and Park (2019), logophoric *ziji* should also allow contextual reference. In addition, there are two other situations with affirmative predictions of *ziji*'s contextual reference. Following Anand (2006), *ziji* as a shiftable indexical (for IND-Mandarin speakers) can refer to the speaker when there is no plausible intra-sentential antecedent, behaving like the 1st person pronoun *wo*. Indexical *ziji*'s reference to the speaker arises from the default in the absence of a context shift operator  $OP_{AUTH}$ .

Another situation with *ziji*'s direct reference to a contextual individual involves two special contexts mentioned in Li (1991). Recall the example sentence in a conversation in (59), replicated as (64). Despite the lack of an intra-sentential antecedent, *ziji* in this sentence can refer to the speaker, bringing the implication that during the production of (64), the speaker was thinking hard to remember or even relive the scene of the event described in this sentence (Li, 1991; Pan, 2001; Chen, 2009). This implication echoes native Mandarin speakers' intuition that the speaker in a conversation does not use *ziji* for direct reference to themselves unless the speaker is in a mental state of contemplation.

- (64) **ziji** dangshi na le shubao jiu zou le, mei kanjian ta.  
self then take PERF book-bag right-away leave SFP not see him  
'self at that time took (self's) book bag and left right away, and didn't see him.'

(Li, 1991, p. 139)

The other special context where *ziji* refers to the speaker involves the production of internal monologue. Internal monologue here means the linguistic outcome from self-talk, e.g., the bracketed sentence in (65). Through self-talk, what is uttered is brought to conscious attention, allowing contemplation to occur (Butler, 2013). In this sense, internal monologue represents the exact thought experienced and possessed by the relevant contemplator, rather than any secondhand representation/report of the thought. Internal monologue thus belongs to direct thought and is usually

presented within quotation marks.<sup>15</sup>

- (65) Lisi xinxiang, [“**ziji** weishenme hen ta ne?”]  
Lisi think self why so hate him Q  
‘Lisi thought, “Why does self hate him?”’

After examining the two special contexts, I find that in both contexts, conscious contemplation is involved during the production of *ziji*, with contemplators simultaneously being speakers. *Ziji*’s reference to the speaker is, in actual fact, a reference to the contemplator, as illustrated in (66). Following Li (1991), *ziji*’s uses in the two contexts should be categorized as contemplative *ziji*.

- (66) In the two special contexts,

$$\begin{aligned} & \llbracket ziji \rrbracket^{c,i} \xrightarrow{\text{REFER TO}} \text{contemplator,} \\ & \text{because contemplator (in this case) } \xrightarrow{\text{SIMULTANEOUSLY}} \text{AUTHOR(c),} \\ & \llbracket ziji \rrbracket^{c,i} \xrightarrow{\text{REFER TO}} \text{AUTHOR(c) = speaker = } \llbracket wo \rrbracket^{c,i} \end{aligned}$$

Nevertheless, contemplative *ziji* used in the two contexts is quite different from contemplative *ziji* introduced in Section 2.2.1 with discursive coreference. In the next subsection, I will differentiate the two types of contemplative *ziji*.

### 2.2.3 Distinguishing contextual contemplative *ziji* and discursive contemplative *ziji*

Contemplative *ziji* with contextual reference and contemplative *ziji* with discursive coreference are different in several ways, so they are treated separately, with the former termed contextual contemplative *ziji* and the latter termed discursive contemplative *ziji*.

First, the two types of contemplative *ziji* differ in where to obtain their interpretations. Contextual contemplative *ziji* appears in the discourse produced during contemplation, and refers to

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<sup>15</sup>Li (1991) takes a different treatment and incorporates internal monologue into represented thought by extending the scope of represented thought to cover all the discourse in which *ziji* refers to a contemplator. This thesis, however, adheres to the original sense of represented thought in Banfield (1982) and considers internal monologue as direct thought, rather than represented thought.

the contemplator in the context. Such discourse, as a direct product of contemplation, is termed “direct thought”, which includes the conversational utterance in (64) and the internal monologue in (65). Moreover, direct thought should also include contemplative texts and oral monologues (i.e., monologues produced with audible forms), as long as these texts/monologues are produced during contemplation. Therefore, the interpretation functions in (66) not only characterize the two special contexts exemplified in (64) and (65), but apply to *ziji* in any direct thought text. As suggested by the interpretation functions, contextual contemplative *ziji* refers to the relevant contemplator, who is simultaneously the speaker. In this sense, contextual contemplative *ziji*'s interpretation is context-dependent.

Discursive contemplative *ziji* is different. It is known to appear in represented thought and refers to a contemplator mentioned in previous discourse. As suggested in Section 2.1.5, represented thought is embedded in narratives. Represented thought passages are thus produced secondhand by narrators, rather than direct products from contemplation, though represented thought can be exactly identical to the thought experienced by the relevant contemplator, as seen in the comparison between the represented thought sentences and their counterparts of direct thought in (56) and (57). Unlike direct thought, represented thought is often produced at a time different from the thought possessor's contemplation.

Discursive contemplative *ziji*'s interpretation is discourse-dependent. Before a narrator presents a protagonist's thoughts in the form of represented thought, the narrator needs to first introduce the protagonist (also the contemplator) and explicitly point out or hint on the fact that the protagonist is in contemplation. Thus, discursive contemplative *ziji*'s antecedent (i.e., the DP encoding the protagonist in contemplation) appears in previous discourse, accounting for its discourse-dependency. The protagonist in contemplation can coincide with the narrator, when the narrator narrates their own contemplative consciousness. Recall the second sentence in (63). It is an instance presenting the represented thought of someone else, i.e., the contemplator *John*. If the represented thought sentence in (63) were to be narrated by the contemplator *John* himself, the preceding sentence would be adjusted, with *John* changed to *wo*, as in (67). Despite *ziji*'s reference to the narrator

in this case, *ziji*'s interpretation is still discourse-dependent, because its reference to the narrator here needs to be mediated by the overt linguistic representation of the narrator, i.e., the 1st person pronoun *wo* in (67). In (68), I present the interpretation functions of discursive contemplative *ziji*.

(67) *wo xian-ru-le chensi. ziji zenme caineng wancheng zhege renwu.*  
 I fall-into-PERF meditation self how can finish this task  
 'I was lost in thought. How can self finish this task.'

(68) In represented thought,

$[[ziji]]^{c,i} \xrightarrow{\text{REFER TO}} \text{contemplator,}$   
 because contemplator  $\xrightarrow{\text{SIMULTANEOUSLY}} \text{AUTHOR}(i), i$  as the circumstances to  
 evaluate the represented thought,  
 $[[ziji]]^{c,i} \xrightarrow{\text{REFER TO}} \text{AUTHOR}(i)$

when a narrator narrates their own thought,

$[[ziji]]^{c,i} \xrightarrow{\text{REFER TO}} \text{AUTHOR}(i) \xrightarrow{\text{COINCIDE WITH}} \text{AUTHOR}(c)$

Second, contemplative *ziji* in direct thought can only refer to the 1st person speaker, while contemplative *ziji* in represented thought can corefer with an antecedent with any person specification. This distinction is easily noted from the contrastive interpretations of  $[[ziji]]^{c,i}$  in (66) and (68). Contemplative *ziji* in direct thought has to refer to the speaker, which is obligatorily 1st person. With regard to discursive contemplative *ziji*'s reference, it may or may not coincide with the 1st person narrator, without being restricted in person specification, as narrators are free to narrate their own thoughts or someone else's.

Third, the domains licensing the two types of contemplative *ziji* (i.e., direct thought and represented thought) are different in whether 1st/2nd person pronouns are allowed. 1st/2nd person pronouns can be used in direct thought to refer to speakers/addressees, but in represented thought, they are generally not allowed. This section has mentioned two special contexts where direct thought is produced, namely, conversational utterance under intense contemplation and internal monologue. The two special contexts differ in that the former is interactional, but the latter is non-interactional. As seen in (69), both *wo* and *ni* can appear in interactional direct thought; they

seem to refer to the speaker and the addressee respectively. As the speaker in this context is simultaneously the contemplator, *wo* can also be used to refer to the contemplator. But since the form “*wo*” is ambiguous and has the potential to refer to a general speaker (i.e., not the contemplator), the form “*ziji*” serves as a more apparent indicator for a sentence/text’s possible categorization as direct thought.

(69) Interactional direct thought (e.g., answering a friend’s question during contemplation),

wo/ziji dangshi xiang gaosu ni zhe-jian shi, dan...  
I/self then want tell you this-CL thing but

‘I/self want to tell you this, but...’

Non-interactional direct thought usually involves talking/writing to oneself, either silently or aloud. This type of discourse includes oral/internal monologues, contemplative texts, etc. Like in interactional direct thought, *wo* and *ni* are also used to refer to the speaker and the addressee respectively. However, in a context where non-interactional direct thought is produced, only one individual is involved and this only individual takes all three roles, including contemplator, speaker, and addressee. Therefore, *ziji*, *wo* and *ni* can all be used to refer to a contemplator in non-interactional direct thought. For instance, Mary needs to decide whether she should accept a job offer and weigh the pros and cons; she may utter to herself any of the sentences in (70), as oral/internal monologue.

(70) Non-interactional direct thought (e.g., Mary’s internal monologue),

a. ruguo ziji qu naer gongzuo...  
if self go there work...  
‘If self goes there for work...’

b. ruguo wo qu naer gongzuo...  
if I go there work...  
‘If I go there for work...’

c. ruguo ni qu naer gongzuo...  
if you go there work...  
‘If you go there for work...’

Unlike either interactional or non-interactional direct thought, represented thought generally does not allow the use of 1st or 2nd person pronouns, except under certain conditions. Banfield (1982) also notices that no 1st/2nd person pronouns can appear in represented thought. Despite being part of narratives, represented thought does not allow the use of *wo* ‘I’ and *ni* ‘you’ to refer to the speaker (i.e., the narrator in this case) and the addressee respectively. Suppose a scenario that a manager fired an employee, but the employee was confused; (71) is what the employee thought to themselves.

(71) The fired employee’s direct thought (specifically, internal monologue):

**ziji** bingmei dezui jingli,        keshi weisha bei-chao-le...  
self not        offend me/manager but    why    PASS-fire-PERF...

‘Self did not offend the manager, so why did (self) get fired?’

When the manager narrates the direct thought in (71) in the form of represented thought, the speaker (i.e., the manager) cannot be encoded with the 1st person pronoun *wo*, as seen in (72a). Similarly, when the same direct thought is narrated to the manager as in (72b), the manager as the addressee, cannot be represented by the 2nd person pronoun *ni*. However, the manager has to be represented somehow as they were involved in the employee’s thought. As seen in (72a) and (72b), the manager takes the form of a 3rd person DP, *jingli* ‘the manager’. Banfield (1982) suggests that the disallowance of *wo* and *ni* for respective references to the speaker and the addressee in represented thought can be explained by the need for represented thought to encode the relevant contemplator’s viewpoint at the time of thinking. In relation to the contemplator *employee’s* thinking, the manager is a 3rd person individual. The employee’s viewpoint is maintained into the two represented thought sentences in (72), which almost replicate the corresponding direct thought form in (71). Therefore, a 3rd person DP is used to represent the manager in the represented thought texts in (72), regardless of the fact that the manager is the speaker of (72a) and the addressee for (72b).

(72) a. AUTHOR(c) = the manager,

na-ge yuangong hen kunhuo. **ziji** bingmei dezui #wo/jingli, keshi weisha  
 that-CL employee very confused self not offend me/manager but why  
 bei-chao-le...  
 PASS-fire-PERF...

‘The employee was very confused. Self did not offend the manager, so why did (self) get fired...’

b. ADDRESSEE(c) = the manager,

na-ge yuangong hen kunhuo. **ziji** bingmei dezui #ni/jingli, keshi weisha  
 that-CL employee very confused self not offend you/manager but why  
 bei-chao-le...  
 PASS-fire-PERF...

‘The employee was very confused. Self did not offend the manager, so why did (self) get fired...’

Note that even though represented thought takes a form as faithful to the original thought form (i.e., direct thought) as possible, the use of *wo* or *ni* in direct thought to refer to the contemplator cannot be maintained into represented thought in most cases. As shown in (73a), direct thought (here the internal monologue) allows the contemplator to be represented by either the 1st/2nd person pronoun or *ziji*; but its represented form in (73b) only allows *ziji*.

(73) a. The fired employee’s internal monologue,

wo/ni/**ziji** bingmei dezui jingli, keshi weisha bei-chao-le...  
 I/you/self not offend manager but why PASS-fire-PERF...  
 ‘I/you/self did not offend the manager, so why did (I/you/self) get fired...’

b. The represented thought form of (73a),

#wo/#ni/**ziji** bingmei dezui jingli, keshi weisha bei-chao-le...  
 I/you/self not offend manager but why PASS-fire-PERF...  
 ‘Self did not offend the manager, so why did (self) get fired...’

The use of *wo* and *ni* in internal monologue is made possible by the felicity condition that the speaker represented by *wo* and the addressee represented by *ni* happen to be the relevant contemplator. When it comes to represented thought, it generally does not enjoy this felicity condition, explaining the unacceptability of *wo* and *ni* in (73b); however, it is anticipated that *wo* and *ni* can

be used in represented thought as long as the aforementioned felicity condition is satisfied, i.e., the speaker/addressee coincides with the relevant contemplator. This anticipation is borne out in (74), where the employee narrates their own thought in the form of represented thought (speaker/narrator = contemplator), or hears their own thought narrated by others in the form of represented thought (addressee = contemplator).

(74) a. The represented thought form of (73a), AUTHOR(c) = the employee

wo hen kunhuo. wo/#ni/**ziji** bingmei dezui jingli, keshi weisha bei-chao-le...  
I very confused I/you/self not offend manager but why PASS-fire-PERF...  
'I was very confused. I/self did not offend the manager, so why did (I/self) get fired...'

b. The represented thought form of (73a), ADDRESSEE(c) = the employee

ni hen kunhuo. #wo/ni/**ziji** bingmei dezui jingli, keshi weisha  
you very confused I/you/self not offend manager but why  
bei-chao-le...  
PASS-fire-PERF...  
'You were very confused. You/self did not offend the manager, so why did (you/self) get fired...'

In Figure 2.1, I have summarized the differences between the two types of contemplative *ziji* and their respective licensing domains for ease of reference.

Figure 2.1: Distinctions between two types of contemplative *ziji*

<b>Type 1:</b> Contextual contemplative <i>ziji</i> in direct thought	<b>Type 2:</b> Discursive contemplative <i>ziji</i> in represented thought
Producer: contemplator themselves	Producer: narrator
Production time: during contemplation	Production time: often a time different from contemplation
Sub-types of direct thought: Interactional: utterances produced during contemplation Non-interactional: monologues/texts produced for contemplation	Sub-types of represented thought: N/A
Contemplative <i>ziji</i> 's reference: <i>ziji</i> = contemplator contemplator also being speaker obligatory 1st person reference	Contemplative <i>ziji</i> 's reference: <i>ziji</i> = contemplator contemplator possibly being narrator possible with any person specification
Ways of encoding a contemplator: In interactional contexts: <i>ziji</i> or <i>wo</i> In non-interactional contexts: <i>ziji</i> , <i>wo</i> or <i>ni</i>	Ways of encoding a contemplator: <i>ziji</i> or <i>wo</i> when contemplator = narrator <i>ni</i> when contemplator = addressee

#### 2.2.4 Sorting out the predicted uses of *ziji*

The previous sections have distinguished the predicted uses of *ziji* allowing discursive coreference and those allowing contextual reference. In Table 2.7, I summarize the predicted uses of *ziji* based on their (co)referential potentials.

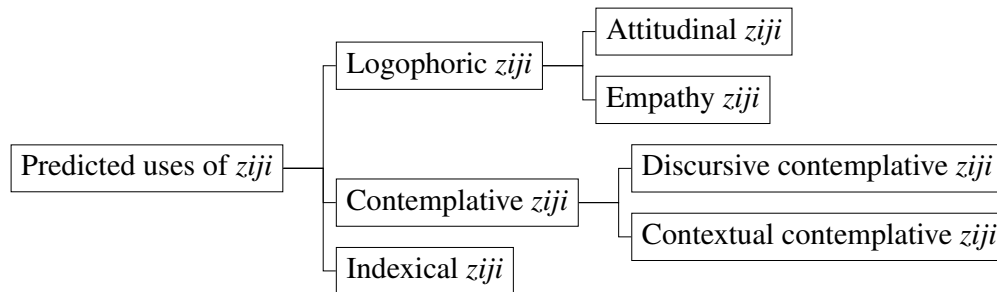
	Discursive coreference	Contextual reference
Logophoric <i>ziji</i>	✓	✓
Empathy <i>ziji</i>	✓	✓
Discursive contemplative <i>ziji</i>	✓	✗
Contextual contemplative <i>ziji</i>	✗	✓
Indexical <i>ziji</i>	✗	✓

Table 2.7: Predicted uses of *ziji* with their extra-sentential (co)referential potentials

These predicted uses of *ziji* are not mutually exclusive. In Charnavel’s and Park’s logophoric analyses, empathy *ziji* is considered to be a subtype of logophoric *ziji*, which allows *ziji* to refer to an empathy locus.<sup>16</sup> As for *ziji* referring to attitude holders, it forms the other subtype of logophoric *ziji*, which is termed “attitudinal *ziji*”. This distinction between attitudinal *ziji* and empathy *ziji* is meaningful in the following ways. Firstly, empathy uses of exempt anaphors do not possess obligatory *de se* interpretations, which characterize exempt anaphors referring to attitude holders (Oshima, 2004; Park, 2018; Charnavel, 2019b). Secondly, attitude holders are usually subjects of attitude predicates licensing intensional contexts, while empathy loci are constrained by principles of empathy hierarchies. Thirdly, different mechanisms are proposed in Park (2018) to account for exempt anaphors’ reference to attitude holders and their reference to empathy loci. In Charnavel’s analysis, an exempt anaphor is locally bound by a null element and the null element then refers to a logophoric center, regardless of the logophoric center’s type. Park has made adjustments and claims that attitudinal exempt anaphor has an extra individual abstractor introduced with attitude predicates’ clausal complements, to derive the obligatory *de se* interpretation specific to attitudinal exempt anaphor. As a result, logophoric *ziji* in this thesis has two subtypes, attitudinal *ziji* and empathy *ziji*. Based on the discussion above, I present Figure 2.2 to show how the various predicted uses of *ziji* relate to each other.

<sup>16</sup>Empathy *ziji* in this thesis follows from Wang and Pan (2012, 2014); it corresponds to empathic uses of exempt anaphors in Charnavel (2017, 2019b). The use of “empathy” instead of “empathic” is to avoid the latter’s being mistaken as “emphatic”.

Figure 2.2: Sorting out the predicted uses of *ziji* allowing extra-sentential (co)reference



With the predicted uses of *ziji* sorted out, I provide Table 2.8, which lists each use’s potential for discursive coreference and contextual reference. Note that “?” is used for attitudinal *ziji*’s potential for contextual reference because it is unclear whether attitude holder can be licensed in the context, and whether *ziji* can directly refer to an attitude holder in the context.

		Discursive coreference	Contextual reference
Logophoric <i>ziji</i>	Attitudinal <i>ziji</i>	✓	?
	Empathy <i>ziji</i>	✓	✓
Contemplative <i>ziji</i>	Discursive contemplative <i>ziji</i>	✓	✗
	Contextual contemplative <i>ziji</i>	✗	✓
Indexical <i>ziji</i>		✗	✓

Table 2.8: Predicted uses of *ziji* with their extra-sentential (co)referential potentials (revised)

## 2.3 Summary

By examining previous approaches to *ziji* beyond local binding, I have found four types of analyses that can possibly predict *ziji*’s extra-sentential (co)reference, including the two-stage logophoric analyses by Charnavel (2017, 2019) and Park (2018), the empathy analysis in Wang and Pan (2012, 2014), Li’s (1991) analysis with *ziji* referring to contemplator, and the shiftable indexical analysis in Anand (2006). They predict logophoric *ziji*, empathy *ziji*, contemplative *ziji* and indexical *ziji*

respectively. These predicted uses of *ziji* are then sorted out: contemplative *ziji* is divided into discursive contemplative *ziji* and contextual contemplative *ziji*; empathy *ziji* is subsumed under logophoric *ziji* as a subcategory. As seen in Table 2.8, the predicted uses all differ in their potentials for discursive coreference and contextual reference. However, it should be noted that these potentials are to be verified and that the details concerning *ziji*'s extra-sentential (co)reference are not fully clear. To resolve these issues is an important and indispensable part of a scientific study of the extra-sentential factors involved in interpreting *ziji*. In the following chapter, I embark on a corpus study to verify the predictions and examine what corpus data suggests about *ziji*'s extra-sentential (co)reference.

# Chapter 3

## A corpus study of sentence-initial *ziji*

### 3.1 Introduction

Through the review of previous studies of *ziji* beyond local binding, Chapter 2 has summarized five predicted uses of *ziji* that allow extra-sentential (co)reference, namely, attitudinal *ziji*, empathy *ziji*, discursive contemplative *ziji*, contextual contemplative *ziji*, and indexical *ziji*. To verify the predicted uses of *ziji*, it is optimal to directly observe relevant data. One way to do so is a corpus study of sentence-free *ziji* (i.e., *ziji* with extra-sentential (co)reference), which would answer the question of whether the corpus contains tokens of the predicted uses of *ziji*, and whether all tokens of sentence-free *ziji* in the corpus can be captured by the predicted uses. Moreover, an examination of corpus data would allow researchers to learn about *ziji*'s extra-sentential (co)reference, which is critical to understanding how the two extra-sentential factors (i.e., context and discourse) exert their influences on the interpretation of *ziji*.

A corpus study of sentence-free *ziji*, however, is not readily implementable. As sentence-free *ziji* does not have an apparent formal marker, a corpus study would mean going through all sentences with *ziji*, which may amount to several hundred thousands. Moreover, sentence-free *ziji* is not immediately recognizable; more often than not, identifying sentence-free *ziji* requires complex and subtle judgments based on background information. Even if all tokens of sentence-free

*ziji* are successfully extracted through the onerous judgments sentence by sentence, later analyses of these tokens may still be susceptible to possible interference from local or cross-clausal binding. All the above makes it less practicable and less fruitful to directly run a corpus study of sentence-free *ziji*. Faced with this problem, I turn my attention to sentence-initial *ziji*. *Ziji* in sentence-initial position is generally free from local or cross-clausal binding due to a lack of constituents that can c-command *ziji*. A study of sentence-initial *ziji* thus steers clear of much of the interference from local and cross-clausal binding, enabling a more focused study on *ziji*'s extra-sentential (co)reference. Moreover, to extract sentence-initial *ziji* is more feasible as it requires little more than collecting all sentences starting with *ziji*.

Despite the fact that sentence-initial *ziji* only includes sentence-free *ziji* in a special position, a corpus study of sentence-initial *ziji* can still lead to valid conclusions on *ziji*'s extra-sentential (co)reference for the following reasons. First, sentence-free *ziji* in this special position is equally subject to the effects from extra-sentential factors, including the extra-sentential (co)referential potential introduced by context and discourse. As a matter of fact, *ziji* in sentence-initial position, confronted with less interference from intra-sentential factors, can better reveal how extra-sentential factors work. Second, none of the predicted uses of *ziji* has specified a positional restriction. If a predicted use of *ziji* is validated by a token of sentence-free *ziji* in sentence-initial position, it is safe to claim that this use is validated; otherwise, more evidence is required to determine whether this use is borne out. Third, a corpus study of sentence-initial *ziji*, despite all its limitations, can reveal at least part of the picture of how each predicted use of *ziji* is licensed.

As will be seen, the corpus study of sentence-initial *ziji* validates attitudinal uses, empathy uses, discursive contemplative uses and contextual contemplative uses but not Anand's indexical uses. The validated uses not only provide evidence for the analyses predicting these uses, but demonstrate the extra-sentential factors' (specifically, discourse and context) effects on *ziji*'s interpretation. Moreover, the tokens of empathy *ziji* found in the corpus study support almost all the empathy hierarchies specified in Kuno and Kaburaki (1977) except the speech-act participant empathy hierarchy.

The rest of this chapter is organized as follows. Section 3.2 introduces the predicted uses of *ziji* to be found in this corpus study, and the predictions following Kuno and Kaburaki's empathy hierarchies. Section 3.3 describes how tokens of sentence-initial *ziji* are collected and how the various uses of *ziji* involved in the corpus are identified. In Section 3.4, I present the number of tokens found of each predicted use of *ziji*, and examine the predictions concerning the empathy hierarchies by analyzing those tokens classified as empathy uses. Section 3.5 discusses several issues, including the speech-act participant empathy hierarchy that fails to be justified, the unproven shiftable indexical analysis in Anand, and a new shiftable indexical analysis proposed to account for contemplative *ziji*. In Section 3.6, I summarize the findings from this corpus study.

## 3.2 Predictions

### 3.2.1 Various uses of *ziji* to be found in a corpus study of sentence-initial *ziji*

The *ziji* tokens expected to be found in this corpus study of sentence-initial *ziji* should cover all the predicted uses that allow extra-sentential (co)reference for two reasons. First, *ziji*, in the case of extra-sentential (co)reference, is free to appear in any position of a sentence. Second, the analyses predicting these uses do not specify any positional requirement. A complete list of the predicted uses as well as their extra-sentential (co)referential potentials is presented in Table 3.1, replicated from Table 2.8 in Chapter 2. I then check whether a corpus of sentence-initial *ziji* contains tokens of the predicted uses and what these tokens resort to, discursive coreference or contextual reference.

		Discursive coreference	Contextual reference
Logophoric <i>ziji</i>	Attitudinal <i>ziji</i>	✓	?
	Empathy <i>ziji</i>	✓	✓
Contemplative <i>ziji</i>	Discursive contemplative <i>ziji</i>	✓	✗
	Contextual contemplative <i>ziji</i>	✗	✓
	Indexical <i>ziji</i>	✗	✓

Table 3.1: Predicted uses of *ziji* with their extra-sentential (co)referential potentials (revised)

### 3.2.2 Predictions concerning empathy locus

Recall that Kuno and Kaburaki (1977) propose four hierarchies constraining a referent's empathy level, as seen in (1). Since empathy *ziji* refers to the empathy locus, which possesses the highest empathy level, the hierarchies help predict what is more likely to be empathized with and serve as the empathy locus of an empathy use of *ziji*.

(1) Surface Structure Empathy Hierarchy:

Subject  $\geq$  Object  $\geq$  ...  $\geq$  By-passive Agentive

Speech-Act Participant Empathy Hierarchy:

*Speaker* > *Addressee* > *Third Person*

Humanness Hierarchy:

*Human* > *Animate Nonhuman* > *Thing*

Topic Empathy Hierarchy:

*Discourse-Topic* > *Non-Discourse-Topic*

(Kuno and Kaburaki, 1977, p. 647, 652-654)

The empathy hierarchies make the following predictions concerning the empathy loci involved in this corpus study: empathy loci represented as subject DPs should outnumber those represented as object DPs or other non-subject DPs; there should be more 1st person empathy loci than 2nd

person empathy loci, which should in turn exceed 3rd person empathy loci; the number of human empathy loci should be greater than that of animate (nonhuman) empathy loci, which then surpasses the number of inanimate empathy loci; there should be more empathy loci served by discourse topics than elements that are not discourse topics. These predictions are also summarized in (2). The tokens of empathy *ziji* to be found in the corpus will allow an examination of whether these predictions are confirmed, which will then suggest whether the empathy hierarchies in (1) hold in corpus data of empathy *ziji*.

(2) Predictions on the distributions of empathy loci:

Empathy loci classified by grammatical function:

Subject  $\geq$  Object  $\geq$  ...  $\geq$  *By-passive Agentive*

Empathy loci classified by person specification:

*Speaker* > *Addressee* > *Third Person*

Empathy loci classified by humanness/animacy:

*Human* > *Animate Nonhuman* > *Thing*

Empathy loci classified by topicality:

*Discourse-Topic* > *Non-Discourse-Topic*

## 3.3 Methodology

### 3.3.1 Data collection

The corpus investigated in this study is provided by Center for Chinese Linguistics (hereafter CCL) of Peking University, with free online access at the website [http://ccl.pku.edu.cn:8080/ccl\\_corpus/](http://ccl.pku.edu.cn:8080/ccl_corpus/) (Zhan, Guo, and Chen, 2003). CCL covers both Classical and Modern Chinese, but the current study only involves Modern Chinese data, which are mostly Mandarin. CCL is one of the biggest Chinese corpora, with the number of characters in CCL Modern Chinese alone reaching 509,913,489, which takes up 1.09 GB. The texts cover official documents and reports, newspapers,

works of fiction, essays, plays, reference books, transcribed TV shows, conversations, academic papers, etc. A Python script was run through the texts to produce an output file that encompasses all tokens of *ziji* (自己) following a white space or certain punctuation marks, including Chinese and English period marks “。” and “.”, question mark “?”, exclamation mark “!” and colon “:”. In Chinese writing, Chinese characters or words within a sentence are not separated; sentences are generally separated by punctuation marks only. “White space” is included in this filter condition because it may precede a sentence, e.g., when the sentence is at the beginning of a paragraph or an article. As for “。”, “.”, “?” and “!”, their appearances mark the end of sentences and *ziji* following any of these marks is assumed to be sentence-initial. The inclusion of “:” here is somewhat tricky. What follows a colon may be a full sentence when the colon occurs between a speaker’s name and their utterances in transcribed conversations. As phrases or incomplete sentences can follow colons as well, the output file generated by running the script includes some unwanted tokens (e.g., phrase-initial ones), which need to be excluded from analysis manually. Note that semicolons are not included in the filter condition because *ziji* following a semicolon is not strictly sentence-initial. Furthermore, considering that the interpretation of sentence-initial *ziji* relies heavily on extra-sentential information (including discourse), each token of sentence-initial *ziji* was extracted along with the preceding and the succeeding 50 characters.<sup>1</sup>

### 3.3.2 Classification and counting

All tokens of sentence-initial *ziji* have been examined to see whether each of them can be identified as any of the predicted uses. The predicted uses include attitudinal *ziji*, empathy *ziji*, discursive contemplative *ziji*, contextual contemplative *ziji*, and indexical *ziji*. Apart from the predicted uses, some tokens of sentence-initial *ziji* are found to be used as a generic or an intensifier use. As will be seen, these two uses are not related to *ziji*’s extra-sentential (co)reference: intensifier *ziji* is

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<sup>1</sup>The script used to extract tokens of sentence-initial *ziji* does not involve quotation marks, because the inclusion of quotation marks would invite many unwanted tokens. While sentence-initial *ziji* can surely follow quotation marks, it is not guaranteed that what follow quotation marks are necessarily sentence-initial, since quotation marks can accommodate words and phrases as well.

used for modification and does not involve any (co)reference whereas generic *ziji* does not possess a specific reference. Tokens of the two uses are thus excluded from analyses; despite this, an introduction to the two uses are provided at the end of this section.

### **Identification of logophoric *ziji* (attitudinal *ziji* and empathy *ziji*)**

Attitudinal *ziji* occurs in attitude contexts and refers to an attitude holder. A typical example of attitudinal *ziji* is *ziji* in an attitude predicate's clausal complement; the clause is the relevant attitude context while the attitude predicate's subject is the attitude holder involved. In terms of *ziji* in sentence-initial position, I adapt Charnavel's (2019) double orientation test to the identification of attitudinal *ziji*. This test is used to tell whether a specific DP is in an attitude context. The application of this test involves two steps: insert an evaluative expression in the phrase containing the DP to be tested; see whether the expression can be evaluated by another individual besides the speaker. If so, this DP is in an attitude context under that interpretation (i.e., the interpretation with the inserted expression evaluated by the individual), and this individual is the attitude holder. For instance, to decide whether *her* in (3a) is in an attitude context and what the relevant attitude holder is, *embarrassing* is added. The expression *embarrassing* can be taken as the speaker's evaluation or the evaluation by *Liz*. Therefore, *her* in (3a) is demonstrated to be in an attitude context. Conversely, *her* in (4a) is not in an attitude context because when the same test is applied, the inserted *horrible* can only be taken as the speaker's evaluation.

- (3) a. Liz thought that a picture of her was circulating.  
b. Liz<sub>i</sub> thought that [an embarrassing picture of her<sub>i</sub>] was circulating.

Adapted from Charnavel (2019, p. 150)

- (4) a. The posts about her on the internet hurt Lucy's feelings.  
b. [The horrible posts about her<sub>i</sub>] on the internet hurt Lucy<sub>i</sub>'s feelings.

(Charnavel, 2019, p. 150)

Though the attitude holder involved in (3a) is within the same sentence containing the DP to be

tested, double orientation tests are not limited to cases with intra-sentential attitude holders. For instance, (4a) can be manipulated by adding a preceding sentence so that *her* is embedded in an attitude context, as in (5a). Since an inserted expression like *horrible* can now be taken as the speaker’s opinion or Lucy’s opinion, Lucy serves as the relevant attitude holder in (5a), despite being represented in a separate sentence.<sup>2</sup> However, if the positions of the two sentences in (5a) are reversed as in (5b), *horrible* inserted before *her* can no longer be taken as Lucy’s opinion, without licensing an attitude context for *her*. In this way, double orientation tests are shown to be equally applicable to stretches of sentences.

- (5) a. Lucy was sad. [The (horrible) posts about her] on the internet hurt Lucy’s feelings.  
 b. [The (horrible) posts about her] on the internet hurt Lucy’s feelings. Lucy was sad.

When it comes to *ziji*, I take (6) for instance, with *ziji* at the beginning of the second sentence. I first replace *ziji* with *jingmingde ziji* ‘smart self’, i.e., inserting the evaluative expression ‘smart’. It is found that the inserted ‘smart’ can be evaluated by the speaker, or by Cuichengxiu.<sup>3</sup> Therefore, *ziji* in (6) is within an attitude context and thus classified as a token of attitudinal *ziji* referring to the attitude holder “Cuichengxiu”.

- (6) Attitudinal *ziji*:

Cuichengxiu<sub>i</sub> cong zhe yi-dian jiu kanchulai-le Sunchengzong de liang-zhi yan  
 Cuichengxiu from this one-point already realize-PERF Sunchengzong POSS two-CL eye  
 hen you gongfu. **ziji**<sub>i</sub> xu huangzhaoer, zai Sunchengzong mian-qian bu-qi zuoyong.  
 very have skills self mock make-moves, at Sunchengzong face-front not-up use.

‘Cuichengxiu<sub>i</sub>, from this point, realized that Sunchengzong’s two eyes were so sharp.  
 Self<sub>i</sub>’s mock moves were not useful to Sunchengzong.’

[CCL, nu·er·ha·chi.txt]

<sup>2</sup>In (5a), only the first *Lucy* is an attitude holder; the second *Lucy* cannot serve as an attitude holder, as demonstrated by the result after applying a double orientation test to (4a). Moreover, a replacement of the second *Lucy* with other proper names does not affect the fact that an inserted evaluative expression can be taken as Lucy’s opinion.

<sup>3</sup>Theoretically, the evaluative expression used in a double orientation test can be placed in any possible position of the phrase containing the DP to be tested. However, it is not clear whether “the phrase” here only covers the immediate phrase. Considering that *ziji* may be taken as a DP in itself, it is safer for this research to limit evaluative expressions to the position of ‘immediately before *ziji*’.

Orientation of evaluative expressions inserted before *ziji*

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Interpretable as the speaker’s opinion	✓
Interpretable as the opinion of <i>ziji</i> ’s referent	✓

Table 3.2: The criteria to identify attitudinal *ziji*

Note that the test above cannot be directly applied to *ziji* that refers to the speaker, because in this case, it is hard to detect other people’s evaluation (i.e., other than the speaker’s). For *ziji* with a 1st person antecedent, the 1st person pronouns in previous discourse are first replaced with the 3rd person pronoun *ta* ‘he/she’; if *ziji* can corefer with *ta*, a double orientation test is then performed to see whether attitudinal *ziji* is involved.<sup>4</sup> The rationale here is that attitudinal *ziji*’s referent, attitude holder, is licensed by certain structures, e.g., attitude predicates with clausal complements, and attitudinal *ziji*’s coreference with an antecedent (representing an attitude holder licensed by relevant structures) should not be impeded by the antecedent’s person specification.<sup>5</sup>

Charnavel (2019) suggests attitude contexts also cover represented thought (free indirect discourse in Charnavel (2019)), which accommodates discursive contemplative *ziji*. However, this seems not to work in Mandarin, because *ziji* tokens in represented thought fail the test for attitudinal *ziji*. The bracketed sentence in (7) is a text of represented thought exemplified in Li (1991); this sentence represents Lisi’s thought so faithfully that it is even identical to the form Lisi would use if he were to speak his thought out aloud. After I apply the test for attitudinal uses to the *ziji* token in (7) by inserting the evaluative expression *shanliangde* ‘merciful’, I find that ‘merciful’ can only be evaluated by the contemplator *Lisi*, not by the speaker. This suggests that represented

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<sup>4</sup>If *ziji* cannot corefer with *ta* after replacement, it means that the structures containing the 1st person pronouns cannot license attitude holders.

<sup>5</sup>Charnavel (2019) considers the speaker to be a potential attitude holder, which is permanently available in the context. If so, the speaker represents an attitude holder that is licensed in the context by default, without involving any specific structure. Nonetheless, this assumption should be treated carefully due to the potential issue of over-generation: the speaker’s permanent availability as an attitude holder should predict that the speaker is always accessible as *ziji*’s referent. As suggested by the results from the corpus study, however, no token of sentence-initial *ziji* allows unconditional reference to the speaker even when no other interpretation is available; otherwise, Anand’s (2006) indexical *ziji* would have been validated. Moreover, the experimental study to be seen in Chapter 5 will indicate that standalone sentences beginning with *ziji* are less acceptable, which should not follow if *ziji* can always access the speaker as an attitude holder.

thought in Mandarin is different from the attitude contexts defined in Charnavel (2019) and does not license attitudinal *ziji*.

- (7) Lisi<sub>i</sub> ye feichang bujie. [ziji<sub>i</sub> weishenme hen xiaotou ne?]  
Lisi also very confused self why hate thief Q  
'Lisi<sub>i</sub> was also very confused. Why did self<sub>i</sub> hate thieves?'

(Li, 1991, p. 156)

Empathy *ziji* is a way to encode empathy locus within an empathy domain/context. The use of empathy *ziji* arises from the speaker's taking the viewpoint of an empathy locus. The test used to identify attitudinal *ziji* can also be used to test empathy *ziji*, though empathy *ziji* is identified based on a different test result. That is, if an inserted expression can only be taken as the speaker's evaluation, the relevant *ziji* token is classified as an empathy use.<sup>6</sup> Following this, *ziji* in (8) is an empathy use because an inserted expression like *yingyongde* 'courageous' can only be evaluated by the speaker, not by Nuerhachi or Anfeiyanggu. As for empathy *ziji*'s referent "empathy locus", it is determined by pragmatic inference. Since Anfeiyanggu has been sent to perform another duty, Nuerhachi is the only plausible individual to undertake the frontal attack. Consequently, Nuerhachi is the referent of *ziji* in (8).

- (8) Empathy *ziji* with empathy locus represented in previous discourse:

hui-dao yingzhai, Nuerhachi<sub>i</sub> rang Anfeiyanggu ling wushi ren, cong cheng-houmian  
back-to campsite, Nuerhachi let Anfeiyanggu lead fifty people from town-back  
de qiaobixuanya-jian, xun jiandao jin-cheng. ziji<sub>i</sub> cong na yimapingchuande  
PNMM cliff-between search shortcut enter-town self from that flat  
caodi zhengmian jingong.  
grassland front attack

'Back at the campsite, Nuerhachi<sub>i</sub> asked Anfeiyanggu to lead 50 people to find a shortcut from between the cliffs behind the town and get into the town. Self<sub>i</sub> had a frontal attack at the town from the flat grassland.'

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<sup>6</sup>All tokens of empathy *ziji* identified via this test are confirmed by the strong sense of perspective-taking, perceived by native Mandarin speakers (e.g., me). That is, a perspective center is clearly sensed in the interpretation of sentences containing empathy *ziji*, so that everything else is presented from the eyes of the perspective center. As will be seen below, some sentences (e.g., (9)) involving empathy *ziji* demonstrate apparent contrasts between perspective centers and those that are not perspective centers. Despite the above, I acknowledge that the current test for empathy *ziji* still requires more justification, which is left for future research.

Empathy *ziji*'s referent is not always represented in previous discourse. Empathy *ziji* can refer to an empathy locus present in the context, e.g., the addressee. In (9), Yuanshi asked a question to Madam Mingshi about the latter's box; Madam Mingshi did not answer the question directly but presented how Yuanshi was mocking her from Yuanshi's viewpoint. *Ziji*'s reference to the addressee *Yuanshi* is inferred from the shared knowledge that Yuanshi is the one that has become a romantic youth. However, if I insert the expression *xingyunde* 'fortunate' before *ziji*, the expression can only be interpreted as the speaker's evaluation, indicating an empathy use of *ziji* in (9). This empathy use also finds support from the explicit mention of *ren* 'others'.<sup>7</sup> According to Zubin et al. (1990), the use of "self" and "others" can build a contrast between a perspective center and a periphery. The construed perspective center represents a different viewpoint from the speaker's, so empathy from the speaker is required.

- (9) Background information: Yuanshi<sub>i</sub> asked Madam Mingshi: "What box is this? It must have been sent by your lover, right?" The following is Madam Mingshi's reply.

“ke, weishi taoyan! **ziji**<sub>i</sub> bian-le ge fengliu shaonian, jiu ruci na  
 ahem indeed annoying self become-PERF CL romantic youth then this-way with  
 taren quxiao.”  
 others mock

‘Ahem! Annoying indeed! Self<sub>i</sub> (you) has become a romantic youth and then mocked others this way.’

Orientation of evaluative expressions inserted before *ziji*

Interpretable as the speaker's opinion	✓
Interpretable as the opinion of <i>ziji</i> 's referent	✗

Table 3.3: The criteria to identify empathy *ziji*

<sup>7</sup>The word *ren* literally means 'person', but in this context it means 'others'. This context-specific interpretation is evidenced by the fact that replacement of 'person' with 'others' in (9) will not change the sentence's meaning.

Similarly, when *ziji* refers to the speaker, additional steps are needed before an application of the test for empathy uses. That is, the 1st person pronouns involved in previous discourse are replaced with the 3rd person pronoun *ta*, and if *ziji* can corefer with *ta*, the test for empathy *ziji* can be conducted. But when *ziji* cannot corefer with *ta* or there is no 1st person pronouns involved in previous discourse, it means that *ziji*'s 1st person reference is not realized via discursive coreference, and *ziji* needs to directly refer to the speaker, one of the discourse participants. In this case, the context and previous discourse can be adjusted so that it is pragmatically felicitous for *ziji* to refer to the addressee, another discourse participant in the context; the test for empathy *ziji* can then be conducted, revealing whether *ziji* is in an empathy context. In this way, empathy *ziji* referring to the speaker can be identified.

### **Identification of contemplative *ziji* (discursive contemplative *ziji* and contextual contemplative *ziji*)**

Discursive contemplative *ziji* occurs in represented thought passages and refers to a contemplator mentioned in previous discourse. It has been shown in (7) that an evaluative expression added to *ziji* in represented thought can only be taken as the relevant contemplator's opinion, which fails the test for attitudinal *ziji* and the test for empathy *ziji*. This is reasonable because represented thought texts in Mandarin present one's thoughts as faithfully as possible and any inserted evaluative expression (e.g., from the speaker's viewpoint) will make represented thought texts unfaithful. Based on the rationale above, discursive contemplative *ziji* can be identified when an evaluative expression added to *ziji* is only interpretable as the contemplator's evaluation, not the speaker's.<sup>8</sup> Following this diagnostic, the *ziji* tokens in (10) are classified as discursive contemplative *ziji*. In addition, (10) also demonstrates that the referent of discursive contemplative *ziji* can be indicated by thinking verbs (e.g., *xiang* 'think' in (10a)), suggested by nouns and adjectives denoting thoughts, ideas,

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<sup>8</sup>Discursive contemplative *ziji* obtains its reference on condition that a contemplator is represented in previous discourse and the sentence containing *ziji* allows *ziji*'s discursive contemplative use. The licensing of *ziji*'s discursive contemplative use is not subject to contemplators' person specifications. Therefore, when *ziji* has a 1st person antecedent, the test for discursive contemplative *ziji* can be conducted by replacing all 1st person pronouns in previous discourse with the 3rd person pronoun *ta*.

mental states (e.g., *yintong* ‘secret-anguish’ in (10b)), or inferred from background information. In (10c), the first sentence is a narrative of the manner in which the female character came to be beside the bed, with her sleepiness dissipated suddenly. This character’s change of state from sleepiness to wakefulness suggests that she was hit by a thought, because no other things were mentioned to bring about this change. In this way, this character was identified as the contemplator involved in (10c).

Orientation of evaluative expressions inserted before *ziji*

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Interpretable as the speaker’s opinion	✗
Interpretable as the opinion of <i>ziji</i> ’s referent	✓

Table 3.4: The criteria to identify discursive contemplative *ziji*

(10) a. Discursive contemplator indicated by thinking verbs:

ta<sub>i</sub> xin-li xiang: ruoshi da-qi-zhang-lai, zhe-yi-pian hemushengping de  
 he heart-in think: if beat-up-fight-come, this-one-CL harmony PNMM  
 qixiang, bijiang bei pohuai. **ziji**<sub>i</sub> hao bu rongyi huode de zhe tianlunzhile,  
 atmosphere surely PASS destroy self very not easy obtain RC this happiness  
 ye nanyi xiangshou-le.  
 also hard enjoy-SFP

‘He<sub>i</sub> was thinking: if the war broke out, this harmonious atmosphere would surely be ruined. It would also be hard to enjoy the happiness that self<sub>i</sub> obtained through great efforts.’

[CCL, nu-er-ha-chi.txt]

b. Discursive contemplator indicated by nouns of thoughts, emotions, etc.:

Wanghongjun<sub>i</sub> zhuguan hushi xin-zhong you yi-zhong yintong, ta  
 Wanghongjun chief nurse heart-inside have one-CL secret-anguish, her  
 zi-xiao ti-ruo de erzi bu-zhi weihe huanshang-le yigan? **ziji**<sub>i</sub>  
 since-young body-weak PNMM son not-know why infect-PERF hepatitis-B self  
 he zhangfu dou hen jiankang, erzi weisheng xiguan hen hao, ...  
 and husband both very healthy son hygiene habit very good

‘The chief nurse Wanghongjun<sub>i</sub> had in her mind the secret anguish that her son who

had been frail since childhood was infected with Hepatitis B without knowing why. Both self<sub>i</sub> and the husband were healthy; the son also had good hygienic habits...’

[CCL, 1998·nian·ren·min·ri·bao.txt]

c. Discursive contemplator inferred from background information:

dai zou dao kang bian, ta<sub>i</sub> lengding yi chan, manshen de kunjuan  
when walk to bed side, she cold one shiver, all-over-body PNMM tiredness  
xiang bei yi-zhen feng chui de yanxiaoyunsan. **ziji**<sub>i</sub> zen neng yu zhege  
like PASS one-gust wind blow RM dissipate. self how can with this  
nanren tong-zhen-gong-mian?  
man identical-pillow-together-sleep

‘While coming to the bedside, she<sub>i</sub> shivered coldly and her sleepiness seemed to be dissipated as if by a gust of wind. How can self<sub>i</sub> sleep on the same bed with this man?’

[CCL. shi·men·jue·chang·(5). txt]

Contextual contemplative *ziji* occurs in direct thought texts and refers to the contextual contemplator (simultaneously the speaker). According to the definition in Chapter 2, direct thought is a contemplator’s discourse produced during contemplation, e.g. internal monologue. In this study, contextual contemplative *ziji* is identified when *ziji* refers to the speaker who is simultaneously the contextual contemplator. In (11), the quoted sentence is an instance of internal/oral monologue, one of the common forms of direct thought. *Ziji* in this sentence is classified as a contextual contemplative use because it refers to the speaker Ms. Wu, who is also the contemplator experiencing the thought encoded in the internal/oral monologue.

- (11) wuxiaojie zheyang wen **ziji**: “... **ziji** de wenti jiuqing chu zai nali?”  
Ms.-Wu this-way ask self ... self POSS problem on-earth from at where  
‘Ms. Wu asked herself like this: “Where on earth do self’s problems lie?”’

[CCL, C000022.txt]

As mentioned in Chapter 2, direct thought can also take the form of contemplative texts, which correspond to monologues produced in written forms. For instance, sentence (12) is part of a contemplative text and holds a token of contextual contemplative *ziji*. This sentence was extracted

from a reflective report, which was written by a government officer after learning policies summarized from the 15th National Congress of the Chinese Communist Party.<sup>9</sup> The reflective report (or contemplative text) containing (12) is actually a direct product from the relevant writer's contemplation through writing. The writer was trying to demonstrate to their superior that they have, in their deep thoughts, grasped the substance and will follow the policies and orientations. With *ziji*'s reference to the speaker (simultaneously the contextual contemplator), *ziji* in (12) is classified as a contextual contemplative use.

- (12) Gloss of the preceding sentence: The 15th National Congress of the Chinese Communist Party formulated the basic policy of rejuvenating the country through science and education.

**ziji** zuowei ke-jiao                      zhanxian shang de      yi-ge    laobing, jiang  
 self as      science-education frontline on      PNMM one-CL veteran will  
 jinquanli      guanche    zhe-ge fangzhen, peiyang gengduode youxiu    boshi    he  
 make-all-effort implement this-CL policy    train      more      excellent doctoral and  
 shuoshi yanjiusheng.  
 master    graduate

'Self, as a veteran on the frontline of science and education, will make every effort to implement this policy and train more excellent doctoral and master students.'

[CCL, 1998·nian·ren·min·ri·bao.txt]

Recall that direct thought can also appear as conversational utterances when the utterances are produced during contemplation. An instance of this is sentence (13), which includes a question that a reporter asked the director named *Ningcaishen* and the director's response. As the question asked may require conscious contemplation to answer, the response in (13) is possibly produced in contemplation, with the involved *ziji* referring to the speaker (simultaneously the contextual speaker). Therefore, *ziji* in (13) can be categorized as a token of contextual contemplative *ziji*.

- (13) Gloss of the question asked: "If you are asked to pick out two episodes that you like the best, can (you) do that?" Below is *Ningcaishen*'s response.

<sup>9</sup>In China, superiors often ask subordinates to write reflective reports as a way of involving the subordinates in contemplation on their own deeds and at the same time monitoring the subordinates' inner thoughts.

“**ziji**<sub>i</sub> zui xihuan de yi-ji, yinggai shi Xiangyu jiao zhantang xuanze.”  
self the-most like RC one-episode should COP Xiangyu ask Zhantang choose

‘The one episode that self likes the most would be (about) Xiangyu asking Zhantang to make a choice.’

[CLL, wu·lin·wai·zhuan.txt]

### **Identification of indexical *ziji***

Indexical *ziji* here refers to the use of *ziji* predicted by Anand’s (2006) analysis of shiftable indexical. Sentences beginning with *ziji* do not have attitude predicates to introduce the context shift operator  $OP_{AUTH}$  in Anand’s analysis, so *ziji* in these sentences experiences no shift and needs to refer to the speaker unconditionally. In this sense, indexical *ziji* in sentence-initial position is identified as long as it has unconditional reference to the speaker. This diagnostic is similar to the one used to identify contextual contemplative *ziji* except that contextual contemplative *ziji*’s reference to the speaker is obtained under the condition that *ziji* appears in a specific type of discourse (i.e., direct thought).

### **Generic *ziji* and intensifier *ziji***

*Ziji* can be used as a generic pronoun to express a general truth in the form of a proverb (Li and Thompson, 1981; Tang, 1989). Generic *ziji* can appear in sentence-initial position, where it serves as a sentence-initial subject. In sentence (14), *ziji* does not have a specific reference; what is represented in (14) can apply to everyone. Therefore, *ziji* is parallel to *one* in English in terms of the generic reference. Sometimes, the generic use of *ziji* is also called the indefinite use (Pollard and Xue, 1998) or arbitrary reference/reading (Sohng, 2004), to characterize *ziji*’s potential to refer to an arbitrary person. It is proposed in Battistella and Xu (1990) that *ziji*’s generic interpretation actually comes from a null pronominal immediately preceding *ziji* and that *ziji* is simply modifying the pronominal. As the current research does not explore generic *ziji*, further details of generic *ziji* will not be discussed.

- (14) **ziji** xihuan de dongxi jiu xihuan hao-le.  
 self like RC thing just like fine-SFP  
 ‘(For) the things that one likes, (it is) fine to just enjoy them.’

[CCL, zhu-ru-de-hua.txt]

The Mandarin reflexive form *ziji* can be an intensifier sometimes, like *self*-forms in English. An instance of intensifier *ziji* is shown in (15a), along with its English counterpart in (15b) and (15c). Intensifiers are claimed to fulfill emphatic/intensifying functions; they can be adjoined to either DPs or VPs and mostly take the form of reflexives (Konig and Siemund, 2000).

- (15) a. wo/*pro* **ziji** wancheng zhe-xiang gongzuo.  
 I/*pro* self finish this-CL job  
 ‘I finished this job without involving others.’  
 ‘I, not others, finished this job.’
- b. I finished the job myself.
- c. I myself, finished the job.

As exemplified in (16), reflexive forms can serve as four different types of intensifiers cross-linguistically, including adverbial exclusive intensifiers, adverbial inclusive intensifiers, adnominal intensifiers and attributive intensifiers. Generally, a language only includes some of the four types. For example, English *self*-forms cannot be used attributively (“*own*” is used instead for this function), whereas reflexive forms in Mandarin exclude the adverbial inclusive use (Wang, 2015). In other words, *ziji* only allows the following three intensifier uses: adverbial exclusive, adnominal and attributive. As *ziji* does not have an adverbial inclusive use, henceforth this thesis will use “adverbial *ziji*” to mean “adverbial exclusive *ziji*”.

- (16) a. I have swept this court **myself**. (adverbial, exclusive)
- b. I have **myself** swept this court. (adverbial, inclusive)
- c. The Queen **herself** will come to the final. (adnominal)
- d. **Kendi** memleket-iniz (attributive) [Turkish]  
 self country-2PL

‘Your own country’

(Konig and Siemund, 2000, p. 44, 69)

Sentence (15a) can be taken as an example with adverbial *ziji*. Like other adverbials, adverbial *ziji* precedes and modifies predicates, which brings the semantic meaning “without involving others, including their help, encouragement, company, threat, coercion, etc.”

As for adnominal intensifiers, I follow the definition specified in Konig and Gast (2006, p. 7):

*Adnominal intensifiers are expressions that are used to relate the referent x of a given (co-)constituent to a set of alternative referents  $Y = \{y_1, y_2 \dots y_n\}$ , such that each element  $y_i \in Y$  can be identified relative to x.*

Adnominal *ziji* usually comes immediately after the DP that it stresses. It can adjoin to any DP (e.g., in subject or object position) to establish a contrast between the stressed DP and a set of contextually defined alternatives. Unlike adverbial *ziji*, which immediately precedes the predicate it emphasizes, adnominal *ziji* is required to follow the DP it emphasizes. However, the distributional difference does not necessarily make it easy to distinguish the two types of intensifier *ziji*, especially when *ziji* is the only element between a subject DP and a predicate, i.e., in the form of “subject DP + *ziji* + predicate”. For instance, *ziji* in (17a) and (17b) immediately precedes a predicate, allowing an adverbial interpretation; meanwhile *ziji* immediately follows a subject DP, enabling an adnominal interpretation. The two possible interpretations are also seen in the glosses of each sentence. Therefore, adverbial *ziji* and adnominal *ziji* can be formally indistinguishable sometimes; in this case, semantic meanings play the role of distinguishing them.

- (17) a. wo **ziji** pa-shang-le zhumulangmafeng.  
I self climb-up-PERF Mount-Everest  
adverbial: ‘I climbed up to Mount Everest without involving others.’ (e.g., without others’ help)  
adnominal: ‘I, not others, climbed up to Mount Everest.’
- b. wo **ziji** xihuan zhe-xiang gongzuo.  
I self enjoy this-CL job

adverbial: ‘I enjoy this job without involving others.’ (e.g., without being persuaded into doing so)

adnominal: ‘I, not others, enjoy the job.’

Mandarin *ziji* can also be used attributively, forming the possessive phrase “DP<sub>1</sub>-*ziji* + *de* + DP<sub>2</sub>”, e.g., the underlined phrase in (18). The particle *de* here is a possessive marker (in a broad sense) and can be dropped sometimes. “DP<sub>1</sub>-*ziji*” serves as a possessor; DP<sub>2</sub> is the possessee and the head of the phrase. Like adnominal *ziji*, attributive *ziji*’s following a DP (DP<sub>1</sub> in this case), also evokes a pool of DP<sub>1</sub>’s possible alternatives and stresses the contrast between them. It is very likely that attributive *ziji* is simply a special use of adnominal *ziji* which adds emphasis to a possessor, though Wang (2015) does not conclude this. In Table 3.5, I provide a summary of the structural and semantic properties used to classify *ziji* as different types of intensifiers.

- (18) John *ziji* de wenti *dao*zhi-le *zhe*-chang chehuo.  
 John self POSS problem lead-to-PERF this-CL car-accident  
 ‘John’s own problems led to this car accident.’

<b>intensifiers</b>	<b>structural property</b>	<b>meanings</b>
adverbial <i>ziji</i>	“ <i>ziji</i> + predicate”	“without involving others in any forms”
adnominal <i>ziji</i>	“DP+ <i>ziji</i> ”	“X himself, not any possible alternatives”
attributive <i>ziji</i>	“DP <sub>1</sub> - <i>ziji</i> + ( <i>de</i> ) + DP <sub>2</sub> ”	“X’s own..., not any possible alternatives’...”

Table 3.5: The classification criteria of *ziji* as different types of intensifiers

The above shows that intensifier *ziji* has three uses, adverbial, adnominal and attributive. All these uses of *ziji* may appear in sentence-initial position. Both adverbial *ziji* and adnominal *ziji* can immediately follow a subject DP. Mandarin allows *pro*-drop, and if the subject DP of a sentence is realized as *pro*, the adverbial/adnominal *ziji* following *pro* may then become the first overt element in this sentence. For example, if the subject *wo* ‘I’ in (17a) is phonetically null, adverbial/adnominal *ziji* will appear to be in sentence-initial position. Attributive uses of *ziji* can appear in sentence-initial position as well. DP<sub>1</sub> in “DP<sub>1</sub>-*ziji* + (*de*) + DP<sub>2</sub>” can also be phonetically null by

taking the covert form *pro*, as long as the referent of *pro* is retrievable from contextual/discursive information. When “DP<sub>1</sub>-*ziji* + (*de*) + DP<sub>2</sub>” appears at the beginning of a sentence and DP<sub>1</sub> is realized as *pro*, attributive *ziji* will be the first overt element in this sentence, e.g. sentence (19).

- (19) **ziji** de diannaoye huai-le, John mei-xinqing bang bieren xiu diannaoye.  
self POSS computer too break-PERF John without-mood help others repair computer  
'(With his) own computer also broken, John is not in the mood to help others repair computers.'

### Multiple countings of some tokens

During the classification of the extracted tokens of *ziji*, it was found that some tokens are ambiguous and can be interpreted in multiple ways, leading to multiple countings of these tokens.<sup>10</sup> First, some tokens (e.g., (20)) can be interpreted either as attitudinal *ziji*, discursive contemplative *ziji* or intensifier *ziji*. When I attach an evaluative expression *weibuzudaode* ‘insignificant’ to *ziji*, this evaluation can surely be taken as Caowensheng’s opinion, but whether ‘insignificant’ can be taken as the speaker’s evaluation depends on how the whole sentence is interpreted.

- (20) English gloss of the preceding sentence: At this moment, Caowensheng thought of his crying wife and two children at home, and was thinking that, (this is) such a serious case, and people said that an imperial minister had been appointed to investigate this; once relevant criminals were found out, death sentences would be unavoidable.

**ziji** si-le busuan, laopo zenme ban?  
self die-PERF not-matter, wife how cope

‘(It) does not matter (if) self die; how can (self’s) wife cope with (this)?’

[CCL, 1996B.txt]

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<sup>10</sup>These ambiguous tokens are not excluded but counted multiple times for three reasons. First, the multiple countings do not have an effect on the main goal of this research, i.e., determining whether each predicted use of *ziji* is found in the corpus study, rather than learning about the distribution of each predicted use. Second, the inclusion of these ambiguous tokens allows the corpus study to cover many more tokens, bringing more credibility. Third, these ambiguous tokens help demonstrate the fact that various extra-sentential factors can intervene, leading to *ziji*’s multiple interpretation possibilities.

If (20) is interpreted as a sentence of Caowensheng’s represented thought, the inserted expression can only be evaluated from Caowensheng’s viewpoint because represented thought in Mandarin needs to be faithful to its counterpart of direct thought and maintain the contemplator’s viewpoint. *Ziji* following this interpretation is classified as a token of discursive contemplative *ziji*. It is also likely that (20) is a continuation of the preceding sentence’s embedded clause; in this case, the inserted ‘insignificant’ can be evaluated from either the speaker’s viewpoint or Caowensheng’s viewpoint, suggesting an attitudinal use of *ziji*.<sup>11</sup> The same *ziji* token in (20) is also interpretable as an intensifier. Specifically, it can be read with emphatic stress and identified as an adnominal use, which implies that death means little to *ziji*’s referent “Caowensheng”, rather than anyone else. This implication is evidenced by the concern that death can mean so much to Caowensheng’s wife that she may not be able to handle it. Therefore, this single token of *ziji* in (20) is counted three times in my classification, as an adnominal token, as a discursive contemplative token, and as an intensifier token.

The second ambiguity in classifying *ziji* tokens involves empathy *ziji* and discursive contemplative *ziji*, e.g. (21). If the evaluative expression *xingyunde* ‘fortunate’ is added before the sentence-initial *ziji* (i.e., the second *ziji*) in (21), this expression can be taken as the speaker’s opinion or the protagonist’s opinion, but under separate conditions. The expression ‘fortunate’ can be evaluated from the speaker’s viewpoint when the sentence containing *ziji* is a narrative of the protagonist’s perception with the speaker standing in the protagonist’s shoes; *ziji* in this case is classified as an empathy use.

- (21) ta<sub>i</sub> kongjvdi bijin-le yanjing, tingtianyoumingdi dengdaizhe kepade jieguo,  
 she fearfully close-PERF eye resignedly wait terrible result  
 xiamian-de jingjiao sheng yuelaiyueda-le, **ziji<sub>i</sub>** zai mengyi zhengyan, a! **ziji<sub>i</sub>**  
 below-PNMM scream sound grow-louder-PERF self again suddenly open-eye ah self

<sup>11</sup>Wang and Pan (2012, 2014) claim that *ziji* embedded in clausal complements of some attitude predicates (e.g., the speech verb *shuo* ‘say’) can be interpreted as an empathy use. Following this line, if a sentence can be taken as the continuation of a preceding sentence’s clausal complement (e.g., of the predicate ‘say’), *ziji* in this sentence also has the potential to be identified as an empathy use. However, as it is still unclear which of the attitude predicates are compatible with empathy uses and how to identify empathy *ziji* in clausal complements of these attitude predicates, this corpus study does not take into consideration empathy uses in attitude predicates’ clausal complements.

zheng jinjin baozhe taisi anquandi zhan zai renqun duier li.  
PROG tightly hold Tess safely stand at crowd pile inside  
'She closed her eyes fearfully and waited for the terrible result resignedly; the scream  
below grew louder and louder, and then self<sub>i</sub> opened eyes suddenly, ah! Self<sub>i</sub> was standing  
safely in the crowd with Tess in (her) arms.'

[CCL. feng·ling·zhi mao·ni.txt]

Additionally, this sentence containing sentence-initial *ziji* in (21) can also be taken as presentation of the protagonist's contemplative experience in the form of represented thought; under this interpretation, the protagonist must have produced the internal monologue in (22) after opening her eyes.

(22) Internal monologue (a type of direct thought) produced by the protagonist involved in (21):

**ziji** zheng jinjin baozhe taisi anquandi zhan zai renqun duier li.  
self PROG tightly hold Tess safely stand at crowd pile inside  
'Self is standing safely in the crowd with Tess in (my) arms.'

[CCL. feng·ling·zhi mao·ni.txt]

The expression 'fortunate' added to *ziji* in represented thought can only be evaluated from the protagonist's (also the contemplator's) viewpoint because represented thought needs to be faithful to its corresponding direct thought form, as seen in the identical forms used for (21)'s second sentence and (22). In this way, a *ziji* token can be ambiguous between an empathy use and a discursive contemplative use depending on whether the sentence containing *ziji* is treated as a narrative of the protagonist's non-contemplative experience (e.g., perception), or presentation of the protagonist's contemplative experience in the form of represented thought.

## 3.4 Results

### 3.4.1 An overview

Running the extraction script produced 1890 tokens of *ziji* from the CCL modern Chinese corpus. There are 76 unusable tokens, with most of them involving repeated occurrence or incomplete

sentences. Moreover, including “colon” in the filter condition introduced 347 unwanted tokens of *ziji*. Among all the remaining 1470 tokens, 338 tokens have generic reference and 446 tokens can be classified as intensifier *ziji*. It is worth noting that 185 of the intensifier tokens are also classifiable as logophoric uses. After excluding all the 338 generic tokens and 261 intensifier tokens that are uninterpretable as other uses (e.g., attitudinal use), there are still 848 valid tokens left for analysis. Following the classification criteria in Section 3.3.2 and the practice that some tokens allow multiple interpretations, all 848 valid tokens are classified as one or two predicted uses, as in Table 3.6.

Number of tokens	Logophoric		Contemplative		Indexical	Other
	attitudinal	empathy	discursive	contextual		
68	✓	✗	✗	✗	✗	✗
117	✓	✗	✓	✗	✗	✗
259	✗	✓	✗	✗	✗	✗
126	✗	✓	✓	✗	✗	✗
148	✗	✗	✓	✗	✗	✗
130	✗	✗	✗	✓	✗	✗
848						

Table 3.6: Overview: classification of all valid tokens of sentence-initial *ziji*

Among the 848 tokens, 68 of them are only interpretable as attitudinal tokens; 117 of them can be interpreted either as attitudinal tokens or as discursive contemplative tokens; 259 tokens are only interpretable as empathy uses; 126 tokens can be identified either as empathy uses or discursive contemplative uses; 148 tokens are only interpretable as discursive contemplative uses; 130 tokens are only interpretable as contextual contemplative uses. The details of each predicted use are to be seen in the next subsection.

### 3.4.2 Examining the predicted uses of *ziji*

Recall that Table 3.1 (replicated as Table 3.7 below) presents the various predicted uses of *ziji* that may appear in a corpus study of sentence-initial *ziji*, along with these uses' extra-sentential (co)referential potential. In order to examine the predicted uses against the corpus data, I have rearranged Table 3.6 to Table 3.8.

		Discursive coreference	Contextual reference
Logophoric <i>ziji</i>	Attitudinal <i>ziji</i>	✓	?
	Empathy <i>ziji</i>	✓	✓
Contemplative <i>ziji</i>	Discursive contemplative <i>ziji</i>	✓	✗
	Contextual contemplative <i>ziji</i>	✗	✓
Indexical <i>ziji</i>		✗	✓

Table 3.7: Predicted uses of *ziji* with their extra-sentential (co)referential potentials (revised)

		Discursive coreference	Contextual reference
Logophoric <i>ziji</i>	Attitudinal <i>ziji</i>	185	0
	Empathy <i>ziji</i>	378	7
Contemplative <i>ziji</i>	Discursive contemplative <i>ziji</i>	391	0
	Contextual contemplative <i>ziji</i>	0	130
Indexical <i>ziji</i>		0	0

Table 3.8: Classifying uses of *ziji* with their extra-sentential (co)referential potentials

A comparison of Table 3.7 and Table 3.8 shows that the corpus includes tokens of all the predicted uses but indexical *ziji*, because there is no token of sentence-initial *ziji* that can refer to the 1st person speaker unconditionally. This suggests that attitudinal uses, empathy uses, discursive contemplative uses, and contextual contemplative uses and their respective potentials for extra-

sentential (co)reference are all validated. The only exception is the indexical use predicted in Anand's (2006) shiftable indexical analysis.

The validation of attitudinal uses and empathy uses provides evidence for Charnavel's (2017, 2019) and Park's (2018) logophoric analyses. In this corpus, empathy *ziji* allows both discursive coreference and contextual reference, while attitudinal *ziji* is only found with discursive reference. This is consistent with the assumption that attitudinal *ziji*'s referent, attitude holder, is licensed by certain structures only (e.g., attitude predicates with clausal complements), which entail the necessity of previous discourse. Moreover, as Wang and Pan's (2012, 2014) empathy analysis also predicts empathy uses of *ziji*, their analysis also finds support from the empathy tokens found in this corpus study.

Li's (1991) analysis of contemplative *ziji* is also verified by relevant data found in the corpus study. However, Li's analysis is more like a description of *ziji*'s contemplative uses; the details underlying the two types of contemplative *ziji* are still to be investigated. As this corpus study found no token of sentence-initial *ziji* with unconditional reference to the speaker, Anand's shiftable indexical analysis of *ziji* is not supported but rather challenged. Implications following from this challenge are discussed in Section 3.5.

### **3.4.3 Examining the predictions on the distributions of empathy loci**

This corpus study has found 385 tokens of empathy *ziji*, including the tokens that also interpretable as discursive contemplative uses. In order to test Kuno and Kaburaki's (1977) empathy hierarchies, the empathy loci of all empathy tokens were examined to see whether the empathy loci are represented as grammatical subjects,<sup>12</sup> whether they are 1st, 2nd or 3rd person individuals, whether they are human, animate non-human or inanimate, and whether they are discourse topics. As shown in (23), the results with numbers and percentages are presented in a way parallel to the predictions made in (2).

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<sup>12</sup>I only distinguish subjects from non-subjects because there is only a small number of empathy *ziji* tokens with antecedents in non-subject position; sub-classification of these limited tokens does not make statistical significance.

(23) Empathy loci classified by grammatical function:

Prediction: Subject  $\geq$  Object  $\geq$  ...  $\geq$  *By-passive Agentive*

Result: Subject (306, 79.48%)  $>$  Non-subject (79, 2.52%)

Empathy loci classified by person specification:

Prediction: *Speaker*  $>$  *Addressee*  $>$  *Third Person*

Result: 1st person (34, 8.83%)  $\approx$  2nd person (20, 5.19%)  $<$  3rd person (331, 85.98%)

Empathy loci classified by humanness/animacy:

Prediction: *Human*  $>$  *Animate Nonhuman*  $>$  *Thing*

Result: Human (384, 99.74%)  $>$  Animate nonhuman(1, 0.26%)  $\approx$  Inanimate (0, 0%)

Empathy loci classified by topicality:

Prediction: *Discourse-Topic*  $>$  *Non-Discourse-Topic*

Result: Topic (385, 100.00%)  $>$  Non-topic (0, 0%)

Nearly all results in (23) are consistent with the respective predictions and suggest decreasing numbers, except the one related to empathy loci's person specification. Among all 385 tokens of empathy *ziji*, there are 306 tokens with the empathy loci represented as subjects; as for the remaining 79 tokens, their empathy loci are either represented as other structural constituents or served by individuals salient in the context. When it comes to humanness/animacy, the empathy loci found in the corpus are predominantly human, with only one token referring to an animate (non-human) empathy locus and zero tokens referring to inanimate empathy locus. Furthermore, all empathy loci serve as topics of the relevant sentences/discourses; these topics vary from the permanently available topics like speakers and addressees, to protagonists mentioned in preceding sentences. All the above indicates that three empathy hierarchies in Kuno and Kaburaki (1977) have been verified, including surface structure empathy hierarchy, humanness hierarchy, and topic empathy hierarchy. Unexpectedly, there are far more 3rd person empathy loci than both 1st and 2nd person empathy loci, contradicting the relevant prediction and challenging the speech-act participant

empathy hierarchy, which specifies that 1st person speakers are empathized with more easily than 2nd person addressees, which in turn outperform 3rd person individuals. This contradiction will be discussed in the next section.

## 3.5 Discussion

### 3.5.1 The speech-act participant empathy hierarchy and its failed prediction

While the results from this corpus study provide evidence for most of the empathy hierarchies proposed in Kuno and Kaburaki (1977), the speech-act participant empathy hierarchy is not supported, because there are more 3rd person empathy loci than 1st or 2nd person ones. To find out why this happened, I took a closer look at all 385 tokens of empathy *ziji*, and found that 352 of the empathy tokens were extracted from narratives. Narrative seems to be a literary style in which the speech-act participant empathy hierarchy does not apply, because usually narrators should be free to tell stories about individuals with any person specification, and all these individuals can serve as the protagonists that narrators empathize with. Moreover, narrators may be inclined to tell about 3rd person protagonists so that this corpus study found that empathy tokens in narratives refer predominantly to 3rd person empathy loci, as seen in (24). However, recognition of the fact that a vast majority of empathy tokens in this corpus study were found in narratives only touches the surface of the problem, because it is still unclear why empathy tokens in the current study tend to occur in narratives.

(24) The distribution of empathy loci with different person features (in narratives)

2nd person (1, 0.28%) < 1st person (31, 8.81%) < 3rd person (320, 90.91%)

Recall that the current corpus study was designed to collect *ziji* in sentence-initial position to investigate *ziji*'s extra-sentential (co)reference. Thus, this corpus study only covers empathy *ziji* with extra-sentential (co)reference, without including all tokens of empathy *ziji* in the corpus. The prediction following from the speech-act participant empathy hierarchy failed to be confirmed by

the current corpus study, but this does not necessarily mean the speech-act participant empathy hierarchy itself is fallible; it only demonstrates that the hierarchy in question does not apply to empathy *ziji* with extra-sentential (co)reference. The failed prediction is actually reasonable because *ziji* with extra-sentential (co)reference has greater reliance on previous discourse for interpretation than *ziji* with intra-sentential coreference, with the former stressing the roles played by discourse. In this case, the empathy hierarchy relating to discourse topics may thus outweigh the speech-act participant empathy hierarchy, so that an individual can be empathized with by the speaker irrespective of its person feature as long as this individual is a discourse topic. Turning back to the strong connection mentioned above between empathy tokens and the genre “narrative”, it may also arise from the fact that this corpus study is only concerned with *ziji* with extra-sentential (co)reference, which mostly requires previous discourse for reference. This is especially true for *ziji* in narratives. In brief, the failed prediction relating to empathy loci’s person feature cannot falsify the speech-act participant empathy hierarchy, because the corpus study only includes empathy tokens with extra-sentential (co)reference. Furthermore, the fact that discourse topics with any person features can serve as empathy loci suggests that the empathy hierarchies in Kuno and Kaburaki (1977) may have different weights in determining a referent’s empathy level and that the empathy hierarchy relating to discourse topics should outweigh the empathy hierarchy relating to person features, especially in the case of *ziji* with extra-sentential (co)reference.

### **3.5.2 Approaching contemplative *ziji* as a shiftable indexical different from Anand’s (2006)**

The fact that *ziji* can refer to a contemplator was first noticed in Li (1991). Li proposes that when someone contemplates on themselves, the contemplator should have an image of themselves projected in their thought, and *ziji* is used to encode the self-image in thought expressions. Li’s analysis describes contemplative *ziji* as a pronominal with special reference; there are no details on what kind of pronominal contemplative *ziji* is and whether it deserves a separate lexical entry. In this section, I explore the possibility of accommodating contemplative *ziji* into logophoric or indexical

analyses. As will be demonstrated below, a shiftable indexical analysis can better account for contextual contemplative *ziji* and discursive contemplative *ziji*, along with some restrictions on co-occurring indexicals. To distinguish the indexical *ziji* proposed for contemplative *ziji* from the indexical *ziji* predicted in Anand (2006), I refer to the new indexical *ziji* as perspective indexical *ziji*.

Contemplative *ziji* in this thesis distinguishes two types, namely, contextual contemplative *ziji* and discursive contemplative *ziji*. The attempt to account for both types of contemplative *ziji* with Charnavel's (2017, 2019) or Park's (2018) logophoric analyses turns out to be less satisfactory. First, the two types of contemplative *ziji* either fail or show incompatibility with the tests for *ziji*'s attitudinal and empathy uses, which involve inserting an evaluative expression before *ziji* to check whether the expression can be taken as the speaker's opinion and/or the opinion of *ziji*'s referent. These tests cannot be applied to contextual contemplative *ziji* because *ziji*'s referent in this case is simultaneously the speaker, without distinguishing the speaker's opinion from the opinion of *ziji*'s referent. To categorize contextual contemplative *ziji*'s referent (i.e., the contextual contemplator) as an attitude holder or an empathy locus, independent motivation is needed. This thesis assumes that attitude holders are licensed by certain linguistic structures, which necessitate previous discourse. Following this assumption, contextual contemplators are not attitude holders, due to the lack of previous discourse. Moreover, contextual contemplators are different from typical empathy loci involved in empathy uses in that the former are inherent to contemplation contexts while the latter are determined through background information. When it comes to instances of discursive contemplative *ziji*, they fail both the test for attitudinal *ziji* and the test for empathy *ziji*, because any evaluative expression inserted before discursive contemplative *ziji* can only be taken as the relevant contemplator's opinion.

Second, contemplative *ziji* and logophoric *ziji* have distinct restrictions on the indexicals that they can co-occur with, and Charnavel's and Park's logophoric analyses cannot capture the co-occurrence restrictions concerning contemplative *ziji*. As noted in Chapter 2, represented thought (i.e., the domain that accommodates discursive contemplative *ziji*) does not allow the occurrence of

a 1st/2nd person pronoun, unless *ziji*'s referent coincides with that of the 1st/2nd person pronoun. Thus, discursive contemplative *ziji* generally cannot co-occur with 1st/2nd person pronouns in represented thought. By contrast, there is no restriction on the use of 1st/2nd person pronouns in a domain that licenses logophoric *ziji*, e.g., attitudinal *ziji*. The sentence in (25) is replicated from Chapter 2; it presents what an employee thought to themselves after being fired by the boss. *Ziji* in (25) thus represents a contextual contemplative use in direct thought form.

(25) Contextual contemplative *ziji* in a fired employee's internal monologue

**ziji** bingmei dezui jingli, keshi weisha bei-chao-le...  
 self not offend manager so why PASS-fire-PERF...

'Self did not offend the manager, so why did (self) get fired...'

If the incident above is narrated by the manager to others, the fired employee's thought in (25) can take the form of represented thought or reported thought (i.e., embedded as an attitude predicate's clausal complement), as presented in the bracketed sentence/clause in (26). In spite of being the speaker, the manager in the represented thought text of (26a) cannot be encoded with the 1st person pronoun *wo*, and a 3rd person DP meaning 'the manager' has to be used instead. But when the thought in (25) is narrated in a reported thought form, the manager as the speaker, can be realized as *wo* 'me', as seen in (26b). *Ziji* in (26b) represents a typical attitudinal use, in contrast to the discursive contemplative use in (26a).

(26) a. Discursive contemplative *ziji* in represented thought (bracketed, AUTHOR(c) = the manager)

na-ge yuangong hen kunhuo. [**ziji** bingmei dezui #wo/jingli, keshi weisha  
 that-CL employee very confused self not offend me/manager so why  
 bei-chao-le...]  
 PASS-fire-PERF...

'The employee was very confused. [Self did not offend the manager, so why did (self) get fired...]'

b. Attitudinal *ziji* in reported thought (bracketed, AUTHOR(c) = the manager)

na-ge yuangong xinxiang [**ziji** bingmei dezui wo/jingli, keshi weisha  
 that-CL employee think self not offend me/manager so why  
 bei-chao-le...]  
 PASS-fire-PERF...

‘The employee thought [self did not offend me/the-manager, so why (self) got fired...]’

1st/2nd person pronouns are not the only indexicals that distinguish the environments that contemplative *ziji* and logophoric *ziji* occur. As demonstrated below, contemplative *ziji* allows co-occurring with indexicals that can be interpreted in relation to the context where *ziji*’s referent contemplates, but these indexicals can only be interpreted in relation to the utterance context when they co-occur with logophoric *ziji*; if these indexicals’ meanings are to be expressed in a logophoric domain, a different set of expressions will have to be used. A typical example of such indexicals is *mingtian* ‘tomorrow’ in (27). The first three examples in (27), i.e., (27a), (27b) and (27c), all express the same thought, though different forms are adopted. For (27a) and (27b), which contains contemplative *ziji*, *mingtian* ‘tomorrow’ is interpreted in relation to the situation where Lisa’s thought was produced, but for (27c), which accommodates attitudinal *ziji*, *diertian* ‘the-second-day’ is used to replace *mingtian* ‘tomorrow’, otherwise this sentence would mean Lisa was worried about the train ticket for the speaker’s ‘tomorrow’, rather than the ‘tomorrow’ in relation to the situation where the Lisa’s thought was produced. The co-occurrence restrictions that attitudinal *ziji* faces also applies to empathy *ziji*. As shown in (27d), in an empathy domain that holds empathy *ziji*, *diertian* ‘the-second-day’ needs to be used to express the perspective center’s ‘tomorrow’, because *mingtian* ‘tomorrow’ here can only be interpreted in relation to the utterance context. Considering the above, contemplative *ziji* is very different from logophoric *ziji*, including attitudinal *ziji* that occurs in attitude reports; the logophoric analyses that capture attitudinal/empathy *ziji* cannot account for the restrictions on indexicals that co-occur with contemplative *ziji*.<sup>13</sup>

<sup>13</sup>Sharvit (2008) has argued that like reported thought in embedded clauses, represented thought (also free indirect discourse) belongs to attitude reports based on the evidence that represented thought also embodies *de se* interpretations. However, I do not think *de se* interpretations alone are sufficient to justify a treatment of represented thought as attitude reports; this is especially true after the data in (27) has demonstrated that different indexicals should be used in represented thought and in reported thought (i.e., attitude report), though the thoughts expressed are identical. If represented thought could be approached in the same way that reported thought is treated, it would be surprising that *mingtian* ‘tomorrow’ and *diertian* ‘the-second-day’ cannot be used interchangeably within the two forms of thought expression.

- (27) a. Contextual contemplative *ziji* in Lisa’s internal monologue (bracketed)

Lisa zai-xinli xiang: “[**ziji** yaoshi mai-bu-dao mingtian chufa de huoche-piao  
 Lisa at-heart think self if buy-not-to tomorrow depart PNMM train-ticket  
 gai zenme ban ya?]”  
 should how deal Q

‘Lisa was thinking to herself: “[How should self deal with (this) if (self) cannot get the train ticket for tomorrow?]” ’

- b. Discursive contemplative *ziji* in represented thought (bracketed)

Lisa feichang danxin. [**ziji** yaoshi mai-bu-dao mingtian chufa de huoche-piao  
 Lisa very worried self if buy-not-to tomorrow depart PNMM train-ticket  
 gai zenme ban ya?]  
 should how deal Q

‘Lisa was very worried. [How should self deal with (this) if (self) cannot get the train ticket for tomorrow?]

- c. Attitudinal *ziji* in reported thought (bracketed)

Lisa feichang danxin [**ziji** yaoshi mai-bu-dao diertian chufa de  
 Lisa very worried self if buy-not-to the-second-say depart PNMM  
 huoche-piao gai zenme ban ya?]  
 train-ticket should how deal Q

‘Lisa was very worried [how should self deal with (this) if (self) cannot get the train ticket for the next day?]

- d. Empathy *ziji* in an empathy domain (bracketed)

Lisa cong chaonaode qinshi chulai, laidao xuexiao de tushuguan. [haozai  
 Lisa from noisy dormitory get-out come-to school POSS library thankfully  
 tushuguan mei duoshao ren, **ziji** zhongyu keyi jingxiainlai kaolv  
 library without many people self finally can heart-down consider  
diertian chufa de huoche-piao de shiqing.]  
 the-second-day depart PNMM train-ticket POSS issue

‘Lisa got out of the noisy dormitory and went to the school’s library. [Thankfully, there were not many people in the library (so that) self could finally get down to think about the train ticket for the next day.]’

There are other indexicals that behave similarly to *mingtian* ‘tomorrow’, e.g., *jintian* ‘today’. These indexicals are interpreted in relation to either the utterance context or the situation where a

contemplator produces their internal monologue. When they occur in a text of represented thought, there appears to be a context shift so that all relevant indexicals are evaluated against the situation where the thought was produced, rather than the utterance context.<sup>14</sup> This aligns with Schlenker's (2004) shiftable indexical analysis proposed for indexicals in represented thought (also free indirect discourse). That is, represented thought seems to be able to introduce a context shift operator, shifting the context to evaluate certain indexicals.<sup>15</sup>

A shiftable indexical analysis of indexicals in represented thought also sheds light on a plausible analysis of contemplative *ziji*. Recall that contextual contemplative *ziji*'s reference is always context-dependent and that previous discourse is not necessary. Contextual contemplative *ziji*'s direct reference to the contemplator in a context of contemplation functions in a way similar to indexicals like the 1st person pronoun *wo* 'I'. But unlike *wo*, contextual contemplative *ziji* is only used in contemplation contexts. It is thus possible that contextual contemplative *ziji* is an indexical specific to contemplation contexts and refers to the only contemplating/speaking individual in a context of contemplation. An indexical analysis of *ziji* is not new, e.g., Anand's (2006) analysis of *ziji* as a shiftable indexical. Moreover, Zubin et al. (1990) claim that both *ziji* and the Korean reflexive form *caki* can be categorized as indexicals in the binary Perspective Indexical System, which

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<sup>14</sup>As for the indexicals specially used in logophoric domains (including attitude reports and empathy domains), e.g., *diertian* 'the-second-day', their interpretations do not depend on a context where utterances/thoughts are produced. For instance, 'the-second-day' in (27d) is interpreted in relation to the protagonist Lisa. In Charnavel (2019a), indexicals can be characterized by e-type function; for example, temporal indexicals encode relations between the speaker and their time. Similarly, temporal indexicals should be able to encode relations between a perspective center and their time. It is thus very likely that indexicals like 'the-second-day' are variables bound by perspective centers, just like logophoric *ziji*. Nonetheless, the validation of such a proposal is beyond the research scope of this thesis, and is thus left for future studies.

<sup>15</sup>Deal (2020) claims that indexical shift occurs in attitude reports, which involve overt/covert attitude predicates. She also compares the properties of attitude reports with free indirect discourse and quotation, and comes to the conclusion that free indirect discourse is more like quotation in terms of whether *de re* descriptions are allowed, whether there is a verbatim requirement and whether reproduction of extra-linguistic factors is involved (refer to Chapter 5 in Deal (2020) for more details). Therefore, Deal argues that free indirect discourse (including represented thought) should be treated as (mixed) quotation, without involving indexical shift. This research acknowledges that free indirect discourse is similar to quotation in the aforementioned ways and Mandarin represented thought is no exception. Despite this, Mandarin represented thought is still different from quotation of direct thought and deserves a separate treatment. As demonstrated in Chapter 2, 1st/2nd person pronouns can be used in direct thought to refer to the relevant contemplator, but this use is not replicated in represented thought. Moreover, represented thought is a means of presenting a contemplator's thought by taking this contemplator's perspective, leaving the impression that the speaker had experienced the thought possessed by the contemplator. Conversely, there is usually no encoding of the speaker and their roles in a directly quoted thought form.

contrasts with the trinary Speech Situation Indexical System. The former system is binary because it only distinguishes “self” and “other”, but the latter system has a tripartite division, including speaker, addressee, and anyone other than speaker and addressee. While the 1st, 2nd, and 3rd person DPs “set up a conceptual polarity indexing the speech situation of interactional discourse”, the indexicals “self” and “other” constitute “an abstract polarity between a center and a periphery” (Zubin et al., 1990, p. 338). For Zubin et al., *ziji* used in binary contexts only involves the distinction of “self” and “other”; it is thus an indexical different from those referring to speakers or addressees. Turning back to contextual contemplative *ziji*, it is licensed in contemplation contexts. As contemplation contexts only distinguish the contemplators themselves and all the others, they demonstrate typical binary contexts specified above. Following the binary Perspective Indexical system, contextual contemplative *ziji* is proposed to be an indexical referring to the perspective center “self” inherent to the context, with the denotation “CENTER(c)”, which is different from Anand’s (2006) analysis treating *ziji* as a 1st person indexical “AUTHOR(c)”. In fact, perspective indexical *ziji* of CENTER(c) does not possess 1st/2nd person features, because the indexical system containing *ziji* distinguishes “self” and “other”, rather than speaker and addressee.<sup>16</sup>

The treatment of *ziji* as CENTER(c) can account for the fact that contextual contemplative *ziji* is only available in certain contexts. In contexts like face-to-face conversation, there is usually no inherent perspective center, because these contexts involve two-way communication and emphasize cooperation, which would be undermined if a specific discourse participant were set up as the inherent perspective center. Consequently, perspective indexical of CENTER(c) in these contexts does not make sense. But when it comes to contemplation contexts, the distinction of speaker, addressee and others fades out while the distinction of “self” and “other” stands out, so that CENTER(c) refers to “self” in these contexts. Since the referent of perspective indexical *ziji*, “inherent perspective center”, is generally also the speaker in the relevant context, perspective indexical *ziji* has a seeming reference to the speaker. This may be part of the reason for Anand’s treatment of *ziji*

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<sup>16</sup>Note that discursive contemplative *ziji* (i.e., shifted indexical of CENTER(i)) may inherit 1st/2nd person features from its referent, because it is produced in a context involving the distinction of speaker and addressee. Similarly, logophoric *ziji*, despite the underspecification of person features, may also inherit these features from its referent.

as AUTHOR(c). But as demonstrated in this corpus study, *ziji* is not like the 1st person pronoun *wo* ‘I’, which has unconditional reference to the speaker. Therefore, the treatment of *ziji* as CENTER(c) rather than AUTHOR(c) can better capture the corpus’s result that only in contemplation contexts does *ziji* have direct reference to the speaker.

Once contextual contemplative *ziji* is categorized as an indexical, a shiftable indexical analysis of discursive contemplative *ziji* follows easily. With the aid of a context shift operator licensed in represented thought, *ziji* and other shiftable indexicals undergo a shift of the context against which these indexicals are evaluated, that is, from the utterance context *c* to *i* (i.e., the situation where the relevant thought is produced), so that contemplative *ziji*’s denotation is changed from CENTER(c) to CENTER(i). In this way, contextual contemplative *ziji* and discursive contemplative *ziji* are unified into a single analysis of shiftable indexical, with *ziji* referring to the inherent perspective center. In a context of contemplation, perspective indexical *ziji* refers to the relevant inherent perspective center, i.e., the contemplator in the context; in a represented thought text, perspective indexical *ziji* shifts its evaluation point under the influence of a context shift operator, and refers to the thought possessor, who is the perspective center inherent to the context of contemplation. Note that it remains unclear what indexicals allow context shifts in Mandarin represented thought passages, but since an answer to this question requires a separate thorough study, this issue is left for future research.

### **3.5.3 The unproven shiftable indexical analysis in Anand (2006) and its difference from the newly proposed shiftable indexical analysis**

As indicated in Table 3.6 and Table 3.8, there is no token of sentence-initial *ziji* in the corpus that can be interpreted as a shiftable indexical as predicted in Anand (2006). According to Anand, *ziji* for IND-Mandarin speakers is a shiftable indexical and has a default reference in relation to the context, i.e., AUTHOR(c); but once a context shift operator  $OP_{AUTH}$  acts on the shiftable indexical, *ziji*’s default reference is overwritten by a reference interpreted in relation to the relevant point-of-view holder, i.e., AUTHOR(i). Anand’s proposal for this dialect of IND-Mandarin is based on the

following two points. First, *ziji*, in the absence of  $OP_{AUTH}$ , is semantically equivalent to *wo* ‘I’ for IND-Mandarin speakers. Second, indexical *ziji*, for these speakers, is not subject to *de re* blocking because indexical *ziji*’s cross-clausal coreference is licensed by overwriting the context parameter, without involving syntactically-mediated binding. Anand consulted with 29 native Mandarin speakers and found that 13 of them consistently allow *ziji*’s cross-clausal coreference even though a *de re* counterpart intervenes. One of the testing sentences that Anand used is presented in (28), where *ziji*’s coreference with *John* may or may not get blocked by *ta* ‘him’ (referring to John) depending on whether the sentence is judged by a LOG-Mandarin speaker who uses *ziji* as a logophor or an IND-Mandarin speaker who uses *ziji* as a shiftable indexical.

- (28) John<sub>i</sub> renwei Bill<sub>j</sub> gei ta<sub>i</sub> **ziji**<sub>7</sub>-de shu.  
 John think Bill give him self-POSS book  
 ‘John<sub>i</sub> thinks Bill<sub>j</sub> gave him<sub>i</sub> his<sub>\*i/j</sub> book’. [16 speakers (LOG-Mandarin)]  
 ‘John<sub>i</sub> thinks Bill<sub>j</sub> gave him<sub>i</sub> his<sub>i/j</sub> book’. [13 speakers (IND-Mandarin)]

(Anand, 2006, p. 135)

Following Anand’s distinction of IND-Mandarin and LOG-Mandarin, the current study with data extracted from a comprehensive corpus should find tokens of sentence-initial *ziji* produced by IND-Mandarin speakers. As tokens of sentence-initial *ziji* do not have attitude predicates that introduce context shift operators, they should function like the 1st person pronoun and possess unconditional reference to the speaker. Contrary to the prediction, this corpus study found no token of sentence-initial *ziji* that refers to the speaker unconditionally. Logophoric *ziji* allows reference to the speaker, but this requires the speaker to be licensed as a logophoric center, either an attitude holder or an empathy locus. As for contemplative *ziji*, discursive contemplative *ziji* relies on previous discourse for reference, whereas contextual contemplative *ziji*’s reference to the speaker is only obtained in contemplation contexts. In consequence, for all the tokens of sentence-initial *ziji* found in the corpus, their reference to the speaker needs to be licensed one way or another, contradicting the first point that Anand uses to justify his shiftable indexical analysis of *ziji* and the dialect “IND-Mandarin”.

Anand’s second argument for the dialect “IND-Mandarin” also faces a challenge. Anand claims

that 13 of his informants consistently allowed *ziji*'s cross-clausal coreference despite the existence of an intervening *de re* counterpart. Chen (2010) has tried to replicate Anand's survey with native Mandarin speakers, but failed to find the sharp, systematic variations claimed by Anand. Chen asked 45 native Mandarin speakers to judge the acceptability of *ziji*'s cross-clausal coreference in (28) and (28)-like sentences. Take the judgment results for (28) for instance. As seen in Table 3.9, while the 45 informants' opinions are clearly divided on their judgments, their opinions do not show consistent patterns, which makes it hard to identify who is an IND-Mandarin speaker and who is a LOG-Mandarin speaker.

	<b>Acceptable</b>	<b>Unacceptable</b>	<b>Marginal</b>
self's = John's	16	15	14
self's = Bill's	24	9	12

Table 3.9: The judgment result concerning (28)

Chen argues that it is problematic for Anand to use native Mandarin speakers' discrepant judgments as evidence for the dialectal distinction between IND-Mandarin and LOG-Mandarin, because the discrepant judgments were not consistently made. Presently, there is no clue as to the underlying reason for informants' inconsistent and discrepant judgments; more research is still needed.

The fact that Anand's indexical analysis is not proven does not mean that indexical analyses should be excluded from the list of potential approaches to *ziji*. On the contrary, this thesis has just proposed a shiftable indexical analysis of contemplative *ziji*. The newly proposed shiftable indexical analysis differs from Anand's shiftable indexical analysis in several ways. First, unlike Anand's treatment of *ziji* as a 1st person indexical AUTHOR(c), *ziji* in the new analysis is an indexical referring to the inherent perspective center in the context, i.e., CENTER(c). The indexical of CENTER(c) is proposed in accordance with Perspective Indexical System whereas AUTHOR(c) is established for the Speech Situation Indexical system. Following this, perspective indexical *ziji* is only allowed in contexts with inherent perspective centers, e.g., contemplation contexts. As the

inherent perspective center in a context of contemplation is the contemplator who is simultaneously the speaker, perspective indexical *ziji* seems to directly refer to the speaker. Because of the seeming reference to the speaker, perspective indexical *ziji* may have been mistaken as a 1st person indexical of AUTHOR(c) in Anand (2006).

Second, *ziji* as a shifted indexical in Anand is aimed to account for *ziji*'s cross-clausal coreference, but *ziji* as a shifted indexical in the new analysis is proposed for *ziji*'s extra-sentential (co)reference (specifically, *ziji* in represented thought). Anand's indexical *ziji* of AUTHOR(c) that appears in propositional arguments of attitude predicates is claimed to shift its evaluation circumstances from the context to the situation in which the relevant propositional argument is produced. Perspective indexical *ziji* of CENTER(c) that occurs in represented thought passages is proposed to shift its evaluation circumstances from the context to the situation in which the relevant thought is produced.

Third, both Anand's indexical *ziji* and perspective indexical *ziji* require context shift operators, but the operators involved are different. Anand's analysis involves  $OP_{AUTH}$ , which is optionally introduced with attitude predicates' clausal complements. Moreover,  $OP_{AUTH}$  only shifts the parameter *author*. In terms of the new shiftable indexical analysis, the context shift operator obligatorily comes with all represented thought passages. Moreover, this operator licensed in represented thought can also shift the circumstances to evaluate other indexicals, e.g., *mingtian* 'tomorrow'.

With the new shiftable indexical analysis proposed for contemplative *ziji*, *ziji*'s extra-sentential (co)reference is thus approached as logophoricity or indexical shift. That is, sentence-free *ziji* is either a logophorically bound element or a shiftable indexical, but this is still different from Anand's analysis, which takes  $ziji_{cc}$  (i.e., *ziji* with cross-clausal coreference) as either a logophor or a shiftable indexical.

### **3.5.4 *Ziji* is not a single lexical entry**

In addition to logophoric *ziji* and contemplative *ziji*, this research also found tokens of intensifier *ziji* and generic *ziji*. Beyond this research, *ziji* also allows local binding; locally bound *ziji* repre-

sents a separate use because it is unique in that its binder is not limited to animate DPs (Charnavel and Huang, 2018). With the various uses of *ziji*, the next question to ask is how many lexical entries are needed to accommodate these uses.

Charnavel (2017, 2019) has provided part of the answer. Logophoric *ziji* and locally bound *ziji*, despite their being labeled as exempt anaphors and plain anaphors respectively, have been unified into one analysis of local binding within spell-out domains, where locally bound *ziji* is bound by an overt DP while logophoric *ziji* is bound by a covert logophoric pronoun. In this way, there is no inherent difference between logophoric *ziji* and locally bound *ziji*, except that they are bound by different type of DPs.

Generic *ziji* can also be integrated into other uses of *ziji*. As mentioned in Section 3.3.2, Battistella and Xu (1990) consider generic *ziji* as an intensifier that immediately follows a null pronominal PRO; *ziji*'s seemingly generic interpretation actually comes from PRO. However, it is also possible that generic *ziji* serves as a pronominal and possesses a generic interpretation on its own. In this case, generic *ziji* can be approached as an instance of logophoric *ziji* with PRO serving as a logophoric center.

(29) **ziji** xiaoxin shi congming zhi-ju.  
self careful be wise action

Intensifier use: 'It is wise for (one) themselves to be careful.'

Logophoric use: 'It is wise for one to be careful.'

Adapted from Battistella and Xu (1990, p. 224)

Not all uses allow a unified analysis. For instance, intensifier *ziji* is not a pronominal because it is not used to track reference but to modify DPs or VPs. In this sense, intensifier *ziji* deserves a separate lexical entry. As regards contemplative *ziji*, Section 3.5.2 has demonstrated the unfruitful attempt at a logophoric analysis of contemplative *ziji*; unlike logophoric *ziji* and locally bound *ziji*, contemplative *ziji* cannot be captured by the analysis of local binding within spell-out domains. Therefore, I propose a shiftable indexical analysis for contemplative *ziji*. Note that the shiftable indexical analysis cannot accommodate logophoric *ziji* or locally bound *ziji*, either. *Ziji* as a shiftable indexical is assumed to only refer to the perspective center inherent in a context, but neither type

of logophoric *ziji*'s referent (i.e., attitude holder and empathy locus) is necessarily an inherent perspective center. In terms of locally bound *ziji*, its reference can vary greatly and is not limited to perspective centers, let alone inherent ones. Considering the mutual exclusivity demonstrated above, at least three different types of *ziji* are needed, namely, *ziji* as a shiftable indexical, *ziji* as a locally bound anaphor and *ziji* as an intensifier.

### 3.6 Summary

This corpus study found tokens of four predicted uses of *ziji* that allow extra-sentential (co)reference, namely, attitudinal *ziji*, empathy *ziji*, discursive contemplative *ziji*, and contextual contemplative *ziji*. The validation of attitudinal *ziji* and empathy *ziji* provides evidence for Charnavel's (2017, 2019) and Park's (2018) logophoric analyses, and Wang and Pan's (2012, 2014) empathy analysis of *ziji*; the validation of discursive contemplative *ziji* and contextual contemplative *ziji* justifies Li's analysis of *ziji* referring to contemplator. The only unproven use is *ziji* as a shiftable indexical predicted in Anand (2006), as no token of this use was found in the current corpus study.

The corpus study also investigated tokens of empathy *ziji* to see whether the empathy hierarchies in Kuno and Kaburaki (1977) hold in the case of empathy *ziji*. The verified empathy hierarchies include surface structure empathy hierarchy, humanness hierarchy, and topic empathy hierarchy. The speech-act participant empathy hierarchy is not supported, possibly because this corpus study of sentence-initial *ziji* only includes empathy tokens with extra-sentential (co)reference. For empathy *ziji* that refers to an empathy locus represented in previous discourse or present in the context, the topic empathy hierarchy about discourse topics may greatly outweigh the speech-act participant empathy hierarchy so that any individuals that are taken as discourse topics can serve as empathy loci, whether they are speaker, addressee or 3rd person individuals.

This study proposed a shiftable indexical analysis of contemplative *ziji*, which is different from Anand's shiftable indexical analysis for *ziji* with cross-clausal coreference. The newly proposed perspective indexical *ziji* has a default reference to the inherent perspective center in the context,

CENTER(c), accounting for the use of contextual contemplative *ziji*; for perspective indexical *ziji* in represented thought passages, a context shift operator will step in to shift the circumstances to evaluate various indexicals (including *ziji*) from the context to the situation in which the relevant thought is produced, accounting for the use of discursive contemplative *ziji*. This shiftable indexical analysis of contemplative *ziji* captures the facts that contextual contemplative *ziji*'s reference to the speaker is limited to certain contexts and that discursive contemplative *ziji* is only one of the indexicals shifted in represented thought passages.

Recall that the predicted uses of *ziji* and the relevant tokens found in the corpus study were handled with the distinction of discursive coreference and contextual reference. The validated uses of *ziji* with discursive coreference include attitudinal *ziji*, empathy *ziji* and discursive contemplative *ziji*; these uses represent the coreferential potentials brought by previous discourse, demonstrating discourse's effects on *ziji*'s interpretation. The verified uses of *ziji* with contextual reference encompass empathy *ziji* and contextual contemplative *ziji*; these referential potentials introduced by contexts represent contexts' effects on *ziji*'s interpretation. However, as suggested in the introductory chapter, the effects exerted from discourse and context are not limited to *ziji*'s extra-sentential (co)reference; they may interfere with *ziji*'s potential for intra-sentential coreference. In the next chapter, I will undertake an experimental study of contexts' effects on *ziji*'s intra-sentential coreference, which involves the potential contextual effect relating to *ziji*'s contextual contemplative use.

## Chapter 4

# An experimental study of contexts' effects on *ziji*'s intra-sentential coreference

## —The blocking effect in different contexts

The previous chapter has demonstrated that extra-sentential factors (e.g., context and discourse) can bring in additional (co)referential possibilities for *ziji*. In addition, extra-sentential factors may interfere with *ziji*'s intra-sentential coreference. For instance, this interference may be embodied in *ziji*'s cross-clausal coreference with the 1st person *wo* 'I' in (1a).

- (1) a.  $wo_i$  zhidao  $Lisi_j$  bu xihuan **ziji** <sub>$i/j$</sub> .  
I know Lisi not like self  
'I know that Lisi did not like  $\gamma$ me/himself.'
- b. Zhangsan <sub>$i$</sub>  zhidao  $wo_j$  bu xihuan **ziji** <sub>$*i/j$</sub> .  
Zhangsan know I not like self  
'Lisi knows that I do not like myself.'

Adapted from Pan (2001, p. 283)

Sentence (1a) is one of the examples that Pan (2001) uses to demonstrate the person asymmetry concerning the blocking effect, because the contrast in (1) seems to suggest that a 3rd person inter-

vening DP (e.g., *Lisi* in (1a)) only partially blocks *ziji*'s coreference with a 1st person antecedent, but a 1st person intervening DP fully blocks *ziji*'s coreference with a 3rd person antecedent (e.g. *Zhangsan* in (1b)). Nevertheless, this contrast of blocking level does not necessarily mean that 3rd person DPs are weaker blockers than 1st person pronouns, since the partial blocking in (1a) may arise from its being bypassable in certain contexts. For instance, sentence (1a) as part of someone's direct thought (produced in contemplation) is perfectly acceptable with the cross-clausal coreference, because according to the equation in (2), *ziji* corefers with *wo* whether or not there is blocking arising from conflicting person specifications. Nonetheless, when (1a) is uttered in a daily conversation without involving the speaker's contemplation, the cross-clausal coreference is ill-formed. This contrast of different contexts' effects is presented in (3).

(2) In direct thought (e.g. produced in a context of contemplation),

$$\begin{aligned} & \llbracket ziji \rrbracket^{c,i} \xrightarrow{\text{REFER TO}} \text{contemplator,} \\ & \text{because contemplator (in this case)} \xrightarrow{\text{SIMULTANEOUSLY}} \text{AUTHOR}(c), \\ & \llbracket ziji \rrbracket^{c,i} \xrightarrow{\text{REFER TO}} \text{AUTHOR}(c) = \text{speaker} = \llbracket wo \rrbracket^{c,i} \end{aligned}$$

(3) a. In a context of contemplation,

wo<sub>i</sub> zhidao Lisi<sub>j</sub> bu xihuan **ziji**<sub>i/j</sub>.  
 I know Lisi not like self  
 'I know that Lisi did not like me/himself.'

b. In a daily conversation,

wo<sub>i</sub> zhidao Lisi<sub>j</sub> bu xihuan **ziji**<sub>#i/j</sub>.  
 I know Lisi not like self  
 'I know that Lisi did not like himself.'

Following this line, the presence/absence of blocking in (1a) depends on the context in which (1a) is interpreted; it is difficult to judge whether the cross-clausal coreference in this sentence obtains if contexts' effects are not taken into consideration. In this chapter, I present an experimental study of contexts' effects, testing how contexts impact *ziji*'s potential for cross-clausal coreference in sentences like (1a). This experiment will not only help figure out whether and when contextual

effects apply, but provide empirical data on the blocking facts, which may confirm or contradict previous accounts of the blocking effect.

## 4.1 Relevant background

### 4.1.1 Experiment studies testing extra-sentential factors in interpreting *ziji*

Reflexive forms generally do not possess independent referential capacities. In addition to the access to local sentential information, Pinango and Burkhardt (2005) claim that reflexive forms may require the relevant utterances' previous discourse and contextual information for interpretation. It seems that the interpretation of reflexive forms requires taking into consideration various levels of representations, including syntax, discourse, context, etc.

Reflexive forms have been approached from the perspective of pragmatics. For example, Reuland (2011) proposes that if a reflexive form like *ziji* is not syntactically bound, it must be pragmatically constrained. Moreover, the logophoric analyses introduced in Chapter 2 are claimed to represent pragmatic approaches. There are experiments testing pragmatic effects on *ziji*'s interpretation. Sperlich (2017) conducts an experiment, asking participants to evaluate whether *ziji* in an embedded sentence corefers with a local antecedent or a cross-clausal antecedent. The test sentences in this experiment were manipulated to be neutral in *ziji*'s interpretation or pragmatically biased towards the interpretation derived from cross-clausal coreference. (4a) is a neutral instance with *ziji* allowing both local coreference and cross-clausal coreference; in (4b), however, cross-clausal coreference is pragmatically more felicitous because the interpretation following this coreference conforms more to people's stereotypical knowledge that a new disciple generally knew little about their teacher Confucius' writings, rather than their own writings.

- (4) a. Laowang renwei Laochen kanjian-le **ziji** zai baozhi shang de zhaopian.  
Laowang think Laochen see-PERF self at newspaper on PNMM photo  
'Laowang<sub>i</sub> thinks that Laochen<sub>j</sub> saw a picture of self<sub>i/j</sub> in the newspaper.'
- b. Kongzi xiangxin xinde dizi hai mei-you du-guo **ziji** de wenzhang.  
Confucius believe new disciple still not-have read-PERF self PNMM article

‘Confucius<sub>i</sub> believed that the new disciple<sub>j</sub> had not yet studied self<sub>i/\*j</sub>’s writings.’

(Sperlich 2017, p. 211)

This experiment’s results suggest that *ziji* in neutral sentences has a roughly 50/50 distribution in terms of the choice between a local and a cross-clausal interpretation, but *ziji* in “biased” sentences has significantly more chances of coreferring with cross-clausal antecedents. Based on the results, Sperlich concluded that the Mandarin reflexive form *ziji* is pragmatically regulated. As will be shown below, *ziji*’s interpretation is constrained not only by stereotypical knowledge, but also by previous discourse.

Lu (2011) carries out an experiment using the method of self-paced reading, to test whether priming from previous discourse has an effect on *ziji*’s interpretation. In each trial, participants are exposed to a priming sentence and then a test sentence. Each priming sentence contains one of the two potential antecedents for *ziji*. As exemplified in (5), each test sentence involves three layers of clauses, with *ziji* serving as the lowest clause’s subject. Theoretically, *ziji* allows cross-clausal coreference with either the intermediate clause’s subject *minzhong* ‘the public’ or the highest clause’s subject *youchai* ‘mailman’, but there is an underlined disambiguating verb in the lowest clause that directs *ziji*’s interpretation. In (5a), the semantic requirement of the underlined disambiguating verb *shoudao* ‘receive’ makes ‘the public’ a more likely antecedent for *ziji*. But if *shoudao* ‘receive’ is replaced with *toudi* ‘deliver’, as in (5b), *ziji* can only refer to ‘mailman’.

- (5) a. [youchai xuancheng [minzhong zong renwei [**ziji** meiyou anshi shoudao  
mailman allege the-public always think self not on-time receive  
youjian]]].

mail

‘The mailman<sub>i</sub> alleged that the public<sub>j</sub> always thinks that self<sub>j</sub> does not receive mail on time.’

- b. [youchai xuancheng [minzhong zong renwei [**ziji** meiyou anshi toudi  
mailman allege the-public always think self not on-time deliver  
youjian]]].

mail

‘The mailman<sub>i</sub> alleged that the public<sub>j</sub> always thinks that self<sub>i</sub> does not deliver mail on time.’

Adapted from Lu (2011, p. 23)

Two biases were involved in this experiment. First, *ziji*'s interpretation was predicted to be biased towards the antecedent mentioned in a priming sentence; second, *ziji*'s interpretation should also be subject to the bias brought by disambiguating verbs used in test sentences. The two biases are claimed to be confirmed by the data of reading time. When the priming bias and the verb bias orient towards the same antecedent, the reading times on disambiguating verbs are shorter. But when the two biases conflict, the reading times are much longer. On this basis, Lu concluded that priming in a preceding sentence can affect the on-line processing of *ziji* and there is a robust preference for *ziji* to corefer with whichever antecedent is mentioned in a priming sentence.

Li and Kaiser (2009) also conducted experiments testing previous discourse's effects on *ziji*'s interpretation. As in Lu (2011), Li and Kaiser's experiments also had each test sentence preceded by a discourse sentence, though this preceding sentence did not simply mention one of the possible antecedents but instead provided background information constraining *ziji*'s interpretation. The test sentences in Li and Kaiser's experiments involve *ziji* with two potential antecedents, a local one and a cross-clausal one, and there is no pragmatic, semantic or any other bias to any one of the antecedents within the test sentences. The preceding sentences were manipulated to create either biased conditions that favored cross-clausal coreference, or neutral ones. (6) is an example test sentence, with its possible preceding sentences listed in (7). If (7a) in the neutral condition precedes (6), either reading of *ziji* in (6) is allowed; but if (7b) precedes (6), it is strongly preferred for *ziji* in (6) to refer to Lisi, because Lisi is the one who was ordered to do things.

(6) A standalone test sentence:

Lisi<sub>i</sub> shuo Zhangsan<sub>j</sub> yaoqiu **ziji**<sub>i/j</sub> xiage libai wancheng zhege yue de yewu.  
Lisi say Zhangsan require self next week complete this month POSS quota  
'Lisi<sub>i</sub> said Zhangsan<sub>j</sub> required self<sub>i/j</sub> to complete this month's quota next week.'

Adapted from Li and Kaiser (2009, p. 4)

(7) The possible sentences that can precede (6) in different conditions:

- a. Neutral condition: Zhangsan and Lisi talked about work-related business last week.
- b. Biased condition: Zhangsan's order to his subordinates has troubled Lisi.

Li and Kaiser first had participants evaluate whether *ziji* in a biased or a neutral condition can refer to any or both of the participants. The results indicate that there is a preference for local antecedents in neutral conditions, but the preference switches to cross-clausal antecedents in biased conditions. They then conducted a separate experiment involving self-paced reading tasks and forced-choice questions. Expectedly, participants chose local antecedents over cross-clausal ones in neutral conditions, and an opposite pattern was seen in biased conditions. In terms of reading time, significant slowdowns were observed in the three words immediately following the presentation of *ziji* in neutral conditions. The slowdowns arose because the background information provided by preceding sentences in neutral conditions cannot reduce the competition between two antecedent candidates. Therefore, previous discourse of background information was evidenced to play roles in the interpretation of *ziji*, and “fit well with the view that anaphor resolution is driven by multiple constraints” (Li and Kaiser, 2009, p. 11).

The above has demonstrated that extra-sentential factors do exert influences on *ziji*'s interpretation and that these factors should be taken into consideration in the resolution of *ziji*'s reference. However, none of the experiments above has explored the effects from the context. In this chapter, I will present an experiment testing whether and how the context shapes *ziji*'s reference.

#### **4.1.2 Experimental studies on the blocking effect concerning *ziji***

The blocking effect concerning *ziji* characterizes the fact that cross-clausal coreference of *ziji* can be blocked sometimes. However, there is no consensus on when blocking occurs. Previous analyses assume two types of blocking, namely, unlike person blocking and asymmetric person blocking. Unlike person blocking specifies that coreference with a cross-clausal antecedent is blocked whenever there is a nearer antecedent with a different person specification from the cross-clausal antecedent's person specification (Tang, 1989; Pollard and Xue, 1998). But when asymmetric person blocking (Pan, 1997, 2001; Xu, 1993) is assumed, the blocking exerted from 3rd person

intervening DPs to 1st/2nd person pronouns is not as strong as the blocking from 1st/2nd person intervening pronouns to 3rd person DPs.

Schumacher et al. (2011) investigated the processing of *ziji* in sentences with potential person-based blocking by recording event-related potentials (ERPs), which are the brain responses after being exposed to a stimulus. ERPs are measured by means of electroencephalography (EEG); the results usually take the form of waveforms (Luck, 2014). One of the ERPs relevant to linguistic studies is P600, which refers to a positive-going deflection that peaks around 600 milliseconds post-stimulus onset. For instance, P600 can be elicited by garden-path sentences, which need to be parsed in a way different from the original expectation, though no grammatical error is involved (Osterhout and Holcomb, 1992). An example garden-path sentence is presented in (8). At first sight, readers of (8) would prefer to interpret “persuaded” as the main verb, but once they see the word “to”, they have to re-analyze the sentence by interpreting “persuaded” as part of a phrase modifying *the broker*. In this case, P600 occurs as a response to the anomaly triggered by the word “to”.

(8) The broker persuaded to sell the stock was tall.

Schumacher et al.’s experiment provided empirical evidence for the blocking of coreference with 3rd person cross-clausal antecedents by 1st/2nd person local antecedents, though it did not address the dispute between unlike person blocking and asymmetrical person blocking. In their experiment, each stimulus sentence was visually presented in segments, with each segment showing on the screen for 550 ms. As illustrated in (9), two types of verbs were distinguished in stimuli, i.e., other-directed verbs and self-directed verbs.

(9) a. Stimuli with other-directed verbs

Zhangsan rang            wo/ni/Lisi kaojin    **ziji**.  
Zhangsan CAUSATIVE me/you/Lisi approach self  
‘Zhangsan asked me/you/Lisi to approach self.’

b. Stimuli with self-directed verbs

Zhangsan rang            wo/ni/Lisi    fanxing    **ziji**.  
Zhangsan CAUSATIVE me/you/Lisi introspect self

‘Zhangsan asked me/you/Lisi to introspect on myself/yourself/himself<sub>Lisi</sub>.’

Adapted from Schumacher et al. (2011, p. 123)

Stimuli with other-directed verbs only allow *ziji* to be bound by non-local antecedents, because the semantic meanings of other-directed verbs like *kaojin* ‘approach’ in (9a) make it impossible for *ziji* to corefer with a local antecedent. Conversely, stimuli with self-directed verbs only allow *ziji* to be bound by local antecedents, e.g., *fanxing* ‘introspect’ in (9b). As exemplified in both examples of (9), this experiment distinguished three types of intervening DPs (also local subjects), the 1st person pronoun *wo*, the 2nd person pronoun *ni*, and 3rd person proper names. If *wo* ‘I’ or *ni* ‘you’ serves as the local subject, *ziji*’s coreference with a 3rd person long distance subject (e.g., *Zhangsan* in (9a)) should be blocked, regardless of whether unlike person blocking or asymmetric person blocking is assumed. In this way, a coreference conflict should arise in the condition with other-directed verbs and 1st/2nd person local subjects, as the semantic meanings of other-directed verbs require non-local reference but 1st/2nd person local subjects block non-local reference. The ERP results show two positive deflections from the onset of *ziji*, an early positivity (300-400ms) and a later positivity (P600). The early positivity was most pronounced in the condition with other-directed verbs and 1st/2nd person local subjects, which, according to Schumacher et al., maximizes the aforementioned coreference conflict. Just as an early positivity (in conjunction with a subsequent P600) in the analysis of garden-path sentences indicates the detection of difficulties in continuing with the initial interpretation (Friederici et al., 2001), the current early positivity was claimed to be a sign of processing conflicts between verb semantics and the blocking effect. When it comes to P600, it was more pronounced for 1st/2nd person than 3rd person intervening DPs, and this effect was largely seen in stimuli with other-directed constructions. This converges with the idea that P600 can demonstrate agreement mismatches in morphosyntax (Osterhout and Mobley, 1995), and provides support for the blocking based on mismatched person features.

He and Kaiser (2012) also probed the blocking effect concerning *ziji*’s interpretation but they

focused on examining whether 1st person or 2nd person intervening pronouns block more strongly than 3rd person DPs. Two experiments were conducted, with identical designs except that Experiment 1 involved the 1st person pronoun while Experiment 2 involved the 2nd person pronoun. The participants were asked to first do self-paced reading tasks of stimulus sentences and then perform forced-choice tasks between two options of *ziji*'s antecedent. As exemplified in (10), each stimulus sentence in Experiment 1 has three layers of clauses; the innermost clause's subject is *ziji*, while the intermediate and the outermost clauses' subjects are realized as the 1st person pronoun or 3rd person DPs. The varied person specifications created four levels of person arrangement, as in Table 4.1. As regards Experiment 2, the stimuli used were adapted from those in Experiment 1, with all 1st person pronouns replaced with 2nd person pronouns.

- (10) [wo/Zhangsan gaosu bieren [wo/Lisi juede [**ziji** nenggou jin hao daxue]]].  
 I/Zhangsan tell others I/Lisi feel self could get-in good university  
 'I/Zhangsan told others I/Lisi felt that self can get into a good university.'

(He and Kaiser, 2012, p. 98)

Person arrangement	Outermost clause's subject	Intermediate clause's subject
1st-1st	1st person ( <i>I</i> )	1st person ( <i>I</i> )
1st-3rd	1st person ( <i>I</i> )	3rd person (e.g., <i>Lisi</i> )
3rd-1st	3rd person (e.g., <i>Zhangsan</i> )	1st person ( <i>I</i> )
3rd-3rd	3rd person (e.g., <i>Zhangsan</i> )	3rd person (e.g., <i>Lisi</i> )

Table 4.1: Four levels of person arrangement in He and Kaiser's (2012) Experiment 1

Both experiments found that the antecedent choice of *ziji* demonstrated a strong preference for the intermediate subject, in all conditions except for "1st-1st" and "2nd-2nd", where the intermediate subjects and the outermost subjects are identical and do not involve antecedent choice. This does not help in determining whether 1st or 2nd person pronouns block more strongly than 3rd person DPs. Despite this, the 2nd person pronoun seems to be a more stable blocker than the 1st person pronoun, as the coreference with an outermost subject occurred more in the "3rd-1st" than

in the “3rd-2nd” condition (26.9% vs. 6.2%,  $p < 0.005$ ). When it comes to on-line processing, the reading times in the “1st-1st” and the “2nd-2nd” conditions were taken as baselines because the two did not involve antecedent competition, hence having the lowest processing loads. Longer reading times reflect greater processing loads (Badecker and Straub, 1994, 2002). Significant slowdowns were witnessed in the “1st-3rd”, the “2nd-3rd”, the “3rd-3rd” and the “3rd-1st” conditions, suggesting that extra processing costs were required to resolve the problem of more than one candidate antecedent (i.e., no blocking occurs to reduce antecedent competition). The slowdown in the “3rd-3rd” condition is consistent with the idea that blocking does not occur when there are no conflicting person specifications. When it comes to the slowdowns in the two conditions “1st-3rd” and “2nd-3rd”, they seem to suggest that no blocking is invoked in the two conditions, which can be characterized by asymmetrical person blocking. The only unexpected significant slowdown happened in the “3rd-1st” condition considering that both unlike person blocking and asymmetric person blocking predict blocking for this condition, but the slowdown seems to suggest that no candidate antecedent was blocked from coreference. As for the “3rd-2nd” condition, a marginal slowdown was found, indicating mild blocking. It was thus concluded that compared to the 1st person pronoun, the 2nd person pronoun is a more stable blocker that can somewhat reduce candidate competition, without involving significantly greater processing loads.

In a more recent study by He and Kaiser (2016), there is an attempt to account for the stronger blocking caused by the 2nd person than by the 1st person pronoun. The less stable and less reliable blocking by a 1st person pronoun shown in He and Kaiser (2012) may result from the matrix verb used in stimulus sentences. As in (10), the matrix verb is always *gaosu* ‘tell’, the clausal complement of which is easily misinterpreted as a direct speech from *Zhangsan*. In the “3rd-1st” condition, a direct speech interpretation allows *ziji* to corefer with the 3rd person outermost subject and mitigate the blocking effect, because *ziji* can be bound by the 1st person intermediate subject, which in turn refers to the direct speech producer represented as the outermost subject. In order to justify this reasoning, they replicated the experiment in He and Kaiser (2012), but with matrix verbs in stimulus sentences replaced with *ting-shuo* ‘hear’, to eliminate the possibility of

misinterpretation as direct speeches. This revised study found that coreference with an outermost subject was still numerically rare overall, but this time the outermost subjects were less preferred in the “3rd-1st” than in the “3rd-2nd” condition, revealing a pattern opposite to the one found in He and Kaiser (2012). The hypothesis is thus supported that participants tend to activate direct speech interpretations in stimuli with ‘tell’ as the matrix verb, providing an “escape hatch” in the face of blocking by the 1st person pronoun. With regard to the reading time patterns, there is no significant indication of reading time slowdowns in all conditions, including “1st-3rd”, “3rd-1st”, “2nd-3rd” and “3rd-2nd”. It seems that participants this time were not including the outermost subject as an option for coreference, and that blocking occurs as long as there is a mismatch of person specification. Based on off-line antecedent choices and on-line reading times from the revised experiment, He and Kaiser (2016) concluded that unlike person blocking is supported.

The experiments of He and Kaiser (2012, 2016) investigated anaphora resolution of *ziji* and took into account the antecedents’ person specifications. It is demonstrated that potential antecedents’ person specifications can affect both real-time processing and comprehenders’ antecedent choices. However, it is doubtful whether the off-line antecedent choice data can really serve as evidence for unlike person blocking, i.e., blocking is triggered whenever there is an intervening DP with a different person specification. Note that the preference for intermediate subject antecedents cannot be simply characterized as blocking/unavailability of coreference with other antecedents (in this case, outermost subjects), as a forced choice between two options does not ensure that the unselected one is not a possible choice (Han and Storoshenko, 2012a). Thus, the blocking facts still need to be clarified by more research, especially experiments. In the remaining sections, I will present my experimental study, which abstained from using forced-choice tasks when evaluating *ziji*’s potential interpretation.

## 4.2 Methods

### 4.2.1 Materials and design

The current experiment intended to evaluate *ziji*'s potential for cross-clausal coreference in different contexts. The stimulus sentences involved all follow the pattern “matrix subject + matrix verb + local subject + embedded verb + *ziji*”, as exemplified in (11).

(11) “3rd-3rd”: 3rd person matrix subject and 3rd person local subject

John<sub>i</sub> mingbai Mike<sub>j</sub> hui tiaozhan **ziji**<sub>i/j</sub>.  
John understand Mike will challenge self

‘John<sub>i</sub> understands that Mike<sub>j</sub> will challenge self<sub>i/j</sub>.’

The matrix subject is a potential cross-clausal antecedent for *ziji*, whereas the local subject is a potential local antecedent. The matrix verb has to be an attitude predicate or speech verb that can introduce clausal complements. The embedded verb here is a two-place transitive verb that is neither self-directed nor other-directed. Recall the other-directed verb *kaojin* ‘approach’ in (9a). ‘Approach’ is other-directed as one cannot approach themselves, so that *ziji* in object position cannot be bound by its co-argument local subject. Self-directed verbs are verbs like *fanxing* ‘introspect’, and the action signified by a self-directed verb can only be directed at the agent of the action. If the embedded verb *tiaozhan* ‘challenge’ in (11) is replaced with the self-directed verb *fanxing* ‘introspect’, *ziji* can only refer to the individual represented by the local subject. Since self-directed and other-directed verbs can constrain *ziji*'s interpretation, both types of verbs were avoided in the design of stimulus sentences to reduce irrelevant variables. In this experiment, fifteen templates in the form of “\_\_\_\_\_ + matrix verb + \_\_\_\_\_ + embedded verb + *ziji*” were prepared to produce all stimuli; each template has a different matrix verb and a different embedded verb.<sup>1</sup>

The sentence in (11) is an example stimulus with both its matrix subject and local subject filled by 3rd person DPs (3rd-3rd), but this arrangement of person specification only represents one level

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<sup>1</sup>The current experiment only made use of fifteen templates, because the number of attitude predicates in Mandarin is limited. Refer to the appendix for a list of the fifteen templates.

of person arrangement. This experiment also involved two other levels of person specification arrangement (“1st-3rd” and “3rd-1st”), as shown in (12). The three levels constitute the factor “person arrangement”. Unlike in (11), *ziji*’s reference is not indicated in sentence (12a) or (12b). This is because in (11) with the arrangement “3rd-3rd”, *ziji* can corefer either with the matrix subject or the local subject because there is no conflicting person specifications that potentially lead to blocking. But when it comes to the arrangements “1st-3rd” and “3rd-1st” shown in (12), whether the incongruous person specifications result in blocking is one of the questions to be answered in this experiment. Thus, *ziji*’s references in (12) are left blank.

(12) a. “1st-3rd”: 1st person matrix subject and 3rd person local subject

wo caixiang jimu dangshi yiding henshi **ziji** le.  
 I guess Jim then must hate-die self SFP  
 ‘I guess that Jim must have detested self at that time.’

b. “3rd-1st”: 3rd person matrix subject and 1st person local subject

yuehan qidai wo neng duo tantan **ziji**.  
 John expect I can more discuss self  
 ‘John expects that I can talk more about self.’

Even if the conflicting person specifications in (12a) with “1st-3rd” lead to blocking, this blocking can be mitigated as long as (12a) is produced as part of one’s direct thought, with *ziji* interpreted as a contextual contemplative use. The production of direct thought requires the producer to be in a contemplative state during production, demonstrating a specified context. In light of this, this experiment had “context” as a second factor, to test contexts’ effects on *ziji*’s interpretation. Four different contexts were developed in this experiment, including two primary test contexts and two secondary test contexts.<sup>2</sup> The context “contemplation”, under which direct thought is produced, was included as one of the two primary contexts. The other primary context is “face-to-face conversation” as it represents one of the most common contexts for language use.<sup>3</sup> More-

<sup>2</sup>The primary test contexts and the secondary test contexts were originally created as test contexts and filler contexts respectively. However, after analyzing the data in filler contexts, it was found that the inclusion of filler items in analyses produced meaningful results. Considering this, test contexts were re-categorized as primary test contexts while filler contexts were re-categorized as secondary test contexts.

<sup>3</sup>The remaining thesis uses the short form “conversation” to mean “face-to-face conversation”.

over, “conversation” was introduced as a control context with almost zero interference expected from *ziji*’s contextual contemplative readings. “Conversation” occurs mainly for the purpose of communication rather than contemplation, so it is usually infelicitous to produce direct thought in “conversation”. The two secondary test contexts are “text messaging” and “public speaking”. They were introduced to diversify the contexts and possibly reveal other contextual effects. With the factors “person arrangement” and “context”, the current experiment had six primary conditions and six secondary conditions, as summarized in Table 4.2. The primary contexts/conditions and the secondary contexts/conditions served as filler contexts/conditions to one another, without involving additional filler contexts/conditions.

	primary contexts		secondary contexts	
	“conversation”	“contemplation”	“text messaging”	“public speaking”
1st-3rd	condition 1	condition 2	condition 7	condition 8
3rd-1st	condition 3	condition 4	condition 9	condition 10
3rd-3rd	condition 5	condition 6	condition 11	condition 12

Table 4.2: Summary of the experiment design

This experiment avoided using linguistic means to signal contexts, as linguistic means may introduce discursive antecedents for *ziji* and complicate this experiment. In order to eliminate any discursive effects and ensure a focus on the contexts, all test contexts were signaled with pictures, as illustrated in Figure 4.1 and Figure 4.2. The pictures used are similar to those in comic books.

Figure 4.1: Instantiated pictures of the primary test contexts

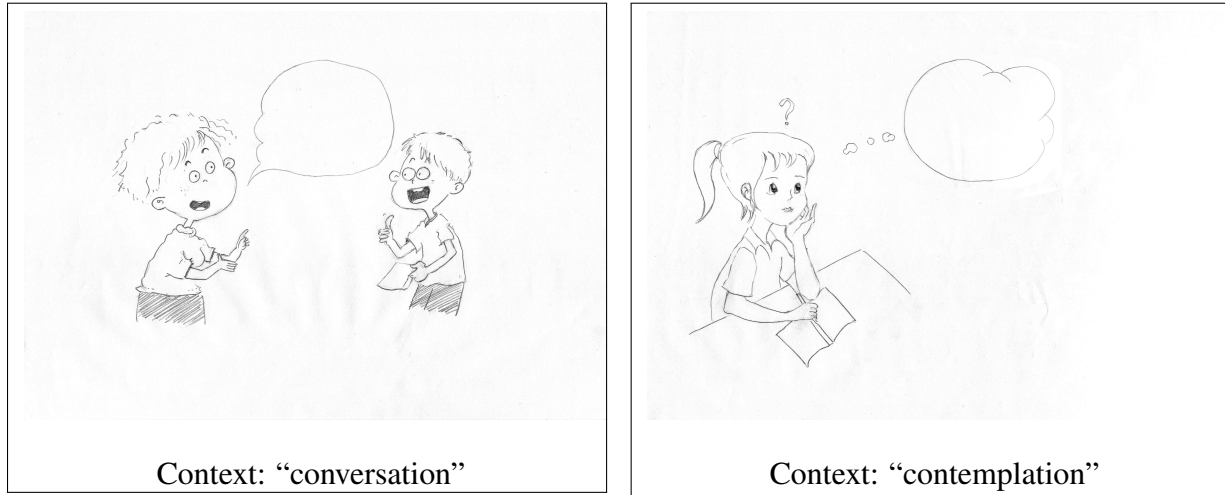
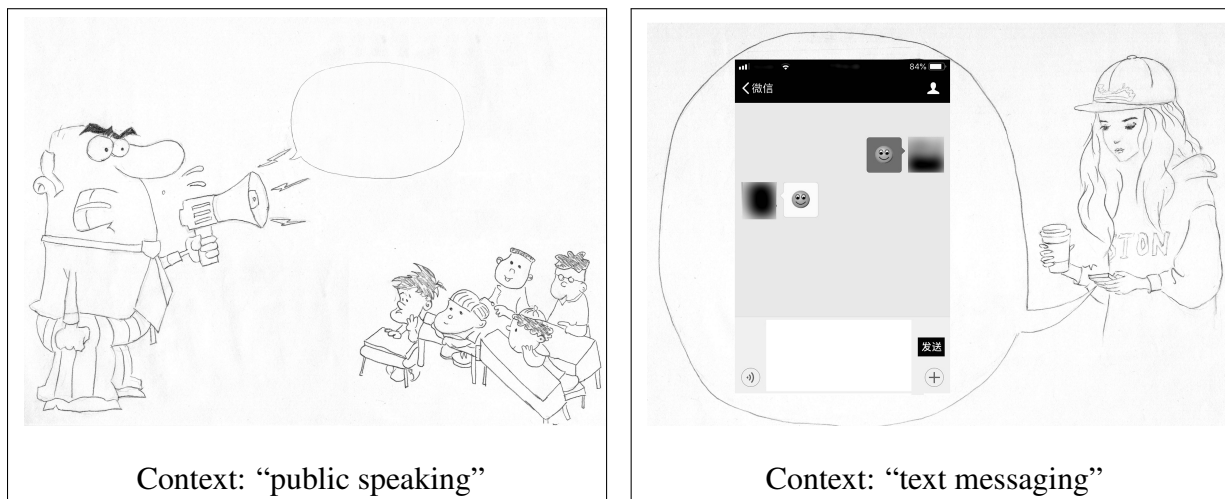


Figure 4.2: Instantiated pictures of the secondary test contexts



As seen above, “conversation” was signaled by pictures showing two people conversing, with one talking to the other; “contemplation” was indicated by pictures with one person meditating; “public speaking” was simulated by pictures showing one giving a speech to a crowd of people. The pictures for “text messaging” are relatively complicated, as each of these pictures depicts one person using a cell phone, along with a closeup of the phone’s screen. The closeup shows the typical screen that a phone user would see when communicating with someone in a messaging application. For each test context, three pictures were prepared. The pictures for each context

are similar in every way except that the figures involved have different looks. It was ensured that the difference in looks would not have an effect on the context that a picture was intended to indicate. In doing so, participants would not always see the same picture for each test context, and meanwhile no extra variable was introduced.

Each context-indicating picture contains a bubble or box where a stimulus sentence can be embedded. The bubbles are overtly connected with specific individuals in the pictures, to help identify the corresponding contemplators or speakers. With regard to the context “text messaging”, a stimulus sentence would not be directly embedded in a bubble, but in the rectangular box within the bubble. As shown in the picture for “text messaging” in Figure 4.2, there is already a round of communication with emojis between the two chatting companions; beside the rectangular box is a button with two characters meaning ‘send’. It is thus clear that the stimulus sentence in the rectangular box simulates a new message that the phone user (i.e., the girl in the picture) has just typed after the previous round of communication with emojis. In this way, a stimulus sentence in “text messaging” would not be taken as a sentence initiating the texting, though no previous discourse was introduced.

Participants faced a computer screen and were presented with the same list of 60 test trials, with each trial displayed on a single screen. As exemplified in Figure 4.3 or its English version in Figure 4.4, each trial contains a stimulus sentence, a context-indicating picture, a judgment question and instructions; the stimulus sentence is within the bubble/box of the picture, while the judgment question is provided right below the picture.

Figure 4.3: An instantiated screen of experiment trials (original)



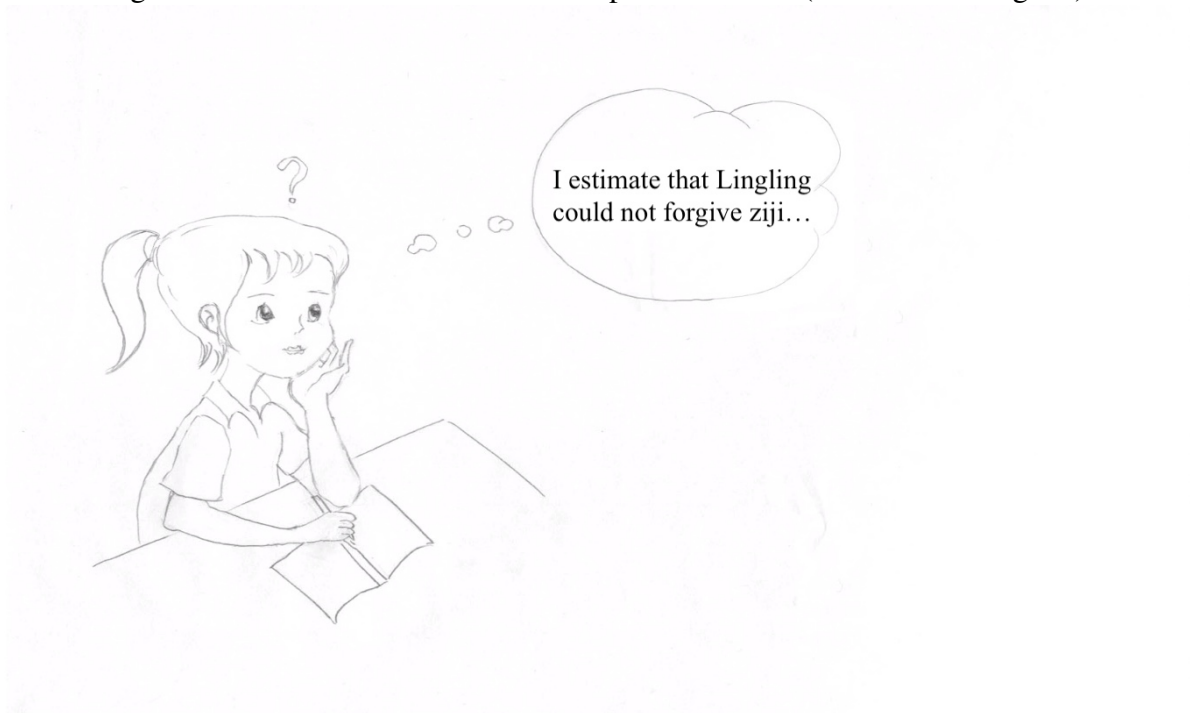
问题：句子中的“自己”可以指“我”吗？

请用从1到7的数字对这种可能性打分。分数越高，表示可能性越高。

1 2 3 4 5 6 7

完成本题后，请按“空格键”继续！

Figure 4.4: An instantiated screen of experiment trials (translated to English)



**Question: how likely do you think it is for ‘ziji’ to refer to ‘I’ in the sentence above?**

**Please give your judgement with a number from 1 to 7. The higher a score is, the more likely it is.**



**After the judgement, press the ‘spacebar’ to continue!**

Judgment questions take the form in (13). The symbol “\*\*\*” represents a blank to be filled by the matrix subject in the corresponding stimulus sentence. For instance, the judgment question for sentence (11) is “How likely do you think it is for *ziji* to refer to John?”

(13) How likely do you think it is for *ziji* to refer to \*\*\*?

Participants were instructed to answer judgment questions using a 7-Point Likert Scale, by pressing a number from 1 to 7 as their answers. A higher score means more likelihood for *ziji* to take the reference in question. Apart from judgment scores, participants’ reaction times were also automatically collected, to examine whether participants spent a reasonable amount of time in each trial. Reaction time measured the time span from the outset of each trial (i.e., the screen with a context-indicating picture, a stimulus sentence and a judgment question as in Figure 4.3) to the

moment that a participant pressed a key as their response to the judgement question.

The list of 60 test trials used in this experiment were created from the aforementioned fifteen templates under the twelve conditions in Table 4.2 (with various combinations of person arrangement and context). In order to maximize the gaps between trials using the same templates and meanwhile ensure randomization, test trials were designed following Table 4.3. The fifteen templates were randomly divided into three groups, i.e., Template 1 to 5, Template 6 to 10, Template 11 to 15. Template 1 to 5 were used in a random order in Trial 1 to 5, Trial 16 to 20, Trial 31 to 35 and Trial 46 to 50; Template 6 to 10 were used in a random order in Trial 6 to 10, Trial 21 to 25, Trial 36 to 40 and Trial 51 to 55; Template 11 to 15 were used in a random order in Trial 11 to 15, Trial 26 to 30, Trial 41 to 45 and Trial 56-60. In this way, each trial had a template for use; each template would appear four times, but participants would not see the same templates within every ten consecutive trials. As for the twelve conditions, they were randomly assigned to the 60 trials, ensuring that there were equal numbers of trials for each condition and that no two consecutive trials had identical person arrangements or identical contexts. Stimulus sentences used in test trials were created by filling the relevant templates with 3rd person proper names and/or the 1st person pronoun *wo* ‘I’ in accordance with the assigned conditions. Lastly, each stimulus sentence was embedded in its corresponding context-indicating picture.

<b>Template 1 to 5</b> (in a random order)	<b>Template 6 to 10</b> (in a random order)	<b>Template 11 to 15</b> (in a random order)
Trial 1-5	Trial 6-10	Trial 11-15
Trial 16-20	Trial 21-25	Trial 26-30
Trial 31-35	Trial 36-40	Trial 41-45
Trial 46-50	Trial 51-55	Trial 56-60

Table 4.3: Distribution of templates in test trials

### 4.2.2 Participants

33 native speakers of Mandarin Chinese participated in this experiment. The participants were all college students recruited from Zhengzhou Institute of Technology (China), including 21 females and 12 males, with their ages ranging from 18 to 22 (mean = 20.2). All participants had normal or corrected-to-normal vision, and there were no known learning difficulties or hearing impairments by their own reports. They were paid 50 yuan (around CAD 10) each for their participation. This research was reviewed and approved by Conjoint Faculties Research Ethics Board of University of Calgary, with the approval number REB18-0602.

### 4.2.3 Procedure

The experiment was conducted on a Macbook using Psychopy (Pierce, 2009). Participants would sit in front of the Macbook, and first saw two practice trials. Each trial followed a similar layout as in Figure 4.3. Adequate time was left for participants to make judgments. After finishing a trial, they would need to press the spacebar to move on to the next trial. After familiarizing themselves with the experiment through practice trials, each participant would see the full list of 60 test trials, which involve all three levels of person arrangement and all test contexts.

### 4.2.4 Predictions

The predictions are concerned with *ziji*'s potential to corefer with a cross-clausal antecedent under different person arrangements and in different contexts. The relevant hypotheses here are unlike person blocking and asymmetric person blocking. Unlike person blocking predicts that blocking appears under both “1st-3rd” and “3rd-1st” but not “3rd-3rd”. When it comes to asymmetric person blocking, no blocking is predicted for “3rd-3rd”, but the blocking under “3rd-1st” (i.e., exerted from 1st person intervening pronouns to 3rd person DPs) should be stronger than that under “1st-3rd” (i.e., exerted from 3rd person intervening DPs to 1st person pronouns). Blocking in this case seems to be gradient, with “3rd-3rd”, “1st-3rd” and “3rd-1st” respectively involving no

blocking, partial blocking, and full blocking. The blocking levels predicted by the two hypotheses are provided in Table 4.4.<sup>4</sup>

unlike person blocking	$B(3rd-3rd) < B(1st-3rd) \approx B(3rd-1st)$
asymmetric person blocking	$B(3rd-3rd) < B(1st-3rd) < B(3rd-1st)$

Table 4.4: Predictions of blocking levels with different person arrangements

Cross-clausal coreference here depends on whether there is blocking and how intense this blocking is. The more intense the blocking is, the less potential *ziji* will have for cross-clausal coreference, and the lower scores participants will give. After the predictions of blocking levels are transformed into referential scores, there are predicted score comparisons as seen in Table 4.5.<sup>5</sup>

unlike person blocking	$S(3rd-3rd) > S(1st-3rd) \approx S(3rd-1st)$
asymmetric person blocking	$S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$

Table 4.5: Predictions on score comparisons with different person arrangements

Note that the predictions above do not include any contextual effect, and that the referential scores can also vary in different contexts. It is hypothesized that “contemplation” contexts can save *ziji*’s cross-clausal coreference from blocking. The linguistic outcome produced in a context of contemplation is direct thought; *ziji* in direct thought is interpreted as a contextual contemplative use and refers to the contemplator in the context. As the contextual contemplator is also the speaker, *ziji* and the 1st person pronoun *wo* corefer in direct thought. This coreference is also demonstrated in (14), which was derived at the end of Chapter 2.

$$(14) \quad \llbracket ziji \rrbracket^{c,i} \xrightarrow{\text{REFER TO}} \text{contemplator} \xrightarrow{\text{SIMULTANEOUSLY}} \text{AUTHOR}(c) = \text{speaker} = \llbracket wo \rrbracket^{c,i}$$

Following the reasoning above, *ziji*’s coreference with the 1st person *wo* should always be maintained in “contemplation” contexts, even if there is an intervening antecedent with a different

<sup>4</sup>“B” in this table (e.g., B(3rd-3rd)) means blocking level.

<sup>5</sup>“S” in this table (e.g., S(3rd-3rd)) means scores.

person specification. That is, any blocking happening to stimuli of “1st-3rd” should be bypassed by *ziji*’s coreference with *wo* in “contemplation” contexts. After incorporating the predicted contextual effect from *ziji*’s contextual contemplative readings, Table 4.6 provides revised predictions on score comparisons.<sup>6</sup> The first two rows are associated with predictions in “contemplation” and the uparrow symbols beside S(1st-3rd) are used to signal the improved referential scores under “1st-3rd”. This improvement comes from the predicted removal of blocking under “1st-3rd”; consequently, the scores under “1st-3rd” will be higher than those under “3rd-1st”, which necessarily involves blocking. As “conversation” is a control context assumed not to invoke *ziji*’s contextual contemplative interpretations, it should follow the predictions without contextual effects, as in Table 4.5. In terms of the two secondary contexts “text messaging” and “public speaking”, contextual contemplative uses of *ziji* are again not as easily obtained as in “contemplation”. For now, I hypothesize that the two secondary contexts do not license *ziji*’s contextual contemplative uses, so the contextual effect in question does not exert its influence and the predictions in Table 4.5 should continue to apply in the two secondary contexts. With the three contexts “conversation”, “text messaging” and “public speaking” embracing identical predictions, they are represented as “other contexts” in the last two rows in Table 4.6.

unlike person blocking (in “contemplation”)	$S(3rd-3rd) \approx S(1st-3rd)\uparrow > S(3rd-1st)$
asymmetric person blocking (in “contemplation”)	$S(3rd-3rd) \approx S(1st-3rd)\uparrow > S(3rd-1st)$
unlike person blocking (in other contexts)	$S(3rd-3rd) > S(1st-3rd) \approx S(3rd-1st)$
asymmetric person blocking (in other contexts)	$S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$

Table 4.6: Predictions on score comparisons (person arrangement  $\times$  context)

<sup>6</sup>Since the predicted contextual effect only comes from *ziji*’s contextual contemplative uses, later uses of “contextual effect from *ziji*’s contemplative readings” also mean the effect from *ziji*’s contextual contemplative readings.

## 4.3 Results and analyses

33 participants were recruited, but the data from three participants were removed from calculations and analyses, i.e., only 30 participants' data were analyzed. The removal was performed based on the mean scores that each participant gave to stimuli with "3rd-3rd" person arrangement. As both unlike person blocking and asymmetric person blocking predict no blocking for the "3rd-3rd" arrangement, stimuli with this arrangement should have high referential scores and serve as the touchstone for reliable and consistent judgments. Two participants' data were ruled out because their mean scores for "3rd-3rd" stimuli were unexpectedly low (1.35 and 2.2 respectively). There is still one more participant's data removed because this participant's reaction times across all trials with "3rd-3rd" stimuli varied dramatically and this participant also reported mental distraction during participation. In consequence, the data to be analyzed was retrieved from the remaining 30 participants' data points.

### 4.3.1 Mean scores

The mean scores for each condition are summarized in the table below.

	3rd-3rd		1st-3rd		3rd-1st	overall
Conversation	4.43	>	3.72	>	2.99	3.71
Contemplation	5.05	>	4.43	>	3.19	4.22
Text messaging	5.28	>	3.77	>	3.05	4.04
Public speaking	5.36	>	4.19	>	3.05	4.20
overall	5.03	>	4.03	>	3.07	4.04

Table 4.7: Mean scores under all conditions

Firstly, comparisons are made among different person arrangements. As shown by the '>' sign between each pair of comparisons in Table 4.7, the mean scores under "3rd-3rd" person arrangement are higher than those under "1st-3rd" person arrangement, which in turn exceed those under

“3rd-1st” person arrangement. This trend of decreasing scores applies within each specific context and the various contexts as a whole. This means that 1st person pronouns’ blocking of coreference with 3rd person DPs is stronger than 3rd person DPs’ blocking of coreference with 1st person pronouns, which in turn exceeds the blocking exerted from 3rd person DPs to 3rd person DPs. However, whether this decreasing pattern is statistically significant still requires more analyses.

Second, comparisons are made under the “1st-3rd” arrangement, which is relevant to the predicted contextual effect. As highlighted with a grey background, “contemplation” has the highest mean score in the column “1st-3rd”, which seems to suggest that 3rd person DPs’ blocking of coreference with 1st person pronouns in “contemplation” is alleviated. Further analyses are required to see whether the scores in “contemplation” are significantly higher than those in other contexts.

### 4.3.2 Analyses of referential scores

All analyses in this research were conducted using linear mixed-effects models in R (R Core Team, 2018), and they were realized through the *lme4* package (Bates et al., 2015) and the *lmerTest* package (Kuznetsova et al., 2017). The two packages allow analyses of all data points, rather than merely mean scores; the analyses took into consideration not only the effects from person arrangement and context, but the random effects from participants and various stimuli. I first analyzed the referential scores in primary test contexts. In fitting the best model, referential scores were made as a function of person arrangement and context, with participant and item as random effects. After necessary model comparisons, it turned out that the best model was the one involving both person arrangement and context but no interaction between them.<sup>7</sup> The results from the best model are summarized in Table 4.8, with the arrangement “1st-3rd” and the context “conversation” serving as the respective baselines.

---

<sup>7</sup>The most complex model (i) and the best model (ii) concerning analyses of referential scores in primary test conditions are provided below.

(i)  $\text{Score} \sim \text{Person arrangement} * \text{Context} + (1|\text{Participant}) + (1|\text{Item})$

(ii)  $\text{Score} \sim \text{Person arrangement} + \text{Context} + (1|\text{Participant}) + (1|\text{Item})$

	Estimate	SE	<i>t</i>	<i>Pr</i>
(Intercept)	3.82	0.27	14.35	< 0.001 ***
3rd-1st	-0.98	0.26	-3.75	< 0.001 ***
3rd-3rd	0.66	0.26	2.52	0.02 *
Contemplation	0.51	0.21	2.39	0.02 *

Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 4.8: Summary of results from analyzing scores in primary test conditions

The results suggest independent effects of person arrangement and context. Compared to the scores under “1st-3rd” arrangement, the scores under “3rd-1st” are significantly lower ( $-0.98, p < 0.001$ ) but the scores under “3rd-3rd” are significantly higher ( $0.66, p = 0.02$ ), showing the inequality “ $S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$ ”. This means that both “1st-3rd” and “3rd-1st” involve blocking, but the blocking under “1st-3rd” (i.e., from 3rd person intervening DPs to 1st person pronouns) is not as strong as that under “3rd-1st” (i.e., from 1st person intervening pronouns to 3rd person DPs). As this inequality is derived based on scores in different contexts, it cannot tell what the blocking facts free from the predicted contextual effect support (i.e., unlike person blocking or asymmetric person blocking). When it comes to contexts’ effects, the overall scores in “contemplation” are significantly higher ( $0.51, p = 0.02$ ) than those in “conversation”, which suggests that the blocking in “contemplation” is lessened. This is consistent with the predicted contextual effect specific to “contemplation”.

The above findings provide evidence for the overall effects of person arrangement and context, but it is also meaningful to examine how the two factors function in the two secondary test conditions. An analysis similar to the previous one was then performed, including the data from both the primary and the secondary test conditions. The best model emerging from comparisons was still the one with person arrangement and context as fixed effects without interactions, and with participant and item as random effects. As shown in Table 4.9, the results from the extended analysis incorporating both primary and secondary test conditions also suggest the individual effects

of person arrangement and context.

	Estimate	SE	t	Pr
(Intercept)	3.82	0.27	14.35	< 0.001 ***
3rd-1st	-0.96	0.17	-5.75	< 0.001 ***
3rd-3rd	1.00	0.17	6.00	< 0.001 ***
Text messaging	0.32	0.19	1.68	0.10
Contemplation	0.51	0.19	2.66	0.01 *
Public speaking	0.49	0.19	2.55	0.01 *

Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 4.9: Summary of results from analyzing scores in all conditions

The extended analysis also found the inequality “ $S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$ ”, confirming the effect from “person arrangement”. Moreover, the predicted contextual effect relating to *ziji*’s contemplative readings was also evidenced by the significantly higher scores in “contemplation” than in “conversation”. The extended analysis also compared the scores in “conversation” with those in “text messaging” and those in “public speaking”. It seems that like “contemplation”, “public speaking” also increased the referential scores for cross-clausal coreference, though it is unclear whether the increase happened to stimuli with a specific person arrangement or all stimuli indiscriminately, and whether this increase also came from the predicted contextual effect relating to *ziji*’s contemplative readings.

The two analyses above confirmed the overall effects from person arrangement and context, but further pairwise analyses were needed to decide where these effects applied exactly, that is, to which person arrangement and to which context. An answer to this question is important to examine whether the predicted contextual effect also applies in contexts other than “contemplation”, and whether unlike person blocking or asymmetric person blocking can better characterize the blocking facts free from the predicted contextual effect.

### Pairwise analyses of “person arrangement”

The data of mean scores in Table 4.7 already suggested that in each separate context, the scores decrease when the person arrangement changes from “3rd-3rd” to “1st-3rd” and finally to “3rd-1st”, with the inequality “ $S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$ ”. However, pairwise analyses were still required to examine whether the inequality was statistically supported in each test context. After rounds of model comparisons and analyses, the significance of differences between pairs of person arrangement in each context is summarized in Table 4.10.

	<i>p</i> -value(3rd-3rd vs. 1st-3rd)	<i>p</i> -value(1st-3rd vs. 3rd-1st)
Conversation	0.005 **	0.004 **
Contemplation	0.14	0.008 **
Text messaging	< 0.001 ***	0.002 **
Public speaking	< 0.001 ***	< 0.001 ***

Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 4.10: Summary of pairwise comparisons in each context

The results indicate significant differences in all the comparisons except the one between “3rd-3rd” and “1st-3rd” in “contemplation”. In other words, the inequality “ $S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$ ” applied in each context except in “contemplation”, where no significant difference was found between  $S(3rd-3rd)$  and  $S(1st-3rd)$ . In Table 4.11, I present the revised score comparisons, based on results from statistical analyses.

	3rd-3rd	1st-3rd	3rd-1st	Comparisons based on statistical analyses
Conversation	4.43	3.72	2.99	$S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$
Contemplation	5.05	4.43	3.19	$S(3rd-3rd) \approx S(1st-3rd) \uparrow > S(3rd-1st)$
Text messaging	5.28	3.77	3.05	$S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$
Public speaking	5.36	4.19	3.05	$S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$

Table 4.11: Summary of comparisons based on statistical analyses

Now I compare the results in Table 4.11 with the predictions in Table 4.6, which is reproduced below as Table 4.12.

unlike person blocking (in “contemplation”)	$S(3rd-3rd) \approx S(1st-3rd) \uparrow > S(3rd-1st)$
asymmetric person blocking (in “contemplation”)	$S(3rd-3rd) \approx S(1st-3rd) \uparrow > S(3rd-1st)$
unlike person blocking (in other contexts)	$S(3rd-3rd) > S(1st-3rd) \approx S(3rd-1st)$
asymmetric person blocking (in other contexts)	$S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$

Table 4.12: Predictions on score comparisons (person arrangement  $\times$  context)

Firstly, comparisons are made in contexts other than “contemplation”, which include “conversation”, “text messaging”, and “public speaking”. In all these contexts, the comparisons based on statistical analyses suggest the inequality “ $S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$ ”: while *ziji*’s coreference with 1st person pronouns was blocked by 3rd person DPs, 1st person pronouns’ blocking of *ziji*’s coreference with 3rd person DPs was more intense, conforming to asymmetric person blocking.

With regard to “contemplation”, this context was predicted to remove the blocking exerted from 3rd person DPs to 1st person pronouns (i.e., under “1st-3rd”). This prediction is borne out by two steps of reasoning. First, the score comparisons between “3rd-3rd” and “1st-3rd” in all the other contexts (especially the control context “conversation”) have demonstrated the existence of blocking under “1st-3rd”. Second, the score difference between “3rd-3rd” and “1st-3rd” is not statistically significant in “contemplation”, which suggests the blocking under “1st-3rd” was removed in this context. Therefore, the predicted contextual effect is validated by the removal of blocking in “contemplation” under “1st-3rd”.

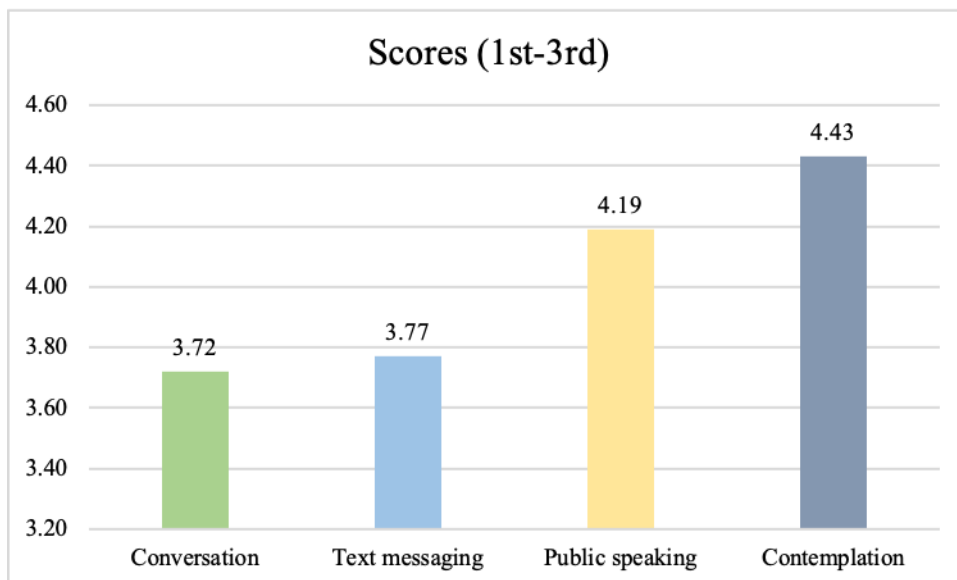
### Pairwise analyses of “context”

A pairwise analysis of context was first run on data retrieved under the person arrangement “3rd-1st”; the mean scores in “contemplation”, “conversation”, “text messaging” and “public speaking” are 3.19, 2.99, 3.05 and 3.05 respectively. As indicated by the seeming similarities of mean scores,

no significant difference was found between each pair of compared contexts. Therefore, stimuli of “3rd-1st” are not subject to contexts’ effects, including the predicted contextual effect.

In terms of the data obtained under the arrangement “1st-3rd”, however, the results from a pairwise analysis turned out to be more complex than predicted. Figure 4.5 presents a visualization of what the cross-clausal coreference potential is like in each context.

Figure 4.5: Mean scores under the person arrangement “1st-3rd”



First, I compared the target context “contemplation” and the control context “conversation”. The person arrangement “1st-3rd” is the exact one and the only one where the contextual effect from *ziji*’s contemplative readings was predicted to play a role. Under “1st-3rd”, *ziji* in “contemplation” should invoke contextual contemplative readings, circumvent the blocking from intervening 3rd person DPs, and gain higher scores for cross-clausal coreference. Following this prediction, the scores in “contemplation” should outnumber those in “conversation”; this is borne out by the score comparison (4.43 vs. 3.72,  $p = 0.003$ ) in Table 4.13, which provides the significance of differences between each pair of compared contexts.

comparison pairs	relation	<i>p</i> -value
Conversation vs. Text messaging	<	0.822
Conversation vs. Public speaking	<	0.047 *
Conversation vs. Contemplation	<	0.003 **
Text messaging vs. Public speaking	<	0.077
Text messaging vs. Contemplation	<	0.005 **
Public speaking vs. Contemplation	<	0.329

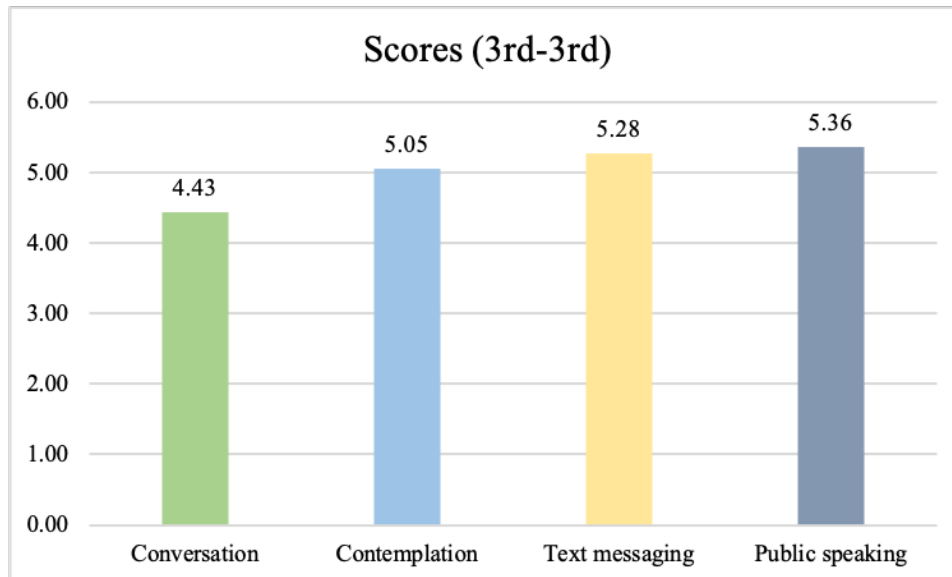
Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 4.13: Summary of pairwise comparisons under the person arrangement “1st-3rd”

As for the two secondary test contexts under the person arrangement “1st-3rd”, they were hypothesized to behave like “conversation”, without invoking *ziji*’s contextual contemplative readings. Following this hypothesis, the referential scores in the two secondary test contexts should be alike. As seen in Figure 4.5 and Table 4.13, the scores in “text messaging” are similar to those in “conversation” (3.77 vs. 3.72,  $p = 0.822$ ); but unexpectedly, the scores in “public speaking” are significantly higher than those in “conversation” (4.19 vs. 3.72,  $p = 0.047$ ). It seems that “public speaking” is more like “contemplation” rather than “conversation” in terms of the scores for cross-clausal coreference, which challenges the hypothesis that “public speaking” behaves like “conversation”. Note that “public speaking” and “contemplation” are still different, when compared to “text messaging”. The scores in “public speaking” are only marginally higher than those in “text messaging” ( $p = 0.077$ ), but the scores in “contemplation” are significantly higher than those in “text messaging” ( $p = 0.005$ ). All these suggest that “public speaking” is also subject to a contextual effect, which increases *ziji*’s potential for cross-clausal coreference. The contextual effect involved in “public speaking” will be discussed in a later section.

Lastly, I compared the mean scores in each context under the person arrangement “3rd-3rd” and did pairwise statistical analyses. While the mean scores are illustrated in Figure 4.6, the results from pairwise analyses are presented in Table 4.14.

Figure 4.6: Mean scores under the person arrangement “3rd-3rd”



comparison pairs	relation	<i>p</i> -value
Conversation vs. Contemplation	<	0.165
Conversation vs. Text messaging	<	0.062
Conversation vs. Public speaking	<	0.044 *
Contemplation vs. Text messaging	<	0.616
Contemplation vs. Public speaking	<	0.442
Text messaging vs. Public speaking	<	0.726

Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 4.14: Summary of pairwise comparisons under the person arrangement “3rd-3rd”

Graphically, the mean scores in “contemplation”, “text messaging” and “public speaking” are all similar in being above 5, while the context “conversation” has the lowest mean score, 4.43. Statistically, the difference in each compared pair is not significant, except for the pair with the highest and the lowest mean score, i.e., “conversation” (4.43) vs. “public speaking” (5.36), with  $p = 0.044$ . In addition, “text messaging” has marginally higher scores than “conversation”, with  $p = 0.062$ . It has to be noted that the significant difference found under the arrangement “3rd-3rd”

does not conform to the prediction that approximate scores should obtain across various contexts, because stimuli with the arrangement “3rd-3rd” did not involve blocking and should be free from the only predicted contextual effect from *ziji*’s contemplative readings. Thus, further investigation is required to account for the unexpected significant difference under “3rd-3rd” between “conversation” and “public speaking”.

## 4.4 Discussion

### 4.4.1 The contextual effect from *ziji*’s contemplative readings

This experiment tested *ziji*’s potential for cross-clausal coreference. With the three types of person arrangement “1st-3rd”, “3rd-1st” and “3rd-3rd”, the target antecedent for each person arrangement should be 1st, 3rd and 3rd respectively. When a target antecedent takes the 1st person specification (i.e., under “1st-3rd”) and the sentence containing the target antecedent is produced in “contemplation”, *ziji* can corefer with the 1st person target antecedent regardless of any potential blocking, due to *ziji*’s contextual contemplative readings in this context. This predicted contextual effect specific to “contemplation” is validated from three findings. First, there is no significant difference between scores under “1st-3rd” and scores under “3rd-3rd” in “contemplation”, indicating that *ziji*’s coreference with cross-clausal 1st person antecedents is not blocked by 3rd person intervening DPs in “contemplation”. But as blocking did happen to stimuli of “1st-3rd” in other contexts, the removal of blocking in “contemplation” serves as the direct evidence for the predicted contextual effect. Second, the scores in “contemplation” are significantly higher than those in the control context “conversation” under the person arrangement “1st-3rd”. This is consistent with the idea that the blocking of cross-clausal coreference involved in “conversation” can be circumvented in “contemplation”. Third, the predicted contextual effect is also witnessed in the comparison of overall scores in the two contexts, “contemplation” (4.22) and “conversation” (3.71), with  $p = 0.02$ . The improvement of overall scores in “contemplation” should, at least partially, come from the increased scores under “1st-3rd”.

#### 4.4.2 “Public speaking’s” similarity to “contemplation” in increasing referential scores

In the elaboration of pairwise comparisons under the person arrangement “1st-3rd”, “public speaking” was found to be similar to “contemplation” as both contexts increased the referential scores significantly, though the improvement in “public speaking” was not as great as that in “contemplation”. However, “public speaking” was initially hypothesized to behave like the control context “conversation”, it is thus necessary to figure out why the initial hypothesis failed. This thesis will bring up two possibilities: “public speaking” may involve the same predicted contextual effect as in “contemplation”; or there may be a different contextual effect involved. This different contextual effect is possibly related to *ziji*’s empathy uses, because empathy *ziji*’s coreference with 1st person pronouns can be reinforced by the extra prominence enjoyed by 1st person referents in contexts like “public speaking”.

The first possibility requires “public speaking” to be able to invoke *ziji*’s contextual contemplative readings, creating *ziji*’s coreference with the 1st person *wo* ‘I’ and mitigating possible blocking, in the same way as “contemplation” does. As proposed at the end of Chapter 3, contextual contemplative *ziji* is a shiftable indexical with a default reference to the inherent perspective center in the context, i.e., CENTER(c). The availability of contextual contemplative readings depends on whether the relevant context involves an inherent perspective center, which tends to appear in less interactional contexts (Zubin et al., 1990). Following this reasoning, lower interactional levels lead to greater availability of contextual contemplative readings, followed by higher referential scores. In this way, “public speaking’s” similarity to “contemplation” in increasing referential scores may arise from their similarity in being less interactional. “Contemplation” represents a context where internal monologues are produced; it is non-interactional because no others appear in the context. “Public speaking” is nearly non-interactional since usually no response is expected from an audience. The assumption that less interactional contexts tend to activate more of *ziji*’s contextual contemplative readings also finds support from the other two contexts, “text messaging” and “conversation”. As seen below, the four contexts involved in this experiment form a continuum with

decreasing interactional levels.

(15) Comparison of interactional levels:

Conversation >>> Text messaging >>> Public speaking >>> Contemplation

“Text messaging” as a more interactional context, should predict less contextual contemplative readings and lower referential scores under “1st-3rd” than “public speaking” and “contemplation”. “Conversation” as an even more interactional context, should predict even lower referential scores than “text messaging”. The predictions are borne out by the comparison of mean scores under the arrangement “1st-3rd” in (16).

(16) Comparison of mean scores under “1st-3rd”:

Conversation <<< Text messaging <<< Public speaking <<< Contemplation  
(3.72) (3.77) (4.19) (4.43)

As witnessed in the contrast of (15) and (16), a negative correlation is demonstrated between contexts’ interactional levels and mean scores under “1st-3rd”. Moreover, pairwise statistical analyses of scores under “1st-3rd” showed that the scores in (16) increase gradually. No significant difference of scores was found between each pair of contexts adjacent on the continuum; but once the compared contexts were not adjacent on the continuum, significant differences were seen, i.e., “conversation” vs. “public speaking”, “conversation” vs. “contemplation”, and “text messaging” vs. “contemplation”.

The greater availability of *ziji*’s contextual contemplative readings may have contributed to the increased referential scores in “public speaking” under “1st-3rd”, but it seems far-fetched to attribute the increase solely to the greater availability of contextual contemplative readings. The mean score under “1st-3rd” in “public speaking” is 4.19, which is not significantly different from its counterpart in “contemplation” (i.e., 4.43) . If the predicted contextual effect (relating to *ziji*’s contextual contemplative readings) is the only reason responsible for the increased referential scores in “public speaking” and “contemplation”, the availability of *ziji*’s contextual contemplative readings in “public speaking” should be comparable to that in “contemplation”, which is highly

doubtful. This is because *ziji*'s contextual contemplative readings require the speaker to be in a consciously thinking state, which is true for “contemplation”, but not necessarily so for “public speaking”. It is often seen as too demanding for public speakers to be simultaneously involved in a deep thinking state. Considering this, there may be other possible reasons for the increased referential scores in “public speaking” under “1st-3rd”, e.g., *ziji*'s empathy use.

*Ziji*'s empathy use, a factor that was overlooked in this experiment's design and predictions, may have contributed to the increased scores under “1st-3rd” in “public speaking”. According to Wang and Pan (2012, 2014) and Charnavel (2017, 2019), *ziji* can refer to an empathy locus, which is the individual that the speaker empathizes with in presenting a(n) event/state. Moreover, empathy locus is claimed to enjoy the highest empathy level among all candidates (Oshima, 2006). The use of empathy *ziji* conveys the impression that the speaker had experienced the event/state by standing in the shoes of the empathy locus. Empathy *ziji* allows both intra-sentential coreference and extra-sentential (co)reference, since *ziji*'s referent, empathy locus, can appear in the context or get represented in higher clauses or previous discourse. Therefore, the individuals represented in stimulus sentences equally have the potential to serve as empathy loci, enabling *ziji*'s empathy use. For instance, empathy *ziji* in (17) may corefer with *wo* ‘I’ or *Jim* as long as the speaker or Jim serves as an empathy locus.

(17) A stimulus sentence with the person arrangement “1st-3rd”:

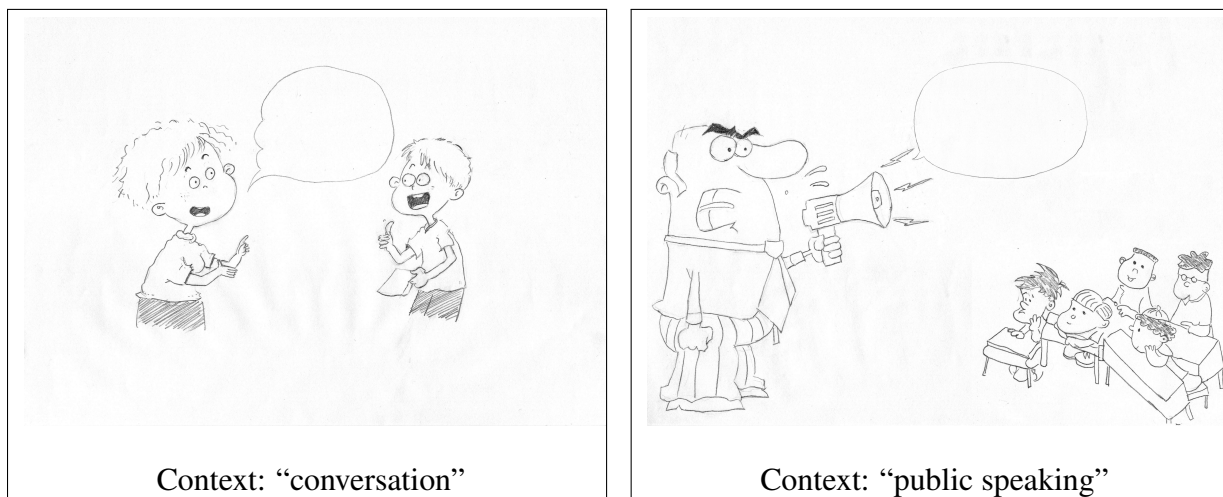
wo caixiang jimu dangshi yiding hensi **ziji** le.  
I guess Jim then must hate-die self SFP

‘I guess that Jim must have detested self at that time.’

Following an empathy analysis of *ziji*, the increased referential scores under “1st-3rd” in “public speaking” can be understood as empathy *ziji*'s improved potential to corefer with the 1st person pronoun in “public speaking”. In other words, the referent of the 1st pronoun, the speaker, is more likely to serve as an empathy locus in “public speaking” than in “conversation”. I propose that speakers in “public speaking” enjoy enhanced prominence, which makes speakers better candidates for discourse topics. As discourse topics are more easily empathized with than others (Kuno

and Kaburaki, 1977), empathy *ziji* in “public speaking” is more inclined to have the speaker as an empathy locus, strengthening *ziji*’s coreference with the 1st person pronoun. The enhanced prominence enjoyed by speakers in “public speaking” is manifested in at least three aspects. First, speakers in “public speaking” are more prominent than speakers in “conversation”, because in “public speaking”, a fixed speaker undertakes the production of most of the discourse. In “conversation”, however, a speaker is not much different from an addressee in terms of the amount of production, as speakers are fluid in “conversation” and participating parties can take turns playing the roles of speaker and addressee. Second, speakers in “public speaking” are contextually more salient than addressees, but in “conversation”, they are relatively balanced. In “public speaking”, speakers are usually few in number but addressees generally come in groups. As the only person speaking in a crowd of people, a public speaker easily stands out in the context. When it comes to “conversation”, there is typically one speaker and one addressee and neither party is more distinguished than the other. The difference in contextual salience is also reflected in the context-indicating pictures used in this experiment (cf. Figure 4.7); the picture for “conversation” only involves two people but the picture for “public speaking” introduces one speaker and a crowd of people as addressees.

Figure 4.7: Instantiated pictures indicating “conversation” and “public speaking”



A close look at the context pictures helps reveal the third aspect suggesting speakers’ enhanced prominence. In all pictures for “public speaking”, the speakers were portrayed as adults whose fig-

ures take up about a third of the relevant pictures, but the addressees were depicted as children with much smaller figures. The differences in terms of age and figure size may further suggest a difference in social status, with the speakers more authoritative than the addressees (e.g., a headmaster vs. students). As for the pictures for “conversation”, there is no such difference between the two discourse participants, since both of them were depicted as adults with no discernible difference in figure size or social status. With the enhanced prominence demonstrated above, empathy *ziji* in “public speaking” should have more potential to refer to the speaker, which is represented as a cross-clausal antecedent in stimuli with the arrangement “1st-3rd”. The greater potential then led to increased referential scores. In this way, the increased referential scores under “1st-3rd” in “public speaking” can be attributed to the contextual effect relating to *ziji*’s empathy uses, which was not included in the predictions. In brief, empathy *ziji*’s coreference with a 1st person cross-clausal antecedent can be enhanced in “public speaking”, because the 1st person antecedent’s referent (i.e., the speaker) is rendered more salient in this context, making it more likely to serve as a discourse topic and get empathized with. This contextual effect is different from the predicted contextual effect from *ziji*’s contemplative readings, because it directly acts on the variable manipulating *ziji*’s intra-sentential coreference, i.e., improving the empathy level of an intra-sentential antecedent’s referent.

#### **4.4.3 Blocking from pure conflicting person specifications: asymmetric person blocking?**

The inequality “ $S(3rd-3rd) > S(1st-3rd) > S(3rd-1st)$ ” was found in “conversation”, suggesting asymmetry between the blocking from 1st person pronouns to 3rd person DPs and the blocking from 3rd person DPs to 1st person pronouns. As “conversation” is assumed to be free from the contextual effect relating to *ziji*’s contemplative readings, it seems appropriate to infer that the asymmetric blocking found in “conversation” characterizes the blocking facts from pure conflicting person specifications. However, as suggested in the previous subsection, referential scores in this experiment may have also been subject to the contextual effect affecting *ziji*’s empathy uses. In the

following, I will demonstrate that stimuli in “conversation” are not completely free from contextual effects, so that the blocking facts from pure conflicting person specifications are still to be figured out.

Recall that empathy uses enable *ziji* to corefer with an antecedent whose referent is an empathy locus. Stimuli in “conversation” should also allow empathy uses. One of Kuno and Kaburaki’s (1997) empathy hierarchies specifies that speakers are more easily empathized with than others; that is, speakers have higher empathy levels than others. Following this hierarchy, empathy *ziji* is more likely to corefer with a 1st person antecedent than a 3rd person antecedent. This can be interpreted as a contextual effect, because a 1st person pronoun’s reference is context-dependent, and empathy *ziji*’s greater potential to refer to the speaker than other individuals also comes from the default contextual salience that the speaker enjoys. On the one hand, contextual salience renders an individual easily accessed for reference. On the other hand, contextual salience is directly related to discourse topics, which are the more competitive candidates for empathy *ziji*’s referents.

With the context “conversation” also subject to contextual effects, it is premature to claim that blocking facts from pure conflicting person specifications demonstrate person asymmetry. This is because the person asymmetry may arise from the contextual effect relating to *ziji*’s empathy uses. Empathy *ziji*’s enhanced reference to the speaker can also ease the blocking from conflicting person specifications. It is worth noting that it is very difficult, if not theoretically impossible, to remove this contextual effect relating to the speaker’s inherently higher empathy level, considering that this contextual effect comes hand in hand with the use of the context-dependent 1st person pronoun. It may as well be concluded that blocking facts under “1st-3rd” and “3rd-1st” are asymmetric by default, due to an inherently higher empathy level enjoyed by the speaker.

#### **4.4.4 “Conversation” vs. “public speaking”: under “3rd-3rd”**

The pairwise analyses of scores under the arrangement “3rd-3rd” also showed an unexpected significant difference between “conversation” and “public speaking” (4.43 vs. 5.36,  $p = 0.044$ ), which is unexpected as no contextual effect was predicted to act on stimuli with this arrangement. The

identical person specifications of stimuli with “3rd-3rd” arrangement should predict no blocking, and the referential scores in different contexts should be approximately equal. In light of this, the unexpected difference between “conversation” and “public speaking” posed a problem to the current research.

Before an attempt to explain the unexpected difference, it should be pointed out that this difference is more likely to arise from the unexpected low scores in “conversation”, rather than the high scores in “public speaking”. The mean scores under “3rd-3rd” in different contexts are 4.43 (conversation), 5.04 (contemplation), 5.28 (text messaging), 5.36 (public speaking) respectively. A preliminary comparison suggests that the mean score of 4.43 in “conversation” is deviant from the mean scores in other contexts, because all the other contexts have mean scores above 5. In addition, the table below (replicated from Table 4.14) demonstrates that the difference between “conversation” and any of the other three contexts (with *p*-values ranging from 0.044 to 0.165) is greater than the internal differences among the three contexts (with *p*-values ranging from 0.442 to 0.726). The other reason for ascribing this significant difference to unexpected low scores in “conversation” is that the Likert scale has a range from 1 to 7, and a mean score of 4.43 is relatively low for a condition that predicts no blocking of cross-clausal coreference.

comparison pairs	relation	<i>p</i> -value
Conversation vs. Contemplation	<	0.165
Conversation vs. Text messaging	<	0.062
Conversation vs. Public speaking	<	0.044 *
Contemplation vs. Text messaging	<	0.616
Contemplation vs. Public speaking	<	0.442
Text messaging vs. Public speaking	<	0.726

Significance: \*\*\* *p* < 0.001, \*\* *p* < 0.01, \**p* < 0.05

Table 4.15: Summary of pairwise comparisons under the person arrangement “3rd-3rd”

Basically, the low scores under “3rd-3rd” in “conversation” can be interpreted as a dislike for

long distance antecedents in this context. In a sentence with the “3rd-3rd” arrangement like (18), *ziji* could take either the cross-clausal antecedent *Annie* or the local antecedent *Lisa*. However, previous studies (Li and Kaiser, 2009; Liu, 2009; Li and Zhou, 2010; Dillon et al., 2014) have demonstrated a locality bias effect: *ziji* has a preference or processing advantage for syntactically local antecedents over long distance ones (also cross-clausal antecedents here).

- (18) Annie<sub>i</sub> yishidao Lisa<sub>j</sub> kenenghui taolun **ziji**<sub>i/j</sub>.  
 Annie realize Lisa may talk-about self  
 ‘Annie<sub>i</sub> realized that Lisa<sub>j</sub> may talk about self<sub>i/j</sub>.’

The dislike for *ziji* to take a long distance antecedent in “conversation” possibly has a pragmatic basis. Theoretically, both *ziji* and the complex reflexive *ta-ziji* ‘herself’ can be used for cross-clausal coreference; that is, *ta-ziji* can be used to replace *ziji* in (18). However, the complex form *ta-ziji* is different in that it is less subject to the locality bias effect (Dillon et al., 2016), thus causing less ambiguity or processing difficulties for addressees. According to the Maxim of Manner (Grice, 1975), cooperative communication should avoid communication burden and ambiguity. Consequently, *ziji* as a means of cross-causal coreference is less felicitous, especially in “conversation”, which represents a more interactional context and requires more cooperation. In terms of contemplation contexts, they do not involve communication with others, and no ambiguity issue should be caused for addressees. There is thus no pragmatic concern that prevents *ziji* from coreferring with a long distance antecedent. As for “public speaking”, a stimulus like (18) is generally not the only sentence uttered by the public speaker to a crowd of people (as addressees); its surrounding discourse can introduce background information and help addressees interpret this sentence. More often than not, the surrounding discourse will also help alleviate ambiguity issues, without triggering the pragmatic infelicity relating to *ziji*’s coreference with long distance antecedents. When it comes to “text messaging”, stimuli in the form of text messages are always accessible on the screen, unlike the fleeting vanishing of sound waves in “conversation”. This leaves text receivers (addressees in “text messaging”) more time to process any ambiguity, so text senders (counterpart of speakers) are not constrained as much by the pragmatic infelicity as speakers in

“conversation”. In other words, speakers in “conversation” should carry more of the communication burden to avoid ambiguity, but in “text messaging”, text senders are relatively relieved from the communication burden and the relevant pragmatic requirement. As seen above, the pragmatic infelicity of using *ziji* for cross-clausal coreference can matter to variable degrees in different contexts, so that referential scores for cross-clausal coreference also vary. The unexpected low scores for cross-clausal coreference in stimuli of “3rd-3rd” in “conversation” may thus result from the strong pragmatic infelicity of using *ziji* for cross-clausal coreference.

#### 4.4.5 An attempt at dissecting the blocking effect

This research thus far has revealed two contextual effects on the blocking of *ziji*'s cross-clausal coreference, namely the contextual effect from *ziji*'s contemplative readings and the contextual effect relating to *ziji*'s empathy use. In this section, I will explore the roles that the two effects play in blocking/enhancing *ziji*'s potential for cross-clausal coreference, and illustrate that this research also sheds light on explaining data on the blocking effect in previous literature.

The two sentences in (19), replicated from (1), are typical instances that involve potential blocking of cross-clausal coreference. Following Charnavel's (2017, 2019) logophoric analysis, cross-clausal coreference is enabled by *ziji*'s binding by the local antecedent  $pro_{log}$ , which then refers to an attitude holder or an empathy locus.

- (19) a.  $wo_i$  zhidao  $Lisi_j$  bu xihuan **ziji** <sub>$i/j$</sub> .  
 I know Lisi not like self  
 ‘I know that Lisi did not like  $\gamma$ me/himself.’
- b.  $Zhangsan_i$  zhidao  $wo_j$  bu xihuan **ziji** <sub>$*i/j$</sub> .  
 Zhangsan know I not like self  
 ‘Lisi knows that I do not like myself.’

Adapted from Pan (2001, p. 283)

Theoretically, both *wo* ‘I’ and *Zhangsan* can serve as attitude holders, because they appear in matrix subject positions of (19), which license attitude holders. This is evidenced by sentence

(20) that adopts the same structure as in (19); an evaluative expression (e.g., *benzhuode* ‘clumsy’) inserted before *ziji* in (20) can be taken as the speaker’s or *Zhangsan*’s opinion, justifying an attitudinal use with *Zhangsan* being the attitude holder.

- (20) Zhangsan<sub>i</sub> zhidao Lisi<sub>j</sub> bu xihuan **ziji**<sub>i/j</sub>.  
Zhangsan know Lisi not like self  
‘Zhangsan<sub>i</sub> knows that Lisi<sub>j</sub> did not like himself<sub>i/j</sub>.’

Moreover, *wo* ‘I’ and *Zhangsan* have the potential to serve as an empathy locus, as long as they enjoy the highest empathy level from the speaker. Considering the potential for attitudinal uses and empathy uses, cross-clausal coreference of *ziji* in (19) should be readily available, in contrast to the marginal acceptability of *ziji*’s coreference with *wo* in (19a) and the unacceptability of *ziji*’s coreference with *Zhangsan* in (19b). Previous analyses, especially those with syntactic movements, have ascribed the (partial) blocking of cross-clausal coreference to conflicting person features between matrix subjects and local subjects. But for the current research that assumes Charnavel’s logophoric analysis, it is not immediately clear how person features are involved to derive the person-based blocking. It is likely that the blocking is pragmatically based; whenever conflicting person features occur, it is almost always possible to use a pronoun or a complex reflexive form for cross-clausal coreference, avoiding the ambiguity brought by *ziji*. For instance, if cross-clausal coreference is intended in (19a), the 1st person pronoun *wo* or the complex reflexive *wo-ziji* ‘my-self’ can be used to replace *ziji* for better clarity. Moreover, both attitudinal uses and empathy uses require the speaker to take the logophoric centers’ perspective (attitude holders’ or empathy loci’s), but the appearance of an intervening 1st pronoun (e.g., in (19b)) strongly suggests that the speaker’s inherent dominance is not subdued, making it difficult for the speaker to take others’ perspectives and realize *ziji*’s logophoric use, the use that enables *ziji*’s cross-clausal coreference. Despite all the above, this research will only acknowledge the fact that blocking is related to conflicting person features but leave it an open question whether pragmatic principles and/or perspective-taking can account for the person-based blocking, due to the great complication in locating the underlying cause.

This research has consistently assumed that a referent’s potential to serve as an attitude holder is licensed by sentence structures, while the potential to serve as an empathy locus is constrained by empathy hierarchies. Since (19a) and (19b) make use of identical sentence structures, *wo* ‘I’ and *Zhangsan* should possess roughly equal likelihood to serve as attitude holders, and the effect from *ziji*’s attitudinal use should be equally applied, failing to account for the varying potential for cross-clausal coreference in (19a) and (19b). This leaves *ziji*’s empathy use responsible for the varying potential. Empathy uses are subject to the empathy hierarchies in Kuno and Kaburaki (1977), and the hierarchy relevant here is speech-act participant empathy hierarchy: speakers are more easily empathized with than addressees, which are then more easily empathized with than 3rd person individuals. Therefore, *ziji*’s empathy use will enhance coreference with the 1st person *wo* ‘I’, which corresponds to the matrix subject in (19a) and the local subject in (19b) respectively. Following this line, the varying potential for cross-clausal coreference in (19) is derived.<sup>8</sup> When the two sentences in (19) are produced in “conversation”, the speaker still has a higher empathy level than 3rd person referents, so that the experimental results in “conversation” show varying potential for cross-clausal coreference. If the two sentences occur in “contemplation”, *ziji* will refer to the contextual contemplator, who is simultaneously the speaker, further strengthening *ziji*’s potential for coreference with *wo* and mitigating the person-based blocking in (19a).

The line of reasoning above can also account for blocking by object DPs, a conundrum that nearly all of the previous analyses introduced in Chapter 2 fail to address. (21) is a sentence that involves blocking by the 1st person oblique object *wo*. Within the local clause containing *ziji*, there are two DPs, *Lisi* and *wo*; since only the former can c-command *ziji*, *ziji* is locally bound by *Lisi*, but not by *wo*.

- (21) Zhangsan<sub>i</sub> renwei Lisi<sub>j</sub> cong wo<sub>k</sub> naer tingshuo-le **ziji**<sub>\*i<sub>j</sub>/\*k</sub> de fenshu.  
 Zhangsan think Lisi from I there hear-say-PERF self POSS score  
 ‘Zhangsan<sub>i</sub> thinks Lisi<sub>j</sub> heard from me his<sub>\*i<sub>j</sub>/\*k</sub> score.’

<sup>8</sup>As addressees also have inherently higher empathy levels than 3rd person individuals, cross-clausal coreference with 2nd person pronouns are more likely to be maintained than cross-clausal coreference with 3rd person DPs when person-based blocking occurs. This is consistent with Pan’s (2001) claim that the blocking level from 1st/2nd person pronouns to 3rd person DPs is stronger than that from 3rd person DPs to 1st/2nd person pronouns.

In terms of *ziji*'s potential for cross-clausal coreference with *Zhangsan*, it depends on whether *Zhangsan* can serve as an attitude holder or an empathy locus. The sentence structure adopted in (21) can well license an attitudinal use of *ziji* with *Zhangsan* serving as the attitude holder; this is confirmed by the result from replacing *wo* with a 3rd person DP (e.g., 'bieren' *others*) and performing the test for *ziji*'s attitudinal use. As for *ziji*'s empathy use, *Zhangsan* in this standalone sentence of (21) can hardly serve as an empathy locus, because this sentence contains a more promising candidate for the empathy locus, i.e., the speaker, considering the speaker's higher empathy level than *Zhangsan*. Therefore, only *ziji*'s attitudinal use provides the potential for *ziji* in (21) to corefer with *Zhangsan*, though this potential is finally blocked for two reasons. First, *ziji* is subject to the locality bias effect so that *ta* 'he' and the complex reflexive *ta-ziji* 'him-self' are more felicitous to be used here. Second, the appearance of *wo* 'I/me' suggests that the speaker is involved in the event described by (21), and there is no contextual/discursive effect that makes *Zhangsan* outshine the speaker so that the speaker takes *Zhangsan*'s perspective. Consequently, *ziji* is left with the only interpretation derived from local binding by *Lisi*.

## 4.5 Summary

This experiment attempted to sort out the blocking facts and verify the contextual effect from *ziji*'s contextual contemplative readings. The results provided empirical evidence for *ziji*'s contextual contemplative uses and the contextual effect from such uses, revealed an ignored contextual effect relating to *ziji*'s empathy uses, and demonstrated that blocking facts are by default asymmetric, with the blocking exerted from a 1st person pronoun to a 3rd person DP stronger than the blocking from a 3rd person DP to a 1st person pronoun.

For *ziji* in a sentence with a 3rd person local subject and a 1st person matrix subject (i.e., "1st-3rd"), *ziji*'s potential to corefer with the 1st person matrix subject (also the cross-clausal antecedent) is context-dependent. Compared to "conversation", *ziji* in "contemplation" has more po-

tential for coreference with the 1st person matrix subject, indicating a contextual effect and giving proof to *ziji*'s contextual contemplative uses. This experiment also found that the context "public speaking" is similar to "contemplation" in increasing *ziji*'s potential for cross-clausal coreference with 1st person antecedents. It was speculated that "public speaking" is less interactional and monologue-like, and tends to activate more contextual contemplative readings of *ziji*, facilitating the cross-clausal coreference in question. Another possibility is that 1st person referents enjoy extra prominence in "public speaking" compared to those in other contexts, which improves 1st person referents' empathy levels and strengthens empathy *ziji*'s coreference with 1st person antecedents. In this way, *ziji* in "public speaking" is subject to the contextual effect relating to *ziji*'s empathy levels. It is worth noting that this contextual effect is not limited to "public speaking"; stimuli in "conversation" should be subject to this contextual effect as well. In "conversation", the speaker has an inherently higher empathy level than 3rd person individuals, so that the speaker is more likely to serve as an empathy locus (also *ziji*'s referent). Therefore, *ziji*'s coreference with a 1st person antecedent is more favored than its coreference with a 3rd person antecedent. This can explain why referential scores under "1st-3rd" are higher than those under "3rd-1st" in "conversation". With the interference from the contextual effect relating to *ziji*'s empathy uses, it is not well grounded to conclude that the asymmetric blocking found in "conversation" characterizes the blocking facts from pure conflicting person specifications; nevertheless, this asymmetry revealed what blocking facts are like by default, because the contextual effect relating to *ziji*'s empathy uses is nearly inseparable from stimuli involving 1st person antecedents.

There is also an unexpected finding concerning sentences with 3rd person local subjects and 3rd person matrix subjects. Under the person arrangement "3rd-3rd", *ziji*'s potential for cross-clausal coreference is lower in "conversation" than in "public speaking". This was explained as *ziji*'s pragmatic infelicity of taking a long distance antecedent in "conversation", which differs from other contexts (especially "public speaking") in that "conversation" requires more cooperation and that pragmatic constraints weigh more in "conversation".

## Chapter 5

# Modality's effects on *ziji*'s interpretation?

### 5.1 Modality: an extra-sentential factor in studies of *ziji*

#### 5.1.1 Modality's potential effect on the availability of *ziji*'s contextual contemplative readings

As evidenced in Chapter 4, contextual contemplative uses of *ziji* appear in contexts of contemplation. Rarely, *ziji* of this use also appears in interactional contexts like oral communication, if the utterance containing *ziji* is produced during the speaker's contemplation. Therefore, *ziji*'s contextual contemplative readings are only available in certain contexts. When native Mandarin speakers receive a sentence with *ziji* but no definite contextual/discursive information is provided for this sentence, the availability of *ziji*'s contextual contemplative readings depends on whether a felicitous context (e.g. "contemplation") is evoked. In this thesis, it is speculated that the way that written words are handled is more likely to evoke "contemplation", which should lead to *ziji*'s contextual contemplative readings. If so, modality should have an effect on *ziji*'s interpretation. Here I first demonstrate why the written mode should evoke "contemplation" more easily.

First, the easy evocation of contemplation is manifested in how the process of reading (especially silent reading or subvocalization) resembles the production of internal monologues. Through the production of internal monologues, the propositions represented in internal monologues are

brought to conscious attention; that is, people are consciously aware of the propositions, bringing about contemplation (Butler, 2013). When it comes to reading, similar reasoning applies; through reading, what is encoded in written sentences can be brought to conscious attention and reflected upon with conscious awareness. Moffett (1983) even claims that reading and writing can temporarily change how people talk to themselves and modify the stream of consciousness represented in internal monologues, which presupposes reading's and writing's easy evocation of contemplation.<sup>1</sup>

Second, reading is typically less constrained by "time pressure", and this allows readers to progress at their own pace (Ochs, 1979; Chafe, 1982). Readers, after finishing one word or one sentence, are not pressed to read the next word or the next sentence immediately; their attention can stay at a word or sentence for as long as they want, or even go back to a previous word or sentence. With less time pressure, readers are free to contemplate a word or sentence, enabling more contemplation. This is different from oral communication (e.g., face-to-face communication), where the speaker's production of one sentence is often immediately followed by the production of a subsequent sentence or the addressee's reply, leaving the addressee very limited time to process the information encoded in the sentence.

Third, compared to the evanescence of aural signals, visual signals in the form of written words are almost permanently available (Chafe, 1994). Therefore, the proposition encoded in a written sentence is easily accessed by reading the sentence. This can save the mental effort used to recall the information encoded in a sentence, especially when the sentence is long and complex and the information mentioned earlier (i.e., at the beginning of the sentence) is easily forgotten. The reduced demand for mental effort allows more focused attention on contemplation.

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<sup>1</sup>The process of writing may also evoke contemplation easily. Writing can be interrupted and backtracked, which allows writers to look back and read what has been put down. The thoughts encoded in the written words are thus subject to reflection. Owing to the easy activation of thinking in writing, writing (e.g., journal writing) acts as a means to promote contemplation on oneself (Lew and Schmidt, 2011).

### 5.1.2 Modality's potential effect on studies of *ziji*: from introspective judgments to experimental studies

Previous studies of *ziji* often use the method “introspection”, which is a self-examining means to look into mental representations of language. When syntacticians ask informants to do introspective judgments or when they themselves do introspective thinking, the sentences to be judged can be presented in writing. Considering this, these judgments' results may be subject to an effect from the presentation mode of writing, which may improve the availability of *ziji*'s contextual contemplative readings.

Modality's effect may also be found in experimental studies, which make use of stimuli with *ziji* presented in the oral mode or the written mode. For instance, Charnavel and Huang (2018) and one experiment in Li and Kaiser (2009) had their participants read written sentences, and Liu (2009) presented oral stimuli to seek participants' responses, though many of the previous experiments (Lu, 2011; Schumacher et al., 2011; He and Kaiser, 2012; Shuai et al., 2013; He and Kaiser, 2016) used the method of self-paced reading or word-by-word reading, which presents a stimulus sentence word by word in a reading order, with only one word displayed at a time.<sup>2</sup> Self-paced reading allows participants to control the displaying at their own pace, whereas word-by-word reading leaves a fixed amount of time for each displayed word. Despite a written presentation of stimuli, experiments using self-paced reading or word-by-word reading are excluded from the current discussion, as stimulus sentences used in the two reading methods are segmented and do not appear all at once, failing to model how written stimuli are typically handled. The current research is only concerned with the situations where participants either hear or read stimulus sentences all at once. If the hypothesis is right that reading written stimuli evokes “contemplation” more easily and promotes *ziji*'s contextual contemplative readings, stimuli's presentation modes should affect *ziji*'s interpretation, which in turn affects experiment results. Presently, there are not many studies directly testing modality's effect on language comprehension, let alone research investigating *ziji*'s interpretation in different presentation modes. In order to fill in this research gap, this chapter

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<sup>2</sup>Sometimes, stimulus sentences are presented phrase by phrase.

presents an experimental study examining whether participants receiving identical stimuli but in different modes give distinct judgments and if so, what those judgments are.

## 5.2 Methods

### 5.2.1 Materials and design

This experiment attempted to investigate whether there is a “modality” effect on *ziji*’s interpretation, especially with respect to the availability of contextual contemplative readings. However, to tell whether contextual contemplative readings are available usually requires substantial debriefing and there are no straightforward means for this. This experiment thus tested the acceptability of sentences in which *ziji* is only interpretable as a contextual contemplative use. The more acceptable a test sentence is, the more likely *ziji*’s contextual contemplative reading is made available in that sentence. In this way, I would be able to compare the availability of contextual contemplative readings in different modes.

The test sentences used in this experiment involve two types: standalone sentences beginning with subject *ziji* (as in (1a)), and standalone sentences with inanimate subjects and object *ziji* (as in (1b)). For each type, I prepared 24 different test sentences.

- (1) a. *Ziji* in subject position:

**ziji** yizhi shi xiangxiaren.  
self always COP countryman  
‘Self is always a farmer.’

- b. *Ziji* in object position:

nage re-shuihu tang-shang-le **ziji**.  
that hot-kettle burn-hurt-PERF self  
‘That hot kettle burned self.’

Both types of sentences need to resort to extra-sentential (co)reference. Sentences starting with subject *ziji* have no intra-sentential antecedents that *ziji* can corefer with; sentences with object

*ziji* seem to allow local binding by subject DPs, but the interpretations following local binding are semantically impossible, e.g., a hot kettle’s burning itself in (1b). Therefore, all the test sentences are only left with the choice of extra-sentential (co)reference. There are various uses of *ziji* that allow extra-sentential (co)reference, but *ziji* in both types of test sentences can only be interpreted as contextual contemplative uses, because each test sentence stands alone without any surrounding discourse, which is necessary for *ziji* to be interpreted as all the other uses. In the following, I demonstrate why surrounding discourse is required for all the uses allowing *ziji*’s extra-sentential (co)reference except the contextual contemplative use.

As evidenced in the corpus study in Chapter 3, *ziji*’s potential for extra-sentential (co)reference can be realized by four different uses, including attitudinal use, empathy use, discursive contemplative use and contextual contemplative use.<sup>3</sup> However, both attitudinal *ziji* and discursive contemplative *ziji* resort to previous discourse for reference. This thesis assumes that attitude holder is licensed by certain structures, e.g., *wo* ‘I’ in (2) is an attitude holder because it serves as the subject of the attitude predicate *ganjue* ‘feel’; previous discourse is thus necessary to introduce a relevant attitude holder.<sup>4</sup> Discursive contemplative *ziji* refers to a contemplator mentioned in previous discourse, as exemplified in (3). In other words, previous discourse is indispensable to the successful interpretation of discursive contemplative *ziji*.

(2) Attitudinal *ziji*, attitude holder introduced in a preceding sentence

wo<sub>i</sub> ganjue ta buhui lai zhe-ci yuehui. **ziji**<sub>i</sub> yizhi shi xiangxiaren.  
 I feel he will-not come this-CL date self always COP countryman

‘I<sub>i</sub> feel that he will not come to this date. Self<sub>i</sub> has always been a bumpkin.’

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<sup>3</sup>Chapter 3 also mentioned the possibility of *ziji* interpreted as a generic use or an intensifier, but the two interpretations do not obtain for *ziji* in the standalone test sentences. A generic interpretation is not allowed because each test sentence used in the experiment was designed not to encode a general truth that can be applied to everyone. Moreover, *ziji* in test sentences does not allow an intensifier interpretation because the requirements to license any of the three types of intensifier *ziji* were not fulfilled. Attributive *ziji* only appears in possessor position, but *ziji* in test sentences (e.g., (1a) nor (1b)) appears in subject/object position; adnominal *ziji* requires alternatives’ presence to form a contrast, but the standalone test sentences have no discursive or contextual information to help decide what *ziji* stresses, let alone the stressed elements’ alternatives; adverbial *ziji* should immediately precede a sentential predicate, but test sentences like (1a) have adverbs standing between *ziji* and predicates while test sentences like (1b) have predicates preceding *ziji*.

<sup>4</sup>Unlike Charnavel (2019), this thesis does not treat the speaker as an attitude holder licensed in the context by default, since *ziji*’s reference to the speaker is not obtained unconditionally. For details, see Footnote 2 in Chapter 3.

- (3) Discursive contemplative *ziji*, contemplator introduced in a preceding sentence

wo<sub>i</sub> xianru-le chensi.            **ziji<sub>i</sub>** yizhi shi xiangxiaren.  
I trap-PERF contempalton self always COP countryman

‘I<sub>i</sub> got lost in thought. Self<sub>i</sub> has always been a bumpkin.’

Empathy *ziji* allows both discursive coreference and contextual reference, because empathy *ziji*’s referent, empathy locus, can come from previous discourse or the context. In (4a), *ziji* refers to an empathy locus mentioned in the preceding sentence; in (4b), *ziji* seems to be able to directly refer to the speaker as an empathy locus. While previous discourse is necessary for empathy *ziji* with discursive coreference, surrounding discourse is also critical to *ziji*’s empathy use with contextual reference. As seen in the contrast between (4b) and (5), the same sentence with *ziji* is involved, but *ziji* is interpretable as an empathy use only when surrounding discourse appears. Despite the fact that empathy *ziji* allows direct reference to individuals in the context, especially discourse participants, discourse is still necessary because of its role played in helping to determine which of the individuals is the relevant empathy locus. For instance, in (4b), the first sentence expresses the speaker’s marvel at seeing the high-rise buildings, which implies that the speaker is more likely to be the bumpkin, leading to *ziji*’s reference to the speaker.

- (4) a. Empathy *ziji*, empathy locus mentioned in the preceding sentence

wo<sub>i</sub> congmei jian-guo name-gao de lou.    **ziji<sub>i</sub>** yizhi shi xiangxiaren.  
I never see-PERF that-high PNMM building self always COP countryman  
‘I<sub>i</sub> have never seen that high a building. Self<sub>i</sub> has always been a bumpkin.’

- b. Empathy *ziji*, empathy locus in the context, e.g., conversation

Chengshi-li gao-lou zhen duo-a.    **ziji<sub>SPEAKER</sub>** yizhi shi xiangxiaren,  
city-in tall-building really many-SFP self always COP countryman  
mei jian-guo zhexie gao-lou.  
without see-PERF these tall-building

‘Many tall buildings in the city indeed! Self<sub>SPEAKER</sub> has always been a bumpkin, and has not seen these tall buildings.’

- (5) In oral communication, e.g., conversation

#**ziji**<sub>SPEAKER</sub> yizhi shi xiangxiaren.  
self always COP countryman

‘Self<sub>SPEAKER</sub> has always been a bumpkin.’

Contextual contemplative *ziji* is different from all the aforementioned uses, because it does not rely on surrounding discourse to provide a referent or determine which of the individuals in the context is *ziji*’s referent. As seen in (6), contextual contemplative *ziji* can go without surrounding discourse and refers to the speaker obligatorily, though this reference is only available when the relevant sentence is produced during the speaker’s contemplation. Turning back to test sentences in the current experiment, *ziji* in these sentences can only be interpreted as a contextual contemplative use, considering the lack of any surrounding discourse. These test sentences’ acceptability thus depends on whether *ziji*’s contextual contemplative readings are available.

(6) In a context of contemplation,

**ziji**<sub>SPEAKER</sub> yizhi shi xiangxiaren.  
self always COP countryman

‘Self<sub>SPEAKER</sub> has always been a bumpkin.’

Apart from the positional difference of *ziji*, this experiment investigating a “modality” effect manipulated two modes of presenting the stimuli, oral and written, though each participant would only receive stimuli in one mode. There are two reasons for the design of “modality” as a between-group factor. First, participants receiving stimuli in both modes may easily realize what this experiment tests. Second, participants ignorant of relevant linguistic knowledge tend to believe that a sentence’s acceptability has nothing to do with its presentation mode, and this belief may lead to similar or even identical judgments, once participants realize that oral stimuli and written stimuli made use of identical sentences. Considering this unwanted interference following from a within-group design of “modality”, the current experiment required that participants receiving oral stimuli should not receive written ones, and vice versa.

The two factors (position × mode), each with two levels, constituted four test conditions. That is, participants would receive test sentences with subject/object *ziji* in the oral/written mode. Fillers

involved in this experiment were obtained by substituting *ziji* in each test sentence with the 1st person pronoun *wo* ‘I/me’. These fillers can also serve as control items, because *wo* is always interpreted as a speaker, irrespective of presentation modes or pronoun positions. In Table 5.1, a summary of all conditions is provided.

	oral mode	written mode
Test combination 1: <i>ziji</i> × subject	condition 1	condition 2
Test combination 2: <i>ziji</i> × object	condition 3	condition 4
Control combination 1: <i>wo</i> × subject	condition 5	condition 6
Control combination 2: <i>wo</i> × object	condition 7	condition 8

Table 5.1: Summary of the experiment design

Recall that this experiment created 24 sentences with subject *ziji* and 24 sentences with object *ziji*. As control sentences were produced by replacing *ziji* with *wo*, the 48 sentences can be taken as 48 templates whose subject/object positions are taken by *ziji*. This experiment prepared two pseudo-randomized lists of stimulus sentences, with each list containing 48 stimuli (12 for each combination of pronoun type and position) and no two adjacent stimuli adopting the same combination of pronoun type and position in a list. The 48 stimuli in each list all made use of different templates so that each list contained stimuli of all 48 templates; a template that accommodated *ziji* in one list would be arranged to take *wo* in the other list. Moreover, the pseudo-randomization ensured that a template that appeared in the first half of a list was arranged to the second half of the other list, to minimize the potential effects arising from stimuli’s order in a list. In terms of presentation modes, stimuli in both lists were prepared with versions in the oral mode and versions in the written mode.

Each participant received only one list of stimuli in one presentation mode. Every time a participant received a stimulus sentence, the participant was required to conduct an acceptability judgment task using a 7-Point Likert Scale, and then answer a multiple-choice comprehension question. Comprehension questions were asked in order to examine whether participants were making sensi-

ble judgments. Each question took the same form as its corresponding stimulus sentence but had a blank where the pronoun (i.e., *ziji/wo*) would be, so that participants would immediately know that the questions asked which referring expression should go in the blank. A sample comprehension question for (1b) and its corresponding list of options are presented in (7). For different stimulus sentences, all options but Option 4 are identical. Option 4 varies with stimulus sentences; it is filled by the referring expression in the corresponding stimulus sentence, e.g., *that hot kettle* in (1b).

(7) A sample set of comprehension question and options:

That hot kettle burned \_\_\_\_?

1. The person producing the sentence
2. The person addressed in the sentence
3. The current participant (i.e., you)
4. The hot kettle
5. Someone/something else

### 5.2.2 Participants

45 native speakers of Mandarin Chinese participated in this experiment, with 24 of them going to the oral group (i.e., only receiving oral stimuli) and the other 21 going to the written group (i.e., only receiving written stimuli). Originally only 20 participants were recruited for each group, but it was later found that four participants from the oral group and one participant from the written group made unexpected choices in over 1/3 of the trials with “*wo*” stimuli. As *wo* has an undoubted reference to the speaker, participants, receiving stimuli with *wo*, should always choose Option 1 (i.e., the person producing the sentence) as their answers to comprehension questions relating to “*wo*” stimuli. The five participants who failed to provide expected answers in over 1/3 of the trials with “*wo*” stimuli were deemed to have made incautious judgments and their data were removed from analyses. To make sure that each group had usable data from 20 participants, five more

participants (four for the oral group and one for the written group) were recruited. Moreover, it was ensured that within each group (oral or written), there were equal numbers of participants taking each list of stimuli, i.e., ten participants taking list 1 and ten taking list 2.

Like the previous experiment in Chapter 4, participants in this experiment were also college students from Zhengzhou Institute of Technology (China), including 32 females and 23 males, with their ages ranging from 18 to 22 (mean = 20.02). Note that participants involved in the previous experiment were excluded from this experiment. All participants had normal or corrected-to-normal vision, and there were no known learning difficulties or hearing impairments by their own reports. After participation, they were paid 50 yuan (around CAD 10) each. This research was reviewed and approved by Conjoint Faculties Research Ethics Board of University of Calgary, with the approval number REB18-0395.

### **5.2.3 Procedure**

The current experiment was conducted on a Macbook using Psychopy (Pierce, 2009). Participants would sit in front of a Macbook, and first completed three practice trials, which followed a pattern similar to test trials. In each practice trial, participants heard (for the oral group) or read (for the written group) a stimulus sentence, and judged the sentence's acceptability by pressing a key (from 1 to 7) on the keyboard. All oral stimuli were produced by a female native Mandarin speaker, adopting neutral declarative intonation, without stressed words or phrases. Reaction times in performing the judgments were also automatically collected. For oral stimuli, reaction times were measured from when the first syllable of each stimulus sentence was played to the moment that participants made judgments by pressing keys, but for written stimuli, the measurement started from when a stimulus sentence first showed on the screen. The participants then answered the corresponding comprehension question. After finishing a trial, they would need to press the spacebar to move on to the next trial. The three practice trials were followed by 48 test trials, adopting either of the two lists of stimuli. Note that a participant received either oral or written stimuli, depending on the group to which the participant was assigned.

## 5.2.4 Predictions

This experiment intended to examine the acceptability of stimulus sentences, which manipulated three factors, “pronoun type” (*ziji* vs. *wo*), “pronoun position” (subject vs. object) and “presentation mode” (oral vs. written). As hinted above, “pronoun type” and “presentation mode” are predicted to affect stimulus sentences’ acceptability, but “pronoun position” is assumed not to exert an influence, as no existing account specifies this. Therefore, the following predictions only take into consideration “pronoun type” and “presentation mode”.

Stimuli with the 1st person pronoun *wo* are predicted to be invariably acceptable, because *wo* as a context-dependent indexical always refers to the individual producing the relevant stimulus sentence. If a stimulus sentence is presented in the written mode, *wo* refers to the writer; if the sentence comes in the oral mode, *wo* refers to the speaker. There is no ambiguity, confusion or any other difficulty in interpreting *wo* and each stimulus sentence with *wo*. Thus, all conditions with *wo* should have the greatest acceptability and serve as the baseline for less acceptable stimuli. As for stimuli with *ziji*, they were designed to only allow *ziji*’s contextual contemplative uses. The findings from the corpus study in Chapter 3 have suggested that contextual contemplative uses of *ziji* are licensed only in certain contexts (mostly “contemplation”). As the stimuli in this experiment were presented without specifications of contextual/discursive information, it was not guaranteed that participants would evoke felicitous contexts like “contemplation” and impose them on the stimuli to obtain *ziji*’s contextual contemplative readings. If the contextual contemplative readings fail to be activated, the relevant sentences should be judged unacceptable. Therefore, stimuli with *ziji* should be rated less acceptable than stimuli with *wo*, though there is no sharp prediction on how downgraded “*ziji*” stimuli would be in comparison with “*wo*” stimuli.

When it comes to the modality factor, it should not affect the acceptability of stimuli with *wo*, which are predicted to have successful interpretation regardless of presentation modes. However, stimuli’s presentation modes should have an effect on the acceptability of “*ziji*” stimuli, whose successful interpretation requires *ziji* to be interpreted as contextual contemplative uses. This is because the written mode is hypothesized to evoke “contemplation” more easily, leading to greater

availability of *ziji*'s contextual contemplative readings and increased chances of successful interpretation. Therefore, “*ziji*” stimuli presented in the written mode should be more acceptable and rated with higher scores. In (8), I provide a summary of the predictions. As “pronoun position” has no predicted effect, the predictions in (8) apply whichever “pronoun position” is taken.

(8) Predicted comparisons of acceptability ratings

- a.  $ziji < wo$
- b.  $wo \times \text{oral} \approx wo \times \text{written}$
- c.  $ziji \times \text{oral} < ziji \times \text{written}$

## 5.3 Results and analyses

### 5.3.1 Mean acceptability ratings

This section presents mean acceptability ratings under each condition, which were calculated based on usable data only (i.e., from 40 participants). The ratings for test conditions (i.e., pronoun type = “*ziji*”) and those for control conditions (i.e., pronoun type = “*wo*”) are provided separately in the two tables below.

	oral mode	written mode	overall
Test combination 1: <i>ziji</i> × subject	5.179	5.350	5.265
Test combination 2: <i>ziji</i> × object	5.629	4.754	5.192
overall	5.404	5.052	5.228

Table 5.2: Mean acceptability ratings of “*ziji*” stimuli

	oral mode	written mode	overall
Control combination 1: <i>wo</i> × subject	6.417	6.029	6.223
Control combination 2: <i>wo</i> × object	6.204	6.192	6.198
overall	6.311	6.111	6.211

Table 5.3: Mean acceptability ratings of “*wo*” stimuli

First, the mean acceptability ratings of “*wo*” stimuli in each condition range from 6.029 to 6.417, which are relatively high against a scale from 1 to 7. This suggests the choice of “*wo*” stimuli as a baseline for acceptability is justified. As for the mean ratings of “*ziji*” stimuli, they range from 4.754 to 5.629. It is seen that “*wo*” stimuli’s advantages over “*ziji*” stimuli are not only manifested globally in the overall comparison (6.211 vs. 5.228), but in each pair of comparisons between a specific condition with “*wo*” stimuli and its corresponding condition with “*ziji*” stimuli. In brief, data of mean ratings suggests that “*ziji*” stimuli are not as acceptable as “*wo*” stimuli.

With regard to a modality difference in “*wo*” stimuli, it can be seen in Table 5.3 that there is a very slight difference of ratings between oral stimuli and written stimuli (6.204 vs. 6.192) when *wo* appears in object position, but there is a relatively large difference (6.417 vs. 6.029) when *wo* appears in subject position. Statistical analyses are needed to decide the significance of these differences, though no difference was predicted to appear.

Back to the target stimuli with *ziji*, Table 5.2 suggests that “*ziji*” stimuli presented in the oral mode are overall rated more acceptable than those presented in the written mode (5.404 vs. 5.052), which contradicts the prediction that written stimuli with *ziji* should be rated higher than oral ones. After a close look at the comparison in each specific combination, it is found that the prediction in (8c) holds in Test combination 1 with *ziji* in subject position (5.179 vs. 5.350), but not in Test combination 2 with *ziji* in object position (5.629 vs. 4.754). Therefore, “*ziji*” stimuli’s contradiction of the prediction comes from Test combination 2, where the mean rating in the written mode is unexpectedly low, only reaching 4.754. In the following subsections, I will demonstrate whether results from statistical analyses support or contradict the predictions.

### 5.3.2 Analyses of overall acceptability ratings

Analyses in this experiment were also carried out using linear mixed-effects models. I first ran an analysis of the overall data of ratings. Here rating was made as a function with “pronoun type”, “pronoun position” and “modality” as fixed effects, “participant” and “item” as random effects. After model comparisons, the most complex model in (9) turned out to be the best fitting model, with full interaction among the factors of fixed effects.

$$(9) \text{ Rating} \sim \text{Pronoun type} * \text{Pronoun position} * \text{Modality} + (1|\text{Participant}) + (1|\text{Item})$$

Table 5.4 shows a summary of analysis results from the best fitting model. As seen in the table, a main effect is only found in pronoun type, though interaction effects are found in “pronoun type × position”, “pronoun type × modality”, “position × modality”, and “pronoun type × position × modality”.

	Estimate	SE	<i>t</i>	<i>Pr</i>
(Intercept)	6.20	0.18	35.31	< 0.001 ***
Pronoun.ziji	-0.58	0.14	-4.04	< 0.001 ***
Position.subject	0.21	0.14	1.50	0.14
Mode.written	-0.01	0.24	-0.05	0.96
Pronoun.ziji: Position.subject	-0.66	0.20	-3.30	0.001 **
Pronoun.ziji: Mode.written	-0.86	0.17	-4.94	< 0.001 ***
Position.subject: Mode.written	-0.37	0.17	-2.15	0.03 *
Pronoun.ziji: Position.subject: Mode.written	1.42	0.28	5.75	< 0.001 ***

Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 5.4: Summary of results from analyzing ratings in all conditions

The analysis results above suggest three points. First of all, the main effect of pronoun type indicates that “wo” stimuli had a significantly greater acceptability level than “ziji” stimuli, bearing out the prediction in (8a). This not only justifies the choice of “wo” stimuli as a baseline, but

confirms the relative deficiency of “*ziji*” stimuli in terms of acceptability. As to whether stimuli in the written mode and/or stimuli in the oral mode display this deficiency, further analyses are required.

Second, the interactions of “pronoun type × position”, “pronoun type × modality”, and “pronoun type × position × modality” suggest that the factors “position” and “modality” may have effects on acceptability ratings, depending on the pronoun type, that is, the effects do not apply equally across the board. This partially echoes the prediction that “modality” should only affect the acceptability of “*ziji*” stimuli, though the factor “pronoun position” was not expected to play any role. In light of this, there is a greater need for further analyses to see whether “*ziji*” stimuli are subject to the effects from “pronoun position” and/or “modality”.

Third, “pronoun position’s” interaction with “modality” also impacts acceptability ratings, despite the fact that “position” or “modality” alone does not. It seems that “position” exerts its influence only in one mode, or that “modality” does not affect acceptability unless *wol/ziji* appears in a specific position. Whichever it is, the current analysis is not informative enough to reach in-depth conclusions; only targeted analyses of “*ziji*” stimuli’s ratings can resolve the question whether and how a modality difference impacts *ziji*’s interpretation and “*ziji*” stimuli’s acceptability. Therefore, more fine-grained analyses of “*ziji*” stimuli’s ratings should be conducted.

### 5.3.3 Further analyses of “*ziji*” stimuli’s acceptability ratings

In this section, I first analyzed all “*ziji*” stimuli with “position” and “modality” as fixed effects, participant and item as random effects. The most complex model as presented in (10) is also the best fitting model for data retrieved from “*ziji*” stimuli.

$$(10) \text{ Rating} \sim \text{Pronoun position} * \text{Modality} + (1|\text{Participant}) + (1|\text{Item})$$

The results from analyzing all “*ziji*” stimuli are shown in Table 5.5. It is clear that both “pronoun position” and “modality” show main effects, along with an interaction effect between the two factors. At first glance, the results confirm that modality has an effect on the acceptability of

stimuli with *ziji*, but more questions are raised than solved when these results are compared with the original predictions.

	Estimate	SE	t	Pr
(Intercept)	5.63	0.25	23.22	< 0.001 ***
Mode.written	-0.88	0.34	-2.64	0.02 *
Position.subject	-0.45	0.16	-2.77	0.007 **
Position.subject: Mode.written	1.05	0.19	5.41	< 0.001 ***

Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 5.5: Summary of results from analyzing ratings of “*ziji*” stimuli

As seen above, the written mode makes “*ziji*” stimuli less acceptable (with a negative estimate value, -0.88), which goes against the prediction that written stimuli with *ziji* should be more acceptable than oral ones. Nonetheless, considering the interaction between “position” and “modality”, it is likely that modality’s effect varies when *ziji* appears in different positions. The prediction that “*ziji*” stimuli in the written mode are more acceptable may still apply in stimuli with subject *ziji*, as suggested in the mean ratings for different conditions in Table 5.6, adapted from Table 5.2. Table 5.6 also includes the results from pairwise analyses of “*ziji*” stimuli’s ratings under different conditions. For stimuli with subject *ziji*, the written mode’s advantage over the oral mode does not reach a significant level ( $p = 0.69$ ); but for stimuli with object *ziji*, the oral mode’s higher ratings over the written mode are confirmed, with  $p = 0.04$ .

	mean in oral		mean in written	p-values
subject <i>ziji</i>	5.179	<	5.350	0.69
object <i>ziji</i>	5.629	>	4.754	0.04 *
overall	5.404	>	5.052	0.02 *

Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 5.6: Pairwise comparisons of stimuli with “*ziji*” in different positions

In brief, “presentation mode” does not make a significant difference in acceptability of stimuli with subject *ziji*, but for stimuli with object *ziji*, the oral mode, rather than the written mode, leads to higher acceptability levels. Therefore, the data of “*ziji*” stimuli, regardless of “pronoun position”, does not support the prediction that written stimuli with *ziji* are more acceptable than oral ones, challenging the underlying hypothesis. In-depth investigation and discussion are thus required.

### 5.3.4 Further analyses of “*wo*” stimuli’s acceptability ratings

This experiment also predicted that the acceptability of “*wo*” stimuli should be free from a modality effect. This subsection thus presents an analysis of “*wo*” stimuli’s ratings to examine whether this prediction concerning “*wo*” stimuli is valid. In Table 5.7, I present a summary of the results after analyzing ratings of “*wo*” stimuli with linear mixed-effects models. The results suggest that “modality” does not play a role in the acceptability of “*wo*” stimuli, validating the relevant prediction in (8b).

	Estimate	SE	<i>t</i>	<i>Pr</i>
(Intercept)	6.20	0.15	41.22	< 0.001 ***
Mode.written	-0.01	0.20	-0.06	0.95
Position.subject	0.21	0.11	1.94	0.055
Position.subject: Mode.written	-0.37	0.13	-2.88	0.004 **

Significance: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \* $p < 0.05$

Table 5.7: Summary of results after analyzing ratings of “*wo*” stimuli

However, the analysis did find a marginal effect of “pronoun position”, which may be related to the interaction effect between “position” and “modality”, as seen in Table 5.7. After pairwise comparisons of “*wo*” stimuli in different modes, a “position” effect was found to only apply in oral stimuli (subject vs. object:  $6.417 > 6.204$ ,  $p = 0.04$ ), but not in written ones (subject vs. object:  $6.029 \approx 6.192$ ,  $p = 0.12$ ). It seems that participants do not like orally produced sentences

with inanimate subjects and human objects (e.g., ‘That hot kettle burned me.’). These sentences deviate from the more typical scenario with human subjects and inanimate objects, and may thus sound less favorable. But when the written mode was adopted, participants were less constrained by “time pressure” and possibly more prone to realize that sentences with inanimate subjects and human objects should be as acceptable as those with human subjects and inanimate objects. Given that “*wo*” stimuli are only control items and that this experiment is more concerned with a “modality” effect, there will not be an elaborate discussion on how and why “position” interacts with “modality” and impacts the acceptability of “*wo*” stimuli.

## 5.4 Discussion

This experiment began with three predictions, and two of them were validated by the experiment results. The overall analysis confirmed that the test stimuli with *ziji* were less acceptable than their counterparts with the 1st person pronoun *wo*. The analysis of “*wo*” stimuli’s ratings validated the prediction that the acceptability of “*wo*” stimuli is not subject to a “modality” effect. However, when it comes to the prediction that “*ziji*” stimuli presented in the written mode are more acceptable than those in the oral mode, neither the overall analysis of “*ziji*” stimuli’s ratings nor pairwise analyses with “*ziji*” in different positions supported this. In the following, I discuss why the prediction failed to be borne out in stimuli with object *ziji* and in stimuli with subject *ziji* respectively.

### 5.4.1 Stimuli with object *ziji*: a “modality” effect opposite to the prediction

The ratings of stimuli with object *ziji* suggested that stimuli presented in the written mode were less acceptable than those presented in the oral mode, completely opposite to the prediction in (8c). Recall that the stimuli with object *ziji* were designed in the way that *ziji* is only interpretable as a contextual contemplative use, so that the stimuli are acceptable only when *ziji*’s contextual contemplative readings are available. The hypothesis underlying Prediction (8c) is that the written mode can easily evoke “contemplation”, which then facilitates *ziji*’s contextual contemplative

readings.

The failure to confirm Prediction (8c) and the finding of an opposite effect suggest the following three possibilities. First, the relevant hypothesis is wrong because oral stimuli have an advantage over written stimuli in terms of the availability of *ziji*'s contextual contemplative readings, as opposed to written stimuli's advantage over oral ones. Second, the relevant hypothesis is wrong because modality does not have an effect on the availability of *ziji*'s contextual contemplative readings; the opposite effect found in the results arises from some unforeseen factor. Third, the relevant hypothesis is correct, but there is an opposite effect from the an unforeseen factor; the opposite effect is much greater than the effect predicted by the hypothesis so that only the opposite effect is seen. While the first possibility requires an investigation into the reason why the oral mode outperforms the written mode on the availability of *ziji*'s contextual contemplative readings, both the second and the third possibilities need to introduce an unforeseen factor to account for the opposite effect. Currently, there is no evident sign that oral stimuli lead to greater availability of *ziji*'s contextual contemplative readings than written stimuli, but there is a potential unforeseen factor concerning stimuli with object *ziji*, i.e., unacceptability arising from semantic impossibility, which can potentially account for the opposite effect.

Structurally, *ziji* in object position was provided with the potential for local binding; semantically, the interpretation following from local binding was designed to be semantically impossible so that participants would resort to *ziji*'s potential for extra-sentential (co)reference. This semantic impossibility was created by having inanimate DPs in subject position and *ziji* in object position, because inanimate entities generally do not have the teleological capacity to perform actions on themselves. As seen in (11), *hot kettle* is inanimate, and the property of being hot suggests the teleological capacity to burn people, animals, or some fragile objects; however, hot kettles do not have the teleological capacity to burn themselves. The interpretation obtained through local binding is thus unacceptable.

- (11) nage re-shuihu tang-shang-le **ziji**.  
that hot-kettle burn-hurt-PERF self  
'That hot kettle burned self.'

It is speculated that the semantic impossibility concerning stimuli with object *ziji* did not always force participants to resort to *ziji*'s potential for extra-sentential (co)reference and that participants receiving written stimuli were more likely to notice and focus on the semantic impossibility and hence judge the stimuli unacceptable, contributing to written stimuli's lower acceptability ratings. As mentioned before, in contrast to the evanescence of oral stimuli, a written stimulus was always accessible to participants before keys were pressed to go to the next stimulus. The greater accessibility of a written stimulus should allow participants to thoroughly ponder over the stimulus's acceptability, which may make the semantic impossibility more easily noticed. Once participants found the semantic impossibility, they would conveniently judge the relevant stimulus unacceptable, because they were not obliged to search for an alternative interpretation to make the sentence acceptable. The greater accessibility of written stimuli and participants' thorough pondering were evidenced by the longer reaction times in the written mode than in the oral mode. Participants spent an average of 3.531 seconds in judging oral stimuli with object *ziji*, but an average of 4.357 seconds was spent in judging the written counterparts; the difference in reaction times reaches a significant degree, with  $p = 0.03$ .<sup>5</sup>

This subsection discussed the possible reasons why written stimuli were rated with lower scores than oral ones when *ziji* appeared in object position. One of the possible reasons is concerned with the unacceptability resulting from inanimate entities' incapacity to perform action on themselves. Despite this, more thorough research is needed to figure out the exact reason.

#### **5.4.2 Subject *ziji*: interference from the way acceptability judgments were made?**

This experiment also had stimuli with subject *ziji* as a testing ground for modality's effect on *ziji*'s contextual contemplative readings. Stimuli with subject *ziji* were presented as standalone sentences beginning with *ziji*. Considering the absence of surrounding discourse and the unavailability of

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<sup>5</sup>Reaction times in handling oral stimuli were counted from the playing of the first syllable of a stimulus, so the reaction times here also included the time spent in playing the whole oral stimulus. In view of this, the actual reaction times left for participants receiving oral stimuli were even shorter.

intra-sentential coreference, those stimuli with subject *ziji* were assumed to be acceptable only when *ziji* is interpreted as a contextual contemplative use. If the hypothesis is correct that the written mode allows more contextual contemplative readings than the oral mode, written stimuli with subject *ziji* should be rated with higher scores than their oral counterparts. Nonetheless, the analysis of ratings of stimuli with subject *ziji* revealed no effect of “modality”. It seems that the null hypothesis was supported; that is, presentation modes of stimuli do not make a significant difference in the availability of *ziji*’s contextual contemplative readings.

A closer look at the results shows that the mean rating for written stimuli with subject *ziji* is 5.350, whereas the mean rating for their oral counterparts is 5.179. Both modes had a relatively high level of acceptability, which would require both modes to induce great availability of *ziji*’s contextual contemplative readings, if *ziji* here (i.e., in stimuli with subject *ziji*) is assumed to be only interpretable as a contextual contemplative use. However, the great availability of *ziji*’s contextual contemplative readings in both modes do not comply with the assumption that only the written mode evokes “contemplation” easily and activates more of *ziji*’s contextual contemplative readings. While this assumption is likely to be wrong, there is another possible explanation for the great acceptability of oral stimuli with subject *ziji*, i.e., the way that participants made acceptability judgments. According to Chomsky (1965), a more acceptable sentence is one that is more likely to be produced. Acceptability judgments of a linguistic form are heavily based on familiarity and frequency, that is, whether participants have experience with the linguistic form and how frequently this form appears (Bybee and Eddington, 2006; Featherston, 2005; Stefanowitsch, 2008). The sentences below are all replicated from Section 5.2.1; they demonstrate that stimuli with subject *ziji* can be easily produced when *ziji* is interpreted as an attitudinal use, a discursive contemplative use, an empathy use and a contextual contemplative use respectively.

(12) Attitudinal *ziji*, attitude holder introduced in a preceding sentence

wo<sub>i</sub> ganjue ta buhui lai zhe-ci yuehui. **ziji**<sub>i</sub> yizhi shi xiangxiaren.  
 I feel he will-not come this-CL data self always COP countryman

‘I<sub>i</sub> feel that he will not come to this date. Self<sub>i</sub> has always been a bumpkin.’

- (13) Discursive contemplative *ziji*, contemplator introduced in a preceding sentence

wo<sub>i</sub> xianru-le chensi.        **ziji**<sub>i</sub> yizhi shi xiangxiaren.  
I trap-PERF contemplation self always COP countryman

‘I<sub>i</sub> got lost in thought. Self<sub>i</sub> has always been a bumpkin.’

- (14) a. Empathy *ziji*, empathy locus mentioned in a preceding sentence

wo<sub>i</sub> congmei jian-guo name-gao de lou.        **ziji**<sub>i</sub> yizhi shi xiangxiaren.  
I never see-PERF that-high PNMM building self always COP countryman

‘I<sub>i</sub> have never seen that high a building. Self<sub>i</sub> has always been a bumpkin.’

- b. Empathy *ziji*, empathy locus in the context, e.g., conversation

Chengshi-li gao-lou zhen duo-a.        **ziji**<sub>SPEAKER</sub> yizhi shi xiangxiaren,  
city-in tall-building really many-SFP self always COP countryman  
mei jian-guo zhexie gao-lou.  
without see-PERF these tall-building

‘Many tall buildings in the city indeed! Self<sub>SPEAKER</sub> has always been a bumpkin, and has not seen these tall buildings.’

- (15) In a context of contemplation,

**ziji**<sub>SPEAKER</sub> yizhi shi xiangxiaren.  
self always COP countryman

‘Self<sub>SPEAKER</sub> has always been a bumpkin.’

As mentioned in Section 5.2.1, the first three uses all need surrounding discourse for successful interpretation; only contextual contemplative uses are allowed to appear in standalone sentences. In order to test the availability of *ziji*’s contextual contemplative readings, stimuli in this experiment were designed to be standalone sentences to exclude *ziji*’s potential to be interpreted as the other uses. However, if acceptability judgments are made based on whether a stimulus can be produced, this design of judging standalone sentences’ acceptability would not tell the availability of *ziji*’s contextual contemplative readings. This is because participants would disregard the existence/absence of surrounding discourse and judge a stimulus acceptable as long as the stimulus can be produced, regardless of whether contextual contemplative readings were available. As exemplified in (12), (13), and (14), stimuli with subject *ziji* can appear as perfectly acceptable sentences

within a larger discourse; the lack of surrounding discourse does not change the fact that these stimuli can be produced. Therefore, a stimulus can still be judged acceptable even if it lacks the surrounding discourse necessary for successful interpretation; this should be especially true when no prior instructions are given to participants to prevent them from treating each stimulus sentence as part of a larger discourse. This interference from the way that acceptability judgments were made may have contributed to the high acceptability scores in the oral mode and the failure to confirm the relevant prediction.

To sum up, this subsection discussed possible reasons why the stimuli with subject *ziji* did not support the hypothesis that written stimuli allow more contextual contemplative readings than oral ones. While the hypothesis itself can be false, it is also likely that participants tend to judge a sentence's acceptability based on whether the sentence can be produced and ignore whether there is necessary surrounding discourse. As each stimulus sentence is perfectly acceptable within a larger discourse, participants may have thus given higher acceptability scores to the stimulus sentences. Therefore, the way that acceptability judgments were made may have interfered with this experiment's results, making it difficult to tell whether modality has an effect on the availability of *ziji*'s contextual contemplative readings. Following this line, the current experiment could not confirm or falsify the hypothesis in question and further studies are thus required. Moreover, future studies should be alert to any potential interference from the way that acceptability judgments are made. For instance, in order to remove the interference in question, participants can either be given explicit instructions that they should not interpret a stimulus as part of a larger discourse, or be told that any stimulus sentence they hear/read is the first sentence of the corresponding discourse, which can at least exclude the interference from previous discourse.

## 5.5 Summary

This experiment was conducted to test whether “modality” affects *ziji*'s interpretations and acceptability judgments of stimuli involving *ziji*. Specifically, it intended to answer the question

of whether “modality” affects the availability of *ziji*’s contextual contemplative readings, which in turn impacts the relevant sentences’ acceptability. With the above aims, this experiment first measured the acceptability of stimuli with the 1st person pronoun *wo*, and found them acceptable in general. Once *wo* in the stimuli were replaced with *ziji*, however, the acceptability decreased significantly, consolidating the conclusion from Chapter 3 that *ziji* is not an indexical as freely used as the 1st person pronoun *wo*. Then I investigated whether “modality” exerts an influence on the acceptability of “*wo*” stimuli, and found no significant effect from stimuli’s presentation modes, indicating that “modality” is not a factor that affects sentences’ acceptability invariably. Lastly, I examined modality’s effect on the acceptability of stimuli with subject *ziji* and stimuli with object *ziji* separately. As both types of stimuli were assumed to be acceptable only when *ziji* is interpreted with contextual contemplative meanings, I predicted that written stimuli should be rated more acceptable than oral ones, based on the hypothesis that written stimuli activate more contextual contemplative readings than oral ones. However, no “modality” effect was found in data with subject *ziji*, and a pattern opposite to the prediction was revealed in data with object *ziji*. This indicates that the hypothesis relating to modality’s effect on *ziji*’s contextual contemplative readings may be false. In addition, there are also other possible explanations for the failure to confirm the prediction. One possible explanation for the observation in stimuli with object *ziji* is that these stimuli were designed with semantic impossibility to prevent local binding and participants receiving written stimuli were more likely to notice the impossibility, considering that written stimuli were always visually accessible, compared to oral stimuli’s transience. As regards stimuli with subject *ziji*, they were rated with unexpectedly high acceptability scores regardless of presentation modes. It is speculated that participants may have made their judgments based on whether a stimulus can be produced. Since each stimulus with subject *ziji* is perfectly producible as part of a larger discourse, these stimuli were rated acceptable, despite the absence of surrounding discourse necessary for successful interpretation. Therefore, the way that acceptability judgments were made may have interfered with this experiment’s results, contributing to the failure to confirm the relevant prediction. In conclusion, this experiment found that modality had an effect on

the acceptability of stimuli with *ziji*, though this effect was not associated with *ziji*'s contextual contemplative readings but may have arisen from written stimuli's constant availability as opposed to oral stimuli's transience.

# Chapter 6

## Conclusion

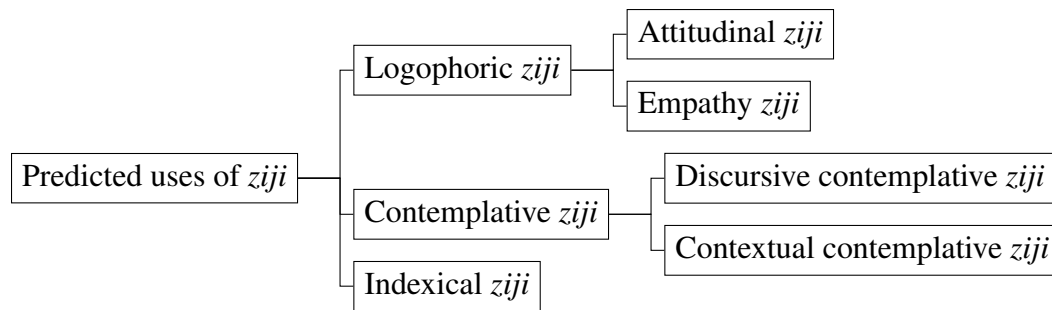
### 6.1 A recap

This thesis started with two general problems concerning the status quo of studies on the Mandarin reflexive form *ziji*. First, there are very few studies investigating *ziji*'s extra-sentential (co)reference, which should embody effects from extra-sentential factors (e.g., context and discourse). Second, previous studies tend to overlook extra-sentential factors' effects on *ziji*'s intra-sentential coreference, which may contribute to the disputes over *ziji*'s cross-clausal coreference, especially the relevant properties, subject orientation and the blocking effect. Considering the roles that extra-sentential factors play in interpreting *ziji*, this thesis endeavored to investigate these roles by firstly examining *ziji*'s potential for extra-sentential (co)reference.

Through a review of previous studies of *ziji* beyond local binding, this thesis sorted out four types of analyses that allow *ziji*'s extra-sentential (co)reference, including the logophoric analyses in Charnavel (2017, 2019b) and Park (2018), the empathy analysis in Wang and Pan (2012, 2014), the shiftable indexical analysis in Anand (2006), and Li's (1991) analysis with *ziji* referring to contemplator. These analyses predict four uses of *ziji*, logophoric *ziji*, empathy *ziji*, indexical *ziji* and contemplative *ziji*. Empathy *ziji* is subsumed under logophoric *ziji*, since it refers to one of the two types of logophoric center (i.e., empathy locus). Subsequently, *ziji* referring to another type

of logophoric center (i.e., attitude holder), represents another subcategory of logophoric *ziji*, i.e., attitudinal *ziji*. This thesis further distinguishes two types of contemplative *ziji*, with discursive contemplative *ziji* referring to a contemplator mentioned in previous discourse and contextual contemplative *ziji* referring to a contemplator in the context, based on their differences in where *ziji* gets its reference and the possible person specifications of contemplative *ziji*'s referent. Figure 6.1 presents the various uses that allow *ziji*'s extra-sentential (co)reference.

Figure 6.1: The predicted uses of *ziji* that allow extra-sentential (co)reference



After a corpus study of sentence-initial *ziji*, most of the predicted uses were validated, including attitudinal *ziji*, empathy *ziji*, discursive contemplative *ziji* and contextual contemplative *ziji*. The validated uses with their potentials for discursive coreference and contextual reference are provided in Table 6.1.<sup>1</sup> The only predicted use left unproven is indexical *ziji*. According to Anand (2006), indexical *ziji* has a default reference to the speaker, but in the presence of a context shift operator  $OP_{AUTH}$ , *ziji*'s reference will be shifted. For sentence-initial *ziji*, it should refer to the speaker because there is no attitude predicate that precedes *ziji* and introduces  $OP_{AUTH}$ . Unfortunately, no token of sentence-initial *ziji* can be classified as Anand's indexical *ziji*, challenging his shiftable indexical analysis.

<sup>1</sup>Dashed lines “- -” are used in Table 6.1 to indicate the fact that the relevant (co)referential potentials are not predicted by previous analyses.

		Discursive coreference	Contextual reference
Logophoric <i>ziji</i>	Attitudinal <i>ziji</i>	VALIDATED	- - -
	Empathy <i>ziji</i>	VALIDATED	VALIDATED
Contemplative <i>ziji</i>	Discursive contemplative <i>ziji</i>	VALIDATED	- - -
	Contextual contemplative <i>ziji</i>	- - -	VALIDATED
	Indexical <i>ziji</i>	- - -	UNPROVEN

Table 6.1: Examining the predicted uses of *ziji* with their extra-sentential (co)referential potentials

Note that contextual contemplative *ziji* has an invariable reference to the speaker, which may have contributed to Anand’s proposal of *ziji* as an indexical with the denotation “AUTHOR(c)”. However, contextual contemplative *ziji*’s reference to the speaker is only apparent. Contextual contemplative *ziji* actually refers to the contemplator in the context; as the contemplator here is simultaneously the speaker, contextual contemplative *ziji* has the seeming reference to the speaker. In Zubin et al.’s binary Perspective Indexical System, indexicals only distinguish “self” (the center) and “other” (the peripheral); *ziji* referring to a contemplator in the context can be approached as an indexical referring to the contextually inherent perspective center, with the denotation “CENTER(c)”. As to discursive contemplative *ziji*, its occurrence in represented thought only and its reference to the relevant thought possessor suggest that discursive contemplative *ziji* can be taken as an indexical of CENTER(i), i.e., with the evaluation circumstances shifted from the context “c” to the situation “i” in which the relevant thought is produced. Therefore, two subcategories of contemplative *ziji* are unified into one shiftable indexical analysis.

The validated extra-sentential (co)referential potentials in Table 6.1 demonstrate that context and discourse can bring in additional extra-sentential (co)referential possibilities. Sometimes, the interpretation from *ziji*’s extra-sentential (co)referential potential can coincide with the interpretation from *ziji*’s intra-sentential coreference; in this case, the intra-sentential coreference will be enhanced, exemplifying extra-sentential factors’ interference in *ziji*’s intra-sentential coreference.

This interference was verified by an experiment testing the blocking effect in different contexts. In “face-to-face conversation”, *ziji*’s coreference with a 1st person matrix subject was partially blocked by an intervening 3rd person DP, but in contemplation contexts, this blocking was alleviated and *ziji* had significantly more potential for cross-clausal coreference with the 1st person matrix subject. This is consistent with the prediction that *ziji* in contemplation contexts can refer to the contextual contemplators (also the speakers) realized as 1st person pronouns, ensuring *ziji*’s coreference with the 1st person pronouns irrespective of blocking. Aside from the interference from *ziji*’s extra-sentential (co)referential potentials, this experiment testing the blocking effect also revealed another extra-sentential factor’s effect on *ziji*’s intra-sentential coreference, specifically, context’s effect on the empathy level of a potential intra-sentential antecedent’s referent. Empathy *ziji* refers to a referent with the highest empathy level; a referent’s empathy level can be affected by the context. For instance, the speaker enjoys an inherently higher empathy level than other individuals in the context, so that empathy *ziji*’s coreference with a 1st person pronoun is favored, despite the blocking from conflicting person specifications.

The extra-sentential effects discussed above all depend on the presence of context or discourse. These effects may not apply to introspective judgments of standalone sentences, which are often used in previous studies of *ziji* with intra-sentential coreference. Despite the absence of surrounding discourse and information on the context, I propose that the interpretation of *ziji* in a standalone sentence is also subject to effects from extra-sentential factors. For example, presentation modes of stimulus sentences may affect the availability of *ziji*’s contextual contemplative readings. An experiment was conducted to test modality’s effect, and modality was verified to be an extra-sentential factor in interpreting *ziji*, though the verified effect is not associated with *ziji*’s contextual contemplative readings but may arise from written stimuli’s constant accessibility to participants, as opposed to oral stimuli’s evanescence. Moreover, it was speculated that participants may judge a sentence acceptable as long as the sentence can be produced, irrespective of whether the sentence needs surrounding discourse for interpretation. If this speculation is true, the acceptability judgment task as a research method in empirical linguistics, should be used cautiously for standalone

sentences that require surrounding discourse for successful interpretation, because the lack of necessary surrounding discourse does not always lead to these sentences' being judged unacceptable. In order to eliminate the potential interference from the way acceptability judgments are made, participants should be given explicit instructions on whether a sentence to be judged can be taken as part of a larger discourse or not.

## **6.2 Classifying the extra-sentential factors in interpreting *ziji***

This thesis revealed several extra-sentential factors in interpreting *ziji* and their relevant effects. As evidenced by the corpus study, context and discourse can bring in extra-sentential (co)referential potentials. Moreover, the experimental studies suggest several extra-sentential factors' effects: the contextual effect from *ziji*'s contextual contemplative readings, the contextual effect affecting *ziji*'s empathy uses, modality's effect from written stimuli's constant availability, etc. While some represent the effects directly arising from context and discourse, others are not, at least not directly, related to context or discourse.

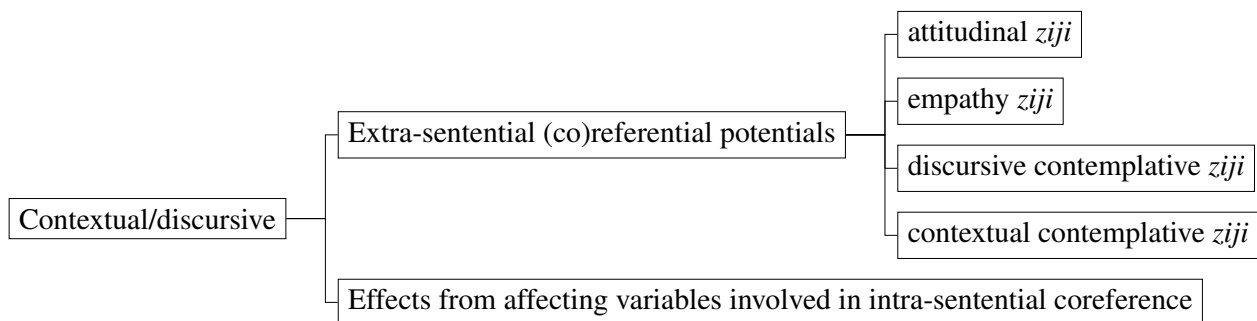
### **6.2.1 Effects from context/discourse**

Context/discourse can affect *ziji*'s interpretation by introducing extra-sentential (co)referential potentials, i.e., antecedents in previous discourse or referents in the context. This effect is more noticeable when no intra-sentential antecedent is available, and has been justified by the corpus study of sentence-initial *ziji*. In other words, each validated use of *ziji* with contextual reference or discursive coreference represents a contextual/discursive effect from that use. The extra-sentential (co)referential potentials can also interact with *ziji*'s intra-sentential coreference. The experiment examining the blocking effect in different contexts has demonstrated that *ziji*'s intra-sentential coreference can be enhanced when its reference coincides with the reference derived from *ziji*'s contextual contemplative use, which is available in contemplation contexts. While this experiment provides experimental evidence for the interference from *ziji*'s contextual contemplative use, it is

conceivable that *ziji*'s potential for extra-sentential (co)reference can also interact with its potential for intra-sentential coreference in other ways. When the two potentials' referents coincide, the relevant reference should be enhanced; otherwise, both references may stand as possible interpretations.

In addition to the extra-sentential (co)referential potentials, context/discourse can also affect *ziji*'s interpretation by interfering with the variables associated with *ziji*'s intra-sentential coreference. According to Charnavel (2019), *ziji*'s intra-sentential coreference can be approached as an exempt anaphor referring to attitude holder or empathy locus. While contextual/discursive information can scarcely alter the fact that a DP taking the role of attitude holder is a potential antecedent for attitudinal *ziji*, context/discourse does play a role in determining whether a certain DP can serve as empathy *ziji*'s antecedent by affecting the empathy level of this DP's referent, because empathy *ziji*'s antecedent is the DP whose referent has the highest empathy level. In fact, the contextual effect on empathy *ziji*'s intra-sentential coreference was also suggested in the experimental study testing the blocking effect in different contexts. *Ziji*'s coreference with a 1st person pronoun can be enhanced because this pronoun's referent is the speaker with a high empathy level endowed by the context. In Figure 6.2, I summarize the contextual/discursive effects on *ziji*'s interpretation.

Figure 6.2: Extra-sentential factors and their effects: **from context/discourse**

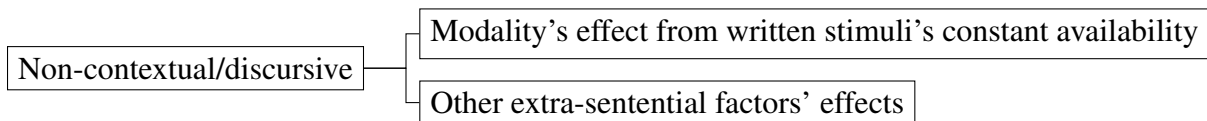


### 6.2.2 Other extra-sentential factors

The interpretation of *ziji* is also subject to the effects from extra-sentential factors other than context/discourse. For instance, presentation modes of stimuli were predicted to affect *ziji*'s potential

to be interpreted as a contextual contemplative use, though this prediction was not supported in the experiment testing modality’s effect on stimulus sentences’ acceptability, whether *ziji* appeared in subject or object position. Despite this, this experiment did suggest a modality effect on stimuli with object *ziji*. Owing to written stimuli’s constant availability, participants receiving written stimuli were allowed to thoroughly ponder over a stimulus’ acceptability, which may have made it more likely for participants to notice the semantic impossibility involved in stimuli with object *ziji*, leading to lower acceptability scores. There are surely more extra-sentential factors’ effects on *ziji*’s interpretation than presented in this thesis. Learning about these factors and their effects is crucial for a comprehensive analysis that accounts for *ziji*’s interpretation. In addition, more focused studies of *ziji* are enabled by excluding irrelevant factors/effects.

Figure 6.3: Extra-sentential factors and their effects: **not (directly) from context/discourse**



## 6.3 Possible future studies

### 6.3.1 Re-examining previous data of *ziji*

This thesis addressed the problems pertaining to previous studies of *ziji* with an in-depth study of *ziji*’s various uses allowing extra-sentential (co)reference and a multifaceted investigation into the extra-sentential factors in interpreting *ziji*. Despite a focus on the Mandarin reflexive form *ziji*, this research’s findings add to the general studies of reflexive forms beyond local binding and may even shed light on the research of similarly-behaved reflexive forms in other languages. More importantly, this thesis draws researchers’ attention to context’s and discourse’s effects on *ziji*’s interpretation, as well as the effects from other extra-sentential factors, e.g., modality. Future studies of anaphor resolution should thus take into account both intra-sentential factors and extra-sentential factors, and mind the interference from extra-sentential factors in probing phenomena

related to intra-sentential coreference.

In addition, previous data of *ziji* can be re-examined by taking into account all known effects and all possible uses of *ziji*, in the hope of more comprehensive and more plausible analyses of these data. In Chapter 4, I have discussed how the incorporation of extra-sentential factors' effects help account for asymmetric blocking of *ziji*'s cross-clausal coreference. There are still other instances where re-examination produces more plausible accounts. (1a) is a sentence involving *ziji*'s intra-sentential coreference with a DP that does not c-command *ziji*. To account for *ziji*'s coreference with *wo* 'I', Tang (1989) proposes that *ziji* can be bound by sub-commanding DPs as well, which are contained within DPs that c-command *ziji*. When there are nearer potential antecedents (e.g., *meimei* 'sister'), *ziji*'s binding by sub-commanding DPs is interrupted, explaining *ziji*'s interpretation in sentence (1b).

- (1) a. [wo<sub>i</sub> de jiaoao]<sub>j</sub> hai-le **ziji**<sub>i/\*j</sub>.  
 I POSS pride hurt-PERF self  
 '[My<sub>i</sub> pride]<sub>j</sub> hurts self<sub>i/\*j</sub>.'
- b. [wo<sub>i</sub> de meimei]<sub>j</sub> hai-le **ziji**<sub>\*i/j</sub>.  
 I POSS sister hurt-PERF self  
 '[My<sub>i</sub> sister]<sub>j</sub> hurts self<sub>\*i/j</sub>.'

(Huang and Tang, 1991, p. 265-266)

The data in (1) can be re-examined by incorporating logophoric uses, especially *ziji*'s empathy use. Following Charnavel (2017, 2019), *ziji* can be locally bound by an overt c-commanding DP or a covert pro<sub>log</sub>, as long as they are contained in spell-out domains no larger than tensed TPs. In (1a), [<sub>DP</sub> *wo de jiaoao*] 'my pride' can c-command *ziji*, but it cannot co-refer with *ziji*, because the interpretation following from this coreference is incomprehensible. In terms of *ziji*'s coreference with *wo*, it is derived in two steps: *ziji* is first bound by pro<sub>log</sub> at the left periphery of vP (a spell-out domain); pro<sub>log</sub> then refers to *wo*'s referent (i.e., the speaker) as an empathy locus.<sup>2</sup> While the

<sup>2</sup>Charnavel also lists DP and tensed TP as possible spell-out domains. However, it is unclear whether *ziji* can be taken as a DP and serves as a spell-out domain for itself. In addition, the tensed TP in (1a) is not an appropriate spell-out domain for *ziji*'s local binding, as pro<sub>log</sub> at the left periphery of this TP may bind *wo* 'I', resulting in a violation of Binding Condition B.

speaker has an inherently higher empathy level than others, the overt appearance of *wo* ‘I’ further indicates the speaker’s dominance in the context, making the speaker the empathy locus in (1a). In (1b), *ziji*’s coreference with the c-commanding DP [<sub>DP</sub> *wo de meimei*] ‘my sister’ is perfectly comprehensible, enabling *ziji*’s local binding by ‘my sister’; theoretically, *ziji*’s empathy use should be available as well, but *wo*’s potential to serve as an empathy locus is weakened. Concerning *ziji*’s empathy use in (1b), two of Kuno and Kaburaki’s (1977) empathy hierarchies are involved; the surface structure empathy hierarchy prescribes that ‘my sister’ in subject position should possess a higher empathy level than DPs in other positions (in this case, *wo*), but the speech-act participant empathy hierarchy specifies that the speaker (also *wo*’s referent) has a higher empathy level than 3rd person individuals. Despite the lack of knowledge on how the two hierarchies may interact to determine a referent’s overall empathy level, it is clear that *wo* in (1b) does not have the same high level of empathy that *wo* in (1a) possesses, which compromises *ziji*’s coreference with *wo* in (1b). Moreover, the use of *ziji* for coreference with *wo* is pragmatically infelicitous, because the use of *wo* for this coreference can lead to better clarity. Considering the above, *ziji* in (1b) seems to only allow local binding by ‘my sister’.

### 6.3.2 Other possible future studies

Notwithstanding the revelation of extra-sentential factors and their potential effects on *ziji*’s interpretation, this research is deficient and could be improved in several aspects. First, this research proposes that *ziji* can be treated as an indexical referring to the inherent perspective center in a context that only distinguishes “self” and “other”. However, further evidence still needs to be found to support this treatment of *ziji*; moreover, it will be interesting to examine whether other languages also contain this kind of indexicals. Second, the corpus study of sentence-initial *ziji* may not be able to capture all tokens of *ziji* with extra-sentential (co)reference, and the findings derived from this study may have overlooked certain uses of *ziji*. Third, modality’s effect relating to written stimuli’s constant availability, along with the effect relating to the way that acceptability judgments were made, were inferred from the experiments aimed for testing other effects. The

justification of these effects still requires more targeted research. Lastly, this research does not address the question of how previous discourse exerts its influence on *ziji*'s intra-sentential coreference. To answer this question, it is advisable to conduct corpus studies of *ziji* in discourse, or experiments manipulating different types of previous discourse.

In addition to improving this thesis, there are other interesting subjects to be investigated. For instance, research can be done to see whether any or even all of the multiple uses that *ziji* demonstrates are associated with *ziji*'s lack of (inherent)  $\phi$  features. Studies of reflexive forms in other languages may provide a clue, e.g., the Korean *caki*. *Caki* is often used as a Korean counterpart of *ziji* in many contexts (e.g., in attitude reports), though it has an inherent 3rd person feature, which indicates that at least some of *ziji*'s uses are compatible with inherent  $\phi$  features. Nonetheless, it is still unclear whether the Korean *caki* allows contemplative uses in direct thought or represented thought passages, and if so, whether it distinguishes  $\phi$  features in this case and whether a shiftable indexical analysis can capture *caki* in Korean direct/represented thought passages. Furthermore, the corpus study of sentence-initial *ziji* also found a considerable number of *ziji* tokens serving as intensifiers. An in-depth examination of these tokens can be conducted to reveal more properties of various types of intensifier *ziji*. All of the above are potential subjects for future research, which will contribute to a comprehensive understanding of reflexive forms in languages.

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# Appendix

## Test stimuli used in the two experiments

### 1 Test stimuli for the experiment in Chapter 4

#### 1.1 Templates of stimuli

1. \_\_\_\_知道\_\_\_\_昨天批评自己了.....  
' \_\_\_\_ knows that \_\_\_\_ criticized self yesterday...'
2. \_\_\_\_觉得\_\_\_\_会给自己买好多东西.....  
' \_\_\_\_ figured that \_\_\_\_ would buy self many things...'
3. \_\_\_\_发现\_\_\_\_对自己没信心.....  
' \_\_\_\_ found that \_\_\_\_ was not confident in self...'
4. \_\_\_\_相信\_\_\_\_不会害自己.....  
' \_\_\_\_ believes that \_\_\_\_ will not harm self...'
5. \_\_\_\_意识到\_\_\_\_正试图改变自己.....  
' \_\_\_\_ realized that \_\_\_\_ was attempting to change self...'
6. \_\_\_\_希望\_\_\_\_不要再责怪自己.....  
' \_\_\_\_ hopes that \_\_\_\_ will not blame self any more...'
7. \_\_\_\_认为\_\_\_\_会给自己带来麻烦.....  
' \_\_\_\_ thinks that \_\_\_\_ will bring trouble to self...'
8. \_\_\_\_期待\_\_\_\_能多谈谈自己.....  
' \_\_\_\_ expected that \_\_\_\_ could talk more about self...'

9. \_\_\_\_说\_\_\_\_可以多关注自己.....  
' \_\_\_\_ said that \_\_\_\_ could pay more attention to self...'
10. \_\_\_\_估计\_\_\_\_无法原谅自己.....  
' \_\_\_\_ estimated that \_\_\_\_ could not forgive self...'
11. \_\_\_\_预料到\_\_\_\_可能会讨论自己.....  
' \_\_\_\_ anticipates that \_\_\_\_ may discuss self...'
12. \_\_\_\_以为\_\_\_\_当时在夸自己.....  
' \_\_\_\_ thought \_\_\_\_ was then praising self...'
13. \_\_\_\_猜想\_\_\_\_当时一定恨死自己了.....  
' \_\_\_\_ guessed that \_\_\_\_ must have detested self at that time...'
14. \_\_\_\_明白\_\_\_\_在挑战自己.....  
' \_\_\_\_ understood that \_\_\_\_ was challenging self...'
15. \_\_\_\_感觉\_\_\_\_应该对自己好点.....  
' \_\_\_\_ feels that \_\_\_\_ should treat self better...'

## 1.2 A complete list of stimuli under each condition

### 1.2.1 Stimuli of "1st-3rd" in "conversation"

1. 我知道玲玲昨天批评自己了.....  
'I know that Lingling criticized self yesterday...'
2. 我觉得小红会给自己买好多东西.....  
'I figured Xiaohong would buy self many things...'
3. 我发现小丽对自己没信心.....  
'I found that Xiaoli was not confident in self...'
4. 我相信菲菲不会害自己.....  
'I believe that Feifei will not harm self...'
5. 我意识到丽丽正试图改变自己.....  
'I realized that Lili was attempting to change self...'

### 1.2.2 Stimuli of “3rd-1st” in “conversation”

1. 小亮希望我不要再责怪自己.....  
'Xiaoliang hopes that I will not blame self any more...'
2. 小明认为我会给自己带来麻烦.....  
'Xiaoming thinks that I will bring trouble to self...'
3. 约翰期待我能多谈谈自己.....  
'John expected that I could talk more about self...'
4. 小强说我可以多关注自己.....  
'Xiaoqiang said that I could pay more attention to self...'
5. 吉姆估计我无法原谅自己.....  
'Jim estimated that I could not forgive self...'

### 1.2.3 Stimuli of “3rd-3rd” in “conversation”

1. 安妮预料到丽莎可能会讨论自己.....  
'Annie anticipates that Lisha may discuss self...'
2. 麦克以为露西当时在夸自己.....  
'Mike thought Lucy was then praising self...'
3. 苏姗猜想玛丽当时一定恨死自己了.....  
'Susan guessed that Mary must have detested self at that time...'
4. 小静明白小刚在挑战自己.....  
'Xiaojing understood that Xiaogang was challenging self...'
5. 保罗感觉汤姆应该对自己好点.....  
'Paul feels that Tom should treat self better...'

### 1.2.4 Stimuli of “1st-3rd” in “contemplation”

1. 我希望玛丽不要再责怪自己.....  
'I hope that Mary will not blame self any more...'
2. 我认为露西会给自己带来麻烦.....  
'I think that Lucy will bring trouble to self...'
3. 我期待汤姆能多谈谈自己.....  
'I expected that Tom could talk more about self...'

4. 我曾说小亮可以多关注自己...  
'I said that Xiaoliang could pay more attention to self...'
5. 我估计玲玲无法原谅自己.....  
'I estimated that Lingling could not forgive self...'

### **1.2.5 Stimuli of “3rd-1st” in “contemplation”**

1. 小明知道我昨天批评自己了  
'Xiaoming knows that I criticized self yesterday...'
2. 小强觉得我会给自己买好多东西.....  
'Xiaoqiang figured I would buy self many things...'
3. 菲菲发现我对自己没有信心.....  
'Feifei found that I was not confident in self...'
4. 约翰相信我不会害自己.....  
'John believes that I will not harm self...'
5. 吉姆意识到我正试图改变自己.....  
'Jim realized that I was attempting to change self...'

### **1.2.6 Stimuli of “3rd-3rd” in “contemplation”**

1. 小刚预料到丽丽可能会讨论自己.....  
'Xiaogang anticipates that Lili may discuss self...'
2. 麦克以为保罗当时在夸自己...  
'Mike thought paul was then praising self...'
3. 小红猜想小丽当时一定恨死自己了.....  
'Xiaohong guessed that Xiaoli must have detested self at that time...'
4. 小静明白丽莎在挑战自己.....  
'Xiaojing understands that Lisha is challenging self...'
5. 苏姗感觉安妮应该对自己好点.....  
'Susan feels that Annie should treat self better...'

### 1.2.7 Stimuli of “1st-3rd” in “text messaging”

1. 我明白小红在挑战自己.....  
'I understand that Xiaohong is challenging self...'
2. 我感觉丽丽得对自己好点.....  
'I feel that Lili should treat self better...'
3. 我曾说小明可以多关注自己.....  
'I said that Xiaoming could pay more attention to self...'
4. 我意识到小亮正试图改变自己.....  
'I realized that Xiaoliang was attempting to change self...'
5. 我估计小静无法原谅自己.....  
'I estimated that Xiaojing could not forgive self...'

### 1.2.8 Stimuli of “3rd-1st” in “text messaging”

1. 苏姗希望我不要再责怪自己.....  
'Susan hopes that I will not blame self any more ...'
2. 小强以为我当时在夸自己.....  
'Xiaoqiang thought I was then praising self...'
3. 丽莎猜想我当时一定非常恨自己.....  
'Lisha guessed that I must have detested self at that time...'
4. 约翰认为我会给自己带来麻烦.....  
'John thinks I will bring trouble to self...'
5. 安妮期待我能多谈谈自己.....  
'Annie expected that I could talk more about self...'

### 1.2.9 Stimuli of “3rd-3rd” in “text messaging”

1. 吉姆知道露西昨天批评自己了.....  
'Jim knows that Lucy criticized self yesterday...'
2. 汤姆觉得保罗会给自己买好多东西.....  
'Tom figured that Paul would buy self many things...'
3. 菲菲发现小刚对自己没有信心.....  
'Feifei found that Xiaogang was not confident in self...'

4. 玲玲相信小丽不会害自己.....  
'Lingling believes that Xiaoli will not harm self...'
5. 麦克预料到玛丽可能会讨论自己.....  
'Mike anticipates that Mary may discuss self...'

#### **1.2.10 Stimuli of “1st-3rd” in “public speaking”**

1. 我希望小刚不要再责怪自己.....  
'I hope that Xiaogang will not blame self any more...'
2. 我以为小明当时正在夸自己.....  
'I thought Xiaoming was then praising self...'
3. 我猜想吉姆当时一定恨死自己了.....  
'I guess that Jim must have detested self at that time...'
4. 我认为小静会给自己带来麻烦.....  
'I think that Xiaojing will bring trouble to self...'
5. 我期待露西能多谈谈自己.....  
'I expected that Lucy could talk more about self...'

#### **1.2.11 Stimuli of “3rd-1st” in “public speaking”**

1. 玛丽明白我在挑战自己.....  
'Mary understands that I am challenging self...'
2. 小丽感觉我应该对自己好点.....  
'Xiaoli feels that I should treat self better...'
3. 苏珊说我可以多关注自己.....  
'Susan said that I could pay more attention to self...'
4. 安妮意识到我正试图改变自己.....  
'Annie realized that I was attempting to change self...'
5. 玲玲估计我无法原谅自己.....  
'Lingling estimated that I could not forgive self...'

### 1.2.12 Stimuli of “3rd-3rd” in “public speaking”

1. 保罗知道约翰昨天批评自己了.....  
'Paul knows that John criticized self yesterday...'
2. 丽丽觉得小红会给自己买好多东西.....  
'Lili figured that Xiaohong would buy self many things...'
3. 汤姆发现丽莎对自己没有信心.....  
'Tom found that Lisha was not confident in self...'
4. 小亮相信小强不会害自己.....  
'Xiaoliang believes that Xiaoqiang will not harm self...'
5. 麦克预料到菲菲可能会讨论自己.....  
'Mike anticipates that Feifei may discuss self...'

## 2 Stimuli and comprehension questions used in the experiment in Chapter 5

### 2.1 Pronoun position = “subject”, Pronoun type = “ziji/wo”

1. Stimulus:  
自己/我最近回到上海了。‘Self/I recently came back to Shanghai.’  
  
ComprehensionQ:  
\_\_\_\_\_最近回到上海了? ‘Who/what recently came back to Shanghai?’
2. Stimulus:  
自己/我最近喜欢吃烧烤。‘Self/I recently likes eating barbecues.’  
  
ComprehensionQ:  
\_\_\_\_\_最近喜欢吃烧烤? ‘Who/what recently likes eating barbecues?’
3. Stimulus:  
自己/我经常走错路。‘Self/I often go(es) the wrong way.’  
  
ComprehensionQ:  
\_\_\_\_\_经常走错路? ‘Who/what often goes the wrong way?’

4. Stimulus:

自己/我经常很小心。‘Self/I is/am often very careful.’

ComprehensionQ:

\_\_\_\_\_经常很小心? ‘Who/what is often very careful?’

5. Stimulus:

自己/我也许去上班。‘Self/I may go to work.’

ComprehensionQ:

\_\_\_\_\_也许去上班? ‘Who/what may go to work?’

6. Stimulus:

自己/我也许知道这个问题的答案。‘Self/I may know the key to the question.’

Comprehension:

\_\_\_\_\_也许知道这个问题的答案。‘Who/what may know the key to the question?’

7. Stimulus:

自己/我下周去出差。‘Self/I will go on business next week.’

ComprehensionQ:

\_\_\_\_\_下周去出差? ‘Who/what will go on business next week?’

8. Stimulus:

自己/我下周在北京。‘Self/I will be in Beijing next week.’

ComprehensionQ:

\_\_\_\_\_下周在北京。‘Who/what will be in Beijing next week?’

9. Stimulus:

自己/我在路口摔了一跤。‘Self/I fell over at a crossroad.’

ComprehensionQ:

\_\_\_\_\_在路口摔了一跤? ‘Who/what fell over at the crossroad?’

10. Stimulus:

自己/我在路口犹豫。‘Self/I was hesitating at a crossroad.’

ComprehensionQ:

\_\_\_\_\_在路口犹豫? ‘Who/what was hesitating at the crossroad?’

11. Stimulus:

自己/我已经顺利完成了任务。 ‘Self/I has/have already accomplished the task smoothly.’

ComprehensionQ:

\_\_\_\_\_已经顺利完成了任务? ‘Who/what has already accomplished the task smoothly?’

12. Stimulus:

自己/我已经是一个大姑娘了。 ‘Self/I is/am already an old girl.’

\_\_\_\_\_已经是一个大姑娘了? ‘Who/what is already an old girl?’

13. Stimulus:

自己/我最终放下了心里的石头。 ‘Self/I finally put down the stone in the heart.’

ComprehensionQ:

\_\_\_\_\_最终放下了心里的石头。 ‘Who/what finally put down the stone in the heart?’

14. Stimulus:

我/自己最终拥有了一套海边的房子。 ‘I/self finally owned a house near the sea.’

ComprehensionQ:

\_\_\_\_\_最终拥有了一套海边的房子? ‘Who/what finally owned a house near the sea?’

15. Stimulus:

自己/我可以吃完三盘饺子。 ‘Self/I can eat up three plates of dumplings.’

ComprehensionQ:

\_\_\_\_\_可以吃完三盘饺子? ‘Who/what can eat up three plates of dumplings?’

16. Stimulus:

自己/我可以看到天上的星星。 ‘Self/I can see the stars in the sky.’

ComprehensionQ:

\_\_\_\_\_可以看到天上的星星? ‘Who/what can see the stars in the sky?’

17. Stimulus:

自己/我依然在农场干活。 ‘Self/I still work(s) in a farm.’

ComprehensionQ:

\_\_\_\_\_依然在农场干活? ‘Who/what still works in a farm?’

18. Stimulus:

自己/我依然相信这个理论。 ‘Self/I still believe(s) in this theory.’

ComprehensionQ:

\_\_\_\_\_依然相信这个理论? ‘Who/what still believes in this theory?’

19. Stimulus:

自己/我刚刚买了一个手机。 ‘Self/I just bought a cell phone.’

ComprehensionQ:

\_\_\_\_\_刚刚买了一个手机? ‘Who/what just bought a cell phone?’

20. Stimulus:

自己/我刚刚听到一个离奇的故事。 ‘Self/I just heard a fantastic story.’

ComprehensionQ:

\_\_\_\_\_刚刚听到一个离奇的故事? ‘Who/what just head a fantastic story?’

21. Stimulus:

自己/我只好去外地工作。 ‘Self/I has/have to work outside of the hometown.’

ComprehensionQ:

\_\_\_\_\_只好去外地工作。 ‘Who/what has to work outside of the hometown?’

22. Stimulus:

自己/我只好呆在那儿不动。 ‘Self/I has/have to stay still over there.’

ComprehensionQ:

\_\_\_\_\_只好呆在那儿不动。 ‘Who/what has to stay still over there?’

23. Stimulus:

自己/我一直在写东西。 ‘Self/I has/have been writing something.’

ComprehensionQ:

\_\_\_\_\_一直在写着东西。 ‘Who/what has been writing something?’

24. Stimulus:

自己/我一直住在中国。 ‘Self/I has/have been living in China.’

ComprehensionQ:

\_\_\_\_\_一直住在中国? ‘Who/what has been living in China?’

## 2.2 Pronoun position = “object”, Pronoun type = “ziji/wo”

1. Stimulus:

这部电影吓坏自己/我了。 ‘This movie scared self/me.’

ComprehensionQ:

这部电影吓坏了\_\_\_\_\_? ‘Who/what did the movie scare?’

2. Stimulus:

落下的苹果砸到自己/我了。 ‘A fallen apple fell on self/me.’

ComprehensionQ:

落下的苹果砸到了\_\_\_\_\_? ‘Who/what did the fallen apple fall on?’

3. Stimulus:

昨天的事惹恼了自己/我。 ‘The thing yesterday annoyed self/me.’

ComprehensionQ:

昨天的事惹恼了\_\_\_\_\_? ‘Who/what did the thing yesterday annoy?’

4. Stimulus:

这个案件牵连到自己/我了。 ‘This case involved self/me.’

ComprehensionQ:

这个案件牵连到了\_\_\_\_\_? ‘Who/what did this case involve?’

5. Stimulus:

这首曲子征服了自己/我。 ‘This song conquered self/me.’

ComprehensionQ:

这首曲子征服了\_\_\_\_\_? ‘Who/what did the song conquer?’

6. Stimulus:

地上的石头绊倒了自己/我。 ‘The stone on the ground made self/me stumble.’

ComprehensionQ:

地上的石头绊倒了\_\_\_\_\_? ‘Who/what did the stone on the ground make stumble?’

7. Stimulus:

这个节目感动了自己/我。 ‘This program moved self/me.’

ComprehensionQ:

这个节目感动了\_\_\_\_\_? ‘Who/what did the program move?’

8. Stimulus:

对面开过来的汽车撞到了自己/我。 ‘A car from the opposite direction ran into self/me.’

ComprehensionQ:

对面开过来的汽车撞到了\_\_\_\_\_? ‘Who/what did the car from the opposite direction run into?’

9. Stimulus:

昨晚的表演震撼到自己/我了。 ‘The performance last night struck self/me.’

ComprehensionQ:

昨晚的表演震撼到了\_\_\_\_\_? ‘Who/what did the performance last night strike?’

10. Stimulus:

外面的大雨淋湿了自己/我。 ‘The heavy rain outside drenched self/me.’

ComprehensionQ:

外面的大雨淋湿了\_\_\_\_\_? ‘Who/what did the heavy rain outside drench?’

11. Stimulus:

更大的困难也无法吓倒自己/我。 ‘An even greater difficulty will not scare self/me.’

ComprehensionQ:

更大的困难也无法吓倒\_\_\_\_\_? ‘Who/what will not an even greater difficulty scare?’

12. Stimulus:

那个热水壶烫伤了自己/我。 ‘The hot kettle burned self/me.’

ComprehensionQ:

那个热水壶烫伤了\_\_\_\_\_? ‘Who/what did the hot kettle burn?’

13. Stimulus:

玫瑰上的刺弄疼了自己/我。 ‘The thorns of roses hurt self/me.’

ComprehensionQ:

玫瑰上的刺弄疼了\_\_\_\_\_? ‘Who/what did the thorns of roses hurt?’

14. Stimulus:

冰冷的风吹着自己/我。 ‘The freezing wind is blowing on self/me.’

ComprehensionQ:

冰冷的风吹着\_\_\_\_\_? ‘Who/what is the freezing wind blowing on?’