

# Epistemic indefinites in Cantonese: a case study of *m-zh* ‘not-know’\*

Tommy Tsz-Ming Lee

University of Southern California

Nov 2, 2021

## Abstract

A recent line of research (Alonso-Ovalle and Menéndez-Benito 2015, and references therein) concerns how an existential claim is bundled with a modal component — in particular, one relating to speakers’ ignorance — in the nominal domain. The primary focus of this paper is to discuss a case of epistemic indefinites in Cantonese which takes the form of *m-zh-WH* ‘not-know-WH’. I argue for two claims in this paper. First, I propose that *mzi* is an (overt) choice function operator that binds both *wh*-expressions and disjunctive expressions. Second, I suggest that the ignorance component associated with *mzi* is a conventional implicature, representing a new type of the ignorance component for epistemic indefinites. I also discuss a potential grammaticalization path of *m-zh*, connecting its syntactic distribution to its semantic properties. The findings in this paper uncover a new breed of epistemic indefinites and contributes to our understanding of both the interpretation of *wh*-expressions in Cantonese and the study of how natural languages encode an

---

\*Earlier versions of this work have been presented at PACLIC-32 (HKPolyU), JK-26 (UCLA), *Syntax+* (USC), CUSP-12 (USC) and ARF-2019 (HKU), WICL (OSU), LSA-93 (virtual), Yale Semantic Reading Group and USC Meaning Lab. For comments and discussions, I thank Dylan Bumford, Lawrence Cheung, Veneeta Dayal, Mitcho Erlewine, Louis Goldstein, Larry Horn, Audrey Li, Roumi Pancheva, Deniz Rudin, Andrew Simpson, Zoltán Szabó, Sze Wing Tang, Alexis Wellwood, Ka Fai Yip, and the audience in the above occasions. All remaining errors are mine.

ignorance component in nominal expressions.

*Keyword: wh-expressions, choice function, ignorance, conventional implicature, grammaticalization, Cantonese*

## Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
<b>2</b>	<b>A choice functional analysis of <i>mzi</i></b>	<b>8</b>
2.1	The non-verbal use of <i>mzi</i> . . . . .	8
2.1.1	Differentiating the verbal <i>m-zī</i> from the non-verbal <i>mzi</i> . . . . .	8
2.1.2	Not syntactic amalgams . . . . .	10
2.2	Arguments for a choice-functional analysis of <i>mzi</i> . . . . .	11
2.2.1	<i>Mzi</i> and expressions invoking sets of alternatives for evaluation . . . . .	11
2.2.2	Competitions with other <i>wh</i> -binders . . . . .	14
2.2.3	Indefiniteness and scope behaviors of the <i>mzi+wh</i> string . . . . .	16
<b>3</b>	<b>The ignorance component as a conventional implicature</b>	<b>18</b>
3.1	The ignorance component . . . . .	18
3.2	Escaping intensional scope . . . . .	21
3.3	Not a conversational implicature . . . . .	24
3.4	Conventional implicature . . . . .	28
<b>4</b>	<b>A compositional analysis</b>	<b>30</b>
4.1	Assumptions . . . . .	30
4.2	Implementation . . . . .	31
4.3	A desirable consequence . . . . .	33
<b>5</b>	<b>Notes on the grammaticalization path of <i>mzi</i></b>	<b>35</b>
5.1	Different usages of the string <i>m-zī</i> . . . . .	35
5.2	Morphological fusion of verbs and <i>wh</i> -expressions . . . . .	36
5.3	On the source of the ignorance component . . . . .	38
<b>6</b>	<b>Conclusions</b>	<b>39</b>

# 1 Introduction

A recent line of research concerns how a particular existential claim and a modal component related to speaker’s ignorance are bundled in the nominal domain. The relevant expressions are often referred to as *modal indefinites* or *epistemic indefinites* (see Alonso-Ovalle and Menéndez-Benito 2015, for recent overview and references therein). The primary focus of this paper is to discuss a case of epistemic indefinites in Cantonese, whose major differences from epistemic indefinites in other languages lie in the less common morphological makeup, and the properties of the associated ignorance component.

The Cantonese expression of interest is the string *m-zī*, which consists of a negative (bound) morpheme *m* ‘not’ and the verb *zī* ‘know’. Canonically, *m-zī* is used as an attitude verb, taking either a declarative complement (as in (1a)) or an interrogative complement (as in (1b)).<sup>1</sup>

- (1) a. ngo **m-zī**      [Aaming taai-zo    ni-bun syu]                      declarative complement  
       I    not-know Aaming read-PERF this-CL book  
       ‘I don’t know Aaming read this book.’
- b. ngo **m-zī**      [Aaming taai-zo    bin-bun syu]                      interrogative complement  
       I    not-know Aaming read-PERF which-CL book  
       ‘I don’t know which book Aaming read.’

The focus of this paper is a less discussed usage of *m-zī*, where it forms a constituent with a *wh*-expression. For example, in (2), the expressions containing *mzi* and a *wh*-expression serves as the object of the sentence.<sup>2</sup>

---

1. *M-zī* can also take nominal complements, as in (i). I set aside this usage throughout this paper.

(i) ngo **m-zī**      ni-gin si  
       I    not-know this-CL event  
       ‘I don’t know this.’

2. Anticipating the discussions in §2.1, I transcribe this usage of *m-zī* as *mzi* and gloss it with MZI to distinguish it from its usage as an attitude verb.

- (2) a. Aaming tai-zo [mzi bin-bun syu] as direct object  
 Aaming read-PERF MZI which-CL book  
 ~→ ‘Aaming read some book (I don’t know which).’
- b. Aaming bei-zo jat-bun syu [mzi bin-go hoksaang] as indirect object  
 Aaming give-PERF one-CL book MZI which-CL student  
 ~→ ‘Aaming gave a book to some student (I don’t know which student).’

This usage of *mzi* is interesting in two ways. First, the *mzi+wh* expressions come with an ignorance component associated with the speaker, i.e., the speaker conveys his/her inability to identify the referent. This property is characteristic of *epistemic indefinites*, which have attracted much attention in the literature (Kratzer and Shimoyama 2002; Jayez and Tovenar 2006; Sudo 2010; Alonso-Ovalle and Menéndez-Benito 2010; Aloni and Port 2015; Slade 2015; Chen et al. 2017; Dawson 2018; Liu and Yang 2021, i.a.). Two examples are given with Spanish *algún* and German *irgendein* below. The signature property of epistemic indefinites is their incompatibility with continuations that presume the speaker’s knowledge.

- (3) a. María se casó con #algún/ un estudiante del departamento de lingüística:  
 María SE married with ALGÚN/ UN student of.the department of linguistics  
 en concreto con Pedro.  
 namely with Pedro  
 ‘María married a linguistics student, namely Pedro.’  
 (Spanish, Alonso-Ovalle and Menéndez-Benito 2010, p.2)
- b. **Irgendein** Student hat angerufen. #Rat mal wer?  
 IRGEND-one student has called guess PRT who  
 ‘Some student called. Guess who?’ (German, Aloni and Port 2015, p.117)

However, the nature of the ignorance component in different languages appears to be non-uniform (see, for an overview on different approaches, Alonso-Ovalle and Menéndez-Benito 2013). In some Gricean approaches, it is a quantity implicature (Alonso-Ovalle and Menéndez-Benito 2010; Alonso-

Ovalle and Shimoyama 2014; Chierchia 2013; Chierchia and Liao 2015; Dawson 2018). In other approaches, it is taken to be a consequence of a shift on the method of identification required by the context (Aloni and Port 2015; Šimík 2014; Slade 2015). The question for *mzi+wh* in Cantonese is then: (i) is it an instance of epistemic indefinites, given its less common morphological makeup<sup>3</sup>, and (ii) if it is, what is the nature of the ignorance component?

Another issue of interest concerns the interpretation of *wh*-expressions. Both sentences in (2) are interpreted as declarative sentences but not matrix questions. The *wh*-expressions are thus not used interrogatively but convey an existential meaning when combined with *mzi*. Such existential reading of *wh*-expressions is not only less discussed in the literature, it also reveals a difference between Cantonese and Mandarin with regard to possible interpretations of *wh*-expressions. It has long been noticed that bare *wh*-expressions in Mandarin can be interpreted existentially in modalized contexts, as in (4) (see Li 1992; Lin 1998; Chierchia and Liao 2015, i.a.; see also Chen et al. 2017; Liu and Cui 2019; Liu and Yang 2021 for more recent discussions on the ignorance component).

- (4) Zhangsan \*(haoxiang) chi-le shenme Mandarin  
 Zhangsan seemingly eat-PERF what  
 ‘Zhangsan seemingly ate something.’

However, bare *wh*-expressions in Cantonese lack such an existential reading even in modalized contexts, as illustrated in (5).<sup>4</sup>

3. Many cases of epistemic indefinites in Romance and Germanic languages involve articles/determiners (see, e.g., Kratzer and Shimoyama 2002; Jayez and Tovenia 2006; Alonso-Ovalle and Menéndez-Benito 2010); in article-less languages, they are often marked by question particles such as Japanese (Sudo 2010; Alonso-Ovalle and Shimoyama 2014) and Sinhala (Kishimoto 2005; Slade 2015). But as we will see in §5, Cantonese is not unique in employing a verb as the epistemic marker.

4. While I do not aim to provide an explanation as to why bare *wh*-expressions in Cantonese cannot be used existentially, the observation is in line with the suggestion in Haspelmath (1997, p.176) that “the interrogative function [of *wh*-expressions] is always primary, and the indefinite function is secondary” and that “[a]n interrogative pronoun may lose its indefinite function” (e.g. Latin *quis/quem* ‘who(m)’ and Classical Greek *tis* ‘who’). This describes the Cantonese case.

- (5) Aaming (houci)    sik-zo    matje    Cantonese  
 Aaming seemingly eat-PERF what  
 Interrogative: ‘What did Aaming (seemingly) ate?’  
 ≠ Existential: ‘Aaming (seemingly) ate something.’

The expression *mzi+wh* thus represents an understudied case of the existential interpretation of *wh*-expressions in Cantonese.<sup>5</sup> The question is: (i) what is the semantic contribution of *mzi*, and (ii) how does it interact with *wh*-expressions?

Against this background, I argue for two claims in this paper. First, I propose that *mzi* is an (overt) choice function operator (Kratzer 1998; Winter 1997; Reinhart 1997) – it takes an alternative set as its argument and return a member of the set. It can bind *wh*-expressions and disjunctive expressions and contributes an existential meaning. Second, I suggest that the ignorance component associated with *mzi* is a conventional implicature (in the sense of Karttunen and Peters 1979; Potts 2005), representing a new type of the ignorance component for epistemic indefinites. Building on these two claims, I further discuss a potential grammaticalization path of *m-zī*, connecting its syntactic distribution to its semantic properties. This paper thereby uncovers a new breed of epistemic indefinites and contributes to our understanding of both the interpretation of *wh*-expressions in Cantonese and the study of how natural languages encode an ignorance component in nominal expressions.

The rest of this paper is organized as follows. §2 differentiates the non-verbal usage of *mzi* from its verbal usage. I present arguments in favor of a choice-functional analysis of *mzi*. §3 specifically discusses the ignorance component associated with *mzi*. I examine its interaction with the quantificational domain, intensional operators, quantifiers and negation. I suggest that the ignorance component is best regarded as a conventional implicature. Building on the findings in §2 and §3, I sketch a compositional analysis on *mzi* in §4. In §5, I discuss a potential grammaticalization path of *mzi*. I conclude in §6.

5. There are two other cases where *wh*-expressions are reported to be interpreted existentially. One is in its doublet form, e.g. *matje-matje* ‘what-what’, see Wong (2018) and Lee and Wong (2018). Another is *wh*-placeholder, which take the form of demonstrative-classifier-*wh*, e.g., *go-go matje* ‘(lit.) that what’; see Cheung (2015) for discussions on their metalinguistic usage in Mandarin. As far as I can tell, Cantonese displays a similar usage.

## 2 A choice functional analysis of *mzi*

In §2.1, I suggest that *mzi* as used in (2) differs substantially from with its verbal use as in (1). I then argue that *mzi* cannot be treated as a type of syntactic amalgam that blends two sentences into one. In §2.2, I provide three pieces of evidence for a choice-functional analysis of *mzi*. I show that *mzi* selects as its associate expressions that invoke sets of alternatives for their evaluation. These expressions include *wh*-expressions and disjunctive phrases. Additionally, *mzi* competes with other potential binders of *wh*-expressions, and thus should be treated on a par with other *wh*-binders. Lastly, I illustrate that when *mzi* forms an indefinite with a *wh*-nominal, it displays exceptional wide scope behaviors.

### 2.1 The non-verbal use of *mzi*

#### 2.1.1 Differentiating the verbal *m-zī* from the non-verbal *mzi*

To differentiate the two usages of *m-zī*/*mzi*, it is crucial to show that the target cases of *mzi* involve a nominal structure instead of a clausal one. This is already shown in (2a), where *mzi* forms a constituent with a *wh*-expression, repeated in (6). This constituent serves as the argument of the transitive verb. Since the verb *tai* ‘read’ only selects a nominal complement (not a verbal/clausal one), the *mzi+wh* expression in the post-verbal position indicates its nominal nature.

- (6) Aaming tai-zo      [**mzi** bin-bun syu]      =(2a)  
 Aaming read-PERF MZI which-CL book  
 ~→ ‘Aaming read some book (I don’t know which).’

Coordination test illustrates the same point. The *mzi-wh* string can conjoin with a plain indefinite, as in (7). It conveys a meaning where Aaming read multiple things - one is a magazine, another is a book (but the speaker does not know which book it is). Such reading is unexpected if *mzi* is a verb and forms a VP conjunction with the verb phrase ‘read a magazine’ (which means something like ‘Aaming read a magazine and didn’t know some book’).<sup>6</sup>

6. For the rest of the paper, I will translate *mzi* as “some”, without explicitly mentioning the ignorance component in



- (7) Aaming tai-zo [jat-bun zaapzi tungmaai **mzi** bin-bun syu]  
 Aaming read-PERF one-CL magazine and MZI which-CL book  
 ‘Aaming read [a magazine and some book].’

As far as meaning is concerned, there is a subtle but detectable difference between (1b) and (2a)/  
 (6). (1b) is repeated below.<sup>7</sup>

- (8) ngo **m-zī** [Aaming taai-zo bin-bun syu] =(1b)  
 I not-know Aaming read-PERF which-CL book  
 ‘I don’t know which book Aaming read.’

At first glance, the two sentences convey very similar meaning, but they can be contrasted in terms of whether the existence of the book that Aaming read is *presupposed* or *asserted*. For example, while (8) is compatible with the continuation in (9), (6) is not.

- (9) A felicitous continuation for (8) but not (6)  
 daan honeng keoi bin-bun dou mou tai-gwo  
 but perhaps he which-CL all not.have read-EXP  
 ‘But perhaps he didn’t read any book.’

Since the continuation in (9) denies the existence of the book that Aaming read, the contrast reflects that in (1b) the existence is not asserted, but just presupposed (as in interrogative clauses). Thus it can be retreated by uttering (9). However, (2a) *asserts* such existence. Denying such existence in the continuation immediately contradicts (2a), hence there is infelicity. I take this as an important semantic distinction between the predicative *m-zī* and the non-predicative *mzi*.<sup>8</sup>

---

the translation for convenience.

7. I thank \*\*\* for raising questions on the meaning difference between these two sentences.

8. Anticipating a choice functional analysis on *mzi*, the existential quantification comes from an existential quantifier associated with *mzi*.

### 2.1.2 Not syntactic amalgams

Before we conclude the non-verbal status of *mzi*, one alternative has to be taken into consideration. The usage of *mzi* in (2) is reminiscent of a type of syntactic amalgam, particularly, the Andrews Case, as discussed in Lakoff (1974). Some examples are given below:

- (10) a. Sally will eat I don't know what today. (Johnson 2013, p.73)  
 b. Sammy's going to marry guess who. (Lakoff 1974, p.321)  
 c. John is going to marry what's her name? (p.c. \*\*\*\*\*)

The signature property of Andrews amalgams is that the two clauses are amalgamated together and the *wh*-expression simultaneously serves as an argument of both the matrix verb and the verb in the (underlined) interrupting clause. One way to maintain the verbal status of *mzi* is to suggest that the Cantonese sentences in (2) are also resulted from syntactic amalgams and the *wh*-expression is selected by both the matrix verb and *mzi*.

However, what we observe so far for *mzi* is that the position it occupies is highly restricted to just one verb. As shown in (11), no other verb can replace *mzi*.

- (11) Aaming tai-zo { ??**m-geidak**/ \***m-hangding**/ \***mou-lamhei** } bin-bun syu  
 Aaming read-PERF not-remember/ not-be.sure/ not.have-think.of which-CL book  
 ‘Aaming read some book that { I do not remember/ I am not-sure/ I didn't think of }.’

The Cantonese case of *mzi* thus contrasts with the examples in (10), where syntactic amalgams are observed with a wide range of verbs (e.g., *know*, *guess*, etc.) and constructions (e.g., declaratives, imperatives, questions, etc.). This suggests some idiosyncratic development of the string *mzi*, instead of a more general syntactic mechanism that includes *mzi* (see also discussions in §5).

Also, the string *mzi* must appear as such without any alternation, i.e., it behaves like a single unit without internal structure. For example, it is not possible to omit the negation, or insert a verb between *m* and *zi*, as in (12). This further indicates that *mzi* might have undergone lexicalization and become a single lexical item.

- (12) \*Aaming tai-zo { **zī**/ **m-soeng-zī** } bin-bun syu  
 Aaming read-PERF know/ not-want-know which-CL book  
 (Lit.) ‘Aaming read { know/ not-want-know } which book.’

Furthermore, if *mzi* were a verb, we would expect recovering the subject (i.e., the attitude holder) in the *mzi-wh* string to be possible. The inability to do so, however, suggests that the subject position of *mzi* is unavailable and thus the *mzi-WH* string does not form a clause.

- (13) \*Aaming tai-zo ngo **mzi** bin-bun syu  
 Aaming read-PERF I MZI which-CL book  
 ‘Aaming read I don’t know which book.’

Lastly, the string *mzi bin-bun syu* ‘MZI which book’ by itself is degraded, as in (14a) and a copula before the *wh*-expression is preferred, as in (14b). However, with the presence of the copula, (14b) cannot replace the string *mzi bin-bun syu* in (2a). These observations combine to suggest that *mzi* is substantially different from its verbal counterpart *m-zī* ‘not-know’.

- |   |   |
|---|---|
| (14) a. ??(ngo) <b>m-zī</b> bin-bun syu<br>I not-know which-CL book<br>‘(I) don’t know which book.’ | b. (ngo) <b>m-zī</b> hai bin-bun syu<br>I not-know be which-CL book<br>‘(I) don’t know which book it is.’ |
|---|---|

In short, this subsection showed that *mzi* can exceptionally occupy positions that are unavailable for other verbs. I conclude the non-verbal status of *mzi* as used in (2). In the next subsection, I present arguments for a choice-functional analysis of *mzi*.

## 2.2 Arguments for a choice-functional analysis of *mzi*

### 2.2.1 *Mzi* and expressions invoking sets of alternatives for evaluation

The first argument concerns a semantic restriction on the associate of *mzi*. *Mzi* forms a constituent not only with *wh*-nominals, but also with *wh*-adverbials (conveying a non-interrogative reading). The

*mzi+wh*-adverbial string occupies the same position as other (non-*wh*) adverbials. Observe the following examples:

- (15) a. Aaming houci { **mzi** dimjoeng/ houfaaigaam } zenghou-zo gaa-ce  
 Aaming seem MZI how rapidly fix-PERF CL-car  
 ‘Aaming seems to have { somehow/ rapidly } fixed the car.’
- b. Aaming camjat { **mzi** dimgaai/ janwai ze syu } lai-zo  
 Aaming yesterday MZI why because borrow book come-PERF  
 ‘Aaming came yesterday { for some reason/ for book-borrowing }.’

In addition to *wh*-expressions, *mzi* can combine with disjunctive phrases, and these disjunctive phrases can be of different syntactic size, including nominal, verb phrases and clauses. Note that disjunctive marker must be the one for alternative questions (i.e., *ding* “or”), but not the one for logical disjunction (i.e., *waakze* “or”).<sup>9</sup>

- (16) a. NP disjunction  
 Aaming maai-zo **mzi** [<sub>NP</sub> syu {ding/ \*waakze} bouzi]  
 Aaming buy-PERF MZI book or/ or newspaper  
 ‘Aaming bought some book or newspaper.’
- b. VP disjunction  
 Aaming zoeng ni-bun syu **mzi** [<sub>VP</sub> fong-zo hai toi {ding/ \*waakze}  
 Aaming to this-CL book MZI put-PERF on table or/ or  
 daai-zo-faan hokhaau]  
 bring-PERF-back school  
 ‘Aaming either put this book on the table or brought it back to school.’
- c. Sentential disjunction

9. Whether the formation of disjunctive phrases involves joining different phrases or are derived via Conjunction Reduction does not concern us here. See, for discussions of their Mandarin counterpart, **HuangR:2010**; Erlewine (2017).

Aaming munggin **mzi** [<sub>CP/TP</sub> keoi saat jan {ding/ \*waakze} jau jan saat  
 Aaming dream MZI he kill person or/ or have person kill  
 keoi]  
 he

‘Aaming dreamed that either he killed someone or someone killed him.’

Relatedly, these observations suggest that *mzi* preserves the syntactic categories of its associate - the presence of *mzi* does not alter the category of its associate. In all the sentences in (15) and (16), leaving out *mzi* still results in well-formed sentences (but they become matrix questions).

The range of possible associate of *mzi* is not entirely unconstrained. *Mzi* cannot combine with referential expressions such as definite/indefinite expressions and proper names.

- (17) \*Aaming tai-zo **mzi** { ni-bu syu/ jat-bu syu/ Hunglaumung}  
 Aaming read-PERF MZI this-CL book/ one-CL book/ Dream.of.the.Red.Chamber  
 (Lit.) ‘Aaming read { this book/ one book/ Dream of the Red Chamber } that I don’t know.’

In other words, expressions combined with *mzi* must be either *wh*-expressions or disjunctive phrases (marked by *ding*). The elements can be regarded as a natural semantic class if we assume that both *wh*-expressions and disjunctive phrases invoke sets of alternatives for their evaluation (see, for the former, Hamblin (1973); for the latter, Simons (2005), Alonso-Ovalle (2006), and Aloni (2007)). We thus reach the following semantic requirement of *mzi*.

(18) The semantic requirement of *mzi*

The associate of *mzi* must be an expression that invokes sets of alternatives for their evaluation.

Together with the existential meaning contributed by *mzi* (as in (2), I suggest that it is best regarded as a choice function in the sense of Kratzer (1998), Winter (1997), and Reinhart (1997), which takes a set of alternatives as its argument and returns a member of that set (for a compositional analysis, see §4).

### 2.2.2 Competitions with other *wh*-binders

The second argument concerns competitions with other *wh*-binders. As with Mandarin and many other languages, the interpretation of *wh*-expressions in Cantonese is dependent on their binders (Kratzer and Shimoyama 2002; Shimoyama 2006; Chierchia and Liao 2015, i.a.). The following examples show that *wh*-expressions in Cantonese can (i) have an interrogative meaning when associated with some covert question operator in (19a), (ii) serve as negative polarity items under negation (19b), or (iii) give rise to a universal reading when co-occurring with the universal/distributive quantifier *dou* in (19c).

(19) a. Interrogative ( $\sim\sim$  covert question operator)

Aaming sik-zo matje?

Aaming eat-PERF what

‘What did Aaming eat?’

b. Negative polarity item *any* ( $\sim\sim$  negation)

Aaming mou sik matje

(Lee 2014)

Aaming not eat what

‘Aaming didn’t eat anything.’

c. Universal ( $\sim\sim$  *DOU*-quantifier)

Aaming matje dou sik

Aaming what all eat

‘Aaming eats everything.’

In this regard, *mzi* pattern with these binders of *wh*-expressions in that *mzi* can also combine with various *wh*-expressions, as shown in Table 1 below.

If *mzi* is also a *wh*-binder, we expect to see that different binders may compete for the binding relation with a *wh*-expression. We have already seen an example where the presence of *mzi* blocks an interrogative reading - the *wh*-expressions in (2) can only be interpreted existentially. The absence of an interrogative reading can be explained by the fact that the *wh*-expressions are bound by the lower

Base gloss	<i>mzi</i>	Interrogative	Negative <i>mou</i>	Universal <i>dou</i>
what	<i>mzi matje</i>	<i>matje</i>	<i>mou...matje</i>	<i>matje dou</i>
who	<i>mzi bingo</i>	<i>bingo</i>	<i>mou...bingo</i>	<i>bingo dou</i>
which	<i>mzi bin-CL</i>	<i>bin-CL</i>	<i>mou...bin-CL</i>	<i>bin-CL dou</i>
how <sub>manner</sub>	<i>mzi dimjoeng</i>	<i>dimjoeng</i>	<i>mou...dimjoeng</i>	<i>dimjoeng dou</i>
how many	<i>mzi gei do</i>	<i>gei do</i>	<i>mou...gei do</i>	<i>gei do dou</i>
when	<i>mzi geisi</i>	<i>geisi</i>	-	<i>geisi dou</i>
why	<i>mzi dimgai</i>	<i>dimgai</i>	-	-

Table 1: Possible binders of *wh*-expressions in Cantonese

*mzi* before the higher, clause-level interrogative operator.

Similar can be said with regard to embedded questions. In an embedded clause containing a *wh*-expression, if *mzi* is present and forms a constituent with the *wh*-expression, then the embedded clause fails to serve as an interrogative complement to *soeng-zidou* ‘wonder (lit. want-know)’, as in (20).

(20) \*ngo soeng-zidou [Aaming tai-zo **mzi** bin-bun syu]

I wonder Aaming read-PERF MZI which-CL book

Int.: ‘I wonder what book Aaming read.’

Similar blocking effects are observed with negation and the universal quantifier *dou*. In (21a), the presence of *mzi* in (21a) forces an existential reading (as it is closer to the *wh*-expression). Also, in (21b), the universal reading is unavailable in presence of *mzi*. The *wh*-expression in (21b) is construed existentially.

(21) a. Aaming mou tai **mzi** matje

Aaming not.have read MZI what

‘There is something that Aaming didn’t read.’

≠ ‘Aaming didn’t read anything.’

b. **mzi** bin-bun syu dou maai-sai

MZI which-CL book all sold.out

‘There is a book sold out (but I don’t know which).’

≠ ‘Every book is sold out.’

In sum, *mzi* shares distributional similarities with other *wh*-binders and it blocks the binding relation between a *wh*-expression and another potential binder. I take this as evidence for the binder/operator status of *mzi*.

### 2.2.3 Indefiniteness and scope behaviors of the *mzi+wh* string

The last argument concerns the scope behaviors of the *mzi+wh* string. Taking *mzi* as a choice function operator that binds a *wh*-expression leads us to expect that *mzi+wh* strings display canonical properties of indefinites. This prediction is borne out in a number of ways.

First, the *mzi+wh* string is compatible with existential *jau*-constructions. The construction arguably displays a *Definiteness Effect* (Safir 1982; Huang 1987), requiring that the nominal following *jau* ‘have’ must be indefinite. The *mzi+wh* string occurs with plain indefinites but not definite expressions.

- (22) *jau* {**mzi** bin-bun syu/ jat-bun syu/ \*ni-bun syu} *mgin-zo*  
 have MZI which-CL book/ one-CL book/ this-CL book lost-PERF  
 ‘There is {some book/one book/ this book} that is lost.’

Another piece of evidence comes from the minimal pairs below. The sentence in (23a) constitutes a contradiction when a definite expression is used (i.e., Aaming). In contrast to this, the *mzi-wh* string does not give rise to any contradictory reading in (23b), suggesting its indefinite status (see also a similar test on Tiwa in Dawson 2018).

- (23) a. #Aaming lai-zo, Aaming mou lai  
 Aaming come-PERF Aaming not come  
 ‘Aaming came, Aaming didn’t come.’  
 b. **mzi** bingo lai-zo, **mzi** bingo mou lai  
 MZI who come-PERF MZI who not come  
 ‘Someone came, (and) someone didn’t come.’

Turning to the scope behaviors of *mzi+wh* strings, they interact with extensional operators in the



same way that plain indefinites do. *Mzi+wh* strings may take wide scope over or below a universal quantifier. In (24), a (prominent) wide scope reading is available.<sup>10</sup>

- (24) mui-go hoksaang dou hok-gwo **mzi** bin-zung jyujin  
 every-CL student all learn-EXP MZI which-CL language  
 ‘Every student has learned some language.’  
 a. Wide:  $\exists y[\text{an-unknown-language}(y) \wedge \forall x[\text{student}(x) \rightarrow \text{learned}(x,y)]]$   
 b. ??Narrow:  $\forall x[\text{student}(x) \rightarrow \exists y[\text{an-unknown-language}(y) \wedge \text{learned}(x,y)]]$

Given sufficient contexts, a narrow scope reading of a *mzi*-indefinite is also possible.<sup>11</sup>

- (25) Context: Every student in School A is required to take one language course. It must be either German, French or Spanish. The speaker then infers:

- mui-go hoksaang dou hok-gwo **mzi** bin-zung ngauzau jyujin  
 every-CL student all learn-EXP MZI which-CL European language  
 ‘Every student has learned some European language.’  
 a. ??Wide:  $\exists y[\text{an-unknown-European-language}(y) \wedge \forall x[\text{student}(x) \rightarrow \text{learned}(x,y)]]$   
 b. Narrow:  $\forall x[\text{student}(x) \rightarrow \exists y[\text{an-unknown-European-language}(y) \wedge \text{learned}(x,y)]]$

Lastly, *mzi+wh* strings also show island-violating scope behaviors, which has been extensively discussed for indefinites (Fodor and Sag 1982, i.a.). For example, they can take scope over a universal quantifier in the matrix clause when occurring within a complex noun phrase island.

- (26) mui-go hoksaang dou tengdou hokhaau kwaidingjiu hok **mzi** bin-zung jyujin ge  
 every-CL student all heard school require learn MZI which-CL language GE  
 siusik  
 news

Wide: ‘There is some language such that every student heard the news that the school requires (them) to learn it.’

10. The unnatural narrow scope reading implies that the wide scope reading cannot be reduced to a special case of narrow scope reading (see, for discussions, Ruys 1992; Reinhart 1997).

11. The availability of the narrow scope reading seems to be related to whether the alternative set denoted by the *mzi*-indefinite is *d-linked* or not (Pesetsky 1987).

In short, *mzi+wh* strings display canonical scope behaviors of indefinites. This follows without further assumption from a choice-functional analysis on *mzi*, which contributes to the existential meaning while allowing scope flexibility (Kratzer 1998; Winter 1997; Reinhart 1997). I postpone a compositional analysis for this in §4.

### 3 The ignorance component as a conventional implicature

In this section, I examine the modal/epistemic component associated with *mzi*. Specifically, I focus on the interpretation of *mzi+wh*-nominals, which I refer to as *mzi*-indefinites. In §3.1, I discuss the basic properties of the ignorance component of *mzi*-indefinites and reveal that there is no anti-singleton requirement (Alonso-Ovalle and Menéndez-Benito 2010). In §3.2, I show that this ignorance component survives various intensional contexts. In §3.3, I argue that the ignorance component of *mzi*-indefinites is not derivable from conversational (e.g., quantity) implicatures. I instead propose a conventional implicature approach in §3.4.

#### 3.1 The ignorance component

An important component in *mzi*-indefinites concerns the epistemic state of the speaker. Intuitively, *mzi* signals that the speaker is ignorant of the referent of the indefinite. Accordingly, *mzi*-indefinites are incompatible with continuations that presume the speaker’s knowledge of the referent. For example, a *mzi*-indefinite as in (27a) contrasts with a plain indefinite as in (27b) in that the former cannot be felicitously continued by either sentence in (28), which presumes the speaker’s knowledge of the referent.<sup>12</sup>

12. The ignorance component is reminiscent of a kind of specificity discussed in Farkas (1995), namely, epistemic specificity (as opposed to scopal specificity). The interpretation of the indefinite in (i-a) is said to be epistemically specific if continued by (i-b), and epistemically non-specific if continued by (i-c).

- (i) a. A student in Syntax 1 cheated on the exam.
- b. His name is John.
- c. We are all trying to figure out who it was. (Farkas 1995)

In this regard, a *mzi*-indefinite can be said to be epistemically non-specific. However, I stick to the term *ignorance component* to avoid confusions over different types of specificity.

- (27) a. Aaming tai-zo      **mzi** bin-bun syu  
 Aaming read-PERF MZI which-CL book  
 ‘Aaming read some book.’ = (2a)

- b. Aaming tai-zo      jat-bun syu  
 Aaming read-PERF one-CL book  
 ‘Aaming read one book.’

- (28) Infelicitous continuations for (27a), but not (27b)

- |  |  |
|--|--|
| <p>a. zikhai Hunglaumung<br/>         namely Dream.of.the.red.chamber<br/>         ‘Namely, Dream of the Red Chamber.’</p> | <p>b. gu-haa hai bin-bun<br/>         guess be which-CL<br/>         ‘Guess which book it is?’</p> |
|--|--|

In some languages, it has been proposed that the ignorance component is incompatible with a singleton domain of quantification. For example, Alonso-Ovalle and Menéndez-Benito (2010) observes that *algún* in Spanish requires that the domain of quantification of the indefinite be non-singleton. Consider the Spanish example in (29).

- (29) #Juan compró **algún** libro que resultó ser el más caro de la librería.  
 Juan bought ALGÚN book that happened to.be the most expensive in the bookstore  
 ‘Juan bought a book that happened to be the most expensive one in the store.’

In (29), *más* ‘most’ in the relative clause forces the domain of *algún* to be a singleton set. Alonso-Ovalle and Menéndez-Benito (2010) take its infelicity as evidence for the anti-singleton requirement imposed by *algún*.<sup>13</sup> However, such an anti-singleton requirement is not observed with *mzi*-indefinites.

The Cantonese counterpart of (29) with a *mzi*-indefinite is felicitous.

13. This requirement is important in the study of ignorance component as it appears to crosscut two families of epistemic indefinites. On one hand, Japanese *-ka* (Alonso-Ovalle and Shimoyama 2014) and Tiwa *-pha* (Dawson 2018) are similar to Spanish *algún*. On the other, German *irgendein* (Aloni and Port 2015) does not display the same requirement.

- (30) Aaming maai-zo **mzi** bin-bun cyun syudim zeoi gui ge syu  
 Aaming buy-PERF MZI which-CL whole bookstore most expensive GE book  
 (Lit.) ‘Aaming bought some book that is the most expensive one in the bookstore.’

One may suggest that ‘most’ does not always force a singleton domain (e.g., one may say *one of the most expensive books* in English). It is therefore instructive to establish a singleton domain in a different way. For example, it is instructive to see whether *mzi*-indefinites can be used when the speaker is pointing at a particular individual. Consider the scenario below (adopted from Alonso-Ovalle and Menéndez-Benito 2003):

- (31) Scenario: L and P are visiting the Math department. They don’t know anything about the people working there, and they haven’t seen any of them before. They suddenly see an individual, who can be inferred to be a professor, frantically dancing on his desk.

The sentence in (32) shows that *mzi*-indefinites are compatible with such scenario, hence the lack of an anti-singleton requirement.<sup>14</sup>

- (32) P: taihaa! **mzi** bin-go gausau hai toi soengmin tiumou  
 look MZI which-CL professor at table top dance  
 ‘(Pointing at the professor) Look! Some professor is dancing on the table!’

As a side note, it is worth discussing how a singleton domain of an indefinite is compatible with an ignorance component. Specifically, if there is only one potential referent in the domain, can the speaker still faithfully claim ignorance? I suggest the notion of relevance is crucial here. In his discussion of the differences between English indefinites marked with *a* and *some*, Strawson (1974) suggests that

“the choice of ‘some’ rather than ‘a’ embodies what might be called an acknowledgement

---

14. As expected, this is in contrast with *algún*, which is disallowed under the same context:

- (i) #P: ¡Mira! **algún** profesor está bailando encima de la mesa!  
 Look ALGÚN professor is dancing on of the table  
 ‘(Pointing at the professor) Look! Some professor is dancing on the table!’

(Alonso-Ovalle and Menéndez-Benito 2010)

So it is possible that an identification is *inadequate* to the circumstances (as the speaker perceives), even though there is only one potential referent. I therefore maintain that a singleton domain is compatible with the ignorance component.<sup>15</sup>

First, when embedded under attitude verbs, the interpretation of *mzi*-indefinites does not depend on the attitude verbs and has a scopally specific reading. The sentence in (33a) is only compatible with a continuation that suggests a specific doctor that Aafan wants to marry (i.e., (33b), but not (33c)).<sup>17</sup>

(i) a. Igor' hochet zhenit'sja na kakoj-**nibud'** studentke. [Russian]  
Igor wants marry WH-NIBUD' student  
'Igor wants to marry a [non-specific] student.'

b. \* ...On znakom s nej dva goda.  
'He has known her for two years.'  
scopally specific

c. ...On poka ni s kem ne poznamilsja.  
'He didn't get to know anybody.'  
scopally non-specific

- (33) a. Aafan soeng tong **mzi** bin-go jisang jitfan  
 Aafan want with MZI which-CL doctor marry  
 ‘Aafan wants to marry to a [specific] doctor.’
- b. ... keoidei sik-zo loeng-nin  
 they know-PERF two-year  
 ‘They knew each other for two years.’ scopally specific
- c. #... daan keoi jat-go jisang dou m-sik  
 but she one-CL doctor all not-know  
 ‘But she does not know any doctor.’ scopally non-specific

Also, *mzi*-indefinites are compatible with epistemic modals, and are likewise interpreted scopally specifically.<sup>18</sup>

- (34) Aaming honeng tai-zo **mzi** bin-bun syu  
 Aaming possibly read-PERF MZI which-CL book  
 ‘There is some book that Aaming may have read.’ scopally specific

When embedded under deontic modals, a *mzi*-indefinite is still interpreted as a scopally specific indefinite, with an ignorance component.<sup>19</sup>

18. In Czech, epistemic indefinites (marked with *jakémsi*) display what Šimík (2014) calls *epistemic clash*, where they cannot be embedded under epistemic modals, as opposed to the one marked with *nějakém* ‘some’.

- (i) Určitě/ možná spí na { nějakém/ \***jakémsi** } gauči. [Czech]  
 surely maybe sleep.3sg on some some.El couch  
 ‘Surely/Maybe he’s sleeping on some couch.’

19. Interestingly, the German *irgendein*-marked indefinite can have a free choice reading, and the ignorance component ceases to exist (Kratzer and Shimoyama 2002; Aloni and Port 2015). The following example is from Kratzer and Shimoyama (2002, p.10-11). Note that the specific reading is also available.

- (i) Mary musste **irgendeinen** Mann heiraten. [German]  
 Mary had-to IRGEND-one man marry  
 a. ‘Mary had to marry a man, any man was a permitted marriage option for her.’ scopally specific  
 b. ‘There was some man Mary had to marry, the speaker doesn’t know or care who it was.’ free choice

(35) Aafan jatdingjiu tong **mzi** bin-go naamjan gitfan

Aafan must with MZI which-CL man marry

a. ‘There is some man that Aafan must marry to.’ scopally specific

b. ≠ ‘Aafan must marry to a man (whoever he is).’ free choice

Interestingly, the ignorance component in *mzi*-indefinites also survives/“outscores” the illocutionary force of a sentence, patterning with what Dawson (2020) observes for epistemic indefinites in Tiwa. For example, in (36), the sentence conveys a pragmatically marked but not impossible meaning: the speaker knows that Aaming wanted to see a particular person, but they can’t remember whether it was Ms Lee or Ms Wong. What the speaker wants to know by uttering (36) is whether Aaming met that particular person (still unknown to the speaker).

(36) The ignorance component persists in *interrogative* clauses

Aaming jau-mou gin **mzi** Lei lousi ding Wong lousi?

Aaming have-not.have meet MZI Ms Lee or Ms Wong

‘Did Aaming see Ms Lee or Ms Wong?’

Similarly, in (37), the speaker knows that the addressee needs to go and talk with a particular teacher, but the speaker can’t remember whether that teacher is Ms Lee or Ms Wong. The speaker instructs the addressee to go and talk with whoever it is they need to.<sup>20</sup>

(37) The ignorance component persists in *imperative* clauses

heoi gin **mzi** Lei lousi ding Wong lousi laa1

go meet MZI Ms Lee or Ms Wong SFP

‘Go and see Ms Lee or Ms Wong!’

The examples above demonstrate that *mzi*-indefinites are always scopally specific and the ignorance component persists as well. This is reminiscent of certain types of indefinites as in St’á t’imcets (Matthewson 1999) and Tiwa (*-khi*, Dawson 2018), where such elements take obligatory wide scope. One difference, however, is that *mzi*-indefinites can in fact take narrow quantificational scope, as il-

20. For further discussions on these examples and implications on imperatives, see Dawson (2020).

illustrated in (25). This also suggests that the scope behaviors of *mzi*-indefinites are not uniform with regard to extensional and intensional quantifiers.

Two remarks concerning the notion of specificity are in order. First, in the above examples, it may be tempting to attribute the scopal specificity to *bin* ‘which’, due to its property of being *discourse-linked* (Pesetsky 1987). The example below however shows that the scopally specific reading remains if the *wh*-expression is replaced by *matje* ‘what’. The same applies to a colloquial version of ‘who’, namely, *matseoi*.<sup>21</sup> I therefore conclude that it is *mzi* that is responsible for scopal specificity.

(38) Aafan soeng tong {**mzi** matje jisang/ **mzi** matseoi} gitfan

Aafan want with MZI what doctor/ MZI who marry

‘There is some kind of doctor/ someone that Aafan wants to marry to.’ scopally specific

Second, if the ignorance component is construed as epistemic non-specificity (following Farkas (1995), see also fn.12), *mzi*-indefinites constitute further evidence for the claim that two kinds of specificity may be involved which are independent of each other: an indefinite can be epistemically non-specific but scopally specific.<sup>22</sup>

### 3.3 Not a conversational implicature

A well-received approach to the ignorance component in epistemic indefinites is to treat this as a conversational implicature derived via Gricean reasoning. The idea at least goes back to the discussion of (39) in Grice (1975). It is suggested that the ignorance component indicates that, on one hand, the speaker is aware of being less informative than required (infringement of the maxim of Quantity). On the other hand, however, “to be more informative would be to say something that infringed the maxim

21. I switch to a colloquial form because, morphology-wise, the more common version *bin-go* ‘who (lit. which-cl)’ also contains *bin-* ‘which’.

22. Relatedly, Farkas (1995) raises the issue of whether the opposite exists, i.e. whether there is a kind of indefinite that is epistemically specific but scopally non-specific. The question is relevant to the interpretation of the following sentences, which would not be addressed here.

- (i) a. John believes that a unicorn has destroyed his flowerbeds.
- b. Cob believes that a witch has blighted his mare and Nob believes that she has destroyed his crops.



of Quality,” (p.51) since the speaker may make a false claim. As a result, in the exchange in (39), even though a better answer would be, for example, Nice or Eze, with the use of *somewhere*, the speaker “implicates that he does not know which town C lives” (p.52).

(39) A: Where does C live?

B: Somewhere in the South of France.

Similar approaches have been adopted and developed in Alonso-Ovalle and Menéndez-Benito (2010), Chierchia (2013), Chierchia and Liao (2015), Alonso-Ovalle and Shimoyama (2014), and Dawson (2018), among others. In what follows, I argue that the ignorance component associated with *mzi*-indefinites should not be treated as such, for it does not display the signature properties of a conversational implicature.

First of all, the ignorance component in a *mzi*-indefinite cannot be canceled or reinforced.<sup>23</sup> The continuation that explicitly cancels the ignorance gives rise to an air of incoherence.

(40) Non-cancellability

#Aaming tai-zo      **mzi** bin-bun syu, ji ngo zidou hai bin-bun

Aaming read-PERF MZI which-CL book, and I know be which-CL

‘Aaming read some book, and I know which (book it is).’

In addition, reinforcing the ignorance component in a subsequent sentence results in redundancy (Horn 1972; Sadock 1978).

(41) Non-reinforceability

#Aaming tai-zo      **mzi** bin-bun syu, ji ngo m-zidou hai bin-bun

Aaming read-PERF MZI which-CL book, and I not-know be which-CL

‘Aaming read some book, and I don’t know which (book it is).’

Note that if we replace the *mzi*-indefinite with a plain indefinite such as *jat-bun syu* ‘one-CL book’ in (40) and (41), both sentences become felicitous.

23. The opposite is observed with Spanish and Japanese epistemic indefinites (see, for example, Alonso-Ovalle and Menéndez-Benito 2010; Alonso-Ovalle and Shimoyama 2014, respectively)

Second, it is often suggested that a conversational implicature tends to disappear in downward entailing environments (Gazdar 1979; Horn 2001; Chierchia 2004). However, the ignorance component of *mzi*-indefinites persists when embedded under negation. Note that the *mzi*-indefinite scopes over the negation and does not result in an NPI reading.

- (42) Aaming mou tai-gwo **mzi** matje syu  
 Aaming not.have read-EXP MZI what book  
 ‘There is some kind of books that Aaming hasn’t read.’  
 (≠ ‘Aaming hasn’t read any kind of books.’)

Similarly, the ignorance component remains when embedded under the attitude verb *waaiji* ‘doubt’.<sup>24</sup>

- (43) Aafan waaiji Aaming jau-mou tai **mzi** bin-bun syu  
 Aafan doubt Aaming have-not.have read MZI which-CL book  
 ‘There is some book such that Aafan doubts whether Aaming read it.’ (≠ ‘Aafan doubts whether Aaming read any book.’)

Third, it has been suggested that the ignorance component that is derived from a conversational implicature does not have to be speaker-oriented. It can be shifted to some other epistemic agent. This is the case for Spanish, where we can see that the ignorance component is not anchored to the speaker, but the subject of the attitude verb (= Juan):

- (44) Juan sabe que María se casó con **algún** estudiante del departamento.  
 Juan know:3s that María SE marry:past3s with ALGÚN student of.the department  
 Él no sabe con quién, ¡pero yo sí!  
 He not know:3s with whom, but I do  
 ‘Juan knows that María married a student in the department. He doesn’t know who, but I do!’

(Alonso-Ovalle and Menéndez-Benito 2010, p.13)

By way of contrast, the ignorance component of *mzi*-indefinites cannot be shifted. In (45), a *mzi*-indefinite is embedded under an attitude verb. If the component could be shifted to, e.g., the subject

24. This is consistent with the claim that *mzi*-indefinites are scopally specific, discussed in §3.2.

*Aaming*, the sentence would allow a continuation that comes with the identification of the doctor that is provided by the speaker. However, this is not the case.

- (45) Aaming gokdak keoi gindou **mzi** bin-go jisaang (#zikhai Wong jisaang)  
 Aaming think he saw MZI which-CL doctor namely Wong doctor  
 ‘Aaming thinks that he saw some doctor (namely Dr. Wong).’

The infelicity of the *namely*-continuation suggests that the ignorance component of a *mzi*-indefinite is consistently oriented to the speaker, but not the subject (another potential epistemic agent).

Similarly, while an ‘according to...’ phrase introduces a salient epistemic agent, the ignorance component is still oriented to the speaker. In (46) it is the speaker, but not the government, who cannot identify the referent mentioned by the government.

- (46) gangeoi zingfu ge gongfaat, Hoenggong gingzai hou-gwo **mzi** bin-go  
 according.to government GE saying Hong.Kong economy good-than MZI which-CL  
 singsi  
 city  
 ‘According the government’s saying, Hong Kong’s economy is better than some city.’

So a *mzi*-indefinite always conveys the speakers’ ignorance. This is different from what is observed for an ignorance component that is characterized as a conversational implicature.

In short, the kinds of evidence that have elsewhere have been given for a conversational/quantity implicature approach do not apply to *mzi*-indefinites. I conclude that the ignorance component of *mzi*-indefinites is not derivable from a conversational implicature.<sup>25 26</sup>

25. The absence of an anti-singleton requirement in *mzi*-indefinites discussed in §3.1 provides a further argument against a conversational/quantity implicature approach. This is because if the quantification domain is a singleton set, it would not violate the maxim of Quantity (see, for discussions along this line of reasoning, Alonso-Ovalle and Menéndez-Benito 2010)

26. Another variant of the conversational implicature approach suggests that the ignorance component may be a *manner* implicature, which is attributable to lexical competition with another expression (cf. lexical blocking, McCawley 1978), as in Russian (Geist 2008) and Tiwa (Dawson 2018). In view of the absence of obvious competitors to *mzi*, I do not consider this possibility.

### 3.4 Conventional implicature

In the previous subsections, we have observed that the ignorance component of *mzi*-indefinites displays the following properties:

(47) Properties of the ignorance component of *mzi*-indefinites

- a. it is compatible with a singleton domain of quantification (i.e., it can refer to a specific unknown);
- b. it survives various intensional contexts;
- c. it cannot be canceled or reinforced;
- d. it does not disappear in downward entailing environments;
- e. it is always oriented to the speaker.

Based on these observations, I propose that the ignorance component of *mzi*-indefinites is best regarded as a *conventional implicature*. I adopt the definition of conventional implicature in Potts (2005, 2015), which basically follows the suggestions in Grice (1975) and Horn (2007).

(48) Meaning *p* is a *conventional implicature* of phrase *S* if, and only if:

- a. *p* is a conventional (encoded) property of a lexical item or construction in *S*;
- b. *p* is entailed by *S*; and,
- c. *p*’s truth or falsity has no effect on the at-issue content of *S*.

The ignorance component of *mzi*-indefinites is obviously encoded by *mzi* given its morphological makeup. We have also seen that it cannot be canceled - it is entailed by *mzi*. These observations satisfy both (48a) and (48b).

As for (48c), this suggests that the ignorance component of *mzi*-indefinites is logically independent of the *at-issue* content of the sentence. Here, I adopt the ‘yes, but...’-test to illustrate this point (Karttunen and Peters 1979; Potts 2005). In the exchange in (49), after hearing (49a), the hearer can follow up by first agreeing on the at-issue existential claim with *hai aa3* ‘yes’ (i.e., Aaming read some book),

29

*mzi*-indefinites can be used felicitously even though there is only one potential referent (see §3.1).

## 4 A compositional analysis

This section sketches a formal compositional analysis of *mzi*, based on the findings in both §2 and §3. I first make explicit a few assumptions and then go on to implement the idea that *mzi* is a choice function that comes with a conventional implicature. In the last subsection, I discuss a desirable consequence of the proposal.

### 4.1 Assumptions

First, given our discussion in §2.1, I assume the internal structure of a *mzi*-phrase as in (51), which indicates that *mzi* is syntactically a modifier, or an adjunct-like element. I use  $\alpha P$  to indicate the category flexibility of *mzi* (recall that it can combine with elements of different syntactic categories). I use the label *WH* to cover both *wh*-expressions and disjunctive phrases.

(51) The internal structure of a *mzi*-indefinite

$$[_{\alpha P} \text{ mzi } [_{\alpha P} \text{ WH } ]]$$

Second, I assume an alternative-based approach to both *wh*-expressions and disjunctive phrases, following Hamblin (1973), Kratzer and Shimoyama (2002), Beck (2006), Cable (2010), Simons (2005), and Alonso-Ovalle (2006). Accordingly, the ordinary semantic values of both kinds of expressions are undefined, but they invoke sets of alternatives for their evaluation. For examples, *bin-bun syu* ‘which book’ invokes a set whose members are books, whereas *syu ding bouzi* ‘book or newspaper’ a set whose members include books and newspapers. Their semantics can be given as follows:

(52) a.  $\llbracket \text{bin-bun syu} \rrbracket = \{x: \text{book}(x)\}$

b.  $\llbracket \text{syu ding bouzi} \rrbracket = \{ \text{book, newspaper} \}$

Lastly, I assume a multi-dimensional semantic framework (Karttunen and Peters 1979; Potts 2005), where single sentences can express more than one, non-conjoined proposition. Substantially, the

meaning of a sentence can be two-dimensional, where the first dimension concerns the *at-issue content* and the second dimension the (non-at-issue) conventionally implicated content.<sup>28</sup>

## 4.2 Implementation

Based on the observations in §2, I suggest that *mzi* is an overt realization of a choice function operator (Kratzer 1998; Reinhart 1997; Winter 1997). A choice function is a function that takes a set denoted by descriptive content as its argument and returns a member of that set, formally defined as in (53):<sup>29</sup>

(53) Let  $f$  be a choice function (variable),

$$f =_{\text{DEF}} \forall X [X \neq \emptyset \rightarrow f(X) \in X]$$

Given the category flexibility of *mzi* discussed in §2.1, I suggest that the semantic type of  $X$  may range over entities, properties or propositions, rather than just  $\langle e, t \rangle$ -type as originally proposed.

The lexical semantics of *mzi* is given below in (54) (following Hagstrom (1998), Kratzer and Shimoyama (2002), Beck (2006), and Cable (2010)). While the existential meaning constitutes at-issue content, the ignorance component is taken as a (non-at-issue) conventional implicature.

(54) A multi-dimensional semantics of *mzi*

a. *At-issue content:*

$$\llbracket mzi_i \rrbracket^g = \lambda P_{\langle e, t \rangle}. g(i)(P), \text{ where } g(i) \in D_{\text{choice function } \langle \langle e, t \rangle, e \rangle}$$

b. *Conventional implicature:*

The speaker *doesn't know* (i.e., fails to identify in a relevant way) the referent chosen by the choice function.

Below I illustrate how (54) derives the narrow scope reading of (25). The relevant example and the target reading are repeated below.

28. For formal implementation of this idea, see Karttunen and Peters (1979) and Potts (2005).

29. The definition is taken from Geurts (2000), which is based on Reinhart (1997).

- (55) a. mui-go hoksaang dou hok-gwo [**mzi** bin-zung auzau jyujin] =(25)  
 every-CL student all learn-EXP MZI which-CL European language  
 ‘Every student has learned some European language.’

b. Narrow:

$$\forall x[\text{student}(x) \rightarrow \exists y[\text{an-unknown-European-language}(y) \wedge \text{learned}(x,y)]]$$

The at-issue content of the *mzi*-indefinite is depicted in (56b), which follows standard compositional principles (Heim and Kratzer 1998).

- (56) a. The internal structure of the *mzi*-indefinites:

$$[_{NP} \text{ mzi } [_{NP} \text{ which European.language } ] ] \quad \text{from (51)}$$

b. *At-issue content*:

$$\begin{aligned} & \llbracket \text{mzi}_i \rrbracket^g (\llbracket \text{which European.language} \rrbracket) \quad \text{via (54a)} \\ & = \lambda X. g(i)(X) (\{x: \text{European.language}(x)\}) \quad \text{by Functional Application} \\ & = g(i)\{x: \text{European.language}(x)\} \\ & = g(i)\{\text{Spanish, German, ...}\} \end{aligned}$$

Note that I adopt the suggestion in Winter (1997) that the choice function can be existentially bound at its base position. The meaning of (55a) can then be stated as follows. Since the ignorance component is associated with the choice function, it is distributed.

- (57) The meaning of (55a)

- a. *At-issue-content*:  $\forall x[\text{student}(x) \rightarrow \exists f [\text{learned}(x, f\{\text{Spanish, German, ...}\})]]$
- b. *Conventional implicature*: The speaker doesn’t know the referent chosen by *f* (= the referent of the indefinite expression).

It is important to note that the conventional implicature given in (57b) suggests that the ignorance component is distributed with the indefinite to each member in the domain of the wide scope universal quantifier. In other words, it suggests that the speaker is ignorant on all the student-language pairs, i.e., the speaker doesn’t know, for each student, which language s/he learned. This accurately captures the narrow scope reading of (55a). This is a desirable consequence especially when we compare such



a property with the ignorance component occurring with epistemic indefinites in other languages. I further elaborate this point in the next subsection.

### 4.3 A desirable consequence

To see one more example on how the ignorance component can be distributed, consider (58) below. Assuming that every Japanese song is only rearranged once, the sentence has a preferred narrow scope reading of the *mzi*-indefinite.

- (58) a. mui-sau 80nindoi coetman ge go dou hai goipin zi **mzi** bin-sau  
 every-CL eighties famous GE song all be rearrange from MZI which-CL  
 jatman-go  
 Japanese-song  
 ‘Every famous song in the eighties is rearranged from some Japanese song.’  
 b. #Wide:  $\exists y[\text{an-unknown-Japanese-song}(y) \wedge \forall x[\text{a-famous-song}(x) \rightarrow \text{be.rearranged.from}(x,y)]]$   
 c. Narrow:  $\forall x[\text{a-famous-song}(x) \rightarrow \exists y[\text{an-unknown-Japanese-song}(y) \wedge \text{be.rearranged.from}(x,y)]]$

Such a narrow scope reading gives rise to a co-variation reading of *both* the existential meaning and the ignorance component. In other words, for each famous song that co-varies with an unknown Japanese song, the speaker cannot identify that Japanese song.

This property of the ignorance component is, as far as I know, not observed in epistemic indefinites in other languages. It should, however, be noted that Alonso-Ovalle and Shimoyama (2014) examine the interaction between epistemic indefinites in Japanese (in the form of *WH-ka*) and universal quantifiers, but they observe that the ignorance component *disappears* when *WH-ka* is interpreted narrowly. Consider the following scenario (60a), adopted from Alonso-Ovalle and Shimoyama (2014):

- (59) Every Friday afternoon, students and professors at the Philosophy Department practice tango. Right now, every professor is dancing with a student. J is seeing quite clearly the scene. She knows perfectly well who is a student and who is a professor in that department. L calls J over

the phone.

The scenario is set up such that J has perfect information on all the professor-student pairs. Alonso-Ovalle and Shimoyama (2014) observe that the use of *WH-ka* is still felicitous as in (60a). Furthermore, the follow-up questions by L in (60b), which presupposes J’s knowledge of the professor-student pair, is also appropriate.

(60) Context: (59)

a. J: *Dono kyooju-mo dare-ka gakusee-to odotteru.*

which professor-MO who-KA student-with is.dancing

‘Every professor is dancing with some student.’

b. L: *Dare-ga dare-to odotteru no?*

who-NOM who-with is.dancing Q

‘Who is dancing with who?’

(p.13)

These observations suggest the absence of the ignorance component, since, if it existed, (60a) would constitute a contradiction and the follow-up in (60b) would render L an uncooperative speaker (as ignorance is already claimed by J).

In contrast, under the same scenario, the Cantonese counterpart with a *mzi*-indefinite suggests the opposite, where the ignorance component of a *mzi*-indefinite does not disappear when interpreted under a universal quantifier. It thus results in infelicity in (61).

(61) Context: (59)

#J: *mui-go gaausau dou tung-gan mzi bin-go hoksaang tiumou*

every-CL professor all with-PROG MZI which-CL dance

‘Every professor is dancing with some student.’

The current proposal straightforwardly explains the difference between epistemic indefinites in Cantonese and Japanese: the ignorance component in *mzi*-indefinites is a conventional implicature and thus persists under (and distributes over) a universal quantifier, whereas the one in *WH-ka* is arguably a conversational implicature (Alonso-Ovalle and Shimoyama 2014) and can be canceled when

interpreted below a universal quantifier.

## 5 Notes on the grammaticalization path of *mzi*

### 5.1 Different usages of the string *m-zī*

Throughout this paper, I have argued that, from a synchronic perspective, the non-verbal *mzi* is substantially different from the verbal counterpart. However, this is not to say that the two usages of *mzi*/*m-zī* are unrelated diachronically. Here I discuss a potential grammaticalization path from the predicative *m-zī* to the choice functional *mzi*, specifically focusing on the change of the selectional requirement of *m-zī*.

First of all, in addition to the two usages of *mzi*/*m-zī* already discussed, it is crucial to note that Yap and Chor (2014) further observe that *m-zī* can be used as a (negative) attitudinal marker, which conveys the speaker’s indifference to the content of the interrogative clause. To see an example,

- (62) Aaming **m-zī**      taai-zo      bin-bun      syu  
 Aaming not-know read-PERF which-CL book

‘(I) don’t know which book Aaming read.’ ≠ ‘Aaming does not know which book (he) read.’

Notice that the surface subject is *not* thematically related to *m-zī* (but to the embedded verb) and the (unexpressed) epistemic agent is by default taken to be the speaker (i.e., it conveys the speaker’s ignorance or indifference). This usage of *m-zī* retains the clause-taking ability of the verbal *m-zī* but its external argument is suppressed/dropped (or becomes unnecessary). I tentatively call such usage of *m-zī* a *raising* one.<sup>30</sup> Interestingly, (64) indicates that the clausal complement of this *m-zī* has to be an interrogative one, as opposed to its attitude verb usage (see (1)).

30. This raising usage in (62) is not unique to *m-zī*, but is observed with a wider set of attitude verbs, examples of which have been reported in Lee and Yip (2020).

- (63) Aaming **gamgok/ guguai** taai-zo      jat-bun      syu  
 Aaming feel.like/ guess read-PERF one-CL book  
 ‘(I) feel/guess Aaming read one book.’ ≠ ‘Aaming feels like/ guesses that (he) read one book.’

This indicates that *m-zī* as a raising verb should be discussed together with these other cases. I do not pursue an analysis in this paper.

- (64) \*Aaming **m-zī**      taai-zo      ni-bun syu  
 Aaming not-know read-PERF this-CL book  
 Int.: ‘(I) don’t know Aaming read this book.’

The different usages and the selectional requirement of *m-zī* are summarized as follows:<sup>31</sup>

	External argument	Internal argument	Examples
(a) As an attitude verb	present	declarative or interrogative clauses	(1)
(b) As a “raising” verb	absent	interrogative clauses	(62)
(c) As a choice function	absent	interrogative clauses or phrases	(2), (16), etc.

Table 2: Different usages of the string *m-zī*

A possible way to interpret the relations between these usages of *m-zī/mzi* is that *m-zī* originates as a (two-place) attitude verb in (a). Then, the selectional requirement on the external argument becomes optional and *m-zī* acquires the usage in (b). Additionally, the potential size of internal arguments extends from clauses to phrases, while both are still required to be interrogative (i.e., alternative-invoking expressions (of different syntactic categories)), and this gives rise to the choice functional usage in (c).<sup>32</sup> Notably, the change of the syntactic distribution of *m-zī/mzi* is correlated with the development of its semantic properties. Precisely, the lexical meaning/at-issue content of the verbal *m-zī* (i.e., not know) in (a) and (b) becomes a non-at-issue content (i.e., a conventional implicature, as argued) in the choice functional usage in (c). The development is reminiscent of a common grammaticalization process, namely, *de-categorialization* (Hopper 1991, p.22), where a clause taking verb loses its morpho-syntactic properties and then develops as a functional category.<sup>33</sup>

## 5.2 Morphological fusion of verbs and *wh*-expressions

In support of the proposed grammaticalization path, diachronic data show that it is commonplace for *wh*-expressions to develop into indefinites by fusing with verbs. In the cross-linguistic investigation

31. *M-zī* can also take NP complements. I set aside this usage.

32. The requirement of interrogative clauses in (b) remains mysterious. It may be related to evidentiality; see Lee and Yip (2020) for discussions.

33. A case in point is the English epistemic adverb *maybe*.

of indefinite pronouns, Haspelmath (1997) reports that one of the major sources for indefiniteness markers arises from the combination of elements with the clause ‘I don’t know’, especially in European languages. The following are some examples taken from Haspelmath (1997, p.131):

(65) a. Middle High German

*ne weil wer* ‘(I) don’t know who’ > *neizwer* ‘somebody’

b. Old English

*ne wāt hwā* ‘(I) don’t know who’ > *nāthwā* ‘somebody’

c. French

*Je ne sais (pas) quel* ‘I don’t know which’ > *je ne sais quel* ‘some kind of’

I suggest that it is plausible that *mzi* is fused with the *wh*-expressions in a similar way. This suggestion is further supported by the observation that *mzi* indeed requires strict adjacency with its associate. For example, in (66), number-classifier expressions and possessors cannot be inserted between *mzi* and the *wh*-expressions.<sup>34</sup> These sentences are otherwise acceptable if *mzi* follows these expressions and appear adjacent to the *wh*-expressions.

(66) a. Aaming sik-zo (\***mzi**) saam-go (<sup>OK</sup>**mzi**) matje

Aaming eat-PERF MZI three-CL MZI what

‘Aaming ate some three units of something.’

b. Aaming sik-zo (\***mzi**) Aafan-ge (<sup>OK</sup>**mzi**) matje

Aaming eat-PERF MZI Aafan-GEN MZI what

‘Aaming ate some Aafan’s thing.’

The same is observed with prepositional phrases. When a PP contains *wh*-expression, *mzi* must occur PP-internally, instead of PP-externally.

34. There is, indeed, one case where *mzi* is separated from its associate, i.e., when there is a plural generic classifier *di*:

(i) Aaming tai-zo **mzi** di matje  
Aaming read-PERF MZI CL.PL what  
‘Aaming read something.’

It should however be noted that, replacing the classifier *di* with other classifiers significantly degrades the sentence and there is strong preference to the classifier-*mzi* ordering. I leave this issue to future research.

- (67) Aaming baai-zo jat-bun syu {a. ??**mzi** hai bindou/ b. hai **mzi** bindou}

Aaming put-PERF one-CL book MZI at where at MZI where

‘Aaming put a book on somewhere.’

Note that the unacceptability of these sentences does not follow from the selectional requirement of *mzi* as discussed in §2.2. This is because *three-what*, *Aafan’s what* and *at where* also potentially invoke alternative sets for evaluation (i.e., the set of alternatives may *expand* until it meets a matching operator, following Rooth (1985), i.a.). Thus the strict adjacency between *mzi* and its associates is not required by semantic requirements. I therefore suggest that *mzi* might have fused with *wh*-expressions.

### 5.3 On the source of the ignorance component

The suggested grammaticalization path of *mzi* receives independent support from the Gifu variety of Japanese, where a verb is fused with *wh*-expressions to form epistemic indefinites. Importantly, the epistemic indefinites so formed share a common property that differentiate them from other cases, namely, the non-cancelability of the ignorance component.

Let us briefly review the epistemic indefinites in the Tokyo variety of Japanese. As argued in Alonso-Ovalle and Shimoyama (2014), the ignorance component of *WH-ka* in (Tokyo) Japanese is arguably a conversational implicature as it is cancelable and reinforceable, as illustrated below.

- (68) Tokyo variety of Japanese

Ken-wa [dare-**ka**] gengogaku-no gakusei-to kekkonshita. jitsuwa dare-da-ka

Ken-TOP who-KA linguistics-GEN student-with married in.fact who-COP-Q

shitteru.

know

‘Ken married a linguistics student. In fact, (I) know who it is.’

(p.14)

Interestingly, in Gifu variety, an additional morpheme *syān* can be attached to a *WH-ka* expression.

Morphology-wise, *syān* is presumably a phonologically reduced form of *shi* + *ran* ‘know + not’.<sup>35</sup> While the sentence in (69) also conveys the ignorance component of the speaker in a similar way as (68), it cannot be canceled.

(69) Gifu variety of Japanese

Ken-wa [dare **ka-syan**]-to kekkonsi-tot-ta kedo, (#boku-wa zituwa dare-da-ka  
 Ken-TOP who KA-SYAN-with married but I-TOP actually who-COP-KA  
 sit-to-ru).  
 know  
 ‘Ken married someone. In fact, I know who it is.’ (p.c. \*\*\*\*\*)

Relevant to the current discussion is that what we observe for Cantonese *mzi* is by no means some idiosyncratic development of a certain lexical item in Cantonese; instead it represents a more general emergent pattern of epistemic markers. Furthermore, the Cantonese *mzi*-indefinites and the *WH-ka-syan* in Gifu variety reflect a close link between the morphological makeup of epistemic indefinites and the nature of the ignorance component. I stress that the particular properties of the ignorance component in *mzi*-indefinites can be attributed to the fact that *mzi* originates from an attitude verb, whose the lexical meaning becomes a non-at-issue content. This differentiates *mzi* from many other cases of epistemic indefinites whose markers do not originate as a verb and provides a partial explanation on why epistemic indefinites across languages display non-uniform properties.

## 6 Conclusions

In this paper, based on in-depth investigation of the string *mzi-WH* in Cantonese, I proposed that *mzi* instantiates a choice functional usage which is associated with a conventional implicature of the speakers’ ignorance. I argued that *mzi* is a binder of *wh*-expressions and disjunctive expressions. It denotes a choice function and contributes to an existential interpretation of these elements. I also suggested that the ignorance component conveyed by *mzi* is best characterized as a conventional implica-

---

35. I thank \*\*\*\*\* for discussions.

ture in the sense of Potts (2005). It represents another possible source of an ignorance component that is less discussed in the study of epistemic indefinites. I also discussed a potential grammaticalization path of the choice functional *mzi*, which reflects a not unusual pattern across languages. It is hoped that the current study will stimulate further research on both the interpretations of *wh*-expressions in Cantonese and the study of how (speakers’) ignorance is encoded in natural languages.

## References

- Aloni, Maria. 2001. “Quantification under Conceptual Covers.” PhD diss., University of Amsterdam.
- Aloni, Maria. 2007. “Free choice, modals, and imperatives.” *Natural Language Semantics* 15 (1): 65–94.
- Aloni, Maria, and Angelika Port. 2015. “Epistemic indefinites and methods of identification.” In *Epistemic Indefinites*, edited by Luis Alonso-Ovalle and Paula Menéndez-Benito, 117–140. Oxford: Oxford University Press.
- Alonso-Ovalle, Luis. 2006. “Disjunction in alternative semantics.” PhD diss., University of Massachusetts Amherst.
- Alonso-Ovalle, Luis, and Paula Menéndez-Benito. 2003. “Some Epistemic Indefinites.” In *Proceedings of NELS33*, edited by Makoto Kadowaki and Shigeto Kawahara, 1–12.
- Alonso-Ovalle, Luis, and Paula Menéndez-Benito. 2010. “Modal indefinites.” *Natural Language Semantics* 18 (1): 1–31.
- Alonso-Ovalle, Luis, and Paula Menéndez-Benito. 2013. “Two Views on Epistemic Indefinites.” *Linguistics and Language Compass* 7 (2): 105–122. doi:[10.1111/lnc3.12009](https://doi.org/10.1111/lnc3.12009).
- Alonso-Ovalle, Luis, and Paula Menéndez-Benito. 2015. *Epistemic Indefinites*. Oxford: Oxford University Press.



- Alonso-Ovalle, Luis, and Junko Shimoyama. 2014. “Expressing Ignorance in the Nominal Domain: Japanese *Wh-ka*.” In *Proceedings of the 31st West Coast Conference on Formal Linguistics*, edited by Robert E. Santana-LaBarge, 11–20. Somerville, MA: Cascadia Proceedings Project.
- Beck, Sigrid. 2006. “Intervention effects follow from focus interpretation.” *Natural Language Semantics* 14:1–56. doi:[10.1007/s11050-005-4532-y](https://doi.org/10.1007/s11050-005-4532-y).
- Cable, Seth. 2010. *The Grammar of Q: Q-Particles, Wh-Movement and Pied-Piping*. Oxford: Oxford University Press.
- Chen, Sihwei, Vera Hohaus, Rebecca Larnus, Meagan Louie, Lisa Matthewson, Hotze Rullman, Ori Simchen, Claire K. Turner, and van der Klok Jozina. 2017. “Past possibility cross-linguistically: Evidence from twelve languages.” *Modality across syntactic categories*: 236–287.
- Cheung, Lawrence Yam-Leung. 2015. “Uttering the unutterable with *wh*- placeholders.” *Journal of East Asian Linguistics* 24:271–308. doi:[10.1007/s10831-014-9130-x](https://doi.org/10.1007/s10831-014-9130-x).
- Chierchia, Gennaro. 2004. “A Semantics for Unaccusatives and its Syntactic Consequences.” In *The Unaccusativity Puzzle: Explorations of the Syntax-Lexicon Interface*, edited by Artemis Alexiadou, Elena Anagnostopoulou, and Martin Everaert, 22–59. Oxford: Oxford University Press.
- Chierchia, Gennaro. 2013. *Logic in grammar: polarity, free choice, and intervention*. Oxford: Oxford University Press.
- Chierchia, Gennaro, and Hsiu-Chen Daphne Liao. 2015. “Where d Chinese *wh*-item fit?” In *Epistemic Indefinites: exploring modality beyond the verbal domain*, edited by Luis Alonso-Ovalle and Paula Menéndez-Benito, 31–59. Oxford: Oxford University Press.
- Dawson, Virginia. 2018. “A new kind of epistemic indefinite.” In *Proceedings of Sinn und Bedeutung*, edited by Uli Sauerland and Stephanie Solt, 22:349–366. Berlin: ZAS.
- Dawson, Virginia. 2020. “Outscoping the directive force of imperatives.” *Linguistic Inquiry*: 1–13.

- Erlewine, Michael Yoshitaka. 2017. “Why the null complementizer is special in complementizer- trace effects.” In *A pesky set: Papers for David Pesetsky*, edited by Claire Halpert, Hadas Kotek, and Coppe van Urk, 371–380. MIT Working Papers in Linguistics.
- Farkas, Donka F. 1995. “Specicity and Scope.” In *Actes du Premier Colloque Langues and Grammaire*, edited by L. Nash and G. Tsoulas, 119–137. Paris: University of Paris VIII.
- Fintel, Kai von. 2004. “Would You Believe It? The King of France is Back! (Presuppositions and Truth-Value Intuitions).” In *Descriptions and beyond*, edited by Marga Reimer and Anne Bezuidenhout, 315–341. Oxford: Oxford University Press.
- Fodor, Janet Dean, and Ivan Sag. 1982. “Referential and Quantificational Indefinites.” *Linguistics and Philosophy* 5:355–398.
- Gazdar, Gerald. 1979. *Pragmatics: implicature, presupposition, and logical form*. New York: Academic Press.
- Geist, Ljudmila. 2008. “Specificity as Referential Anchoring : Evidence from Russian.” In *Sinn und Bedeutung*, edited by Atle Grønn, 151–164. Oslo: ILOS.
- Geurts, Bart. 2000. “Indefinites and choice functions.” *Linguistic Inquiry* 31 (4): 731–738.
- Giannakidou, Anastasia, and Josep Quer. 2013. “Exhaustive and non-exhaustive variation with free choice and referential vagueness: Evidence from Greek , Catalan , and Spanish.” *Lingua* 126:120–149. doi:[10.1016/j.lingua.2012.12.005](https://doi.org/10.1016/j.lingua.2012.12.005).
- Grice, H. P. 1975. “Logic and conversation.” In *Syntax and semantics 3: Speech arts*, edited by Peter Cole and Jerry L Morgan, 41–58. New York: Academic Press.
- Hagstrom, Paul. 1998. “Decomposing questions.” PhD diss., Massachusetts Institute of Technology.
- Hamblin, Charles. 1973. “Questions in Montague grammar.” *Foundations of Language* 10 (1): 41–53.

- Haspelmath, Martin. 1997. *Indefinite Pronouns*. Oxford: Oxford University Press.
- Heim, Irene, and Angelika Kratzer. 1998. *Semantics in generative grammar*. Malden, MA: Blackwell.
- Hopper, Paul J. 1991. "On some principles of grammaticalization." In *Approaches to grammaticalization*, edited by Elizabeth Closs Traugott and Bernd Heine, 17–36. Amsterdam: John Benjamins.
- Horn, Laurence R. 1972. "On the semantic properties of logical operators in English." PhD diss., University of California, Los Angeles. doi:[10.2307/306769](https://doi.org/10.2307/306769).
- Horn, Laurence R. 2001. *A natural history of negation*. Stanford, CA: CSLI Publications.
- Horn, Laurence R. 2007. "Toward a Fregean pragmatics: Voraussetzung, Nebengedanke, Andeutung." In *Explorations in Pragmatics: Linguistics, cognitive and intercultural aspects*, edited by Istvan Kecskes and Laurence R. Horn, 39–69. Berlin: Mouton de Gruyter. doi:[10.1515/9783110198843](https://doi.org/10.1515/9783110198843).
- Huang, C.-T. James. 1987. "Existential sentences in Chinese and (in)definiteness." In *The Representation of (In)definiteness*, edited by Eric J Reuland and Alice G B ter Meulen, 226–253. Cambridge, MA: MIT Press.
- Jayez, Jacques, and Lucia M. Toven. 2006. "Epistemic Determiners." *Journal of Semantics* 23:217–250. doi:[10.1093/jos/ffl002](https://doi.org/10.1093/jos/ffl002).
- Johnson, Kyle. 2013. "Licensing Ellipsis." *Studies in Chinese Linguistics* 34 (2): 72–97.
- Karttunen, Lauri, and Stanley Peters. 1979. "Conventional implicature." In *Syntax and semantics, xi: Presupposition*, edited by Choon-kyu Oh and David A Dinneen, 1–56. New York: Academic Press.
- Kishimoto, Hideki. 2005. "WH-in-situ and Movement in Sinhala Questions." *Natural Language and Linguistic Theory* 23 (1): 1–51.
- Kratzer, Angelika. 1998. "Scope or pseudoscope? Are there wide-scope indefinites?" In *Events and grammar*, edited by Susan Rothstein, 163–196. Dordrecht: Kluwer Academic Publishers.

- Kratzer, Angelika, and Junko Shimoyama. 2002. "Indeterminate pronouns: The view from Japanese." In *Proceedings of the Tokyo conference on psycholinguistics*, edited by Yukio Otsu, 3:1–25. Tokyo: Hituzi Syobo.
- Lakoff, George. 1974. "Syntactic Amalgams." In *Papers from the 10th Regional Meeting of the Chicago Linguistic Society*, edited by Michael Galy, Robert Fox, and Anthony Bruck, 321–344.
- Lee, Man Ki Theodora. 2014. "Negative *wh*-quantifiers in Cantonese: a syntactic proposal and an investigation of adult English-Cantonese interlanguage." PhD diss., University of York.
- Lee, Tommy Tsz-Ming, and Hok-Yuen Wong. 2018. "Epistemic indefinites and reportative indefinites in Cantonese." In *Proceedings of the 32nd Pacific Asia Conference on Language, Information and Computation (PACLIC-32)*. Hong Kong: Association for Computational Linguistics.
- Lee, Tommy Tsz-Ming, and Ka-Fai Yip. 2020. "Raising, phase unlocked." Presentation at West Coast Conference on Formal Linguistics (WCCFL-38), University of British Columbia on March 6-8, 2020.
- Li, Audrey Yen-Hui. 1992. "Indefinite *Wh* in Mandarin Chinese." *Journal of East Asian Linguistics* 1 (2): 12–155.
- Lin, Jo-Wang. 1998. "On Existential Polarity *wh*-phrases in Chinese." *Journal of East Asian Linguistics* 7 (3): 219–255.
- Liu, Mingming, and Yanyan Cui. 2019. "Situating Mandarin *wh*-indefinites in the typology of modal indefinites." *Journal of Foreign Languages* 42 (3): 26–37.
- Liu, Mingming, and Yu'an Yang. 2021. "Modal *wh*-indefinites in Mandarin." In *Proceedings of Sinn und Bedeutung 25*, edited by P. G. Grosz, L. Marti, H. Pearson, Yasutada Sudo, and S. Zobel, 581–599. University College London / Queen Mary University of London.

- Matthewson, Lisa. 1999. "On the Interpretation of Wide-Scope Indefinites." *Natural Language Semantics* 7 (1): 79–134.
- McCawley, James D. 1978. "What is conversationally implicated by an utterance depends not only on the utterance but on what other utterances the speaker could have produced but did not. For example, a declarative sentence A." In *Syntax and Semantics 9: Pragmatics*, edited by Peter Cole, 245–259. Academic Press.
- Pesetsky, David. 1987. "Wh-in-Situ: Movement and Unselective Binding." In *The Representation of (In)definiteness*, edited by Eric J Reuland and Alice G B ter Meulen, 98–129. Cambridge, Massachusetts: MIT Press.
- Potts, Christopher. 2005. *The Logic of Conventional Implicatures*. Oxford: Oxford University Press.
- Potts, Christopher. 2015. "Presupposition and Implicature." In *The Handbook of Contemporary Semantic Theory*, 2nd Edition, edited by Shalom Lappin and Chris Fox, 168–202. John Wiley & Sons. doi:[10.2307/417579](https://doi.org/10.2307/417579).
- Reinhart, Tanya. 1997. "Quantifier Scope: How Labor is Divided between QR and Choice Functions." *Linguistics and Philosophy* 20 (4): 335–397.
- Rooth, Mats. 1985. "Association with Focus." PhD diss., University of Massachusetts, Amherst.
- Ruys, E G. 1992. "The scope of indefinites." PhD diss., Utrecht University.
- Sadock, Jerrold M. 1978. "On testing for conversational implicature.pdf." In *Syntax and Semantics 9: Pragmatics*, edited by Peter Cole, 281–297. Academic Press.
- Safir, Ken. 1982. "Syntactic Chains and the Definiteness Effect." PhD diss., Massachusetts Institute of Technology.

- Shanon, Benny. 1976. “Semantic and syntactic features in the context of dreams.” *Linguistic Inquiry* 7 (3): 518–519.
- Shimoyama, Junko. 2006. “Indeterminate Phrase Quantification in Japanese.” *Natural Language Semantics* 139–173 (14): 2.
- Šimík, Radek. 2014. “Epistemic indefinites under epistemic modals in Czech.” In *Slavic grammar from a formal perspective: Proceedings of FDSL 10*, edited by Gerhild Zybatow, Petr Biskup, Marcel Guhl, Claudia Hurtig, Olav Mueller-reichau, and Maria Yastrebova, 425–442. Frankfurt am Main: Peter Lang.
- Simons, Mandy. 2005. “Semantics and Pragmatics in the Interpretation of ‘or.’” In *Proceedings of SALT XV*, edited by Effi Georgala and Jonathan Howell, 205–222. Cornell University, Ithaca, NY: CLC Publications.
- Slade, Benjamin. 2015. “Sinhala epistemic indefinites with a certain *je ne sais quoi*.” In *Epistemic Indefinites: exploring modality beyond the verbal domain*, 82–99. Oxford: Oxford University Press. doi:[10.1093/acprof:oso/9780199665297.001.0001](https://doi.org/10.1093/acprof:oso/9780199665297.001.0001).
- Strawson, P.F. 1974. *Subject and Predicate in Logic and Grammar*. London: Routledge.
- Sudo, Yasutada. 2010. “Wh-ka Indefinites in Japanese,” 1–19. Handout distributed at Workshop on Epistemic Indefinites, University of Göttingen on June 11, 2010.
- Winter, Yoad. 1997. “Choice Functions and the Scopal Semantics of Indefinites.” *Linguistics and Philosophy* 20 (4): 399–467.
- Wong, Hok-Yuen. 2018. *Wh-doublings in Cantonese*. MA thesis, The Chinese University of Hong Kong.

- Yap, Foong Ha, and Winnie Oi-Wan Chor. 2014. "Epistemic, evidential and attitudinal markers in clause-medial position in Cantonese." In *Modes of Modality: Modality, typology, and universal grammar*, edited by Elisabeth Leiss and Werner Abraham, 219–262. Amsterdam and Philadelphia: John Benjamins Publishing Company.