On a Focus Particle Analysis on Cantonese *Wh*-NPI *matzai*[1]

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This paper examines the semantics of Cantonese *wh*-NPI *matzai* '(not…) that much'. It first studies the semantics of each component of the *wh*-NPI, namely the *wh*-indeterminate pronoun *mat* 'what' and the excessive modifier *zai* 'excessive(ness)' by looking at their distributions. It, then, proposes a novel compositional account which illustrates the contributions of *mat* and *zai* for the overall semantics of the *wh*-NPI. The current proposal requires a permissive modal component which allows us to pin down a contextually determined standard for comparisons between the actual value and the expected value. Lastly, a pragmatic enrichment operator is necessary for deriving the polarity sensitivity, which explains the negation requirement of *matzai*.

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1 Introduction

1.1 Overview

1. Cross-linguistically, NPIs can be constituted with a *wh*-indeterminate pronoun. They are termed as *wh*-NPIs. Generally, operators which combine with an *wh*-indeterminate and form *wh*-NPIs are focus particles, such as *even* in Tibetan *wh*-NPI *su-yang* 'who-even', as in (1), and universal quantifier *-um* in Tamil *wh*-NPI *yaar-um* 'who-all', as in (2).

(1) *Su*-yang slebs-ma-song
who-EVEN arrive-NEG-PRFV
'No one arrived.' (cited in Erlewine 2019: (31))

(2) Naan kiTTe-taTTe yaar-ai-um paaka-le
I almost WHO-ACC-UM see-NEG
'I saw almost no one.' (Iyer 2017: (6))

Cantonese *matzai* is also an example of *wh*-NPIs. *Matzai* is constituted by the *wh*-indeterminate pronoun *mat* 'what' and an excessive modifier *zai* 'excessive'. *Matzai* has to co-occur with a clausemate negation, giving rise to the meaning of 'not...(that) much'.

(3) Siuming *(m) gou matzai (Non-Quantity/Frequency scalar reading)
Siuming not tall MATZAI
'Siuming is not that tall.'

The goal of this paper is twofold. First, I propose a compositional analysis on the semantics of *matzai*. I propose that a modal component is encoded in the semantics of *matzai*, which allows us to derive the resulting meaning of 'not...(that) much'. Second, I will explain the polarity sensitivity of *matzai*. Following Chierchia (2006) and Matsui (2011), I propose a pragmatic operator which derives the entailment relation between prejacent and its alternative propositions. I show that negation is essential for deriving the correct entailment relation.

The outline of this paper is as follows: Section 1 briefly introduces the Cantonese *wh*-NPI *matzai* and its similarity with *wh*-NPIs in other languages. Section 2 reviews and challenges

previous analyses on *matza*. I argue that a detailed compositional account is required to illustrate the contributions of *mat* 'what' and *zai* 'excessive' respectively. Section 3 discusses relation between negation and *matzai*. Section 4 presents a morphological analysis of *matzai*, which examines the distribution of *zai*. I propose that the polarity sensitivity of *matzai* comes from the meaning of *zai*. Section 5 introduces semantics of excessiveness and proposes that the semantics of *zai* encodes a permissive modal component. Section 6 shows a novel compositional analysis on *matzai*. I propose the semantics of *zai* and show a stepwise process of compositionalty of *matzai*-sentences. I also drive the polarity sensitivity of *matzai* with a proposed pragmatic operator. Section 7 is the conclusion.

2 Literature Review

In this section, I review literature about *matzai*, mainly focusing on Tang (2006, 2009) and Lee (2013, 2021). Tang and Lee have different translations for *matzai*-sentences. For Tang (2009), *matzai*-sentences are translated as 'not...much at all'; whereas Lee (2013, 2021) translates *matzai*-sentences as 'almost not'. I do not agree with their translations. In the text, I keep the original translations provided by Tang and Lee on the first line, but I provide my translation 'not...that much' in the second line.

Tang and Lee share some similarities in their analyses. First, both propose that *matzai* has to occur with a negation, as shown in (4).

(4) Keoi mou /m[2] siu matzai.
He not(-have)/ not smile MATZAI
'He did not laugh much at all.' (Tang 2009: (34))
'He did not laugh that much.'

[2] In this paper, I gloss negation *m* as 'not', *mou* as 'not(-have)'.

Second, negation and *matzai* have to be in the same clause, as in (5); otherwise, the sentence becomes ungrammatical, as shown in (6).

(5) Ngo zidou [$_{TP}$ Can-sinsaang m heoi matzai].
1S.G. know Mr.Chan not go MATZAI
'I know that Mr. Chan almost does not go.' (Lee 2021: (10))
'I know that Mr. Chan does not go [to parties] that much'

(6) Ngo m zidou [$_{TP}$ Can-sinsaang heoi matzai].
1S.G. not know Mr.Chan go MATZAI
(Intended) 'I do not know that Mr. Chan almost goes.' (Lee 2021: (11))
(Intended) 'I do not know that Mr. Chan does not go [to parties] that much'

Third, *matzai* is considered an NPI and an approximative, denoting the minimal distance to one end of the scale.

Forth, *matzai* cannot occur with other measure phrases. As shown in (7), the measurement phrase *saam-ci* 'three times' is incompatible with *matzai*.

(7) *Keoi mou heoi saam-ci matzai
He not go three-time MATZAI
'He almost has not gone three times.' (Lee 2021: (16))

Nevertheless, Tang and Lee have different arguments on the syntactic and semantic properties of *matzai*. In the rest of this section, I first review arguments proposed by Tang (2006, 2009) and Lee (2013, 2021) and point out the problems of their analyses. Second, I show that the current analysis can overcome some of these problems.

2.1 Tang 2006, 2009

Tang (2006, 2009) provides syntactic observations and accounts for *matzai*. First, Tang proposes that *matzai* is compatible with different types of predicates and negation, which gives rise to different readings of *matzai*-sentences. In this paper, the different types of readings are termed as (I) Scalar Quantity reading, (II) Scalar Frequency Reading and (II) Scalar Non-Quantity/Frequency Reading. For Reading I: Scalar Quantity reading, *matzai* occurs with activity

predicates and eventive negation *mou* 'not have', as shown in (8). (8) means that the duration of the laughing event is short.

(8) Keoi mou siu matzai
He not(-have) laugh MATZAI
'He did not laugh much at all.' (Tang 2009: (8))
'He did not laugh that much.'

For Reading II: Scalar Frequency reading, *matzai* occurs with activity predicates and stative negation *m*. The *matzai*-sentence in (9) means that the subject does not laugh very often.

(9) Keoi m siu matzai
He not laugh MATZAI
'He does not laugh much at all.' (Tang 2009: (8))
'He does not laugh that much.'

The last reading is Reading III: Scalar Non-Quantity/ Frequency reading. This reading is derived when *matzai* occurs with stative predicates, such as *gouhing* 'happy', and stative negation *m*, as in (10).

(10) Keoi m gouhing matzai. (Gradable reading)
3S.G. not be.happy MATZAI
'He is not too happy at all.'
'He is not that (much) happy.'

Second, Tang proposes that *matzai* is an adverb which cannot occur with measurement phrases. The ungrammaticality of (11) is caused by the occurrence of the measurement phrase *saam-ci* 'three times'.

(11) *Keoi mou heoi saam-ci matzai
3S.G. not(-have) go three-time MATZAI
(Intended) 'He almost has not gone three times.'

Third, *matzai* is only allowed to occur after an NP object if it is definite, as in (12), or kind-denoting, as in (13); whereas indefinite NP objects are not allowed, as in (14).

(12) Keoi mou taai **nei-saam-bun** syu matzai
3S.G. not(-have) read this-three-CL book MATZAI
'He hardly read these three books at all.' (Tang 2009: (14))

'He did not read these three books that much.'

(13) Keoi mou taai **syu** matzai
3S.G. not(-have) read book MATZAI
'He did not read books much at all.' (Tang 2009: (15))
'He did not read books that much.'

(14) *Keoi mou taai **saam-bun** **syu** matzai
3S.G. not(-have) read three-CL book MATZAI (Tang 2009: (16))

Fourth, to show that *matzai* is under the scope of negation, Tang (2009) provides (15) and suggests that negation negates the frequency of the event happening *heoi* 'go' which is associated with *matzai*. This means that *mou...matzai* means 'not...much at all'.

(15) Keoi mou heoi matzai (Quantity reading)
3S.G. not(-have) go MATZAI
'He did not go much at all.' (Tang 2009: (18))
'He did not go [to parties] that much.'

To derive the surface word order, Tang adopts Kayne (1994) and assumes (16) as the underlying structure of *matzai*-sentences.

(16) Subject [Negation [*matzai* [VP]]] (Tang 2006: (40); Tang 2009: (20))

The surface order with sentence-final *matzai* is derived by predicate raising, as shown in (17).

(17) Subject [Negation [VP_i] [matzai [t_i]]

2.2 Lee 2013, 2021

Based on Lee (2013), Lee (2021) proposes a new account on the semantics of approximatives in Cantonese and Mandarin Chinese. Lee (2021) proposes that *matzai* is a scalar operator which relies on the bound of a closed scale for interpretations. The meaning of *matzai* is constituted with the following two components.

(i) The proximal component: it gives rise to the meaning of proximity as an approximatives. *Matzai*-sentences assert that 'it is close to a certain point *i*' and this analysis falls under literature

about approximatives, such as *chi(yi)dian* and *cha(yi)dian-mei* in Kaufmann and Xu (2015) and *almost, barely* in Amaral (2010).

(ii) The minimizer component: it requires *matzai* to denote the minimal distance to the low-end of the scale

Lee (2021) also proposes that *matzai* shows polarity phenomenon because it contains the semantic properties which contribute to the sense of polarity (Israel 2011). First, *matzai* has a form of quantitative value (*q*-value) which is on the low position in the scalar ordering. That means, *matzai* has low *q*-value. Second, *matzai* is considered a minimizer as it attains a high informative value (*i*-value). That means, *matzai*-sentences give assertions which have to go beyond what would generally be expected — the use of *matzai*, as a minimizer, gives rise to emphatic sense.

On the role of negation, Lee (2021) suggests that the relation between negation and *matzai* should be explained by semantic scope, instead of c-commanding relation. The evidence is that if *matzai* is interpreted within the scope of negation, an incorrect reading 'He has *not almost* gone' is yielded for the *matzai*-sentence (18). To fix this, *matzai* has to take wide scope over negation such that it matches with the reading that *almost* takes wide scope over negation *not*: 'He *almost* had *not* gone'.

(18) Keoi mou heoi matzai
3S.G. not(-have) go MATZAI
'He almost has not gone,' (Lee 2021: (12 & 13))
'He did not go [to parties] that much.'

In addition, negation serves to reverse the direction of scale which allows *matzai* to be in the low position in scalar ordering (i.e. low *q*-value). Lee (2021) provides (19) to illustrate her proposal.

(19) Keoi mou heoi seongtong matzai.
3S.G. not(-have) go class MATZAI
'He almost has not attended any classes.' (Lee 2021: (17))
'He did not attend the class that much.'

In (19), *matzai*, as a minimizer, indicates the smallest distance to the low-end of the scale. The minimizing meaning causes an empathetic effect that *matzai* has high *i*-value. 'The smallest distance' is non-directional. This means that 'the smallest distance' can occur above or below the boundary of the scale, causing inferences of 'the occurrence' or 'the non-occurrence of the event'. Therefore, (19) can be interpreted as 'he almost did not ever come to the class' and does not presuppose that he came to the class before.

As *matzai* denotes the 'minimizing meaning', it is not compatible with measurement phrases which do not give the minimal value on the quantitative scale.

2.3 Advantages of the present analysis

Tang (2006, 2009) seems to treat *matzai* as an excessive degree modifier but he neither says it explicitly nor has an account for it. Lee (2013, 2021) treats *matzai* as English *almost* which denotes minimizing meaning when it occurs with negation. Lee assumes that there is a specific value to be the lowest point on the scale for comparisons such that the actual value of an entity is a value being minimally close to that value. However, we cannot find a proposition which expresses such specific value without carefully defining the context and the quantified domain. This paper solves some of these problems. First, I propose that the semantics of *zai* encodes some modal base which provides the standard for comparison. Second, the present analysis decomposes the meaning of *matzai* by examining the contributions of *mat* and *zai* respectively. This is along the line of literature about *wh*-NPIs, such as Erlewine and Kotek (2016), Erlewine (2019), Beck (2020) and among many others, showing that the *wh*-indeterminate pronoun and the lexical item involved contribute different semantics and interact with each other. Third, the

compositional account also explains the role of negation in deriving the polarity sensitivity of *matzai* as a strict NPI.

3 Negation and *Matzai*

In Cantonese, there are five types of negation which are used in different clause types: (i) negation *mou* which denies the existence of a described event (Law 2014, Lam 2018, 2019, Tang 2015); (ii) negation *m* which denotes negative states (Lam 2019, Tang 2015); (iii) negation *mei* which denotes the imperfective aspect of a described event (Tang 2015, Matthews and Yip 1994, 2011); (iv) sentence-final negation *mei* is used in polar questions (Tang 2015, Matthews and Yip 1994, 2011) and (v) negation *mai/ m-ho* appears in imperatives (Matthews and Yip 1994, 2011). I present that only the first three types of negation, *mou*, *m* and *mei* are compatible with *matzai*, whereas the other two are not. See the examples below.

(A) Eventive negation *mou* and *matzai*

(20) Aaming mou coenggo matzai
Aaming not(-have) sing.song MATZAI
'Aaming did not sing that much.'

(B) Stative negation *m* and *matzai*

(21) Aaming m zungji Aafen matzai.
Aaming not like Aafen MATZAI
'Aaming does not like Aafen that much.'

(22) Aaming m coeng go matzai.
Aaming not sing song MATZAI
'Aaming does not sing that often.'

(23) Aaming m fei matzai.
Aaming not fat MATZAI
'Aaming is not that fat.'

(B) Imperfective negation *mei* and *matzai*

(24) Di poutau mei hoi-faan-saai matzai.
CL-PL shop NEG.IMPERF open-back-all MATZAI

'Those shops have not yet been fully re-open.'

(B) Polar question particle sentence-final negation *mei* and *matzai*

(25) Nei zou-jyun gungfo mei (*matzai)?
2S.G. do-finish homework NEG.IMPERF MATZAI
'Have you finished your homework yet?'

(E) Imperative negation *mai/ m-ho* and *matzai*

(26) Nei mai/m-ho gam je daa-dinwaa bei ngo (*matzai).
2S.G. NEG.IMP this late call-phone to 1S.G. MATZAI
'Don't call me late at night!'

4 Morphological analysis of *matzai*

4.1 Distribution of *zai*

The basic meaning of *zai* expresses situations where someone has indigestion because of eating too much (Cheung 2007). *Zai* forms resultative verbal compounds (RVCs) with activity predicates, such as *sik* 'eat' in (27).

(27) Aaming ***sik-zai***-zo, keoi jiu jausik jat-haa.
Aaming eat-ZAI-PERF, 3S.G. need rest one-CL
'Aaming got indigestion, he needed to take a rest for a while.'

The RVC *sik-zai* is composed of an activity predicate *sik* 'eat' which causes the result denoted by *zai* 'indigestible'. The RVC *sik-zai* denotes a situation in which Aaming got indigestion by eating too much.

Zai can also be attached to nouns and form adjectives, such as *wan-zai* 'unlucky' in (28). The compound *wan-zai* is constituted by a noun *wan* 'luck/fate' and *zai* which, here, means 'obstacles/ blocks'. The compound behaves as an adjective which can be modified by a degree intensifier *hou* 'very'.

(28) Aafan zeoigan singjat jyudou paasau. zanhai hou ***wan-zai***.
Aafan recently always encounter pickpocket, really very luck-zai
'It's very unlucky that Aafan has encountered pickpockets many times.'

Zai can also be attached to a noun, forming a nominal compound. In (29), the nominal compound is constituted by a noun *zo* 'blocks' and *zai*, which means 'obstacles/ challenges'.

(29) Aaming soeng zyun gung, daan jyudou hou do ***zo-zai***.
Aaming want change job but encounter very many block-zai
'Aaming wants to get a new job, but he has encountered many challenges.'

While the category that allows *zai* to attach varies a lot, the meaning of those compounds denote a sense of excessiveness, which is contributed by *zai*.

Despite this, *zai* combines with other elements and form adverbial predicates. *Matzai* is one of the examples, as in (30).

(30) Siuming m gou matzai
Siuming not tall MATZAI
'Siuming is not that tall.'

The adverbial expression *dakzai* is composed of the ability modal *dak* 'be able to' and *zai*. *Dakzai* means 'exceeding some comparative standard'. *Dak* 'be able to', as an ability modal, is usually found in post-verbal position (Simpson 2001), as in (43).

(31) Keoi jau ***dak*** seoi.
3S.G. swim can water
'He can swim.' (Simpson 2001: (90))

Roughly speaking, *dakzai* means 'allow to exceed the comparative standard', as in (32).

(32) Gin saam zak ***dak-zai***
Cl shirt small DAK-ZAI
'The shirt is too small.'

Dakzai-constructions are similar to English *too*-constructions: *too*-constructions denote excessiveness and the infinival clause is not realized in the real world. For example, (33) can be paraphrased as 'Bill was too busy and Bill did not come last night'.

(33) Bill was too busy to come last night. (Zhang 2018: (38))

While *dakzai*-constructions do not allow an infinitival clause to be followed, they have the same implication--some default goal is not met due to the excessiveness. In (32), it means that the shirt is too small for the speaker. The default goal of wearing this shirt is not met.

In addition, the use of *dakzai* encodes negative connotation. (35) is a felicitous continuation of (34), as it expresses speaker's suspicion about whether the painting is child's painting. However, if the continuation is a compliment, as in (36), it is infelicitous. This indicates that *dakzai* does not simply denote 'exceeding the comparative standard', it also means that 'exceeding some degree that is not allowed'.[3]

(34) Fuk waa liang dakzai
Cl painting beautiful DAKZAI

[3] There are other syntactic properties of *dakzai*, which are not associated with its core meaning 'excessiveness'. First, *dakzai* can only occur with adjectival predicates, but not with other categories, such as verbs. No matter if it is an activity predicate, as in (i), an achievement as in (ii) or an accomplishment as in (iii), they are not compatible with *dakzai*.

(i) *Siuming pao dakzai (activity predicate)
Siuming run DAKZAI
(Intended) 'Siuming ran too much.'

(ii) *Aaming jeng-zo nei-leoijing ge beicoi dakzai (achievement predicate)
Aaming win-PERF this-type MOD competition DAKZAI
(Intended) 'Aaming has won this type of competition too many times.'

(iii) *Aafan zeng-wang go dinsigei dakzai (accomplishment predicate)
Aafan make-broken CL television DAKZAI
(Intended) 'Aafan broke the television too many times.'

Dakzai cannot occur within the scope of negation. See the contrast between (iv) and (v). If *dakzai* and negation occur within the same clause, as in (iv), the sentence becomes ungrammatical. However, if the negation is in a different clause, as (v), *m-hai* 'not be' is in the matrix TP, whereas *dakzai* is in the embedded TP, the sentence is grammatical. This shows that *dakzai* behaves like positive polarity items (PPIs) that it cannot be under scope of negation.

(iv) *Aafan m gui dakzai (Stative predicate)
Aafan not tired DAKZAI
(Intended) 'Aafan is not too tired.'

(v) [$_{TP1}$Aafan m-hai [$_{TP2}$gui dakzai]]. (Eventive predicates)
Aafan not-COP tired DAKZAI
'It is not the case that Aafan is too tired.'

'The painting is too beautiful.'

(35) ^{OK}Dou m ci hai siupengjau waa ge.
also not like COP children paint ASSERT
'It doesn't like a child's painting.'

(36) ^{NotOK}liang-dou koji luo zoeng.
beautiful-to possible win prize
'It is beautiful enough to win the prize.'

The last example of an adverbial predicate is *gamzai*. *Zai* is composed with the demonstrative *gam* 'this' to denote the scalar meaning 'almost' when the sentence has stative reading, as in (37), or prospective meaning 'be going to' when the sentence has eventive reading, as in (38).

(37) Gaan heijyun bao gamzai.
CL cinema explode GAMZAI
'The cinema is almost full.'

(38) Aaming bitjip gamzai.
Aaming graduate GAMZAI
'Aaming is going to graduate.'

Unlike *dakzai*, *gamzai* can occur with clausemate negation, as shown in (39).

(39) Aaming mou faan-guo-hok gamzai
Aaming not(-have) go-PERF-school GAMZAI
'Aaming hardly ever goes to school.'

Gamzai does not seem to encode the meaning of 'excessiveness'. However, *zai* in *gamzai* functions as an upper-bound on the scale. This gives rise to the sense of polarity.

In short, the meaning of *zai* can be interpreted as 'obstacle', 'excessive(ness)' and/ or 'the upper-bound on the scale', which carries to expressions which contain *zai*.

4.2 *Mat* as an *wh*-indeterminate

This subsection is to show that *mat* is an *wh*-indeterminate in Cantonese. The distributions of *wh*-indeterminates are subject to semantic and syntactic constraints. Semantically, *wh*-indeterminates are required to be licensed by operators, such as interrogative operators; Syntactically, they have

to be structurally c-commanded by licensing operators (Li 1992, Giannakidou and Lin 2016). Generally speaking, *wh*-indeterminates can be used as question words or have non-interrogative readings, such as 'some' or 'any'. *Mat* has both readings respectively in interrogatives, as in (40) and non-interrogatives (41).

(40) Aaming gokdak ngo zungji di mat?
Aaming think 1S.G. like some what
'What does Aaming think I like?'

(41) Aaming gokdak ngo zungji di mat
Aaming think 1S.G. like some what
'Aaming thought that I liked something.'

Despite this, it is generalized that *wh*-indeterminates can be semantically licensed in nonveridical environments, a typical NPI-licensing condition (Li 1995, Giannakidou and Lin 2016). I show that *mat* patterns with those *wh*-indeterminates in the aspect of distributions in the following contexts: (i) negation, (ii) conditionals, (iii) embedding contexts of non-factive predicates and (iv) modalized contexts.

(i) Negation functions as an operator which licenses *mat*. The absence of negation makes the sentence ungrammatical.

(42) Aaming cumjat *(mou) mai di mat.
Aaming yesterday not(-have) buy some what
'Aaming did not buy anything yesterday.'

(ii) Conditionals licence *wh*-indeterminates, as well as *mat*.

(43) Jyugwo nei jau mat mantai, cing lyunlok ngo.
If you have what question please contact 1S.G.
'If you have any questions, please contact me.'

(44) Aaming jau mat syu, ngo zau taai mat syu.
Aming have what book 1S.G. then read what book
'Whatever book that Aaming have, I will read it.'

(iii)The Cantonese counterpart *mat* patterns with the Mandarin *wh*-indeterminate *shenme* 'what' that *shenme* cannot be embedded under factive predicates, but non-factive ones (Li 1992). As shown in (45), *mat* appears in the embedded clause of the factive predicate *haufui* 'regret', and the sentence is ungrammatical.

(45) *Aafan haufui zou-zo di mat.
Aafan regret do-PERF some what
(Intended) 'Aafan regretted that she had done something.'

Meanwhile, when the matrix predicate is a non-factive one, as *gokdak* 'think' in (46), *mat* is allowed to appear in its embedded clause.

(46) Aafan gokdak Aaming zungji di mat.
Aafan think Aaming like some what
'Aafan thought that Aaming liked something.'

(iv) Modalized contexts can license *wh*-indeterminates. As shown in (47), *mat* can appear in a context without negation when there is an epistemic modal adverb *houci* 'seemingly'.

(47) Aaming houci zungji di mat.
Aaming seemingly like some what
'It seems that Aaming likes something.'

Mat, similar to other *wh*-words, shows subject-object asymmetry. As shown in (48) and (49), *mat* is structurally c-commanded by the conditional marker *jyugwo* 'if', and therefore the sentences are grammatical no matter *mat* is in subject or object position.

(48) Jyugwo (jau) mat jan zungji Aaming, zau tung ngo gong.
If have what person like Aaming then with 1S.G. tell
'If there is someone who likes Aaming, then tell me.'

(49) Jyugwo Aaming zungji mat jan, zau tung ngo gong.
If Aaming like what person then with 1S.G. tell
'If Aaming likes someone, then tell me.'

However, if *mat* is not c-commanded by the conditional marker *jyugwo*, the sentence becomes ungrammatical. As in (50), *mat* appears in the consequent which is outside the scope of *jyugwo*.

(50) *Jyugwo Aaming zungji Aafan, mat jan wui hou hoisam.
If Aaming like Aafan what person will very happy
(Intended) 'If Aaming likes Aafan, who will be happy about it?'

To conclude, the distributions of *mat* pattern with *wh*-indeterminates that *mat* requires a c-commanding licensors to survive. This indicates that *mat* in Cantonese is also an *wh*-indeterminate. This leads to the proposal that the *wh*-NPI *matzai* is composed of an *wh*-indeterminate and an excessive modifier.

5 Semantics of excessiveness

Among analyses of semantics of excessiveness (Meier 2003, Hacquard 2005, Li 2015, Nadathur 2017 a.o.), many propose that excessiveness is expressed with respect to some comparative standard which is determined by context. Context is derived from some modal component. This section mainly reviews analyses of Meier (2003) on the semantics of excessiveness. I show that semantics of excessiveness has to contain a modal component.

5.1 Meier 2003

Meier (2003) analyzes *too*-constructions which are followed by a *to*-infinitive clause as conditionals in Kratzer's style (1978). For example, *too*-constructions such as (51) are proposed to be composed by two parts: the main clause is analyzed as the antecedent and the *to*-infinitive clause is analyzed as the consequent. A (implicit/ explicit) modal with existential force is introduced by the *to*-infinitive clause.

(51) The food is too good to throw (it) away. (Meier 2003: (1b))

Too-constructions are proposed to denote two values for comparisons. One is the actual value of the object, the other is the maximal or minimal value of a set of values determined by a hidden conditional. In the case of (51) which involves a positive polar adjective *good*, the first value is the actual quality of the food and the second value is the maximal value of the set of

values *v* that makes the hidden conditional *If the food is v-good, we are allowed to throw it away* true. The truth condition for (51) can be captured in the paraphrases in (52).

(52) "The value *v* such that the food is *v*-good" is GREATER than the MAXIMUM of all values *v** such that, if the food is *v**-good, we *are allowed* to throw it away.
(Meier 2003: (6a))

Meier (2003) proposes that there is a modal component in the semantics of *too*-constructions. Slightly departing from Kratzer's (1991) standard analysis, Meier treats modals in conditionals as a four-place relation which relates a world assignment *w*, a conversational background *h* and two propositions *p* and *q*. The lexical entry for the modal *can* is shown below.

(53) $[\![can]\!] = f : D_{\langle s,\langle h,\langle p,\langle p,t\rangle\rangle\rangle\rangle}$
For any world $w \in W$, conversational background $h \in D_h$, and propositions $p, q \in D_p$:
$f(w)(h)(p)(q) = 1$ iff $\bigcap(h(w) \cup p) \cap q \neq \emptyset$

The degree modifier *too* is assumed to have the truth condition of (51), as shown in (54). In (54), the truth condition assumes that the extent predicate *P* and *Q* stand in a 'greater than'-relation which shows that the maximal value *e* of *P* is greater than the maximal value *e** of *Q* in *w*. These are the two values for comparison and the two values are presupposed to exist and to be unique. *too* is assumed to be a three-place predicate which relates a world argument, an unsaturated modalized expression and an extent predicate.

(54) $[\![too]\!] = f : D_{\langle s,\langle\langle s,\langle p,t\rangle\rangle,\langle\langle d,p\rangle,t\rangle\rangle\rangle}$
For all $w \in W$, $Q \in D_{\langle s,\langle p,t\rangle\rangle}$ and $P \in D_{\langle d,p\rangle}$:
$f(w)(Q)(P) = 1$ iff
$MAX(\lambda e.P(e)(w)) > MAX(\lambda e^*.Q(w)(P(e^*)))$ (Meier 2003: (53))

The calculation of the meaning of (51) is shown in (56), which is based on the definition of *maximality* in (55).

(55) $MAX(E) = \iota e[e \in E \ \& \forall e \in E \Rightarrow e > e' \vee e = e']$ (Meier 2003: (21))

(56) $[\![\textbf{too}(@)(\lambda w.\textbf{can}^R)(w)(h)(\lambda w.\text{PRO}_1\textbf{ is thrown away in } w))\ (\lambda e.\lambda w.\textbf{the food}_1\textbf{ is } e\textbf{-good in } w]\!]^g = 1$

> iff the maximal *e* such that the food is *e*-good is greater than the maximal *e** such that, if the food is *e**-good, it can be thrown away given what is allowed. (Meier 2003: (55))

In (56), the modal base is a permissive conversational background. *Too* first combines with a hidden world argument, then with the intension of an unsaturated conditional (i.e. λw.PRO$_1$**is thrown away in** *w*). The last step is to combine with the extent predicate and then gives a truth value. The resulting meaning is that 'there is a maximal extent *e* such that the actual value of the food is *e*-good which is greater than the maximal *e** which is the maximal value of food to be thrown away'.

6 Analysis: Deriving Polarity Sensitivity

6.1 Matsui (2011): Japanese *a(n)mari*

Similar phenomenon is found in Japanese. Matsui (2011) suggests that *a(n)mari* has an intensifying or excessive meaning. Similar to *matzai*, *a(n)mari* behaves like an NPI which is licensed by negation, as in (57), whose meaning is similar to English *all that* as in *It is*(n't) all that hot today*. However, *a(n)mari* can also appear in *because*-clauses when negation is absent, as in (58).

(57) Kyoo-wa a(n)mari atsuku*(-nai)
Today-TOP a(n)mari hot-not
'It isn't very/all that hot today.' (Modified Matsui 2011: (2))

(58) Heya-ga a(n)mari atsukatta-kara eakon-o tsuketa.
Room-NOM a(n)mari hot.PAST-because A/C-ACC turned.on
'I turned on the air conditioner, because the room was very/ all that hot.'

Matsui (2011) follows Chierchia's (2006) proposal of pragmatic enrichment operator and proposes that the semantics of *a(n)mari* is the same as the English *very*, suggested by Kennedy and McNally (2005), but it behaves like an NPI. In this sense, *a(n)mari* is alternative-sensitive. See the denotation of *a(n)mari* in (59).

(59) a. $[\![\text{a(n)mari}_D]\!] = \lambda G_{\langle d, et\rangle} \lambda x \exists d \in D[G(d)(e) \wedge d >_! Stnd(G)(D)]]$

b. ALT([[a(n)mari$_D$]]) ={$\lambda G_{d, et)} \lambda x$[$\exists d' \in D'$[$G(d')(e) \wedge d' >_! Stnd(G)(D')$]]:$D' \subset D \wedge max(D') < max(D)$} (Matsui 2011: (22))

According to (59a), the semantics of *a(n)mari* provides a degree that exceeds the standard degree of *G*-ness by some significant amount ($>_!$). The standard is assumed to be contextually determined.

In (59b), *D* is the set of all possible degrees salient on the scale available in the present context, and *D'* as the subset of *D*. $max(D') < max(D)$ indicates that the maximal possible degree of *G* in *D'* has to be the maximal possible degree of *G* of *D*.

Matsui (2011) proposes that the pragmatic enrichment operator M_C is sensitive to the alternatives and compares the proposition *p* with its alternatives. According to the definition of M_C, *p* is ranked as the least refutable, least controversial claim that requires less evidence. Matsui suggests that, in this sense, *p* is 'stronger' in terms of quality.

(60) $M_C(p) = p \wedge \forall q \in C$[*p* is less refutable (hence) modest than *q*], where *C*=ALT

When negation is absent, *a(n)mari*-sentences are ungrammatical and M_C derives entailment which is contradictory. See (61). (61b) shows that the pragmatic operator takes the wide scope. (61c) is the denotation of (61b). (61d) shows the alternatives of (61c). (61d) is the entailment between the prejacent and its alternatives.

(61) a.*A(n)mari atsui.
A(n)mari hot.NPST
Intended: '(It) is very hot.'
b. σ[a(n)mari$_{[+\sigma]}$*hot*]
c. $M_C(\exists d \in D[hot(d) \wedge d >_! Stnd(hot)(D)])$
d. {$\exists d' \in D'$[$hot(d) \wedge d >_! Stnd(hot)(D')$]: $D' \subset D \wedge max(D') < max(D)$}
1. e. $\exists d \in D[hot(d) \wedge d >_! Stnd(hot)(D)]$ *is less refutable than* $\exists d' \in D'[hot(d) \wedge d >_! Stnd(hot)(D')]$ (Matsui 2011: (26))

(61) shows contradictions of the entailment relation. The reason is that the maximal degree in *D* of *hotness* is greater than that of *D'* of *hotness*. The former has stronger strength compared to the

latter. This does not match with the entailment requirement that the prejacent is less refutable or weaker, compared to its alternatives.

However, when we put back negation, the entailment relation passes through, as shown in (62). In (62b), negating a greater degree of hotness, i.e. the maximal degree of hotness in *D*, is less refutable than negating a smaller degree of *hotness* which is in *D'*.

(62) a. A(n)mari atsui-nai.
A(n)mari hot.NPST
'(It) is not very hot.'

b. $\neg\exists d{\in}D[hot(d){\wedge}d{>_!}Stnd(hot)(D)]$ is less refutable than
$\neg\exists d'{\in}D'[hot(d){\wedge}d{>_!}Stnd(hot)(D')]$ (Modified Matsui 2011: (28))

There are several differences between the analysis of Matsui (2011) and ours. First, we stipulate presuppositions about the domains of degrees such that the domains of alternatives are not arbitrary. Second, I determine the standard of scale by modal accessibility which indicates the requirements expressed by excessive degree modifiers.

2. *6.2* *Matzai* and the pragmatic enrichment operator

Following Chierchia's (2006) idea, I propose that *zai* (i) quantifies over a domain *D* of degrees, (ii) encodes the semantics of comparison between two values and (iii) alternatives of the domain *D* of degrees are exploited by a pragmatic enrichment operator that scopes over negation. The semantics of *zai* is illustrated in (63).

(63) $[\![\text{zai}_D]\!] = \lambda P_{\langle d\langle e\langle s,t\rangle\rangle\rangle}.\lambda d.\lambda x.\lambda w.\delta(d{\in}D \wedge D \infty P){\wedge}P(d)(x)(w){=}1 \wedge \forall u[u{<}w \rightarrow P(d)(x)(u){=}0]$

a. $u{<}w$: u is accessible from w

1. b. $D \infty P := \exists d[d{\in}dom(P) \wedge D{=}\{d'{\in}dom(P) \mid d'{\leq}d\}]$

As shown in (63), *zai* is a function which takes a gradable predicate *P* of type ⟨d⟨e⟨s,t⟩⟩⟩. *Zai* encodes modal accessibility that for all *u*, *u* is accessible to *w*, as indicated in (63a). In addition, presupposition about the domain of degrees that *zai* quantifies over is expressed as

$\delta(d \in D \wedge D \infty P)$, as stated in (63b). The presupposition says that *d* is in the domain *D* that restricts *zai*. *D* is a subset of the scale of a gradable predicate *P* whose domain extends from zero up to some degree. So, in the case that *d* and *d'* are within *D*, one has to be less than another, i.e. *d'* < *d'*. The values in *D* are in a monotonic relation. The delta operator δ is presupposition operator which introduces the presupposition that *d* is a degree of *D* of scale *P*. The presupposition $d \in D \wedge D \infty P$ is projected and therefore when negation is applied, it is unaffected.

As shown in (63), the comparison between two values denoted by the semantics of *zai* are: (i) the first conjunct $P(d)(x)(w)=1$ indicates the actual value of an entity or an associated event; (ii) the second conjunct $\forall u[u<w \rightarrow P(d)(x)(u)=0]$ denotes the value to be compared with, termed as comparative standard. A modal is contained, which determines the comparative standard with respect to context. In this sense, the standard contributed by *zai* is the maximal degree of *P* allowed for *x*. The second segment says that $P(d)(x)(u)$ is required to be false in some world *u* which is accessible to *w*. This is because *d* which exceeds the maximal degree of *P* that *x* is allowed to have. In short, *zai* denotes that an entity *x* has the degree *d* of *P* in *w* but the entity is required not to have the value of *d* of *P*.

Zai does not only denote the prejacent proposition, but it is also sensitive to the alternatives. By applying the ALT function to *zai*, the alternative propositions are derived, as shown in (64).

(64) $\text{ALT}([\![\text{zai}_D]\!]) = \{\lambda P_{\langle d\langle e\langle s,t\rangle\rangle\rangle}.\lambda d.\lambda x.\lambda w.\delta(d \in D' \wedge D' \infty P) \wedge P(d)(x)(w)=1 \wedge \forall u[u<w \rightarrow P(d)(x)(u)=0\ ] \mid D' \subset D\}$

Following Chierchia (2006, 2013), (64) indicates that there is a domain *D'* which is a proper subset of *D*. According to the presupposition in (64), *D'* and *D* are initial segments of the scale of *P* such that *D'* is not an arbitrary subset of *D*. This allows the entailment relation from *D'* to *D* in positive context, but *D* to *D'* in negative context.

I illustrate the idea of (63) and (64) with the *matzai*-sentence (65).

(65) Siuming *(m) gou matzai (Non-Quantity/Frequency scalar reading)
Siuming not tall MATZAI
'Siuming is not that tall.'

In the case of (65), the presupposition of domain $\delta(d \in D \wedge D \propto P)$ states that possible heights of *Siuming* are restricted in the domains quantified by *zai*. Within these domains, given the monotonic relation among the degrees of height, the possible heights have to be in partial order. That is, $d' \leq d'+d$, but not in reverse. For example, 5.5 feet $\leq$ 6 feet, but not 6 feet $\leq$ 5.5 feet.

Zai is sensitive to the alternative domains, which is indicated in (64) that the alternative function ALT is applied to *zai*. The domains quantified by *zai* are different from the one expressed in assertions. That is *D'*, instead of *D*. As mentioned, *D'* is a proper subset of *D*, and both domains start the measurement from zero or the same particular value of heights. In the case of (65), *Siuming*'s actual height is the maximal degree d of height in *D*; whereas the requirement provided by the context states that the maximal degree of height for *Siuming* is *d'* in *D'*. So, the comparisons are between the domain *D*, which is asserted, and the domain *D'*, which is the alternative domain.

The second part of the denotation is about the modal accessibility $\forall u[u<w \rightarrow P(d)(x)(u)=0]$ which states the requirement for *Siuming*'s height that for all worlds *u* which are accessible to the evaluation world *w*, *Siuming*'s height has to be greater than *d*.

When we apply negation, the scale of height is reversed. This negates the maximal degree *d* of height in the domain of *D*. That is, it negates the truth condition '*Siuming* is *d*-tall and he is required not to be *d*-tall'. The resulting meaning is that '*Siuming* is not *d*-tall and he is required to be *d*-tall'.

Another crucial factor for deriving the semantics of NPI *matzai* is the pragmatic enrichment operator. Building on Chierchia (2006), I propose M_C as the pragmatic operator which denotes the prejacent proposition and compares it with its alternatives. That is, M_C presupposes that *p* entails all of its alternatives. The definition of M_C in (66).

(66) $[\![M_C]\!] = \lambda p.\lambda w.p(w)=1 \wedge \delta(\forall q \in C[p|=q])$, where C=ALT

Under Chierchia's framework, scalar items activates alternatives which have enriched meaning. The NPI-use of *any* is employed as an example. *Any* widens the domain which is associated with the described DP, as illustrated in (67).

(67) I didn't see any_D boy. (Chierchia 2006: (53))

The NPI-use of *any* widens the domain of quantification, namely the DP *boy*. So, the union of subsets of boys is the domain *D* of boys. The pragmatic enrichment operator proposed is shown in (68).

(68) $E_C(p)= p \wedge \forall q \in C[p \subseteq Cq]]$, where C = ALT (Chierchia 2006: (50a))

At the first glance, these two pragmatic enrichment operators are of no difference. However, M_C encodes a presupposition operator, δ. Recalling that the NPI *any* expresses the widest domain *D* associated with the DP under discussion. Any domains which are smaller than *D* are entailed by *D*, they could be arbitrary domains.

However, this is not the case of *zai*. *Zai* denotes comparisons between two maximal degrees in two domains. The subset *D'* cannot be an arbitrary subdomain of *D*. The subdomain *D'* and the superset domain *D* have initial segments of the same scale. The only difference between them is the value of the maximal degree. Therefore, we need to stipulate the presupposition regarding the subset-superset relation between *D'* and *D*.

So far, I propose the semantics of *zai* and the pragmatic operator M_C. Let us take (69) for

illustrations.

(69) Siuming m gou matzai.
Siuming not tall MATZAI
'Siuming is not that tall.'

I propose the following lexical entries for (69). (70) shows the lexical entry for the adjective *gou* 'tall'. Similar to Mandarin Chinese, adjectives in Cantonese are unmodified and requires a *pos* morpheme to make them interpretable.

(70) $[\![\text{gou}]\!]=\lambda d.\lambda x.\lambda w.\text{height}_w(x) \geq d$

In (71), *mat* takes a gradable predicate and returns an entity with that predicate. In this case, *mat* functions as *pos* morpheme contained in unmodified adjectives (McNally and Kennedy, 2005). The are some differences between *pos* and *mat*.

(71) $[\![pos]\!]=\lambda G.\lambda x.\exists d[\text{standard}(d)(G)(C)\wedge G(d)(x)]$ (Kennedy and McNally 2005: (13))

As shown in (71), *pos* encodes the relation standard which holds the relation between a degree *d* which meets a standard of comparisons for an adjective *G* with respect to a comparison class determined by the context C. In the case of *mat*, the degree bound by the existential quantifier also meets some standard determined by the context, but such context is established by the modal base contributed by the meaning of *zai*. This is shown when *mat* and *zai* combines and return a degree which satisfies the contextual requirement. In this paper, I treat indeterminate pronouns as existential quantifiers:

(72) $[\![\text{mat}]\!]=\lambda P.\lambda x.\lambda w.\exists d[P(d)(x)(w)=1]$

Negation *m* 'not' is a truth functional negation. It simply reverses the truth of its argument.

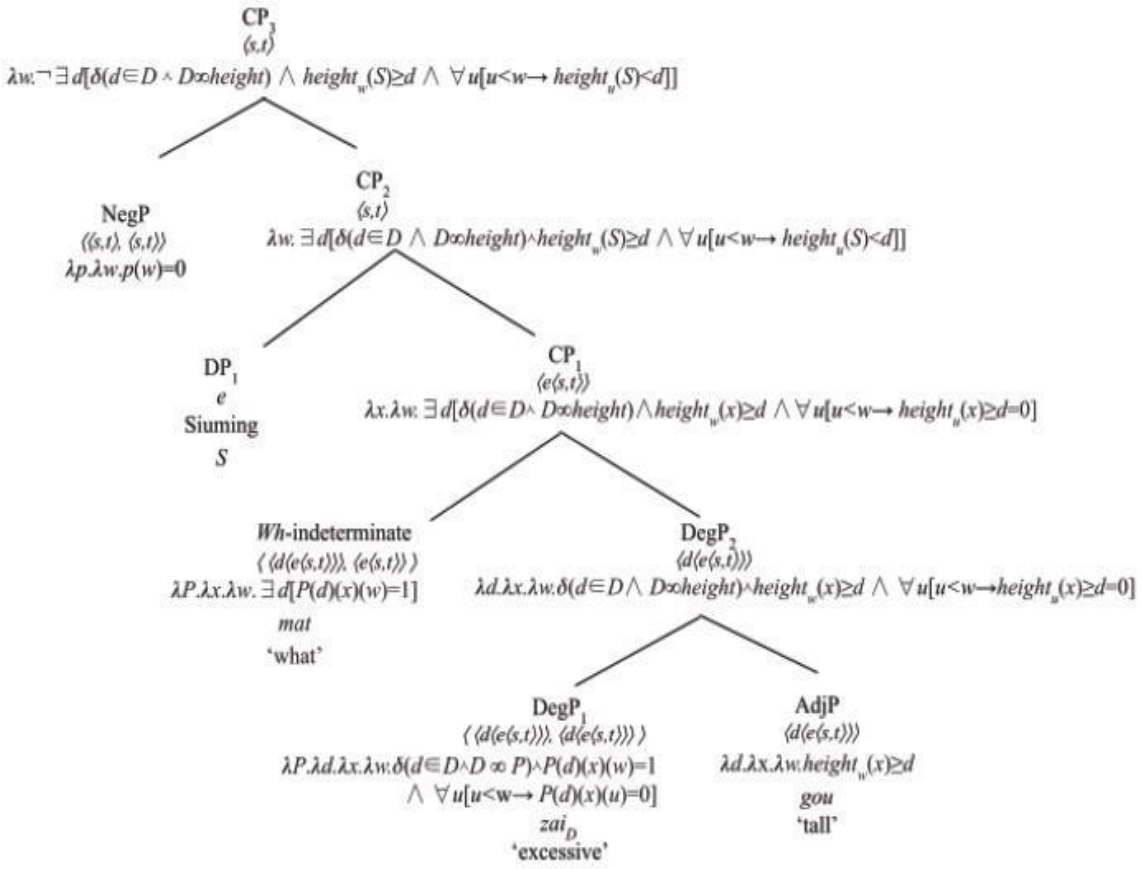
(73) $[\![\text{m}]\!]=\lambda p.\lambda w.p(w)=0$

We can start to build up the structure of the *matzai*-sentence (65), as shown in (74).

(74) M_C [m [Siuming [mat [zai[gou]]]]]

With the above ingredients, the meaning of (65) can be composed, with its LF in (75).

(75)



(76) $[\![\text{DegP}_2]\!]$
$=[\![\text{zai}_D]\!]\ ([\![\text{gou}]\!])$
$= [\lambda P{<}d{<}e,t{>}{>}.\lambda d.\lambda x.\lambda w.\delta(d{\in}D{\wedge}D \infty P){\wedge}P(d)(x)(w){=}1{\wedge}\forall u[u{<}w{\rightarrow}P(d)(x)(u){=}0\ ]\ ]$
$(\lambda d.\lambda x.\lambda w.\text{height}_w(x) \geq d)$
$=\lambda d.\lambda x.\lambda w.\delta(d{\in}D{\wedge}D{\infty}P){\wedge}\text{height}_w(x) \geq d{\wedge}\forall u[u{<}w{\rightarrow}\text{height}_u(x) \geq d{=}0\ ]$

(77) $[\![\text{CP}_1]\!]$
$= [\![\text{mat}]\!]\ ([\![\text{DegP}_2]\!])$
$= [\lambda P.\lambda x.\lambda w.\exists d[P(d)(x)(w){=}1]](\lambda d.\lambda x.\lambda w.\delta(d{\in}D{\wedge}D{\infty}P){\wedge}\text{height}_w(x) \geq d{\wedge}\forall u[u{<}w{\rightarrow}$
$\text{height}_u(x) \geq d{=}0])$
$= \lambda x.\lambda w.\exists d[\delta(d{\in}D{\wedge}D{\infty}P){\wedge}\text{height}_w(x) \geq d{\wedge}\forall u[u{<}w{\rightarrow}\text{height}_u(x) \geq d{=}0\ ]$

(78) $[\![\text{CP}_2]\!]$
$[\![\text{CP}_1]\!]\ ([\![\text{Siuming}]\!])$

$= \lambda w.\exists d[\delta(d \in D \wedge D \propto P) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) \geq d = 0$]
$= \lambda w.\exists d[\delta(d \in D \wedge D \propto P) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]]$

(79) $[\![CP_3]\!]$
$= [\![NegP]\!]\ ([\![CP_2]\!])$
$= \lambda w.\neg\exists d[\delta(d \in D \wedge D \propto P) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]]$

In (76), *zai* takes a gradable predicate *gou* 'tall' and returns a function which expresses a gradable predicate denoting the relation between degrees and an entity. This gradable predicate is taken as an argument when it combines with mat 'what', as in (77). The subject *Siuming* is combined as shown in (78). The resulting meaning is as follows: 'there is some degree which is presupposed to be in the domain of *D* and *D* is part of the scale on the predicate *gou*. *D* includes degrees which are from certain value to the degree *d*. Siuming has the height of *d* in *w* and for all *u* which are accessible to *w*, it is required that Siuming's height is less than *d*. To be brief, it means 'Siuming is *d*-tall and Siuming has to be less than *d*-tall.'

In (79), negation *m* reverses the truth condition of the proposition it applies to. The resulting meaning is 'there is not some degree that Siuming is *d*-tall and Siumig is required to be *d*-tall'. That means, 'Siuming is not that tall'.

6.2 Deriving the polarity sensitivity

When deriving polarity sensitivity of an NPI, it shows the important role of negation. As aforementioned, I propose a pragmatic operator, namely M_C, as in (66), repeated in (80).

(80) $[\![M_C]\!] = \lambda p.\lambda w.p(w) = 1 \wedge \delta(\forall q \in C[p|=q])$

Here I show the result when negation is absent.

(81) a. *Siuming gou matzai
b. $\exists d[\delta(d \in D \wedge D \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]]$
(Prejacent proposition)
c. $\{\exists d[\delta(d \in D' \wedge D' \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]] \mid D' \subset D\}$
(Alternative propositions)
d. $M_C(\exists d[\delta(d \in D \wedge D \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]])$

$= \lambda w.\exists d[\delta(d \in D \wedge D \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]] \wedge$
$\delta(\forall q \in C[(\lambda w.\exists d[\delta(d \in D \wedge D \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]]) \vDash q)$

(81a) and (81b) are the prejacent and alternative propositions of (81a). In (81d), the application of M_C presupposes the entailment relation between the prejacent and the alternatives. The meaning denoted in (81d) as follows: There is some *d* in *D* of tallness Siuming has and it is not allowed for Siuming to have *d*-tall, which entails that there is some *d'* in *D'* Siuming is *d'*-tall and it is not allowed for Siuming to have *d'*-tall, given $d' \in D'$, $d \in D$ and $d' < d$, and *D'* is a proper subset of *D*. However, this entailment relation is contradictory. Here is the reason: Suppose the prejacent denotes that 'Siuming is 6 feet tall and he is not allowed to be 6 feet tall'. With the presuppositions about *D'* and *D*, the alternative propositions have to denote degrees of tallness that is within *D'*. Let us say the maximum degree in *D'* is 5.5 feet tall. One of the alternative propositions denotes that 'Siuming is 5.5 feet tall and he is not allowed to be 5.5 feet tall'. If Siuming is 6 feet tall and he is not allowed to be that tall, it does not entail that Siuming is not allowed to be 5.5 feet. Following this sense, the entailment relation illustrated in (81d) does not go through. Let us look at the derivation when negation is present.

(82)

a. Siuming m gou matzai
b. $\neg\exists d[\delta(d \in D \wedge D \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]]$
(Prejacent proposition)
c. $\{\neg\exists d[\delta(d \in D' \wedge D' \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]] \mid D' \subset D\}$
(Alternative propositions)
d. $M_C(\neg\exists d[\delta(d \in D \wedge D \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]])$
$= \lambda w.\neg\exists d[\delta(d \in D \wedge D \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]] \wedge$
$\delta(\forall q \in C[(\lambda w.\neg\exists d[\delta(d \in D \wedge D \propto \text{height}) \wedge \text{height}_w(S) \geq d \wedge \forall u[u < w \rightarrow \text{height}_u(S) < d]]) \models q$

As shown in (82), the entailment relation between the prejacent and its alternatives passes. Let us say if Siuming is not 6 feet tall and he is not allowed to be less than 6 feet, it entails that

Siuming's height is not allowed to be less than 5.5 feet. There is no contradiction in this entailment relation.

7 Conclusion

This paper presents a novel compositional account for the semantics of Cantonese *wh*-NPI *matzai*. I propose that with the *wh*-indeterminate pronoun *mat* 'what' functioning as a positive morpheme in unmodified adjectives, *mat* takes a gradable predicate as an argument and returns a modified gradable predicate. *Zai*, which denotes 'excessiveness', expresses comparisons between two values: the actual value of an entity and its value required by the context with respect to some permissive modal component. In addition, I derive the polarity sensitive of *matzai* by proposing the pragmatic operator M_C, which accounts for its requirement of negation. M_C denotes the entailment relation between the prejacent and its alternative propositions. Without negation, the entailment causes contradictions. The entailment relation goes through only when negation is present. This shows the role of negation in strict NPI *matzai*.

There are issues remained unresolved in this paper. I only provide detailed compositional account for the case in which *matzai* occurs with adjectival predicates, I do not illustrate how the reading (I) Scalar, Quantity reading, as in (83), and (II) Scalar, Frequency reading, as in (84), are derived when the gradable argument is phonetically null.

(83) Koei mou siu matzai (Scalar, Quantity reading)
He not(-have) laugh MATZAI
'He did not laugh that much at all.' (Tang 2009: (8))

(84) Keoi m siu matzai (Scalar, Frequency reading)
He not laugh MATZAI
'He doesn't laugh much at all.' (Tang 2009: (8))

The type of negation used also affects the interpretations of *matzai*-constructions. A unified analysis for *matzai*-constructions is called for future research.

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