

國立交通大學

外國語文學系外國文學與語言學碩士班

碩士論文

漢語平比句式的句法語意研究

The Syntax and Semantics of Chinese Equatives



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摘要

本篇論文主要探討中文的“一樣”和“不一樣”的句法語意特質，並進一步探討三種比較句(由這兩個詞彙所核心構成(headed))的句法語意特性。這三種比較句分別為程度平比句(scalar (un-)equatives)、像似比較句(similarity comparatives)及相同比較句(identity comparatives)。首先，我們提供了許多證據，例如句法刪略(ellipsis)、問句助詞的語意範域(scope of question particle)及結構歧義性(structural ambiguity)等，證明中文的“(不)一樣”在句法分布上的確可以擔任程度副詞和形容詞(謂語)。再來，我們提出中文的“跟”以及“和”在比較句中做為介紹比較標準的比較標記(comparative marker)時，其詞性為介係詞。關於程度比較句，我們提出此類比較句是由程度副詞的“(不)一樣”所核心構成。程度副詞的“(不)一樣”在語意上會引介出程度序列關係(ordering relation)，從這個角度來說，程度副詞的“(不)一樣”在中文程度比較句中所擔任的句法及語意工作跟 more 在英文的程度比較句中所擔任的非常相似，除了詞彙本身所引介的程度序列關係不同。另外，我們提出中文的“(不)一樣”和英文中的 same 及 different 相同，均呈現了詞彙歧義性(lexical ambiguity)，英文的部份請參考 Alrenga (2007)。進一步說，“(不)一樣”在中文同時具有“像似語意(similarity reading)”以及“相同”語意(identity reading)。我們針對“(不)一樣”的歧義性，進行句法和語意上的研究。一方面，我們提出像似形容詞“一樣”可以帶一個控制結構的補語子句，然而像似形容詞“不一樣”卻不行。我們進一步提出，如果把“一樣”所帶的補語子句看作是像似比較句中的衡量詞組(measure phrase)，這個句法不對稱則可以歸因於“一樣”和“不一樣”引介的區間性質(interval nature)不同，而非單純詞彙表現的任意性(idiosyncrasy of lexicons)。另一方面，我們提出中文的像似比較句及相同比較句分別由“(不)一樣”的兩種詞項所核心構成。進一步說，我們認為“(不)一樣”不僅是這兩種比較句在語法語意上的核心成分，同時表現也像程度謂語一樣，決定了一個在相關量級(scale)上正向或負向的區間。這樣的分析也幫助我們見到了——那些具有比較語意的程度形容詞(comparative-like gradable adjectives)更深一層的本質。

The Syntax and Semantics of Chinese Equatives

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Abstract

This thesis explores both syntax and semantics of *yi yang* 'same', *buyi yang* 'different' and three types of comparative constructions (i.e. scalar (un-)equatives, similarity comparatives and identity comparatives) headed by them in Mandarin. In the first place, we present several pieces of evidence (e.g. ellipsis, the scope of question particle and structural ambiguity) for a necessary distinction between two different uses of *yi yang* and *buyi yang*, namely, degree adverbs and adjectival predicates. Secondly, we argue that the comparative marker *gen/ he*, which introduces the comparative standard, is prepositional in these three types of comparatives. This in turn suggests an adjunction analysis for the structural configuration of comparatives (e.g. Liu 1996, Kennedy 1999, Lin 2009). Regarding scalar (un-)equatives, we propose that they are both syntactically and semantically headed by degree adverbs *yi yang* and *buyi yang*. Seen in this way, *yi yang* and *buyi yang* resemble the English degree morpheme *more* in two respects. First, all of them are the head of comparatives. Second, all of them are degree morphemes introducing an ordering relation between individuals with respect to possessing some gradable property.

Turning to similarity comparatives, we first propose that *yi yang* and *buyi yang*, resembling their counterparts *same* and *different* in English, are lexically ambiguous between similarity and identity readings in Mandarin. Regarding the syntax of similarity predicates, we propose that *yi yang* (but not *buyi yang*) syntactically combines with a clause which is complement in nature, since the extraction of elements from it does not render island effects (i.e. CED effects in the sense of Huang 1982). Further, this complement clause functionally serves as a further specification of the dimension of similarity.

For another, by relating dimensions of similarity to degrees of similarity, we propose that the complement clause can be considered as measure phrases in similarity comparatives. Seen in this light, dubbed with Alrenga's (2007) insight that comparative adjectives such as *different* and *like* determine positive and negative

intervals of a scale (i.e. similarity), we suggest that the syntactic asymmetry between *yiyang* and *buyiyang* can not be attributed to the idiosyncrasy of lexicons; rather, it is better considered as a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyiyang*.

Concerning the semantics of similarity predicates, we argue against Alrenga's (2007) treatment of similarity *same* and *different* as a pair of total/partial adjectives; rather, we suggest that the two pairs of adjectives *same/ different* and *yiyang/ buyiyang* be better considered as the adjectives with totally closed scale (e.g. *full/ empty, open/ closed*), rather than the adjectives with partially closed scale (e.g. *dry/ wet, straight/ bent*) (see Rotstein & Winter 2004, Kennedy & McNally 2005). Finally, we present a syntax-semantics analysis of similarity *yiyang/ buyiyang* and similarity comparatives in Mandarin. In particular, we propose that similarity comparatives are both syntactically and semantically headed by similarity predicates *yiyang* and *buyiyang*.

As for identity comparatives, we point out two potential problems for Alrenga's (2007) semantic analysis of identity *same* and *different*. The first problem is an empirical one, concerning the combination of *same* and proportion modifiers such as *almost* and *completely*. The second one is theoretical in nature, concerning the postulation of an abstract measure phrase. Given these considerations, I propose a syntax-semantics analysis of identity *yiyang/ buyiyang* and identity comparatives in Mandarin. Specifically, following Alrenga's conception that individual identity itself constitutes as the dimension of comparison in identity comparatives, I propose that identity predicates *yiyang* and *buyiyang* not only syntactically and semantically head identity comparatives, but also determine positive and negative intervals of a scale (i.e. cardinality). Importantly, our analysis requires *yiyang* to return a positive interval on the relevant scale, and this move leaves room for how proportion adverbs semantically contribute to identity comparatives. Obviously, our analysis thus fares better than Alrenga's with respect to the empirical problem. However, with respect to the theoretical problem, our analysis suffers the same pain as Alrenga's does, since both analyses have to postulate an abstract measure phrase and the truth value of a comparative sentence relies on the combination of such degree morphemes.

Last but not the least, our analysis of similarity and identity comparatives sheds light on the nature of those comparative-like gradable adjectives such as *yiyang* and *buyiyang*. More specifically, *yiyang* and *buyiyang* not only serve as the head of comparatives (i.e. similarity and identity), but also resemble gradable adjectives in determining an interval on the relevant scale (i.e. similarity and cardinality).

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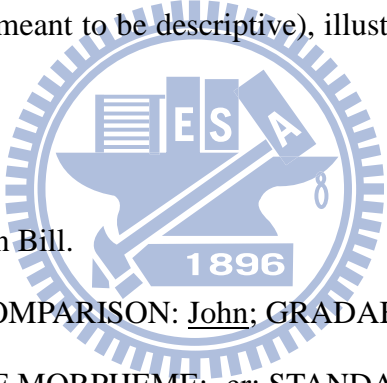
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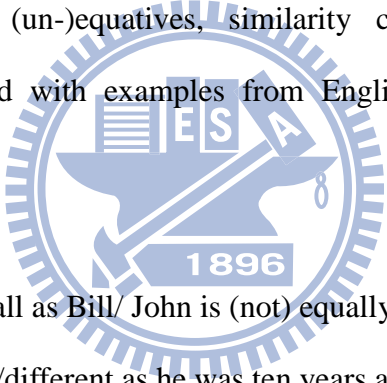
INTRODUCTION

All languages have syntactic categories that express grade concepts, and also have designed comparative constructions, which are used to express ordering between two objects with respect to the degree or amount to which they possess some property (Sapir 1944). Although comparative constructions syntactically vary quite a bit from language to language, comparatives may universally have the following semantic constituents (the labels are meant to be descriptive), illustrated with an example from English.

- 
- (1) a. John is taller than Bill.
b. TARGET OF COMPARISON: John; GRADABLE PREDICATE: tall;
COMPARATIVE MORPHEME: -er; STANDARD MARKER: than
STANDARD OF COMPARISON: Bill

Concerning the ordering relation conveyed by comparatives, (un-)equatives are the comparative constructions used to express an (in-)equality relation between individuals with respect to the degrees of possessing some gradable property (i.e., the one introduced by the gradable predicate). On the other hand, aside from the comparatives involving the ordering relation between individuals along some quantitative dimension (e.g., height, width, length), there exist some comparative constructions involving a comparison relation between individuals along both quantitative dimensions and qualitative dimensions (e.g., color, shape).

What are these comparative constructions? As pointed out by Alrenga (2007), they are similarity comparatives (see also Huddleston & Pullum 2002). Similarity comparatives are the comparatives used to express a similarity or dissimilarity relation between individuals. As suggested by Alrenga (2007: 3), a key insight into the interpretation of similarity comparatives is that these are concerned with the distances that separate individuals' locations along various dimensions of comparison (i.e., both quantitative and qualitative). In addition to the two types of comparatives (i.e., ordinary (scalar) comparatives and similarity comparatives) mentioned above, a third type of comparatives concerns the identity or non-identity relation between individuals. They are identity comparatives (see Heim 1985: 21, Beck 2000, Alrenga 2007: 5). Below, scalar (un-)equatives, similarity comparatives, and identity comparatives are illustrated with examples from English, in (2a), (2b) and (2c) respectively.

- 
- (2) a. John is (not) as tall as Bill/ John is (not) equally tall as Bill.
b. John is the same/different as he was ten years ago.
c. The presenters at this year are the same as/ different from the presenters at last year.

According to Alrenga (2007), example (2c) reveals a variation of truth conditions. Under its identity reading, (2c) asserts that the presenters at this year are similar to the presenters at last year in all relevant respects. Under its similarity reading, (2c) asserts that the set consisting of the presenters at this year is identical in its membership to the set consisting of the presenters at last year.

Additionally, as is well observed by Alrenga, in scalar comparatives, the dimension of comparison is introduced grammatically by a gradable adjective

occurring in construction with the comparative head (e.g., *tall-er*, *as tall*). In contrast, similarity comparative heads (e.g., *same*, *different*) do not combine with any dimension-introducing expressions. This suggests that the dimensions relevant to their interpretation must be provided to them in some other fashion. On the other hand, concerning the dimension of comparison in identity comparatives they seem to take individual identity to itself constitute an attribute with respect to which individuals may differ, so that the dimension of comparison relevant to the identity readings in (2c) simply is the dimension of individual identity.

Turning to Mandarin, interestingly, three types of comparatives in (2) all involved the morphological forms *yi*yang ‘same’ and *buyi*yang ‘different’. See the examples below.

(3) Scalar (Un-)Equatives

a. Zhangsan gen Lisi yiyang gao.

Zhangsan with Lisi same tall

‘Zhangsan is equally tall as Lisi.’

b. Zhangsan gen Lisi buyiyang gao.

Zhangsan with Lisi different tall

‘Zhangsan is not equally tall as Lisi.’

cf. Lit. Zhangsan is unequally tall than Lisi.

(4) Identity comparatives and Similarity comparatives

a. Zhangsan de zhidaojiaoshou gen Lisi de zhidaojiaoshou yiyang ma?

Zhangsan POSS adviser with Lisi POSS adviser same Q

‘Are Zhangsan’s adviser and Lisi’s adviser the same one?’

‘Is Zhangsan’s adviser the same as Lisi’s adviser with respect to some

contextually salient properties?’

b. Zhangsan de zhidaojiaoshou gen Lisi de zhidaojiaoshou buyiyang

Zhangsan POSS adviser with Lisi POSS adviser different

‘Zhangsan’s adviser and Lisi’s adviser are different ones.’

‘Zhangsan’s adviser is different from Lisi’s adviser with respect to some contextually salient properties.’

Note that both examples (4a-b) are ambiguous between similarity and identity readings. A more interesting fact is the example (5) below reveals a variation in truth-conditions as well.

(5) Zhangsan gen Lisi yiyang xihuan Mali.

Zhangsan with Lisi same like Mary

Reading A: ‘Zhangsan is the same as Lisi in that they both like Mary.’

Reading B: ‘The degree to which Zhangsan likes Mary is the same as the degree to which Lisi likes Mary.’

Given these intriguing facts, I intend that (un-)equatives, similarity comparatives, and identity comparatives in Mandarin call for both syntactic and semantic analysis. In this thesis, following the terminology of Alrenga (2007), I use the term “identity comparatives” to refer to comparative constructions headed by *yiyang* and *buyiyang* when these adjectives receive identity interpretations. On the other hand, I use the term “similarity comparatives” to refer to comparative constructions headed by *yiyang* and *buyiyang* when these adjectives receive similarity interpretations. Finally, I will use the term “Chinese Equatives” (henceforth CE) to refer to the three types of comparatives, namely, scalar (un-)equatives, similarity comparatives, and identity

comparatives in Mandarin.

This thesis is organized as follows. Chapter 2 gives a brief introduction about previous analyses on CEs, and some common views on gradable adjectives and comparatives in the formal literature. Chapter 3 presents a detailed discussion on three issues. One concerns the argument that both *yiyang* and *buyiyang* involve two uses, namely degree adverbials and adjectival predicates. Specifically, I provide several pieces of evidence (e.g., ellipsis, the scope of question particle and structural ambiguity) for a necessary distinction between these two different uses. Another concerns the syntax of similarity predicate *yiyang* and its clausal complement. In particular, I suggest that similarity predicate *yiyang* syntactically combines with a clause which is complemental in nature, since the extraction of elements from it does not render island effects (i.e., CED effects in the sense of Huang 1982). Further, this complement clause functionally serves as a further specification of the dimension of similarity. On the other hand, it is observed that the adjectival predicate *buyiyang* can not combine with such a complement clause. Thus, a syntactic asymmetry exists between *yiyang* and *buyiyang*. The final issue concerns the syntax-semantics of scalar (un-)equatives. Precisely, I show that they are both syntactically and semantically headed by degree adverbs *yiyang* and *buyiyang*. Chapter 4 consists of three themes. First, I show that *yiyang* and *buyiyang*, resembling their counterparts *same* and *different* in English, are lexically ambiguous (between similarity and identity readings) in Mandarin. Second, the syntactic asymmetry between *yiyang* and *buyiyang* can not be attributed to the idiosyncrasy of lexicons; rather, it is better considered as a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyiyang*. Third, I provide a syntax-semantics analysis for similarity *yiyang/buyiyang* and similarity comparatives in Mandarin. Chapter 5 is dedicated to identity readings of *yiyang* and *buyiyang*. In particular, I offer a syntax-semantics analysis for identity

iyang/ buyiang and identity comparatives in Mandarin. Chapter 6 is the conclusion of this thesis.



2.1 Previous Analyses of Chinese Equatives

Chao (1968: 342) points out equatives *X gen Y yiyang Adj* in Mandarin have two different structural interpretations, depending on the categorial status of *gen/he*. If *gen/he* is a preposition, then the interpretation would be ‘X is equally Adj with Y’; in contrast, if *gen/he* is a coordinator, the interpretation would be ‘X and Y are equally Adj’. In addition, he also points out that the negation counterpart of the first structure is *X bu gen Y yiyang Adj* ‘X is not equally Adj with Y’, and that of the second one *X gen Y buyiyang Adj* ‘X and Y are not equally Adj’.¹ Seen in this way, there are two important issues here, one concerns the categorial status of comparative marker (i.e., standard marker), since it would result in different interpretations. The other concerns the syntactic category of *yiyang* ‘same’. It seems to Chao that *yiyang* is an adverbial element in equatives. Li and Thompson (1981: chapter 19) make this point more explicitly. They suggest a generalized schema for all comparative constructions in

¹ Chao (1968) does not touch the issue whether *bu* ‘not’ is a lexical negation or a sentential negation in *buyiyang* ‘different’. Morphologically speaking, *bu* may be a prefix or a free morpheme. However, in this paper, it is shown that *buyiyang* demonstrates some idiosyncratic lexical properties distinct from *yiyang* ‘same’. For example, *buyiyang* receives different patterns of degree modification, and *buyiyang* (crucially but not *yiyang*) can occur in *bi*-comparatives.

Regarding the latter contrast, as suggested in Liu (2010a:17), the gradable adjective with lexical negation (but not the gradable adjective with sentential negation) are permitted to occur in *bi*-comparatives, as shown in (i).

- (i) a. *Zhangsan bi Lisi (geng) bu gao
Zhangsan BI Lisi even more not tall
b. Zhangsan bi Lisi (geng) bu-shufu.
Zhangsan BI Lisi even more uncomfortable

In brief, there is a good amount of supporting evidence for us to make the assumption that *bu* ‘not’ is a lexical negation in *buyiyang* ‘different’, though I do not formally argue for this point in this paper.

Mandarin:

(6) X comparison word Y (adverb) dimension

In this schema, it is evident that *iyang* and *buyiyang* are considered as adverbial elements in CEs, under the view of Li and Thompson. On the other hand, Lü (1980: 609) and Liu et al. (2001: 833) observe that the elements following *iyang* could be verbs or adjectives (i.e., either semantically gradable or non-gradable). In addition, Zhu (1982: 177) and Liu et al. (2001) also observe that *iyang* can serve as a predicate, when no elements follow it in the sentence.

However, a common problem for all previous analyses on CEs is that they are descriptive. They do not pay much attention to the syntax-semantics of gradable predicates and comparatives. Furthermore, regarding the contrasts among (3)-(5), none of the previous analyses can accommodate them. Despite these problems, these previous analyses have offered some important observations. First, *iyang* can be employed either as an adverbial element or a predicate in Mandarin. Secondly, the categorial status of *gen/he* seems to determine the different interpretations of comparatives.

Based on these two basic observations, I explore the syntax and semantics of Chinese Equatives in this thesis. The main themes of this thesis are demonstrated as follows: (a) I argue that *iyang* ‘same’ and *buyiyang* ‘different’ both can be used either as degree adverbs or adjectival predicates. Being degree adverbs, *iyang* and *buyiyang* semantically establish an ordering relation (i.e., equality and inequality) between individuals/ objects with respect to some gradable property (the one introduced by the gradable predicate). In that case, *iyang/ buyiyang* headed the (un-)equatives in Mandarin. (b) I argue that, resembling *same* and *different* in English, *iyang* and

buyiyang are lexically ambiguous in Mandarin as well. More precisely, they are ambiguous between similarity and identity readings. In these cases, *yiyang* and *buyiyang* both headed the similarity and identity comparatives in Mandarin. (c) I argue that *yiyang* (but not *buyiyang*) is syntactically permitted to take a complement clause, which functions as a specification of the dimension of similarity. Further, this syntactic asymmetry between *yiyang* and *buyiyang* can be regarded as a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyiyang*. (d) Regarding the categorial status of *gen/he*, it is argued that *gen/he* is prepositional in nature, when it functions as a comparative marker introducing the comparative standard in the sentence. Otherwise, it may be a coordinator. In that case, the whole coordination complex semantically serves as the target of comparison, while the standard of comparison may be recovered from the context. (e) I will propose a syntax-semantics analysis for Chinese Equatives in detail.

In the following two sections (section 2.2 and 2.3), I briefly review some standard assumptions on the semantics of gradable predicates and comparatives in the formal literature. Finally, in section 2.4 I demonstrate some basic facts about CEs.

2.2 The Semantics of the Positive Form of Adjectives and Implicit Comparison

In the formal semantics literature, it is widely assumed that gradable predicates do not themselves denote properties of individuals; rather, they map objects onto abstract representations of measure (i.e., scales) formalized as sets of values (i.e., degrees) ordered along some dimension (e.g., height, length, width) (see e.g., Cresswell 1977, von Stechow 1984, Heim 1985, Kennedy 1999, Graff 2000, Barker 2002, Kennedy & McNally 2005, Kennedy 2007a and Kennedy 2007b). In such a degree analysis of gradable predicates (in contrast to “the vague predicate analysis”),

a gradable adjective *expensive* is given a denotation like (7), where *tall* represents a measure function that takes an individual and returns its value, a degree on the scale associated with the adjective, so that $\text{tall}(x)$ represents x ' height².

$$(7) \llbracket \text{tall} \rrbracket = \lambda d \lambda x. \text{tall}(x) \geq d$$

Pursuant to Graff (2000), Barker (2002), Kennedy & McNally (2005) and Kennedy (2007a), most gradable predicates have contextually dependent interpretation in the positive form (with a few exceptions). In addition, the positive form of a gradable adjective lacks overt morphology, in contrast to its comparative form (i.e., *more expensive* and *wider*).

(8) a. This elephant is small.

b. This ant is big.



(8a) could be judged true if asserted as part of a discussion about the size of elephants, but false in a discussion about the size of an ant versus an elephant. Likewise, (8b) could be judged true if asserted as part of a discussion about the size of ants, but false in a discussion about the size of an ant versus an elephant. One possible explanation

² In fact, the denotation given in (7) is the relational analysis; under such a view gradable predicates are analyzed as relations between individuals and degrees. On the other hand, some authors noted above treat gradable adjectives as functions from individuals to degrees (e.g., Kennedy 1999), as shown in (i).

$$(i) \llbracket \text{tall} \rrbracket = \lambda x. \text{tall}(x)$$

As pointed out in Kennedy (2005b:10), the crucial differences between the relational analysis and measure function analysis boil down to the following: “In the former, gradable adjectives introduce degree arguments which must be saturated to generate a property of individuals; while in the latter, gradable adjectives must combine with some other expression (possibly something that introduces a relation and a degree) in order to generate a property of individuals.”

In this thesis, I basically take the relational analysis, though shifting to the measure function analysis for the convenience of demonstrations on some occasion.

for this variability, as Kennedy (2005a, 2007a) and Kennedy & McNally (2005) argues, is to assume a degree morpheme *pos* (i.e., a covert positive morpheme) with a denotation in (9), where *s* is a context-sensitive function from measure function to degrees: it returns a contextually significant degree (i.e., the standard of comparison) of the gradable property measured by the adjective *g*.

$$(9) \llbracket [\text{Deg } \textit{pos}] \rrbracket = \lambda g \lambda x. g(x) \geq s(g)$$

In other words, the positive form of adjectives is evaluated with respect to the context-sensitive function denoted by the covert positive morpheme: a DELINEATION FUNCTION (in the terminology of Kennedy) which maps a measure function to a degree that represents the standard of comparison based on the context of utterance. Furthermore, as pointed out in Graff (2000) and Kennedy (2005a), one fundamental semantic property of the positive form of a gradable adjective is that it is vague, and this vagueness leads to borderline cases: the cases in which it is not clear whether the predicate holds for the object or not (i.e., crisp judgment).

Most importantly, Kennedy (2005a) uses this semantic characteristic of the positive form to divide **comparison** in natural languages into two different modes, namely, **explicit comparison** and **implicit comparison**. Crucially, it is the latter that involves borderline cases (i.e., the cases leading to crisp judgment) but not the former. The definitions of explicit and implicit comparison is illustrated in (10), and the relevant examples are demonstrated in (11) and (12) respectively (see also Kennedy, 2007a and 2007b).

(10) a. Implicit comparison

Establish an ordering relation between object *x* and *y* with respect to

gradable property g using the positive form by manipulating the context in such a way that the positive form true of x and false of y .

b. Explicit comparison

Establish an ordering relation between objects x and y with respect to gradable property g using special morphology (e.g., *more/-er*, *less*, or *as*) whose conventional meaning has the consequence that the degree to which x is g exceeds the degree to which y is g .

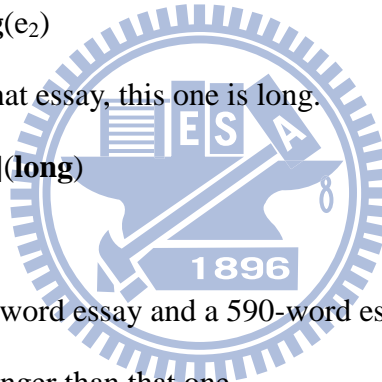
(11) Context 1: A 600-word essay and a 200-word essay (Kennedy 2005a:11)

a. This essay is longer than that one.

long(e_1) > **long**(e_2)

b. Compared to that essay, this one is long.

long(e_1) > $s[e_2]$ (**long**)



(12) Context 2: A 600-word essay and a 590-word essay

a. This essay is longer than that one.

long(e_1) > **long**(e_2)

b. ??Compared to that essay, this one is long.

long(e_1) > $s[e_2]$ (**long**)

Explicit comparison in (12a) simply requires an asymmetric ordering relation between the degrees to which two objects possess the relevant property (i.e., the length of essay), the crisp judgments thus are not problematic.

However, implicit comparison in (12b) requires the first novel to have a degree of length that is significant relative to the region of the length scale whose lower bound is the length of the second essay. In other words, the differences between the

two degree values of length (i.e., the differences between the length of 600 words and the length of 200 words), as shown in Context 1, must be **significantly greater than** some contextually determined threshold specifying the degrees of length of that essay. Before leaving this section, I want to mention another common view on the meaning of comparative constructions in many recent analyses: the definite description of degrees (e.g., von Stechow 1984, Heim 1985, Kennedy 1999, Kennedy 2005a and Kennedy 2007b). The basic idea behind the view of definite description of degrees is that it presupposes an *exactly*-reading for the degree variable. That is, “Mary is *d*-tall” abbreviates that Mary has exactly the degree *d* on the tallness scale. In an *at least*-reading for the degree variable the uniqueness presuppositions would not be satisfied.

- 
- (13) a. Mary is taller than Bill (is).
 b. [the *d*: Mary is *d*-tall] > [the *d'*: Bill is *d'*-tall]

In order to derive definite descriptions of degrees, a maximality operator is introduced as an essential component of meaning of comparatives in many recent analyses.

- (14) a. Mary is taller than Bill (is).
 b. **max** [*d*: Mary is *d*-tall] > **max** [*d'*: Bill is *d'*-tall]

To be brief, in this paper, following some common views on gradable predicates in the formal semantics literature, I adopt a degree analysis of gradable predicates (i.e., specifically, a relational analysis). Furthermore, I assume a maximality operator as a basic component in an analysis of meaning of comparatives. In the next section, I briefly discuss the positive morpheme and the adjectival structure in Mandarin, by

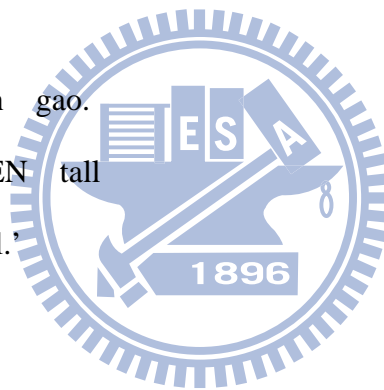
reviewing the work of Liu (2010a).

2.3 The Positive Morpheme in Mandarin and the Adjectival

Structure

As shown in the previous discussion, the positive morpheme is covert (i.e., without overt morphology) in a language such as English. Interestingly, different languages may vary in this regard. For example, as demonstrated in Sybesma (1999), the positive form of gradable adjectives in Mandarin is morphologically marked by the morpheme *hen*. *Hen* is sometimes glossed as very, but it also has a neutral interpretation that marks the positive form (see Sybesma 1999: 27 for discussion).

- (15) a. Zhangsan *hen* gao.
Zhangsan HEN tall
'Zhangsan is tall.'
- b. Zhangsan gao.
Zhangsan tall
'Zhangsan is taller (than X).'



Additional support for *hen* as an overt positive morpheme in Mandarin comes from the extensive study of Liu (2010a) on the occurring environment of the positive form of gradable predicates in Mandarin. Two important points are concluded in Liu (2010a). The first one is that the positive morpheme in Mandarin has two allomorphs: a covert one and an overt one (i.e., the degree word *hen*). Pursuant to Liu (2010a), the former, behaving like a polarity item, only occurs in a predicate-accessible domain with a structure where the head X^0 carries the predicate-accessible operator_[-wh] feature. In Liu's term, the head X^0 not only introduces a predicate-accessible operator_[-wh] but

also licenses the occurrence of a degree phrase headed by the covert positive morpheme (i.e., Deg⁰). In contrast, the latter (i.e., the degree word *hen*) occurs in contexts elsewhere. Without running into the theoretical complexities of covert positive morpheme in Mandarin, I simply demonstrate the empirical contexts where the covert positive morpheme occurs in (16) ~ (21).

(16) The *bu* negation sentence

a. Zhangsan bu gao.

Zhangsan not tall

‘Zhangsan is not tall, and the possibility of Zhangsan’s being short is not excluded.’

(17) The contrastive focus construction

a. Zhangsan gao, Lisi bu gao.

Zhangsan tall Lisi not tall

‘Zhangsan is tall, but Lisi is not tall.’

b. Zhangsan gao, Lisi ai.

Zhangsan tall Lisi short

‘Zhangsan is tall, but Lisi is short.’

(18) The *ma* particle question

a. Zhe duo hua hong ma?

This CL flower red SFP

‘Is this flower red?’

(19) The conditional

a. Zhangsan yaoshi gao dehua, Lisi jiu bu ai.

Zhangsan if tall PAR Lisi then not short

‘If zhangsan is tall, then Lisi is not short.’

(20) The epistemic adjectival small clause

a. Zhangsan xiao [EA-SC ni sha].

Zhangsan deride you silly

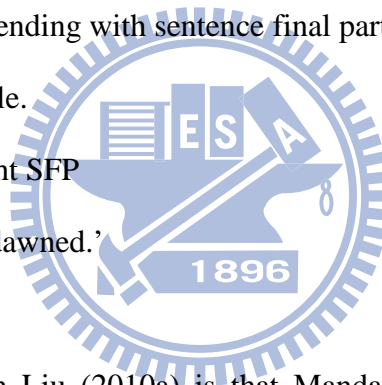
‘Zhangsan derided you as being silly.’

(21) The construction ending with sentence final particle *le*

a. Tian hei/ liang le.

Sky black/bright SFP

‘It got dark/It dawned.’



Another conclusion in Liu (2010a) is that Mandarin has a simpler adjectival structure than English. More specifically, English has a QP between the lower adjectival phrase and its functional degree projection (see Bresnan 1973, Corver 1997 and Neeleman et al. 2004 for discussions). In contrast, Mandarin simply has an adjectival structure introduced by a functional degree projection headed by the positive morpheme without having a QP in-between (see Liu 2010a: 44). Example (22) illustrates this point.

(22) a. Adjectival phrase in English: [DegP [Deg [QP[Q [AP [A]]]]]]

b. Adjectival phrase in Mandarin: [DegP [Deg [AP [A]]]]]]

In short, in this paper, following Sybesma (1999) and Liu (2010a), I assume that the degree word *hen* is the overt positive morpheme in Mandarin. I further assume that Mandarin has a simpler adjectival structure than English; in particular, an adjectival phrase does not contain a QP in Mandarin.

2.4 Basic Facts about Chinese Equatives

In the previous sections, I have introduced some common views concerning gradable adjectives and comparatives in the literature, which I assumed in this paper. In the following I will first review two semantic parameters concerning comparative construction (proposed in Huddleston & Pullum 2002), and I will indicate some interesting facts when we consider the Mandarin data with the two semantic parameters.

Huddleston & Pullum (2002: 1099) consider that there are two semantic parameters concerning comparative constructions, namely, (a) whether comparisons are concerned with relative position on some scale, such as that denoted by gradable adjective *old* or not; and (b) whether comparisons are concerned with equality relation or not. As shown in (23), two semantic dimensions of contrast yield the four types of comparative construction.

(23) Four types of comparative construction

| | EQUALITY | INEQUALITY |
|------------|--|---|
| SCALAR | Kim is <u>as old as</u> Pat. | Kim is <u>older than</u> pat. |
| NON-SCALAR | I took <u>the same bus as</u> last time. | I took a <u>different bus from</u> last time. |

Note that the non-scalar comparison, in Huddleston & Pullum (2002), includes both identity vs. non-identity and likeness vs. unlikeness (i.e., similarity). For another,

when we consider the Mandarin data with two semantic dimensions indicated above, an interesting fact emerges: In Mandarin, comparisons concerned with equality relation (i.e., including both scalar and non-scalar) may all involve *yi*yang ‘same’; and comparisons concerned with inequality relation (i.e., including both scalar and non-scalar) may all involve *buyi*yang ‘different’. Examples (24)-(26) illustrate this point.

(24) Comparison of **Degrees**

a. Zhangsan gen Lisi yiyang gao.

Zhangsan with Lisi same tall

‘Zhangsan is exactly as tall as Lisi.’

cf. ‘Zhangsan is equally tall as Lisi.’

b. Zhangsan gen Lisi buyiyang gao.

Zhangsan with Lisi different tall

‘Zhangsan is not exactly as tall as Lisi.’

cf. Lit. Zhangsan is unequally tall than Lisi.

(25) Comparison of **Identity** and comparison of **Similarity** (properties)

a. Zhangsan de zhidaojiaoshou gen Lisi de zhidaojiaoshou yiyang ma?

Zhangsan POSS adviser with Lisi POSS adviser same Q

‘Are Zhangsan’s adviser and Lisi’s adviser the same one?’

‘Is Zhangsan’s adviser the same as Lisi’s adviser with respect to some contextually salient properties?’

b. Zhangsan de zhidaojiaoshou gen Lisi de zhidaojiaoshou buyiyang

Zhangsan POSS adviser with Lisi POSS adviser different

‘Zhangsan’s adviser and Lisi’s adviser are different ones.’

‘Zhangsan’s adviser is different from Lisi’s adviser with respect to some contextually salient properties.’

(26) Comparison of **Similarity** (properties)

a. Ta de daan gen wo de daan youdian/ jihu/ chabuduo/

His answer with my answer slightly almost/ nearly/

wanquan yiyang.

completely same

‘His answer is slightly/almost/nearly/completely the same as mine.’

b. Ta de daan gen wo de daan youdian/ xiangdang/ hen/ jihu/

His answer with my answer slightly/ quite/ very/ almost/

wanquan buyiyang.

completely different

‘His answer is slightly/quite/very/almost/completely different from mine.’

For one thing, in (24a-b), it seems that *yiyang* and *buyiyang* in Mandarin serve as degree adverbs (i.e., which saturates the degree argument of a gradable adjective). For another, (25a-b) is truth-conditionally ambiguous between the so-called **token-identity** reading and **type-identity** reading in the literature. Last, *yiyang* and *buyiyang* in (26a-b) act like gradable predicates in the sense that they receive degree modifications. In addition to the interesting properties indicated above, consider the semantic contrast in (27a-b) below:

(27) a. Zhangsan gen Lisi yiyang gao.

Zhangsan with Lisi same tall

‘Zhangsan is exactly as tall as Lisi.’

cf. ‘Zhangsan is equally tall as Lisi.’

b. Zhangsan gen Lisi yiyang hen gao.

Zhangsan with Lisi same very tall

‘Zhangsan is the same as Lisi in that they both are (very) tall.’

The truth condition of (27b) requires that the height of *Zhangsan* and *Lisi* must exceed some contextually determined standard of tallness (i.e., they both must be tall and they are not necessarily of the same height), while that of (27a) does not. In other words, *Zhangsan* and *Lisi* in (27a) could both be short or tall as long as they are of the same height. On the other hand, it appears that *yiyang* is followed by an embedded clause in (28a-b). Note that temporal adverbials and evaluative adverbials are normally assumed to be IP-level and CP-level, respectively.

(28) a. Zhangsan gen Lisi yiyang **mingtian** hui qu taibei.

Zhangsan with Lisi same tomorrow will go Taipei

‘Zhangsan is the same as Lisi in that they both will go to Taipei tomorrow.’

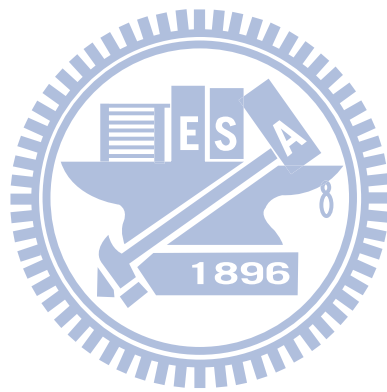
b. Zhangsan gen Lisi yiyang **hen xingyundi** zhong le letou.

Zhangsan with Lisi same very luckily win ASP lottery

‘Zhangsan is the same as Lisi in that they both luckily win the lottery.’

Given all contrasts demonstrated above, several questions are immediately raised: (a) is it possible to propose a unified account for all contrasts illustrated above? (b) If not, how many *yiyang* and *buyiyang* are necessary to be semantically and syntactically distinguished in Mandarin? (c) What are the semantic contributions of *yiyang* and *buyiyang* to the truth condition of a sentence in Mandarin? (d) What are the syntactic structures of scalar (un-)equatives, (non-)identity comparatives and

(dis-)similarity comparatives in Mandarin? In this thesis I will answer these questions in order.



SCALAR (UN-)EQUATIVES IN MANDARIN

In this chapter, from section 3.1 to 3.3 I first present several pieces of supporting evidence for the argument that *yi yang* in Mandarin potentially can occupy two different syntactic positions, specifically, a degree adverb and a predicate position. Then, in section 3.4, I explore the syntax of predicate *yi yang*, and examine the syntactic nature of comparative marker *gen/he*. Finally, in section 3.5 and 3.6, I return to the data about scalar (un-)equatives, and propose a syntax-semantics analysis for them.

3.1 Truth Condition

The first piece of evidence comes from the variation of truth conditions with respect to the two different syntactic positions of *yi yang*. As pointed out in section 2.4, sentences (27a-b) are truth-conditionally different, here repeated as (29a) and (30a). The logical representations and truth conditions of (29a) and (30a) are shown in (29b-c) and (30b-c), respectively (Note that *c* stands for some contextually determined standard of tallness).³

(29) a. Zhangsan gen Lisi yi yang gao.

Zhangsan with Lisi same tall

‘Zhangsan is exactly as tall as Lisi.’

³ Notice that the descriptive version (30b) here does not involve the semantics of *yi yang* “same”. As it will become clear, (30a) actually involves a comparison of similarity. The formal version will be provided in chapter 4.

cf. 'Zhangsan is equally tall as Lisi.'

b. $\max [d: \text{Zhangsan is } d\text{-tall}] = \max [d': \text{Lisi is } d'\text{-tall}]$

c. The degree d such that Zhangsan is d -tall **equals** the degree d' such that Lisi is d' -tall.

(30) a. Zhangsan gen Lisi yiyang hen gao.

Zhangsan with Lisi same very tall

'Zhangsan is the same as Lisi in that they both are (very) tall.'

b. $[\text{gao}(\text{Zhangsan}) \geq c \wedge \text{gao}(\text{Lisi}) \geq c]$

c. The degree d such that Zhangsan is d -tall exceeds the contextual standard of tallness and the degree d' such that Lisi is d' -tall exceeds the contextual standard of tallness.

Descriptively speaking, *yiyang* in (29a) introduces an equality relation between individuals in terms of degrees (i.e., the sameness of degrees of tallness), while in (30a) in terms of properties (i.e., the sameness of property of being (very) tall). To put it differently, it would be not unreasonable for us to propose that *yiyang* could potentially occupy two different syntactic positions since (29a) and (30a) are truth-conditionally different. This in turn suggests that (29a) and (30a) should be considered as two different comparative constructions in Mandarin.

3.2 The Deictic Reading

The second piece of evidence stems from the deictic reading of *same* in English. Carlson (1987: 532) points out that there are two readings concerning the use of *same* in English. One is deictic reading. Under such reading, the comparative standard is identified in the previous context. The other is the interpretation of an internal reading,

which requires the comparative standard be identified within the sentence (i.e., without referring to the previous context). The two readings are illustrated in (31c-d) respectively (see also Dowty 1985, Moltmann 1992, Lasersohn 2000, Beck 2000 and Barker 2007 for discussions).

- (31) a. Mary read The Old Man and The Sea.
 b. John and Bill read the same book. (Ambiguous between two readings)
 c. John and Bill both read The Old Man and The Sea. (The deictic reading)
 d. John read the book that Bill read. (The sentence internal reading)

Interestingly, the deictic reading of *yiyang* in Mandarin yields two different syntactic patterns, which is completely unexpected under the view that *yiyang* is located in exactly one syntactic position.

- (32) a. Zhangsan gao yi bai wushi gongfen, Lisi ye yiyang gao.⁴

⁴ Under the unified account, one may argue that the underlying structure of (32a) is indeed (i), which undergoes PF-deletion of the measure phrase *yi bai wushi gongfen* ‘one hundred and fifty centimeters’, so that *yiyang* has the same syntactic status (i.e., a predicate) as in (32b).

- (i) Zhangsan gao yi bai wushi gongfen, Lisi ye yiyang gao [~~yi bai wushi gongfen~~].

However, there are both theoretical and empirical problems for this analysis. Theoretically speaking, such a PF-deletion analysis would predict that the degree argument of an adjective such as *gao* can be saturated simply at LF (i.e., without PF-realization of the degree argument), contrary to the fact, as shown in the empirical data (ii). Alternatively, one may still argue that (i) involves a covert positive morpheme, which saturates the degree argument. However, if that is the case, it would lead to *semantic anomaly*, since the sentence *Zhangsan gao yi bai wushi gongfen* ‘Zhangsan is one hundred and fifty centimeters tall’ does not entail that *Zhangsan* is tall, and one hundred and fifty centimeters does not constitute as the contextual standard of tallness (i.e., the standard for being tall) in normal situations. This semantic anomaly is demonstrated in (iii). In short, (i) can not be justified as the underlying structure for (32a).

- (ii) *Zhangsan gao yi bai wushi gongfen, Lisi ye gao [~~yi bai wushi gongfen~~].

Zhangsan tall one hundred fifty centimeter, Lisi also same tall
'Zhangsan is one hundred and fifty centimeters tall, Lisi is equally tall.'

b. Zhangsan gao yi bai wushi gongfen, Lisi ye yiyang

Zhangsan tall one hundred fifty centimeter, Lisi also same

(gao yi bai wushi gongfen).

tall one hundred fifty centimeter

'Zhangsan is one hundred and fifty centimeters tall; Lisi is the same as
Zhangsan, too.'

Crucially, the deictic reading of *yiyang* in (32a) refers to the contextually salient degree to which *Zhangsan* is tall, namely, the measure phrase *yi bai wushi gongfen* "one hundred and fifty centimeters". On the other hand, however, the deictic reading of *yiyang* in (32b) presupposes an individual holding the contextually salient property, namely, being one hundred and fifty centimeters tall. The basic idea here is that the deictic reading of *yiyang* revealing two different patterns is actually predicted under a non-unified account. Imaginably, a unified account has to make some stipulations in order to explain why this is so.

3.3 The Structural Ambiguity of *Yiyang*

The final piece of evidence comes from the case of structural ambiguity. Recall that it is argued that *yiyang* potentially can occupy two different syntactic positions (either degree adverbs or adjectival predicates) in Mandarin. Since a degree adverb is normally incompatible with a non-gradable predicate, it is expected that the

(iii) ??Zhangsan gao yi bai wushi gongfen, Lisi ye yiyang gao [~~yi bai wushi gongfen~~]. .

Intended meaning: Zhangsan is one hundred and fifty centimeters tall; Lisi is the same as Zhangsan in that he is (very) tall, too.

modification of the degree adverb *yi yang* to a non-gradable predicate would lead to semantic anomaly. Example (33) verifies this expectation.

(33) Zhangsan gen Lisi yiyang you yi ge erzi.

Zhangsan with Lisi same have one CL son

‘Zhangsan is the same as Lisi in that they both have a son.’

*‘The degree to which Zhangsan has a son is the same as the degree to which Lisi has a son.’

Crucially, if the predicate is gradable, the sentence becomes ambiguous. Compare (33) and (34):

(34) Zhangsan gen Lisi yiyang xihuan Mary.

Zhangsan with Lisi same like Mary

‘Zhangsan is the same as Lisi in that they both like Mary.’

‘The degree to which Zhangsan likes Mary is the same as the degree to which Lisi likes Mary.’

Again, the contrast between (33) and (34) is unexpected under a unified account. The important point here is that (34) can be regarded as a case of structural ambiguity. More specifically, the two different syntactic positions of *yi yang* structurally contribute to the variation of truth conditions of a sentence.

3.4 The Clausal Complement of *Yi yang*

In the following several subsections, I present a detailed discussion about the syntax of *yi yang*. In particular, I will first show two pieces of evidence for the

predicative status of *yiyang*, and propose that *yiyang* is a similarity predicate in the sense that it semantically introduces a similarity relation between individuals/objects. Secondly, I argue that *yiyang* takes a clause involving control structure, and further that the embedded clause is complement in its syntactic nature since extraction of syntactic elements from the clause does not render island effects (i.e., CED effects, in the sense of Huang, 1982). Next, I argue that the categorial status of *gen/he* is preposition in nature, when they functions as comparative markers introducing **the comparative standard** in Chinese Equatives. Importantly, this does not exclude the possibility for *gen/he* to be a coordinator in Chinese Equatives. Finally, I propose that the clausal complement functions as a specification of the dimension of similarity, by reviewing McCawley's (1970) discussion about *in that clause* in similarity construction in English.

3.4.1 Ellipsis Behavior of *Yiyang* and the Scope of Question Particle

Ma

The first supporting evidence comes from the ellipsis behavior of *yiyang*. As well observed in the literature, in Mandarin Chinese, sentences involving ellipsis need an operation like the *do*-support in English to insert an auxiliary after the application of PF-deletion; otherwise, a sentence will be ungrammatical, as the contrast in (35a-b) indicate. Alternatively, some predicative elements but not adverbial elements seem to license the elided elements as well, as the contrast in (36a-b) and (37a-e).⁵

⁵ Luther Liu (p.c.) points out that the function of elements (such as *shi* 'is', *hui* 'will' and *xihuan* 'like') may be to support the predicate position in the second conjunct involving *ye* 'also', instead of licensing the elided elements. He provides the following contrast:

- (i) a. Zhangsan mingtian qu Taibei, Lisi houtian
 b. *Zhangsan mingtian qu Taibei, Lisi ye houtian
 'Tomorrow Zhangsan will go to Taipei; the day after tomorrow, Lisi will, too.'

As shown above, (ia) is well-formed despite the fact that there are no supporting elements (i.e., predicative elements) to license the elided elements in the second conjunct. For this moment, I leave

- (35) a. Zhangsan xihuan chi pinguo, Lisi ye **shi** [e].
 Zhangsan like eat apple Lisi also is
 ‘Zhangsan likes eating apples, so does Lisi.’
- b. *Zhangsan xihuan chi pinguo, Lisi ye [e].
 Zhangsan like eat apple Lisi also
- (36) a. Zhangsan xihuan chi pinguo, Lisi ye **xihuan** [e].
 Zhangsan like eat apple Lisi also like
 ‘Zhangsan likes eating apples, Lisi likes, too.’
- b. Zhangsan mingtian hui qu Taipei, Lisi ye **hui** [e].
 Zhangsan tomorrow will go Taipei Lisi also will
 ‘Zhangsan will go to Taipei tomorrow, Lisi will, too.’
- (37) a. *Zhangsan changchang qu Taipei, Lisi ye **changchang** [e].
 Zhangsan often go Taipei Lisi also often
 Lit. Zhangsan often goes to Taipei, Lisi often, too.
- b. *Zhangsan dashengdi chang zhe ge, Lisi ye **dashengdi** [e].
 Zhangsan loudly sing ASP song, Lisi also loudly
 Lit. ‘Zhangsan is singing songs loudly, Lisi loudly, too.’
- c. *Zhangsan zai gongyuan chi pinguo, Lisi ye **zai gongyuan** [e].
 Zhangsan at park eat apple Lisi also at park
 Lit. ‘Zhangsan eats apples at park, Lisi at park, too.’
- d. *Zhangsan zuotian chi le pinguo, Lisi ye **zuotian** [e].

open the issue whether the function of the elements (such as *shi* ‘is’, *hui* ‘will’ and *xihuan* ‘like’) is to rescue the second conjunct involving *ye* ‘also’ by supporting the predicate position, or to license the elided elements. The crucial point here is that *yi yang* resembles *shi* ‘is’, *hui* ‘will’ and *xihuan* ‘like’ in that they all are predicates.

Zhangsan yesterday eat ASP apple Lisi also yesterday

Lit. 'Zhangsan ate apples yesterday, Lisi yesterday, too'

e. *Zhangsan hen xingyundi zhong le letou, Lisi ye hen

Zhangsan very luckily win ASP lottery Lisi also very

xingyundi [e].

luckily

Lit. 'Zhangsan luckily wins the lottery, Lisi luckily, too.'

Importantly here, as indicated in (37a-e), adverbial elements cannot license the elided elements regardless of the syntactic levels of the adverbs. More specifically, under normal circumstances, frequency adverbs *changchang* 'often', manner adverbs *dashengdi* 'loudly' and locative adverbial phrases *zai gongyuan* 'at park' are assumed to be VP-level; temporal adverbs *zuotian* 'yesterday' associate with IP-level; and evaluative adverbs *hen xingyundi* 'very luckily' are assumed to be CP-level. In contrast, predicate elements such as *shi* 'is', *xihuan* 'like' and *hui* 'will' can license the elided elements. Given the contrasts above, consider the following examples (38) and (39), where *yiyang* surprisingly licenses the elided elements.

(38) a. Zhangsan you yi ge erzi, Lisi ye yiyang you yi ge erzi.

Zhangsan have one CL son Lisi also same have one CL son

'Zhangsan has a son; Lisi is the same as Zhangsan in that he has a son, too.'

b. Zhangsan you yi ge erzi, Lisi ye yiyang [e].

Zhangsan have one CL son Lisi also same

'Zhangsan has a son; Lisi is the same as Zhangsan, too.'

(39) a. Zhangsan hen gao, Lisi ye yiyang hen gao..
 Zhangsan very tall Lisi also same very tall
 ‘Zhangsan is (very) tall; Lisi is the same as Zhangsan in that he is (very) tall, too.’

b. Zhangsan hen gao, Lisi ye yiyang [e].
 Zhangsan very tall Lisi also same
 ‘Zhangsan is (very) tall; Lisi is the same as Zhangsan, too.’

In contrast, without the occurrence of *yiyang*, the sentences became ungrammatical since *ye* is an adverbial element, which can not license the elided elements.

(40) a. *Zhangsan you yi ge erzi, Lisi ye [e].
 Zhangsan have one CL son Lisi also
 Lit. Zhangsan has a son; Lisi, too.
 Intended meaning: ‘Zhangsan has a son; Lisi is the same as Zhangsan, too.’

b. *Zhangsan hen gao, Lisi ye [e].
 Zhangsan very tall Lisi also
 Lit. Zhangsan is (very) tall; Lisi, too.
 Intended meaning: ‘Zhangsan is (very) tall; Lisi is the same as Zhangsan, too.’

The ability of licensing the elided elements suggests that *yiyang* in Mandarin be predicative in its syntactic nature, rather than an adverbial element, in these cases.

Additional support comes from the scope of question particle *ma*. As widely assumed in the literature, the scope of question particles such as *ma* can not be

embedded, it must take matrix scope. The prediction here is that the question particle *ma* would scope over the whole comparative construction, since *yiyang* is employed as the predicate (as previous discussions suggested above) in the matrix clause and question particle *ma* can not be embedded. Fortunately, example (41) witnessed the prediction.

(41) a. Zhangsan gen Lisi yiyang you yi ge erzi ma?

Zhangsan with Lisi same have one CL son Q

‘Is Zhangsan the same as Lisi in that they both have a son?’

b. Zhangsan gen Lisi yiyang hen gao ma ?

Zhangsan with Lisi same very tall Q

‘Is Zhangsan the same as Lisi in that they both are (very) tall?’

Last, the temporal adverbial such as *mingtian* ‘tomorrow’ and the evaluative adverb such as *hen xingyundi* ‘very luckily’ are normally assumed to associate IP-level and CP-level respectively. This in turn suggests that the syntactic nature of the element following *yiyang* ‘same’ be exactly a clause. Example (28) is repeated here as (42).

(42) a. Zhangsan gen Lisi yiyang **mingtian** hui qu taibei.

Zhangsan with Lisi same tomorrow will go Taipei

‘Zhangsan is the same as Lisi in that they both will go to Taipei tomorrow.’

b. Zhangsan gen Lisi yiyang **hen xingyundi** zhong le letou.

Zhangsan with Lisi same very luckily win ASP lottery

‘Zhangsan is the same as Lisi in that they both luckily win the lottery.’

In short, I have presented two pieces of evidence for the predicative status of *iyang* in Mandarin. Also, I show that *iyang* in Mandarin indeed takes an embedded clause⁶⁷. In the next section 3.4.2, I argue that this embedded clause is complement in its syntactic nature by demonstrating the fact that extraction of syntactic elements from the clause does not render island effects.

3.4.2 CED Effect

Huang et al. (2009, Chapter 6) suggest that relatives in Mandarin could be syntactically formed in two ways; one involves movement, whereas the other does not. In particular, they make the following generalizations (Huang et al. 2009: 225):

(43) a. Relatives with a gap in argument position:

A relative can be derived by directly raising the nominal to be relativized to the Head position. The Head is related to the trace in an argument inside the relative.

b. Relatives with the Head related to an adjunct or a pronoun in an argument position:

The Head of the relative is base-generated. The Head-relative clause relation is via a relative operator at the peripheral position of the relative clause.

⁶ In fact, it is not surprising that adjectives can take an embedded clause. In English, an evaluative adjective can take an infinitival clause. Further, this infinitival clause is adjunct in its syntactic nature (see Stowell 1991 and Landou 2009 for discussions). Example (i) is borrowed from Landou (2009).

- (i) a. %? To whom was it stupid of John to talk?
- b. *John went home, as it was smart of John ___/ as he was smart__.
- c. *How stupid to leave town was it of John?
- d. *How stupid of John to leave town was it?

Regarding the infinitive, it is shown that it creates a weak island (ia), cannot be gapped in a clause (ib), and cannot be pied-piped (ic, id).

⁷ I am grateful to Jonah Lin for bringing my attention to the argument structures of adjectives in English.

Regarding the relatives involving movement, island conditions are undoubtedly relevant. Consider the example below:

(43) a. *[[Wo renshi henduo[[e_i xihuan] de] ren de] na ge nuhai_i]

I know many like DE person DE that CL girl

Intended meaning: the girl that I know many people who e_i likes

b. *[[Wo hen xihuan [[e_i chang ge] de] shengyin de] na ge nuhai_i]

I very like sing song DE voice DE that CL girl

Intended meaning: the girl that I like the voice with which e_i sings

c. *Wo xiang kan [[ni [yinwei e_i bu hui lai] hen shengqi

I want see you because not will come very angry

de] [na ge xuesheng_i].

DE that CL student

Intended meaning: I want to see the student with whom you are angry because he would not come.

Now, to make it more complex, consider the cases where the relativized nominal is originally within the embedded clause following the predicate *yiyang* ‘same’ in Mandarin.

(44) a. *Zhangsan gen Lisi yiyang [xiangxin [[Wangwu xihuan e_i] de]]

Zhangsan and/with Lisi same believe Wangwu like DE

yaoyan de] [na ge nuhai_i]

rumor DE that CL girl

Intended meaning: the girl that Zhangsan and Lisi equally believe the

rumor that Wangwu likes e_i

b. Zhangsan gen Lisi yiyang [xiangxin [[Wangwu xihuan e_i] de]]

Zhangsan and/with Lisi same believe Wangwu like DE

[na ge nuhai_i]

that CL girl

‘the girl that Zhangsan and Lisi equally believe Wangwu likes e_i ’

‘Zhangsan and Lisi equally believe the girl that Wangwu likes e_i .’

The ungrammaticality of (44a) results from the relativization of the nominal *na ge nuhai* ‘that girl’ from an island environment (i.e., a complex NP, *Wangwu xihuan de yaoyan* ‘the rumor that Wangwu likes’). In contrast, the grammaticality of (44b) indicates that the embedded clause following *yiyang* does not constitute an island environment, that is, the embedded clause is complement in its syntactic nature rather than adjunct. More interestingly, (44b) is ambiguous: one reading concerns the girl that Zhangsan and Lisi equally believe Wangwu likes (i.e., ignoring the matter of comparative standard), while the other concerns Zhangsan and Lisi equally believe the girl that Wangwu likes (i.e., ignoring the matter of comparative standard). The example (45) makes the NP reading more prominent:

(45) Zhangsan gen Lisi yiyang [xiangxin [[Wangwu xihuan e_i] de]]

Zhangsan and/with Lisi same believe Wangwu like DE

[na ge nuhai_i] jintian mei lai shangxue.

that CL girl today not come school

‘The girl that Zhangsan and Lisi equally believe Wangwu likes did not come to school today.’

‘Zhangsan and Lisi equally believe that the girl who Wangwu likes did not

come to school today.’

Syntactically speaking, these two readings stem from two different syntactic positions that the nominal *na ge nuhai* ‘that girl’ is relativized to. In particular, the “noun phrase” reading arises when the nominal *na ge nuhai* ‘that girl’ is relativized to the Head position in matrix context, while the “clause” reading arises when it is relativized to the Head position in embedded context. Evidently, such ambiguity reveals an unbounded dependency of A-bar movement (see Chomsky 1977). I take this unbounded dependency of movement as another support for the complement status of the embedded clause. The parallel between (44b) and (46) again illustrates the point.

- (46) Zhangsan xiangxin [[Lisi piping e_i] de] [na ge nuhai]
 Zhangsan believe Lisi criticize DE that CL girl
 ‘the girl that Zhangsan believes Lisi criticized e_i’
 ‘Zhangsan believes the girl that Lisi criticized e_i.’

Another support for the complementation structure in question is from PP-movement in Mandarin. Consider the contrast between (47b) and (48b).

- (47) a. Zhangsan gen Lisi yiyang [yinwei Yuehan dui Mali] hen
 Zhangsan and/with Lisi same because John to Mary very
 ganmao feichang shengqi.
 sick very angry
 b. *[Dui Mali]_i, Zhangsan gen Lisi yiyang [yinwei Yuehan e_i hen
 To Mary Zhangsan and/with Lisi same because John very

ganmao] feichang shengqi.

sick very angry

‘Zhangsan is the same as Lisi in that they are equally angry because John is sick of Mary.’

(48) a. Zhangsan gen Lisi yiyang [dui Mali hen ganmao].

Zhangsan and/with Lisi same to Mary very sick

b. [Dui Mali]_i, Zhangsan gen Lisi yiyang [e_i hen ganmao].

To Mary Zhangsan and/with Lisi same very sick

‘Zhangsan is the same as Lisi in that they are sick of Mary.’

The ungrammaticality of (47b) is due to the extraction of the prepositional phrase *dui Mali* ‘to Mary’ from an island environment (i.e., a reason clause---adjunct island). In contrast, again, the grammaticality of (48b) suggests that the embedded clause following *yiyang* is indeed a complement in syntactic nature.

To summarize, as demonstrated above, the extraction of syntactic elements from the embedded clause following *yiyang* does not render island effects (i.e., CED effects in the sense of Huang 1982). In the next section, I give a discussion about the syntactic status of *gen/he* in Chinese Equatives, since *gen/he* could be either a preposition or a coordinator in Mandarin. Specifically, I argue that *gen/he* is a preposition in nature when functioning as a comparative marker introducing the comparative standard in Chinese Equatives.

3.4.3 The Syntactic Status of Comparative Marker *Gen/He* in Chinese Equatives

It is well known that *Gen* and *he* can be used as either prepositions or

coordinators in Mandarin. Example (49) is slightly adapted from Zhang (2005).

(49) Zhangsan *gen* Lisi *gen* Wangwu *xue le* henduo dongxi.

Zhangsan GEN Lisi GEN Wangwu learn ASP many thing

Reading A: 'Zhangsan and Lisi learned many things from Wangwu.'

Reading B: 'Zhangsan learned many things from Lisi and Wangwu.'

As Zhang (2005: 358) puts it: "In Reading A, only *Wangwu* can be the source, whereas *Lisi* cannot, though both are introduced by *gen*. In Reading B, the complex *Lisi gen Wangwu* is the source. Within the complex, *gen* does not introduce either another source or a goal. This means that this *gen* is a coordinator." An insightful point in Zhang (2005) is that *gen/he* is a preposition in nature when it introduces either another source or a goal. On the other hand, *gen/he* does not introduce either another source or a goal when it is a coordinator.

More interestingly, the comparative standard marker, in many languages, is a morpheme that typically introduces goal phrases (like 'to' or 'for'), or a morpheme with a meaning roughly equivalent to 'from' (see Staseen (1985) and Kennedy (2005b) for discussion). Example (50) is borrowed from Kennedy (2005b: 3).

(50) a. Nihongo-wa doitsgo yori muzukashi. JAPANESE

Japanese-TOP German **from** difficult

'Japanese is more difficult than German.'

b. Sapuk ol-kondi to l-kibulekeny. MAASAI

is-big the-deer **to** the-waterbuck

'The deer is bigger than the waterbuck.'

c. Jazo bras-ox wid-on. BRETON

he big-PRT for-me

‘He is bigger than me.’

With this connection in mind, shifting our attention to CEs, it is interesting to note that the situation for the categorial status of *gen/he* in CEs is on a par with that of *gen/he* in the normal circumstances such as example (49). To be more specific, in Chinese Equatives, *gen/he* is a preposition when it functions as a comparative marker introducing the comparative standard; otherwise, it is a coordinator. Example (51) illustrates this point.

(51) a. Zhangsan gen Lisi gen Wangwu yiyang gao.⁸

Zhangsan GEN Lisi GEN Wangwu same tall

Reading A: ‘Zhangsan and Lisi are equally tall as Wangwu.’

Reading B: ‘Zhangsan is equally tall as Lisi and Wangwu.’

Reading C: ?‘Zhangsan and Lisi and Wangwu are equally tall as some contextually salient individual.’⁹

⁸ In fact, this sentence also has another reading concerning *Zhangsan and Lisi and Wangwu are equally tall*. Such a reading resembles the sentence internal reading (see discussions in section 3.2) in that the comparative standard is identified within the sentence (i.e., without referring to previous context). However, this internal reading differs from other readings (in (51a)) in that the comparative standard does not refer to any particular individuals/objects in the sentence. For the sake of convenience, I demonstrate this point by presenting the English examples:

- (i) a. John and Bill read the same book.
- b. John read the same book as Bill (did).

Note that (ia) and (ib) both involve the internal reading. Crucially, while the latter identified the book that Bill read as the comparative standard in the sentence; in the former, the comparative standard is identified **reciprocally**. Regarding the complexities of the internal reading and its licensing conditions in English, I refer the reader to Dowty (1985), Carlson (1987), Moltmann (1992), Beck (2000), and Barker (2007) for further discussions.

⁹ For such a reading to be available, the adverb *ye* ‘also’ obligatorily occurred in the sentence, as shown below.

- (i) Yuehan gao yi bai bashi gongfen, Zhangsan gen Lisi gen Wangwu ye yiyang gao.
John tall one hundred eighty centimeter Zhangsan and Lisi and Wangwu also same tall
‘John is one hundred and eighty centimeters tall, Zhangsan and Lisi and Wangwu are equally

b. Zhangsan *gen* Lisi *gen* Wangwu *yi*yang hen gao.

Zhangsan GEN Lisi GEN Wangwu same very tall

Reading A: ‘Zhangsan and Lisi are the same as Wangwu in that they are (very) tall.’

Reading B: ‘Zhangsan is the same as Lisi and Wangwu in that they are (very) tall.’

Reading C: ‘Zhangsan and Lisi and Wangwu are the same as some contextually salient individual in that they all are (very) tall.’

As for (51a-b), in Reading A, only *Wangwu* can be the comparative standard, whereas *Lisi* cannot, though both are introduced by *gen*. In Reading B, the complex *Lisi gen Wangwu* is the comparative standard.¹⁰ Within the complex, *gen* does not introduce another independent comparative standard. This means that this *gen* is a coordinator.

Additional support for the prepositional nature of a comparative marker comes from the distribution of the distributive operator *dou* in the sentence. It is observed that the distributive operator *dou* syntactically can not occur within the coordination complex (i.e., between the first conjunct and the second conjunct), even though the first conjunct is in principle semantically distributable. Consider the contrast indicated in (52a-b) and (53a-b).

tall, too.’

In contrast, their counterparts in English do not need the adverbial elements *too* or *also*.

(ii) John is one hundred and eighty centimeters tall. Bill is equally tall.

Honestly, I have no explanation for this contrast at this moment.

¹⁰For Reading B, there is a variation on the judgments among native speakers. Imaginably, it is pragmatically trivial to mention a comparative standard containing two individuals that both are identical in any contextually relevant respects. Leaving this issue aside, the crucial point here is that the comparative marker (introducing the comparative standard) is preposition in nature, and this is at least supported by Reading A and many other pieces of evidence.

(52)a Na wu ge xuesheng gen/he Lisi (**dou**) shi Taiwanren.

That five CL student and Lisi **DOU** is Taiwanese

b. Na wu ge xuesheng (***dou**) gen/he Lisi shi Taiwanren.

That five CL student **DOU** and Lisi is Taiwanese

‘The five students and Lisi are Taiwanese.’

(53) a. Na wu ge xuesheng gen/he Lisi (**dou**) hen gao.

That five CL student and Lisi **DOU** very tall

b. Na wu ge xuesheng (***dou**) gen/he Lisi hen gao.

That five CL student **DOU** and Lisi very tall

‘The five students and Lisi are (very) tall.’

On the other hand, in the situation that *gen/he* serves as a comparative marker, the distributive operator *dou* can occur between the target of comparison and the standard of comparison in Chinese Equatives, as shown in (54).

(54) a. Na wu ge xuesheng (**dou**) gen/he Lisi yiyang hen gao.

That five CL student **DOU** with Lisi same very tall

‘The five students are the same as Lisi in that they are (very) tall.’

b. Na wu ge xuesheng (**dou**) gen/he Lisi yiyang gao.

That five CL student **DOU** with Lisi same tall

‘The five students are equally tall as Lisi.’

In brief, as all the contrasts suggested above, *gen/he* in Chinese Equatives serves as a preposition when it functions as a comparative marker introducing the comparative standard. In the next section, following the Generalized Control approach

(Huang 1984 and many subsequent works), I propose that the clausal complement of *yi yang* involves control structure, and the syntactic antecedent of *pro* is the matrix subject (which is also semantically the target of comparison).

3.4.4 Control Structure and the Antecedent of *pro*

Huang (1984 and many subsequent works) shows that an important difference between Chinese and English lies in which empty pronoun (*pro* or *PRO*) is available.¹¹ Chinese allows an empty pronoun in all argument positions (*pro*), in contrast to English, which only allows an empty pronoun in a Caseless position (*PRO*, such as the subject of an infinitival clause). The distribution of *pro* or a *PRO* is governed in part by a Generalized Control Rule, generalizing the control rule for the reference of *PRO* in English:

(55) The Generalized Control Rule (GCR):

An empty pronoun is co-indexed with the closest nominal.

Assuming a generalized control approach and the GCR, dubbed with the facts that Mandarin Chinese is well known as a *pro*-drop language and the predicate *yi yang* ‘same’ takes a clausal complement, I propose that an empty pronoun *pro* is situated at the embedded subject position. Furthermore, since the comparative marker *gen/he* is prepositional (see discussions in previous sections), I suggest that its syntactically c-commanding antecedent be the matrix subject.¹² Example (56b) is the syntactic

¹¹ Generally, *PRO* is in a position not assigned Case while *pro* appears in a position that is assigned case. In the framework of Government and Binding, *pro* but not *PRO* can be in a governed position.

¹² Alternatively, one may consider *yi yang* ‘same’ as a raising predicate. This means that the matrix subject was originally generated in the embedded clause, and then underwent subject-to-subject raising (i.e., A-movement) However, this argument may encounter difficulties. Note that a finite clause is an island for A-movement in English. In (56), the presence of progressive marker *zai* suggests that the complement clause be finite. In addition, according to Paul (2002), a non-finite clause in MC does not

representation of (56a).

(56) a. Zhangsan gen Lisi yiyang [zai shuijue].

Zhangsan with Lisi same PROG sleep

‘Zhangsan is the same as Lisi in that they both are eating apples.’

b. [CP[IP[NP**Zhangsan**_i [PPgenLisi] [yiyang [CP[IP **pro**_i [AspP zai [VP shuijue]]]]]]]]].

Since an empty pronoun *pro* has occupied the embedded subject position, it is expected that another nominal occurred in the embedded subject position would render the ungrammaticality. Such expectation is actually borne out. Consider the following examples (57a-d):

(57) a. *Zhangsan_i gen Lisi yiyang [[**ta**_i] zai shuijue].

Zhangsan with Lisi same **he** PROG sleep

b. *Zhangsan_i gen Lisi yiyang [[**na ge ren**_i] zai shuijue].

Zhangsan with Lisi same **that CL person** PROG sleep

c. *Zhangsan gen Lisi yiyang [[**tamen**] zai shuijue].

permit object shift. Interestingly, the complement clause in question seems to permit object shift. This means that the complement clause of *yiyang* seems to be finite.

- (i) Zhangsan_i gen Lisi yiyang [pro_i Taipei mingtian hui qu].
Zhangsan with Lisi same Taipei tomorrow will go
‘Zhangsan is the same as Lisi in that Taipei, they will go tomorrow.’

In this line of reasoning, if one contends that *yiyang* ‘same’ is a raising predicate, one has to explain why a finite clause is an island for A-movement in English, while it is not the case in Mandarin. This is obviously beyond the scope of this paper; I thus leave aside the possibility of *yiyang* to be a raising predicate at this moment.

In fact, T-H Lin (2008) provides a possible reason for the puzzle why finite complement clause in Mandarin is not an island for subject-to-subject raising (i.e., A-movement). In Lin’s idea, Mandarin Chinese doesn’t have grammatical features; as a consequence, the subject of a finite clause doesn’t perform checking of grammatical features, and thus is *free* to raise (i.e., vacuous satisfaction). Lin takes the phenomenon as evidence against the checking-based theory to A-movement. I refer the reader to T-H Lin (2008) for further discussions.

- Zhangsan with Lisi same **they** PROG sleep
- d. *Zhangsan gen Lisi yiyang [[**liang ge ren**] zai shuijue].
- Zhangsan with Lisi same **two CL person** PROG sleep

3.4.5 The Function of the Complement Clause

So far, we have examined the syntactic relation between the similarity predicate *yiyang* and its clausal complement. An important question immediately arises: what kind of semantic relation is there between the similarity predicate *yiyang* and its clausal complement? To put it differently, what kind of role does the complement clause play in this similarity comparative?

I suggest that the complement clause exactly functions as a specification of the dimension of similarity. In this sense, the complement clause may not be restricted to denote the generic property of individuals. Instead, the complement can be episodic, which expresses similar events that the individuals (the target and the standard of comparison) participate in respectively. In other words, the participating of similar events constitutes the dimension of similarity. See the following examples:

A. Future event

(58) Zhangsan gen Lisi yiyang mingtian hui qu taibei.

Zhangsan with Lisi same tomorrow will go Taipei

‘Zhangsan is the same as Lisi in that they both will go to Taipei tomorrow.’

B. Present Progressive event

(59) Zhangsan gen Lisi yiyang zhengzai chi pinguo.

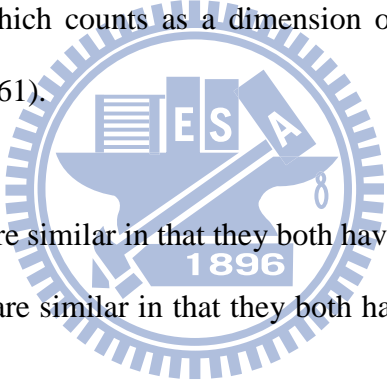
Zhangsan with Lisi same PROG eat apple

‘Zhangsan is the same as Lisi in that they both are eating apples.’

C. Past event

- (60) Zhangsan gen Lisi yiyang zuotian jiandao le Wangwu.
Zhangsan with Lisi same yesterday see ASP Wangwu
'Zhangsan is the same as Lisi in that they both saw Wangwu.'

Interestingly, although it seems there are no semantic/pragmatic restrictions on the complement clause as a specification of the dimension of similarity in Mandarin, it is not the case for the similarity comparatives in English. According to McCawley (1970), there are semantic/pragmatic restrictions on *in that S* in English, that is, the *S* must express a property which counts as a dimension of "similarity". McCawley's examples are illustrated in (61).

- 
- (61) a. ??Max and Fred are similar in that they both have a prime number of uncles.
b. ??Max and Fred are similar in that they both had lunch at the Tai Sam Yon today.
c. ?? Max and Fred are similar in that they both live next door to someone who has an aunt that was once arrested in Syracuse for shoplifting.

The crucial point of McCawley's explanation is that a property counts as "a dimension of similarity" between two individuals if it fails to distinguish between them, by either applying to both individuals, or else to neither. In other words, an *in that S* clause occurring with *similar* must entail the existence of a property that fails to distinguish between the relevant individuals. Alrenga (2006) illustrates this point by presenting the example (34) in the following:

(62) Jack is like Diane in that...

- a. ...they both have red hair.
- b. *...he has red hair.
- c. ...he has red hair, too.
- d. ...neither of them finds people with red hair attractive.

To sum up, I propose that the complement clause of *yi yang* ‘same’ functions as a specification of the dimension of similarity between individuals/objects (i.e., the target and the standard of comparison). In this sense, the complement clause may either denote a generic property of individuals, or be episodic (i.e., present an event that the individuals/objects participate in). On the other hand, although the complement clause of *yi yang* and *in that S* in English similarity constructions function alike, namely, denote the dimension of similarity; the latter, not the former, receives some semantic/pragmatic restrictions.

3.5 Un-equatives in Mandarin

In this section I briefly show that *buyi yang* ‘different’, resembling *yi yang* ‘same’, syntactically can be either a degree adverb or an adjectival predicate in Mandarin. Being a degree adverb, *buyi yang* semantically introduces an ordering relation (i.e., inequality) between individuals/objects with respect to some gradable property, and this ordering relation is established via explicit comparisons (see (10)). On the other hand, being an adjectival predicate, *buyi yang* semantically introduces a dissimilarity relation between individuals/objects (the target and the standard of comparison). Finally, however, unlike *yi yang*, *buyi yang* does not syntactically take a complement clause.

Consider the following examples, where *buyi yang* is a degree adverb in (63a)

and predicate in (64). Note that (63b-c) are the logical representation and truth condition of (63a) respectively:

(63) a. *Zhe tiao shengzi gen na tiao shengzi buyiyang chang.*¹³

This CL rope with that CL rope different long

‘This rope is not exactly as long as that rope.’

cf. Lit. This rope is unequally long than that rope.

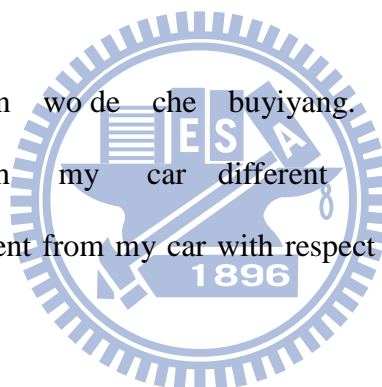
b. $\max [d: \text{this rope is } d\text{-tall}] \neq \max [d': \text{that rope is } d'\text{-tall}]$

c. The degree d such that this rope is d -tall **does not equal** the degree d' such that that rope is d' -tall.

(64) *Ta de che gen wo de che buyiyang.*

His car with my car different

‘His car is different from my car with respect to some contextually salient properties.’



As (63b-c) suggests, the truth condition of (63) requires that *zhe tiao shengzi* ‘this rope’ and *na tiao shengzi* ‘that rope’ be of unequal length. In other words, logically speaking, the length of two ropes could both be either long or short, or one is

¹³ It is observed that the gradable adjectives which can combine with the degree adverb *buyiyang* ‘different’ are mostly those measure-adjectives (e.g., *chang* ‘long’, *kuan* ‘wide’ and *gao* ‘tall/high’) and phonologically monosyllabic adjectives (e.g., *hong* ‘red’, *hei* ‘black’ and *liang* ‘bright’). Other gradable adjectives seem not to be compatible with the degree adverb *buyiyang* ‘different’, as in (i).

- (i) a. **Zhangsan gen Lisi buyiyang shuai.*
 Zhangsan with Lisi different handsome
 Intended meaning: Zhangsan is not equally handsome as Lisi.
 b. **Zhangsan gen Lisi buyiyang congming.*
 Zhangsan with Lisi different smart
 Intended meaning: Zhangsan is not equally smart as Lisi.

Obviously, there are some phonological and semantic factors playing their roles here. I leave the research for another occasion.

long and the other is short, as long as this rope and that one are of unequal length. In this sense, obviously, the ordering relation is established via explicit comparison, since it tolerates borderline cases (i.e., crisp judgment) between the length of two ropes (see previous discussions (11) and (12)). On the other hand, being a predicate in (64), *buyiyang* introduces a dissimilarity relation between *ta de che* ‘his car’ and *wo de che* ‘my car’ with respect to some contextually salient properties. For example, in a discussion about the color of cars, (64) could be judged true if his car and mine are of different colors.

Finally, the ill-formation of example (65) shows that *buyiyang* is not syntactically permitted to take the complement clause.¹⁴

- (65) a. *Zhangsan gen Lisi buyiyang [hen gao].
 Zhangsan with Lisi different very tall
 Lit. Zhangsan differs from Lisi in being (very) tall.
- b. *Zhangsan gen Lisi buyiyang [mingtian hui qu Taipei].
 Zhangsan with Lisi different tomorrow will go Taipei
 Lit. Zhangsan differs from Lisi in being going to Taipei tomorrow.

In brief, I have shown that both *yiYang* and *buyiyang* syntactically can serve as degree adverbs and predicates in Mandarin. For one thing, being a degree adverb, *buyiyang* introduces an ordering relation (i.e., inequality) between individuals/objects with respect to some gradable property. Further, the ordering relation is established via

¹⁴ A conception so far tacitly assumed in these sections is that *yiYang* and *buyiyang* are two different lexicons. In other words, the negation *bu* ‘not’ is a lexical negation rather than sentential negation. More explicitly, if *bu* ‘not’ is a sentential negation, it is unclear why the syntactic difference (taking complement clause or not) should exist, since the syntactical addition of a negation should not alter the argument structure of a lexicon. In contrast, *yiYang* and *buyiyang* are expected to show their idiosyncratic lexical properties, if *bu* ‘not’ is a lexical negation. However, as I will argue in chapter 4, this syntactic asymmetry is not due to lexical idiosyncrasy, instead, it is a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyiyang*.

explicit comparison. For another, being a predicate, *buyiyang* introduces a dissimilarity relation between individuals/objects. In the next section, I propose a syntax-semantics analysis for scalar (un-)equatives in Mandarin.

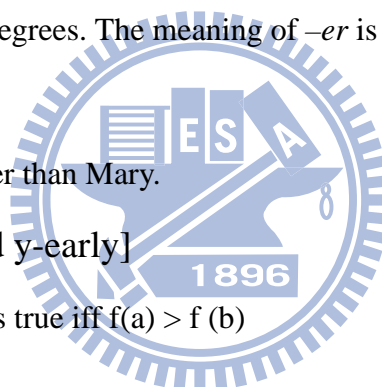
3.6 The Syntax-Semantics of Scalar (Un-)Equatives in Mandarin

Heim (1985) argues for a direct analysis of phrasal comparatives. For instance, the comparison in (66a) is between two individuals along the dimension of “earliness of death”. A dimension of comparison is a function from individuals to degrees, so the dimension of “earliness of death” is translated by Heim as a lambda-iota expression like (66b). This function can take the two individuals in (66a) as arguments respectively and give two degrees. The meaning of *-er* is specified as (66c).

(66) a. John died earlier than Mary.

b. $\lambda x \iota y [x \text{ died } y\text{-early}]$

c. “*-er* <a, b> f” is true iff $f(a) > f(b)$

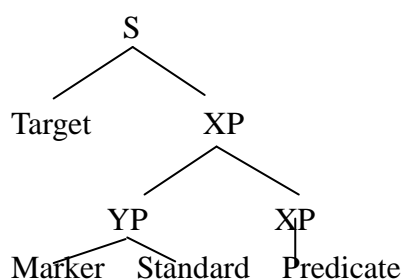


Under this analysis, (66a) has a semantic representation like (67), and (67) is true if and only if “the earliness of death for John” > “the earliness of death for Mary”.

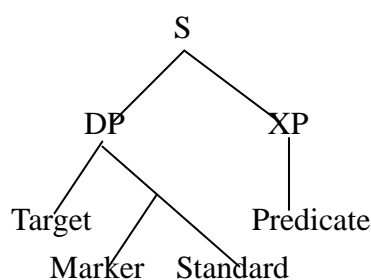
(67) *-er* <John, Mary> $\lambda x \iota y [x \text{ died } y\text{-early}]$

On the other hand, concerning the syntactic structures of comparatives, there are three possible configurations in the literature, as illustrated below. (Note that Target stands for the target of comparison, Marker stands for the comparative marker, Standard stands for the comparative standard, and Predicate the gradable predicate).

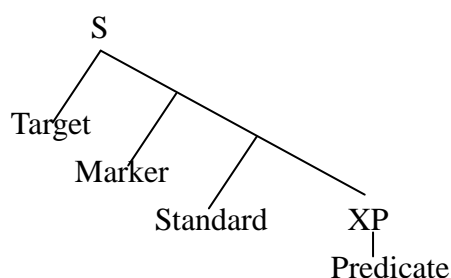
(68) a. Adjunction



b. Coordination



c. Predication (complementation)



Importantly, the syntactic relation between the comparative marker and the comparative standard are of great differences among the three configurations. Under adjunction analysis (68a) (e.g., Liu 1996, Kennedy 1999, Lin 2009), the comparative marker would be a preposition immediately c-commanding the comparative standard. Under coordination analysis (68b) (e.g., Napoli 1983, Hung 1991), the comparative marker is a coordinator, which coordinates the target of comparison and the standard of comparison. Under predication analysis (68c) (e.g., Xiang 2003, Mitcho 2007), the comparative marker may be some functional elements (e.g., a light verb head, or degree head).

In this thesis, I adopt the adjunction analysis, namely, the comparative marker *gen/he* is prepositional (see a detailed discussion in section 3.4.3). Further, following Corver 1997, Kennedy 1999, Xiang 2003, Lin 2007, Mitcho 2007, Liu 2010a-b, among many among others, I assume that adjectives, like nouns and verbs, project extended functional structure. In particular, I assume that the extended projection is headed by a degree morpheme, and further that Chinese simply has an adjectival

structure introduced by a functional degree projection, without having a QP in-between (see section 2.3).

Given these considerations, I propose that scalar (un-)equatives are both syntactically and semantically headed by degree adverbs *yiyang* ‘same’ and *buyiyang* ‘different’ in Mandarin. Semantically, they establish an ordering relation (via explicit comparison) between individuals with respect to some gradable property. Syntactically, they occur as Deg⁰ (the head of functional projection of gradable adjectives). The relevant syntactic and semantic representations are given below.

(69) Scalar Equatives

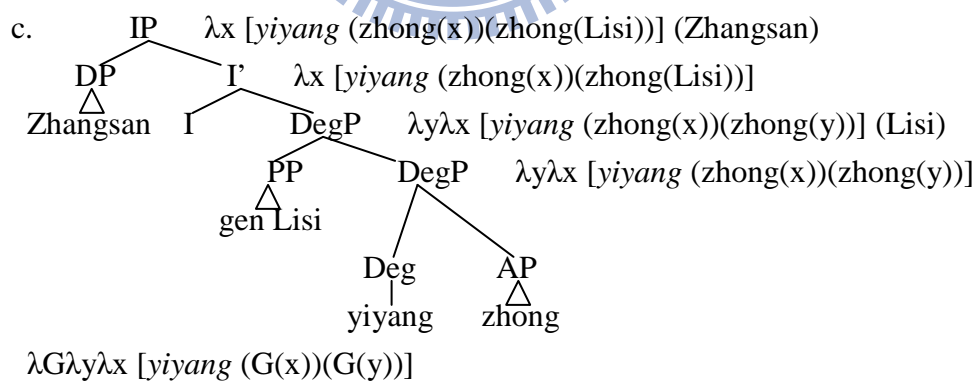
a. “*yiyang* <a, b> f” iff $f(a) = f(b)$

b. Zhangsan gen Lisi *yiyang* zhong.

Zhangsan with Lisi same heavy

‘Zhangsan is exactly as heavy as Lisi.’

cf. ‘Zhangsan is equally heavy as Lisi.’



(70) Scalar Unequatives

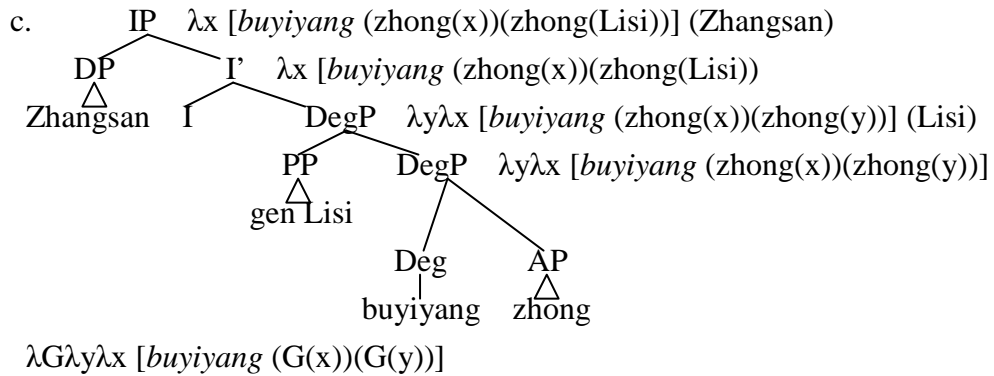
a. “*buyiyang* <a, b> f” iff $f(a) \neq f(b)$

b. Zhangsan gen Lisi *buyiyang* zhong.

Zhangsan with Lisi different heavy

‘Zhangsan is not exactly as heavy as Lisi.’

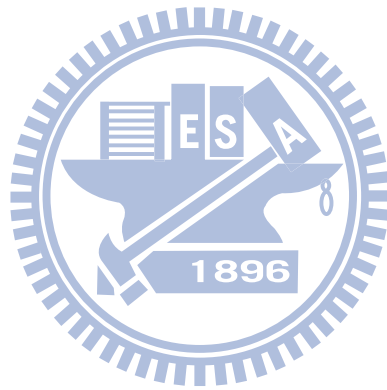
cf. ‘Zhangsan is unequally heavy as Lisi.’



As shown above, degree morphemes *yiyang* and *buyiyang* resemble the English degree morpheme *more* in two respects. First, all of them are the head of comparatives. Second, all of them are degree morphemes introducing an ordering relation between individuals with respect to possessing some gradable property. Specifically, *more* requires a “greater than” ordering relation, while *yiyang* requires an “equal” ordering relation and *buyiyang* an “unequal” ordering relation. Moreover, these two ordering relations (i.e., “equal” and “unequal”) are established by explicit comparison rather than implicit comparison (see (10)), since truth conditions in (69a) and (70a) only require the weight of individuals to be equal or unequal. In the former case, both individuals can be heavy or light as long as they are of equal weight. In the latter case, both individuals can be heavy or light, or even one is heavy and the other is light — as long as they are of unequal weight.

In the next chapter I deal with similarity comparatives in Mandarin. I first show that *yiyang* and *buyiyang*, resembling their counterparts *same* and *different* in English, are lexically ambiguous between similarity and identity readings in Mandarin. Next, I suggest that the two pairs of adjectives *same/ different* and *yiyang/ buyiyang* be better considered as adjectives with totally closed scale (e.g., *full/ empty*, *open/ closed*),

rather than adjectives with partially closed scale (e.g., *dry/ wet, straight/ bent*). Finally, I present a syntax-semantics analysis of similarity predicates *yiyang/ buyiyang* and similarity comparatives in Mandarin.



Chapter 4

Similarity Comparatives in Mandarin

The goal of this chapter is four-fold. First, following Alrenga's (2007) analysis of *same/different* in English, I argue that adjectival predicates *yi yang* 'same' and *buyi yang* 'different', resembling their counterparts in English, are lexically ambiguous between similarity and identity readings in Mandarin. Specifically, they can semantically introduce either a similarity relation or identity relation between individuals. This in turn leads to a variation of truth conditions of the sentence. Second, different from Alrenga's proposal, I suggest that *same/different* and their Chinese counterparts in question be better considered as gradable adjectives with totally closed scale (e.g., *full/empty*, *opaque/transparent*), rather than total/partial adjectives (e.g., *dry/wet*, *complete/incomplete*). Third, I propose that the syntactic asymmetry (see discussions in section 3.5) between *yi yang* and *buyi yang* can be regarded as a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyi yang*. Forth, I propose a syntax-semantics analysis of similarity comparatives in Mandarin.

4.1 The Lexical Ambiguity of *Same* and *Different* in English

It is well known in the literature that identity statements involving the adjectives *same* and *different* often allow for "type-identity" reading in addition to their expected "token-identity" readings. Consider the following examples:

(71) a. John owns the same watch as I used to own.

b. Bill sent me a different CD-player than I had purchased.

Under one of its readings, example (71a) asserts that I am a previous owner of the watch that John currently owns (he purchased the watch from me). Under this reading for (71a) (its token-identity reading), what is required is that John's watch is strictly identical to my previous watch. Interestingly, the example can also assert that John's watch is merely of the same make, model, and perhaps year as my previous watch. Under this reading for (71a) (its type-identity reading), the watches need not be strictly identical: if I previously owned a Tissort PRC 200, then (71a) would be true if John currently owns another Tissort PRC 200. A similar ambiguity can be detected for (71b). To be brief, (71b) could be true in a context that the CD-players are not strictly identical, though they may be of the same brand and model (the token-identity reading). On the other hand, (71b) could also be true in a context that the CD-players are strictly non-identical (the type-identity reading).

Heim (1985: 23), Beck (2000: (16)), and Alrenga (2005, 2006) take the token/type distinction in identity statements to reflect variation in the denotations of *same* and *different*.¹⁵ Such a line of analysis takes *same* and *different* simply to be ambiguous between 'x is strictly (non-)identical to y' and 'the type that x instantiates is strictly (non-)identical to the type that y instantiates'. The former produces the token-identity reading, while the latter produces the type-identity reading. In this thesis, I also pursue such line of analysis. However, without being misleading, following the terminology in Alrenga (2007), I will use identity readings and

¹⁵ A rather different analysis of this sort is developed by Lasersohn (2000), within his Pragmatic Halos (see Lasersohn 1999). Lasersohn proposes that relative to a context C, the nominal expression such as *same watch as I used to own* in (71a) denotes the set of watches that differ from my previous watch only in ways which are pragmatically irrelevant in C.

Alternatively, one may consider that the token/type distinction in identity statements stems from variation in the denotations of the head nouns with which these adjectives combine (see Nunberg (1984)). However, many recent analyses such as Barker (to appear) argue against this approach. I refer the reader to Barker (to appear) for further discussions.

similarity readings to refer to the two ambiguous readings induced by *same/ different* (and by *yi yang/ buyi yang*).

Notice that *same* and *different* in (71) are in attributive positions. Alrenga (2007: 44) further points out that the similarity reading is also available when *same/different* in predicative position. Consider example (72).

- (72) a. The presenters at this year's Emmy awards are the same as they were last year.
- b. The medicines used to treat malaria today are different than they were fifty years ago.

Example (72) allows for both similarity and identity readings. Under its similarity reading, (72a) asserts that the presenters at this year's Emmy awards are similar to those at last year's awards in all relevant respects, while under its identity reading, what is asserted is that the set consisting of the presenters is identical in its membership to the set consisting of last year's presenters. In (72b), a similarity interpretation for *different* yields that there is dissimilarity between the medicines used to treat malaria today and those used to treat malaria fifty years ago, whereas an identity interpretation yields that the set of medicines used to treat malaria differs in its membership from the set of medicines used to treat malaria fifty years ago.

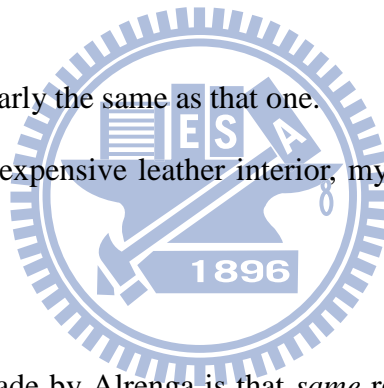
Besides the variation of truth conditions, a further support for *same* and *different* to be lexically ambiguous comes from degree modifications. Consider example (73).

- (73) a. John's car is {almost, nearly, just about, roughly} the same as mine.
- b. John's watch is {very, much, more, a lot, a great deal} different from/than mine.

Importantly, the occurrence of degree modifiers poses a problem for the simple view that *same/ different* can only introduce (non-)identity relations. On the other hand, regarding the degree modifications in (73), Alrenga (2006: 55) suggests that (*the*) *same* may belong to the class of “total adjectives”, e.g., *dry* and *complete* (see Rotstein & Winter 2004 and Kennedy & McNally 2005). The following examples illustrate the parallel between *same* and total adjectives:

- (74) a. The towel is nearly dry.
b. The poem is complete except for the last stanza.

- (75) a. The towel is nearly the same as that one.
b. Except for its expensive leather interior, my new car is the same as my last one.



An important point made by Alrenga is that *same* requires a maximal degree of the gradable property (i.e., similarity), which involves universal quantification, as indicated by the toleration of exceptive phrases. In this respect, *same* resembles total adjectives. However, the whole picture seems more complicated. As it will be argued in section 4.2.1, *same/ different* and their Chinese counterparts in question should be better considered as gradable adjectives with totally closed scale with respect to their degree modifications.

4.2 The Lexical Ambiguity of *Yiyang* and *Buyiyang* in Mandarin

In Mandarin, interestingly, the sentences involving *yiyang* ‘same’ and *buyiyang* ‘different’ in predicate position also seem to be ambiguous between identity and

similarity readings. Consider the following examples:

(76) Zhangsan de zhidaojiaoshou gen Lisi de zhidaojiaoshou yiyang ma?

Zhangsan. POSS adviser with Lisi POSS adviser same Q

Token reading: 'Are Zhangsan's adviser and Lisi's adviser the same one?'

Type reading: 'Is Zhangsan's adviser the same as Lisi's adviser with respect to some contextually salient properties?'

(77) a. (Dangran) **yiyang** (a). Zhangsan he Lisi de zhidaojiaoshou dou shi

Of course **same** SFP Zhangsan and Lisi POSS adviser DOU is
Liu laoshi.

Liu teacher

'Of course (the same one), the adviser of Zhangsan and Lisi is professor
Liu.'

b. (Dangran) **yiyang** (a). Zhangsan de zhidaojiaoshou gen Lisi de

Of course **same** SFP Zhangsan POSS adviser and Lisi POSS
zhidaojiaoshou dou hen zhaogu xuesheng.

adviser DOU very care student

'Of course (the same), Zhangsan's adviser and Lisi's adviser both take
good care of students.'

(78) a. (Dangran) **buyiyang** (a). Zhangsan de zhidaojiaoshou shi Liu laoshi,

Of course different SFP Zhangsan POSS adviser is Liu teacher

Lisi de zhidaojiaoshou shi Lin laoshi.

Lisi POSS adviser is Lin teacher

'Of course (different), Zhangsan's adviser is professor Liu, and Lisi's

adviser is professor Lin.’

- b. (Dangran) **buyiyang** (a). Zhangsan de zhidaojiaoshou hen xihuan kan
Of course different SFP Zhangsan POSS adviser very like read
manhuashu, Lisi de zhidaojiaoshou wanquan bu xihuan.
comic book Lisi POSS adviser completely not like
‘Of course (different), Zhangsan’s adviser like reading comic books very
much, but Lisi’s adviser does not like reading comic books.’

Note that (76) is an interrogative sentence, which is ambiguous between identity and similarity readings. Under its identity reading, the speaker inquires whether *Zhangsan*’s adviser and *Lisi*’s adviser are the same one. In contrast, under similarity reading, the speaker inquires whether *Zhangsan*’s adviser and *Lisi*’s adviser are the same with respect to some contextually salient properties. On the other hand, *yiyang* ‘same’ in (77a-b) serves as an appropriate answer for the two readings of (76) respectively. In particular, (77a) is an answer for the identity reading of (76), and (77b) is an answer for the similarity reading of (76). Similarly, *buyiyang* ‘different’ in (78a-b) serves as an appropriate answer for the two readings of (76) respectively.¹⁶

More interestingly, besides the predicative position (e.g., (76)), the sentence involving *yiyang* and *buyiyang* in attributive position is ambiguous as well. See the following example.

- (79) a. Zhangsan he Lisi xihuan yiyang de nuhai.
Zhangsan with Lisi like same DE girl

¹⁶ Pragmatically speaking, the felicitous conditions and the world knowledge of the speaker for the two readings of (76) are also different. Under the token reading, the speaker has no idea whether *Zhangsan*’s adviser and *Lisi*’s adviser are the same one or not, though he may or may not know who *Lisi*’s adviser is. In contrast, crucially, under the type reading, the speaker has known that *Zhangsan*’s adviser and *Lisi*’s adviser are different one, and he intends that the hearer share this knowledge as well.

‘The girl Zhangsan likes and the girl Lisi likes are the same one.’

‘The girl Zhangsan likes is the same as the girl Lisi likes with respect to some contextually relevant properties.’

b. Zhangsan he Lisi xihuan buyiyang de nuhai.

Zhangsan with Lisi like different DE girl

‘The girl Zhangsan likes and the girl Lisi likes are different ones.’

‘The girl Zhangsan likes is different from the girl Lisi likes with respect to some contextually relevant properties.’

Last but not the least, *yiayng* and *buyiyang* also receive degree modifications in Mandarin, as illustrated in (80).

(80) a. Ta de daan gen wo de xiangfa youdian/ *xiangdang/*hen/ jihu/

His answer with my answer slightly/ quite/ very/ almost/

chabuduo/ wanquan yiyang.

nearly/ completely same

‘His answers are slightly/*quite/*very/almost/nearly/completely the same as mine.’

b. Ta de daan gen wo de daan youdian/ xiangdang/ hen/ jihu/

His answer with my answer slightly/ quite/ very/ almost/

*chabuduo/ wanquan buyiyang.

nearly/ completely different

‘His answers are slightly/quite/very/almost/nearly/completely different from mine.’

4.2.1 Scale Structure of *Yiyang/ buyiyang* and Degree modifications

Alrenga (2006, 2007) suggests that *same/ different* be regarded as total/partial adjectives. There are both theoretical and empirical problems for this proposal. Let us first consider the theoretical problem. According to Kennedy & McNally (2005) (see also Kennedy 1999, Kennedy 2007a; cf. Yoon 1996 and Rotstein & Winter 2004), there are four logically possible variations: (a) A scale may neither have both the minimal and maximal element (i.e., open scale); (b) it may have the minimal but no maximal element (i.e., partially closed scale); (c) it may have the maximal but no minimal element (i.e., partially closed scale); (d) it may have both the minimal and maximal element (i.e., totally closed scale). In fact, these expected patterns are empirically supported by the examples involving the degree modifier *absolutely* (i.e., which takes the maximal value on the scale), as shown in (81) ~ (84).

(81) Open Scale Adjectives

- a. ??absolutely {tall, deep, expensive, likely}
- b. ??absolutely {short, shallow, inexpensive, unlikely}
- c. ??completely {long, short, interesting, inexpensive}
- d. ??partially { long, short, interesting, inexpensive }
- e. ??half { long, short, interesting, inexpensive }

(82) Lower Closed Scale Adjectives

- a. ??absolutely {possible, bent, bumpy, wet}
- b. absolutely {impossible, straight, flat, dry}

(83) Upper Closed Scale Adjectives

- a. absolutely {certain, safe, pure, accurate}

b. ??absolutely {uncertain, dangerous, impure, inaccurate}

(84) Closed Scale Adjectives

a. absolutely {full, open, necessary}

b. absolutely {empty, closed, unnecessary}

c. completely {empty, full, open, closed}

d. partially { empty, full, open, closed }

e. half { empty, full, open, closed }

If *same* and *different* are indeed treated as a pair of total/ partial adjectives (e.g., *dry/wet*, *straight/bent*), it is predicted that *different* should be in principle incompatible with degree modifiers such as *completely*, which requires a maximal degree on the scale (according to (82)). On the other hand, the adjective *same* is predicted to be incompatible with degree modifiers such as *slightly*, which require a minimal degree on the scale. However, such theoretical prediction is not borne out.

(85) a. John's idea is {slightly, partially, **completely**} different from/than mine.

b. This teacher is {**slightly**, partially, completely} the same as that one.

What is worse, the adjective *different* is unexpectedly empirically compatible with exceptive phrases, which Alrenga used to show that *same* requires a maximal degree of the gradable property, which involves universal quantification.

(86) This listing is different from/than that one, except for the names.

Logically speaking, there are two possibilities for the contrast. One is that exceptive

phrases fail as a piece of evidence for *same* to require a maximal degree. The other possible result is that the exceptive phrases test works. This in turn suggests that both *same/ different may* require a maximal degree of the gradable property. Evidently, the second possibility seems to be preferred (c.f. (85a)).

The contrasts in (85) and (86) thus cast a serious doubt on Alrenga's proposal for the treatment of *same/ different* as a pair of total/ partial adjectives. On the other hand, the above contrasts strongly suggest that *same/ different* be considered as the adjectives with totally closed scale (e.g., *full/empty, open/closed*, according to (84)).

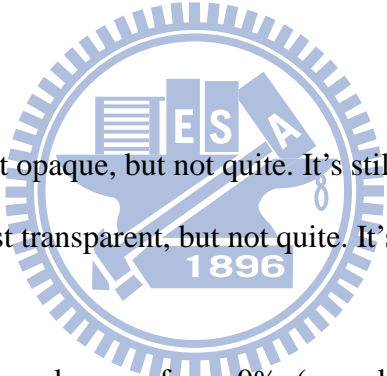
Turning to Mandarin, *yiYang* and *buyiYang* receive degree modifications as well. The example (80) is repeated as (87) here.

- (87) a. Ta de daan gen wo de xiangfa youdian/ *xiangdang/*hen/ jihu/
 His answer with my answer slightly/ quite/ very/ almost/
 chabuduo/ wanquan yiyang.
 nearly/ completely same
 'His answers are slightly/*quite/*very/almost/nearly/completely the same
 as mine.'
- b. Ta de daan gen wo de daan youdian/ xiangdang/ hen/ jihu/
 His answer with my answer slightly/ quite/ very/ almost/
 *chabuduo/ wanquan buyiyang.
 nearly/ completely different
 'His answers are slightly/quite/very/almost/nearly/completely different
 from mine.'

Regarding the example (87), there are three important contrasts here. In the first place, both *yiYang* and *buyiYang* in Mandarin are perfectly acceptable with the

PROPORTIONAL MODIFIERS *shaowei youdian* “a bit, slightly” and *wanquan* “completely”. This means that they must be the gradable adjective associated with totally closed scale.

Secondly, the degree modifier *jihu* “almost” often entails a negation. More precisely, the degree phrase *jihu yiyang* “almost same” entails *buyiyang* “different”, while the degree phrase *jihu buyiyang* “almost different” does not mean *yiyang* “same”. Concerning this contrast, it is suggested that the degree modifier *jihu* “almost” in (87b) does not directly modify *buyiyang*. According to Rotstein and Winter (2004) and Kennedy (2007a), the adverbials such as *almost* select an interval which is adjacent to and below the maximum on the scale. The evidences from English are showed in (88).

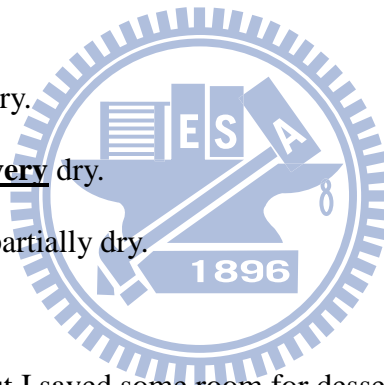
- 
- (88) a. The glass is almost opaque, but not quite. It's still transparent.
b. The glass is almost transparent, but not quite. It's still opaque.

In the context that there are degrees from 0% (completely transparent) to 100% (completely opaque) for the glass, then, (88a) is felicitously uttered to deny that the glass is completely opaque. Likewise, (88b) can be used for the reverse situation: one is asserting that the glass is almost completely transparent (i.e., the degree is almost down to 0%). In this sense, *jihu* “almost” in (87b) does not directly modify the absolute gradable adjective *buyiyang*, rather, it modifies an implicit adverbial *wanquan* “completely” which select the maximum on the scale, as suggested in English example (88). If this is correct, then it justifies the argument that the scale structure of *buyiyang* is a totally closed scale (i.e., closed both on its ends).

Last but not the least, some degree modifiers associated with open scale such as *xiangdang* “quite” and *hen* “very”, are compatible with the similarity predicate

buyiyang, while they are incompatible with the similarity predicate *yiayang*. Concerning this contrast, two possible solutions are suggested. One possible explanation is that *buyiyang* may have some other related lexical entries such as *teshu/ tebie* ‘special’, which associates with an open-scalar structure. In this vein, *buyiyang* is thus compatible with the degree modifiers with open scale. Alternatively, one may consider the phenomenon as a relative use of absolute gradable adjectives. Kennedy & McNally (2005: 371, fn.20) point out that it is also possible for some (but not all) absolute gradable adjectives to permit relative-like, imprecise interpretations. In other words, in these cases, the adjectives with closed scale can occur with the degree modifiers with open scale. They provide the following examples:

- (89) a. My hands are dry.
 b. My hands are **very** dry.
 c. My hands are partially dry.



- (90) I'm (very) full, but I saved some room for dessert.

According to Kennedy & McNally, example (89a) can be understood either as a claim that my hands have a certain skin quality, or as a claim about the amount of some liquid on them. Example (89b) is consistent only with the former interpretation, while (89c) forces the latter. More interestingly, *very full* is felicitous as a description of one's stomach after a big meal. This is assumed to be a relative use of *full*, as indicated by the absence of a contradiction in (90). In brief, a relative use of absolute gradable adjectives would involve a different interpretation (i.e., a relative-like, imprecise interpretation).

Along the same line as Kennedy & McNally (2005: 371), I suggest that *buyiyang*

(but not *yiyang*) in Mandarin permits the relative use. Consider the following example (91a-b), where *buyiyang* occurred in the *bi*-comparative construction:

(91) a. Zhe ge jiezhi bi na ge jiezhi geng buyiyang.

This CL ring BI that CL ring even more different

‘This ring is more special than that ring.’

b. Xiangjiao bi liucheng geng buyiyang.

Banana BI orange even more different

‘The bananas are more different than the oranges with respect to some contextually determined standard.’

(91a) is indeed an empirical case of the first solution suggested above. That is, it involves a different lexical entry, which denotes the meaning *special*. Importantly, this meaning associates with an open scale (like relative gradable adjectives, e.g., *tall/short*, *wide/narrow*). In this respect, *buyiyang* is not considered as a similarity predicate.

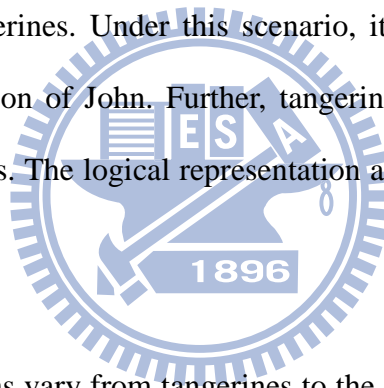
The logical representation of (91a) is shown in (92) below.

(92) $\max [d: \textit{Zhe ge jiezhi} \textit{ is } d\text{-special}] > \max [d': \textit{Na ge jiezhi} \textit{ is } d'\text{-special}]$

In contrast, (91b) involves *comparison of divergence* (henceforth COD). As Kennedy (2001: 44) pointed out, what is unique about comparisons of divergence is that they compare the degrees to which two objects deviate from some reference point — a contextually determined standard value. In other words, COD construction, unlike a standard comparative, compares two sets of differential degrees. Kennedy provides the example (93) to illustrate the point.

(93) The Cubs are as old as the White Sox are young.

Crucially, example (93) can only mean that the degree to which the average age of the Cubs exceeds a standard of oldness (for baseball teams) is the same as the degree to which the average age of the White Sox exceeds a standard of youngness. Now, turning back to example (91b) in Mandarin, it is important to note that it also involves a contextually determined standard. To see why, imagine a scenario that John is trying to compare the differences among bananas, oranges and tangerines, and he intends that the variations between bananas and tangerines are more than the variations between oranges and tangerines. Under this scenario, it is felicitous for (91b) as a description of the conception of John. Further, tangerines serve as the comparative standard in the comparisons. The logical representation and truth condition in (94a-b) illustrate the point.



- (94) a. $\max [d: \text{bananas vary from tangerines to the extent } d] > \max [d': \text{oranges vary from tangerines to the extent } d']$
- b. The degree d such that bananas vary from tangerines (to the degree d) exceeds the degree d' such that oranges vary from tangerines (to the degree d').

Since tangerines serve as the comparative standard in the scenario above, this means that the comparative standard would vary from different context. In other words, the comparative standard is contextually determined. In this respect, (91b) can be considered as an empirical case of the second solution suggested above, namely, it involves a relative use of *buyiyang*.

In sum, in this section I argued that *same/ different* in English and *iyang/ buyiyang* in Mandarin are gradable adjectives associated with totally closed scale. In addition, I suggest that *buyiyang* (but not *iyang*) has some other related lexical entry meaning ‘special’, which associates with open scale structure. On the other hand, *buyiyang* (but not *iyang*) permits a relative use; this means that it may have a contextually determined standard (like a relative gradable adjective). At last, recall that there exists a syntactic asymmetry between similarity predicates *iyang* and *buyiyang*, namely, *iyang* (but not *buyiyang*) is syntactically permitted to take a clausal complement. In the next section, I provide an answer for this syntactic puzzle.

4.2.2 A Solution to the Syntactic Asymmetry between *Yiyang* and

Buyiyang

In section 3.4.5, I propose that the clausal complement of *iyang* is a further specification of the dimension of similarity. However, an important question we need to and have to answer is: Why is *buyiyang* not syntactically permitted to take such kind of clausal complement? Compared with English, both *same* and *different* are syntactically compatible with *in that S*. Consider the following example.

- (95) a. John is different than Mary in that he has red hair and she has brown one.
b. The government is the same as the mafia in that they both use force to extract revenue from society.

Although one may consider the syntactic asymmetry between *iyang* and *buyiyang* stems from the idiosyncrasy of lexicons, we think that there should be a deeper reason for this contrast. In what follows, I will first argue that the clausal complement is actually the measure phrase in similarity comparatives, and then I propose that this

syntactic asymmetry can be considered as a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyiyang*.

It is well-observed that measure phrases are syntactically optional in comparative constructions. In scalar comparatives, the measure phrases denote the differential degrees between individuals along some dimension of measurement (e.g., Kennedy 1999, 2001, Schwarzschild 2002, Schwarzschild 2005, Schwarzschild and Wilkinson 2002).

- (96) a. John is 2cm taller than Mary.
b. Mary is 2cm shorter than John.

In Mandarin, measure phrases in scalar comparatives are also syntactically optional, and semantically serve as a further specification of the differential degrees (e.g., Liu 2006, Xiang 2003).

- (97) a. Zhangsan bi Lisi gao (**san gongfen**).
Zhangsan than Lisi tall three centimeter
'Zhangsan is (3cm) taller than Lisi.'
b. Lisi bi Zhangsan ai (**san gongfen**).
Lisi than Zhangsan short three centimeter
'Lisi is (3cm) shorter than Zhangsan.'

Turning to similarity comparatives in Mandarin, the clausal complement is syntactically optional, and semantically serves as a further specification of the dimension of similarity (see discussions in section 3.4).

(98) a. Zhangsan gen Lisi yiyang (**hen gao**).

Zhangsan with Lisi same very tall

‘Zhangsan is the same as Lisi (in that they both are (very) tall).’

b. Zhangsan gen Lisi yiyang (**hen ai**).

Zhangsan with Lisi same very short

‘Zhangsan is the same as Lisi (in that they both are (very) short).’

In addition to these empirical syntactic and semantic parallels, there is also one conceptual reason supporting the idea that the complement clause is exactly a measure phrase in similarity comparatives. As we will see in section 4.3, the calculation of degrees of similarity comparatives concerns individuals’ locations along multiple dimensions. In other words, the measure of similarity is based on dimensions. Differently put, dimensions are thus considered as degrees. More importantly, in this vein, it is not unreasonable for us to consider the complement clause as measure phrases in similarity comparatives, since it specifies individuals’ locations along a scale of similarity though in a more precise manner than other degree morphemes.¹⁷¹⁸

¹⁷ Another syntactic support comes from the formation of A-not-A question. In Mandarin, A-not-A question is a type of disjunctive question, which involves some reduction of their constituents, as shown below.

- (i) a. Zhangsan zhi bu zhidao Lisi dapo na ge beizi.
Zhangsan know not know Lisi break that-CL cup
‘Does Zhangsan know or not know that Lisi broke the cup?’
b. Zhangsan xiang bu xiangxin Lisi?
Zhangsan believe not believe Lisi
‘Does Zhangsan believe or not believe Lisi?’

Notice that the grammaticality of the formation of A-not-A question is independent of different syntactic types of complements (i.e., complement clauses in (ia) and noun phrases in (ib)).

Interestingly, the formation of A-not-A question involving only adjectival predicates is legitimate, while the occurrence of measure phrases (i.e., nominal predicates in the sense of Schwarzschild 2002, 2005) leads to ungrammaticality. Consider the contrast below.

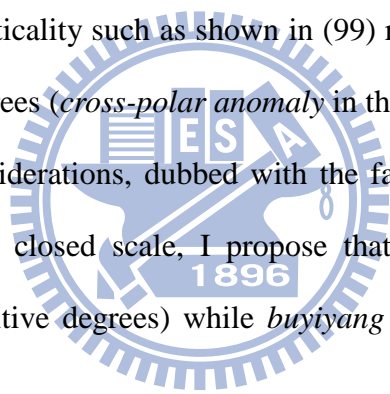
- (ii) a. Zhangsan gao bu gao?
Zhangsan tall not tall

Due to these empirical and conceptual reasons, I conclude that the complement clause in question is a measure phrase in similarity comparatives. After establishing this connection, it is important to note that measure phrases are incompatible with the adjectives with negative polarity in the non-comparative form (e.g., Kennedy 1999, 2001, Schwarzschild 2002, Schwarzschild 2005).

- (99) a. *2 inches narrow/ short/ shallow/ low/ thin.
 b. *2 years young/ short/ new.

According to Kennedy (2001: 60), measure phrases introduce only positive degrees. It follows that the ungrammaticality such as shown in (99) results from a conflict in the ordering of two sets of degrees (*cross-polar anomaly* in the terminology of Kennedy).

Given the above considerations, dubbed with the fact that *yiyang/buyiyang* are the adjectives with totally closed scale, I propose that *yiyang* denotes a positive interval (i.e., set(s) of positive degrees) while *buyiyang* denotes a negative interval



-
- ‘Is Zhangsan tall or not tall?’
 b. *Zhangsan gao bu gao yi bai bashi gongfen?
 Zhangsan tall not tall one hundred eighty centimeter
 Intended meaning: ‘Is Zhangsan one hundred and eighty centimeters tall or not one hundred and eighty centimeters tall’

More interestingly, the formation of A-not-A question of *yiyang* and its complement clause crucially patterns with that of adjectival predicates and measure phrases. Compare (iii) and (ii).

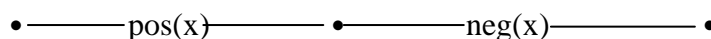
- (iii) a. Zhangsan gen Lisi yi bu yiyang?
 Zhangsan with Lisi same not same
 ‘Is Zhangsan the same as Lisi or not the same as Lisi?’
 b. *Zhangsan gen Lisi yi bu yiyang hen gao?
 Zhangsan with Lisi same not same very tall

Although it is not clear to me why the contrast between (i) and (ii) would exist, the parallel between (ii) and (iii) is quite clear. Importantly, such parallel again suggests that the complement clause in question should be considered as a measure phrase.

¹⁸ I am grateful to Jo-Wang Lin for bringing my attention to the formation of A-not-A question of *yiyang*.

(i.e., set(s) of negative degrees) on the similarity scale, as shown below.¹⁹

(100) The similarity scale (closed both on its ends)



(101) Measure of *similarity*

(102) Measure of *dissimilarity*

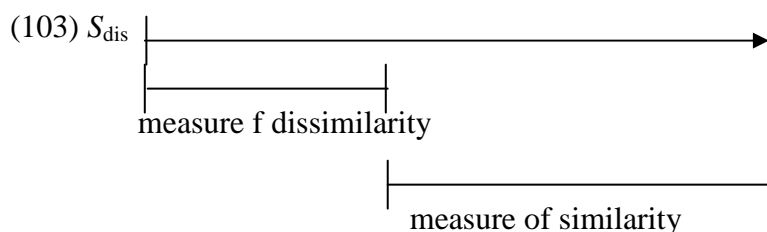
Note that these two intervals are complementary on the same scale (i.e., similarity; see Kennedy 2001 for relevant discussions about the intervals of antonyms). If the above discussions are on the right track, the syntactic asymmetry between *yi yang* and *buyi yang* follows automatically. Since *buyi yang* denotes set(s) of negative degrees, and measure phrases introduce only positive degrees, the combination of *buyi yang* and measure phrases (i.e., the clausal complement) contributes to a conflict in the ordering of two sets of degrees. In this line of reasoning, the syntactic asymmetry thus can not be simply attributed to the idiosyncrasy of lexicons. Instead, it is a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyi yang*.

On the other hand, my proposal forms a sharp contrast with the proposal of Alrenga (2007: 107) that *different* denotes a positive interval (and *like* denotes a

¹⁹ In recent work, several arguments have been given for the relevance of intervals to the semantics of gradable adjectives and scalar comparatives. However, different authors take different views on the ontological status of intervals. For example, some authors take intervals to be ontologically basic, while other authors reconstruct intervals as ordered pairs or sets of degrees (e.g., von Stechow 1984, Kennedy 1999: chapter 3, 2001, Schwarzschild 2005, Heim 2006a). Another point of variation concerns the pervasiveness of intervals. For example, whereas Kennedy (1999: chapter 3, 2001) analyzes gradable adjectives as relations between individuals and intervals, they remain relations between individuals and degrees for Heim (2006a), Schwarzschild (2005) and Buring (2007a, b).

Regarding the first point of variation, we adopt the latter view in this thesis. Regarding the second one, we basically maintain Kennedy's proposal (i.e., gradable adjectives denote relations between individuals and intervals) to demonstrate the semantics of adjectival predicates *yi yang* and *buyi yang*, though nothing substantive will hinge upon this.

negative interval) on the dissimilarity scale, as shown below (S_{dis} stands for the dissimilarity scale).



In this respect, my proposal fits well with Alrenga's proposal. Since *different* denotes a positive interval, the combination of *different* and *in that S* is fine.

Interestingly, Alrenga (2007) does not discuss the interval nature of *same*. In fact, under Alrenga's semantic analysis of *same*, it leaves no room for the interval arguments witnessed for *different* (see Alrenga 2007: 108). However, under my proposal, *same* is predicted to denote a positive interval, therefore the combination of *same* and *in that S* is fine.

If my proposal is correct, this in turn suggests a cross-linguistic variation. That is, as for an antonymous pair such as *same* and *different* in English, they both denote a positive interval (though on different scales: similarity and dissimilarity). In contrast, in Mandarin, *yi yang* denotes a positive interval, whereas *buyi yang* denotes a negative interval (on the same scale: similarity). An interesting question immediately arises: Are there more linguistic contrasts along this cross-linguistic variation? I leave this line of research for further investigation on another occasion.

4.3 The Syntax-Semantics of Similarity comparatives in

Mandarin

Alrenga (2007: 103) proposes the following representations for the semantics of

*different*_{SIM} and similarity comparatives headed by *different*_{SIM} in English.

$$(104) \textit{different}_{\text{SIM}} = \lambda P_{\langle\langle\langle d, t \rangle, \langle e, t \rangle \rangle, \langle d, t \rangle \rangle} \lambda Q_{\langle\langle\langle d, t \rangle, \langle e, t \rangle \rangle, \langle d, t \rangle \rangle} \lambda I_{\langle d, t \rangle} : I \subseteq D_{\text{dis}}$$

$$\mu_{\text{DIS}}((P(R) - Q(R)), (Q(R) - P(R))) = I$$

$$(105) \textit{SOME} = \lambda I_{\langle d, t \rangle} \exists I_c \in \textit{SOME}_c [I \supseteq I_c]^{20}$$

(106) a. Barry is different than John (is).

b. *SOME*(ιK [*different*_{SIM} ($\lambda G. \iota I[G(I)(j)]$)($\lambda G. \iota I[G(I)(b)]$)(K)])

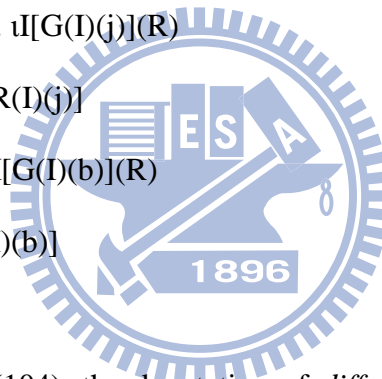
c. $\exists I_c \in \textit{SOME}_c [\iota K [\mu_{\text{DIS}}(S-B, B-S) = K] \supseteq I_c]$

where $S = \lambda G. \iota I[G(I)(j)](R)$

$= \iota I[R(I)(j)]$

and $B = \lambda G. \iota I[G(I)(b)](R)$

$= \iota I[R(I)(b)]$



According to Alrenga, in (104), the denotation of *different* is a three-place relation holding between a function P of type $\langle\langle\langle d, t \rangle, \langle e, t \rangle \rangle, \langle d, t \rangle \rangle$, another function Q of the same type $\langle\langle\langle d, t \rangle, \langle e, t \rangle \rangle, \langle d, t \rangle \rangle$, and a scalar interval I of type $\langle d, t \rangle$. In addition, μ_{DIS} is a measure function representing a measure of dissimilarity. The relation R is a single constant relation of type $\langle\langle d, t \rangle, \langle e, t \rangle \rangle$, the purpose of which is to introduce the dimensions of comparison. As pointed out by Alrenga, “unlike the denotations of gradable adjectives, which relate individuals to their locations along a single quantitative dimension of measurement, R is sortally non-specific: for any dimension represented in D_d along which an individual x can be properly located, the set

²⁰ In a sense, the abstract phrase *SOME* is an interval version of the positive morpheme (see discussions in sections 2.2 and 2.3; c.f. f.n. 17).

$\mathcal{U}[R(I)(x)]$ will include the (sortally specific) subset of D_d that corresponds to x 's location along that dimension" (p. 98). In other words, the set of abstract points $\mathcal{U}[R(I)(x)]$ represents x 's location along numerous dimensions, and in such a way, R relates individuals to "multidimensional" locations.²¹ In other words, in (105), *SOME* is an abstract measure phrase (or degree morpheme), whose interpretation is context-dependent. In (106c), $S-B$ is the set difference $\mathcal{U}[R(I)(j)] - \mathcal{U}[R(I)(b)]$, which contains those members of D_d that belong to $\mathcal{U}[R(I)(j)]$ but not to $\mathcal{U}[R(I)(b)]$. Likewise, $B-S$ is the set difference $\mathcal{U}[R(I)(b)] - \mathcal{U}[R(I)(j)]$ that belongs to $\mathcal{U}[R(I)(b)]$ but not to $\mathcal{U}[R(I)(j)]$.

Importantly, in Alrenga's idea, the union of these two sets $(S-B) \cup (B-S)$ is the symmetry set difference between $\mathcal{U}[R(I)(j)]$ and $\mathcal{U}[R(I)(b)]$; in it will be found any member of D_d that occurs in just one of these two sets. In other words, the requirement that their symmetry set difference be non-empty then amounts to the requirement that their locations differ along at least one dimension of comparison. Therefore, as illustrated in (104), the dissimilarity measure determined by μ_{DIS} depends upon the set difference $P(R) - Q(R)$ and $Q(R) - P(R)$, since these encode the

²¹ Regarding individuals' locations along numerous dimensions, Alrenga (2007: 118) further assumes that measure function μ_{DIS} is provided contextually. This means that the dimensions for the measure of dissimilarity between individuals may vary from different utterance contexts. Formally, Alrenga achieves this goal by expressing that a particular dimension of comparison constituted by the sortal subclass D_{sort} of D_d **does not affect** the measure returned by μ_{DIS} , as demonstrated below.

$$(i) \text{ For } I, J, K \subseteq D_d, \text{ if } J - D_{sort} = K - D_{sort}, \text{ then } \mu_{DIS}(I - J, J - I) = \mu_{DIS}(I - K, K - I).$$

That is, if the "multidimensional" locations J and K of the individuals j and k differ only in the subsets of D_{sort} that they include (which represent the locations of j and k along some contextually irrelevant dimension), then j and k are equally dissimilar to the individual i (whose multidimensional location is I).

In this thesis, I adopt this line of formal representations. That is, the conception that the measure function μ_{SIM} (the measure function of *yi yang* in my analysis) is provided contextually, can be formally represented as follows:

$$(ii) \text{ For } I, J, K \subseteq D_d, \text{ if } J - D_{sort} = K - D_{sort}, \text{ then } \mu_{SIM}(I, J) = \mu_{SIM}(I, K).$$

As it will become clear in the following, there are two important differences between my analysis and Alrenga's. One concerns the measure function (μ_{DIS} v.s. μ_{SIM}). The other concerns the way of deriving the semantics (by utilizing the union of two set difference or the inter set of two sets).

differences amongst the “multidimensional” locations $P(R)$ and $Q(R)$.

In a similar line, Alrenga (2007: 108) proposes the following representations for the semantics of $same_{SIM}$ and similarity comparatives headed by $same_{SIM}$ in English.

$$(107) \text{ same}_{SIM} = \lambda P_{\langle\langle d, t \rangle, \langle e, t \rangle, \langle d, t \rangle\rangle} \lambda Q_{\langle\langle d, t \rangle, \langle e, t \rangle, \langle d, t \rangle\rangle} \\ \mu_{DIS}((P(R) - Q(R)), (Q(R) - P(R))) = \emptyset$$

(108) a. Barry is the same as John (is).

b. $same_{SIM} (\lambda G. \iota[G(I)(j)])(\lambda G. \iota[G(I)(b)])$

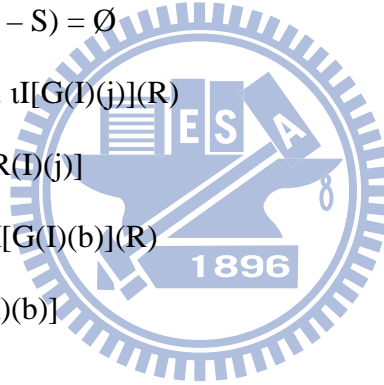
c. $\mu_{DIS}(S - B, B - S) = \emptyset$

where $S = \lambda G. \iota[G(I)(j)](R)$

$= \iota[R(I)(j)]$

and $B = \lambda G. \iota[G(I)(b)](R)$

$= \iota[R(I)(b)]$



According to Alrenga, such analysis takes *same* to express the absence of dissimilarity, by requiring that the measure returned by μ_{DIS} be the zero interval \emptyset . Obviously, Alrenga’s analysis in (107) leaves no room for the combination with degree morphemes, *same* in (107) is a two-place relation. In other words, as mentioned above, Alrenga treats *same* and *different* as a pair of total/ partial adjectives. However, as we have already mentioned, such treatment is suffering both theoretical and empirical problems.

Before we turn to Mandarin data, it is important to note that the adjectives such as *same* and *different* are **comparative-like gradable** adjectives. That is, such kinds of adjectives have not only some properties of comparatives, but also some properties of

gradable adjectives. Under Alrenga’s analysis, as illustrated above, *same/ different* are the heads of similarity comparatives. On the other hand, as suggested by Alrenga (2007: 140), these adjectives may also determine positive and negative intervals of a scale (e.g., *different* determines a positive interval and *like* a negative one on the scale of dissimilarity). Following this line of research, I analyze *yiYang* and *buyiYang* as the heads of similarity comparatives in Mandarin. Furthermore, these *comparative-like* adjectives determine positive and negative intervals on a scale as well.

Now, shifting our attention to Mandarin; I propose the following representations for the syntax-semantics of *yiYang*_{SIM} and similarity comparatives headed by *yiYang*_{SIM}.

$$(109) \text{yiYang}_{\text{SIM}} = \lambda P_{\langle\langle d, t \rangle, \langle e, t \rangle, \langle d, t \rangle\rangle} \lambda Q_{\langle\langle d, t \rangle, \langle e, t \rangle, \langle d, t \rangle\rangle} \lambda I_{\langle d, t \rangle} : I \subseteq D_{\text{sim}}$$

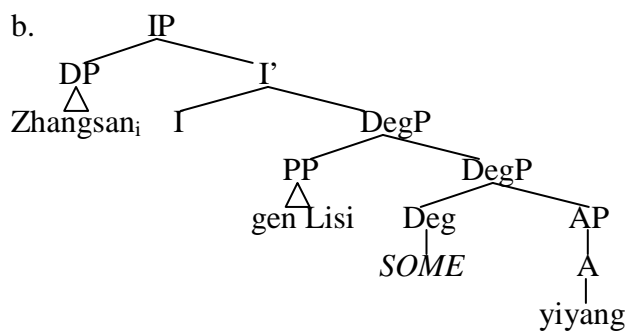
$$\mu_{\text{SIM}}(P(R), Q(R)) = I$$

(110) Similarity comparatives in Mandarin

a. Zhangsan gen Lisi yiyang.

Zhangsan with Lisi same

‘Zhangsan is the same as Lisi with respect to some contextually salient properties.’



In (109), *yiYang* is analyzed as not only the head of similarity comparatives, but also a

gradable adjective determining a positive interval on the scale of similarity. Resembling Alrenga's analysis, $P(R)$ and $Q(R)$ are the interpretations of complement and matrix clause, respectively. The relation R is a single constant relation of type $\langle\langle d,t\rangle,\langle e,t\rangle\rangle$, the purpose of which is to introduce the dimensions of comparison. In my view, the intersection of these two sets $P(R)$ and $Q(R)$ is a set consisting of any members of D_d occurring in both sets. In such way, the semantics of *iyang* is **directly** derived. This forms a sharp contrast with Alrenga's idea, which utilizes the union of those two sets (i.e., $S-B$ and $B-S$) to **indirectly** derive the semantics of *same*. Another important difference along this line concerns the intervals returned by *iyang* and *same*. Under the present analysis, *iyang* is required to return a positive interval on the scale of similarity; while under Alrenga's analysis, *same* is required to return a zero interval \emptyset on the scale of dissimilarity (since its associated measure function is μ_{DIS}). Evidently, on Alrenga's analysis, nothing can be said about the combination of *same* and different degree morphemes (or measure phrases).

For another difference, in order for a similarity comparative to receive a truth value, *iyang* further needs to combine with either degree morphemes or a measure phrase (i.e., the clausal complement).^{22,23} In (110), *iyang*, resembling gradable adjectives, syntactically projects a functional projection DegP and combines with an abstract degree morpheme *SOME*.

Heim (2006a) observes that the meaning for *short* in Kennedy (2001) can be understood as the result of composing the meaning of its positive counterpart *tall* with

²² In fact, Alrenga argues for a similar proposal. As demonstrated in (104)-(106), Alrenga proposes that a similarity comparative sentence such as (106a) semantically involves a further combination of an abstract measure phrase (or degree morphemes) *SOME*.

²³ Imaginably, one may feel it is bizarre for a sentential complement to "semantically satisfy" a gradable predicate. However, such an idea is not a new one in the literature. See Meier (2003) for discussions about *too*, *enough*, and *so..that* constructions in English, where their sentential complements denote the maximal or minimal extent of a set of extents (within the framework of possible world semantics). Also see Louis Liu (2006) for discussions about the *dao*-clause in Mandarin, which semantically introduces the excessive degree saturating the degree argument of gradable adjectives.

an abstract “interval negation” operator *neg*, which applies to an interval and then returns its complement. Heim proposes that the scalar comparative head *less* be analyzed as the combination of *more/ -er* and *neg* (see also Büring 2007a-b). The following version of *neg* is provided by Alrenga (2007: 70).

$$(111) \mathit{NEG} = \lambda I_{\langle d, t \rangle} . \lambda d_d . \exists d' [I(d') = 1 \ \& \ (d > d' \ \text{or} \ d' > d)] \ \& \ I(d) = 0$$

According to Alrenga, the existential conjunct in (111) is added to Heim’s original definition; this conjunct ensures that the interval *neg(I)* will consist only of degrees from the same scale as the one to which *I* belongs. Recall that *yiyang* and *buyiyang*, under my analysis, denote two complementary intervals on the same scale (see (100)~(102)). Seen in this way, I thus adopt the version of *neg* in (111) in this thesis. I propose the following representations for the syntax-semantics of *buyiyang*_{SIM} and similarity comparatives headed by *buyiyang*_{SIM} in Mandarin.

$$(112) \mathit{buyiyang}_{\text{SIM}} = \lambda P_{\langle \langle \langle d, t \rangle, \langle e, t \rangle \rangle, \langle d, t \rangle \rangle} \lambda Q_{\langle \langle \langle d, t \rangle, \langle e, t \rangle \rangle, \langle d, t \rangle \rangle} \lambda I_{\langle d, t \rangle} : I \subseteq D_{\text{sim}}$$

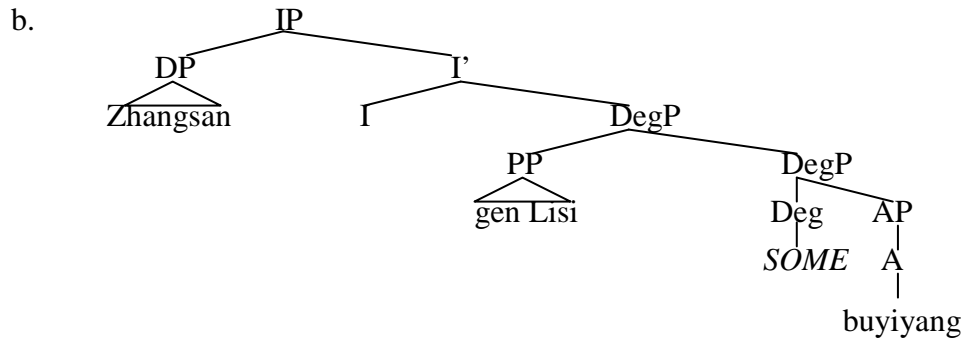
$$\mathit{NEG} (\mathit{U}[\mathit{yiyang}(P)(Q)(J)]) = I$$

(113) Similarity comparatives headed by *buyiyang*_{SIM} in Mandarin

a. Zhangsan gen Lisi buyiyang.

Zhangsan with Lisi different

‘Zhangsan is different from Lisi with respect to some contextually salient properties.’



In (112), *buyiyang* is analyzed as not only the head of similarity comparatives, but also a gradable adjective determining a negative interval on the scale of similarity. In (113), *buyiyang*, like gradable adjectives, syntactically projects a functional projection DegP and combines with an abstract degree morpheme *SOME*.

To summarize, this chapter is devoted to similarity readings of *iyang* and *buyiyang*. First, I demonstrate that *iyang* and *buyiyang* in Mandarin, like their counterparts *same* and *different* in English, are lexically ambiguous (between similarity readings and identity readings). Additionally, I argue that the two pairs of adjectives *iyang/buyiyang* and *same/different* should be considered as the adjectives with totally closed scale. Third, I propose that the clausal complement (and *in that S*) can be regarded as the measure phrase in similarity comparatives. Along a line with Alrenga (2007), I suggest that *iyang* and *buyiyang* serve as not only the comparative heads, but also determine an interval on the scale. Under these assumptions, a cross-linguistic variation between English and Mandarin emerges: *Yiyang* determines a positive interval, while *buyiyang* determines a negative interval on the scale of similarity. In contrast, *same* and *different* determine a positive interval on the scale of similarity and dissimilarity respectively. Further, if this line of reasoning is correct, the syntactic asymmetry between *iyang* and *buyiyang* can not be simply attributed to the idiosyncrasy of lexicons; rather, it is a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyiyang*, since the combination of

buyiyang and the clausal complement leads to a conflict in the ordering of two sets of degrees (or two intervals). Finally, I propose the representation of the syntax-semantics of similarity *yiyang/ buyiyang* and similarity comparatives in Mandarin.

In the next chapter, I deal with identity readings of *yiyang/ buyiyang*. I will first discuss Alrenga's analysis of identity *same* and *different*, and point out some potential problems for his analysis. Then, I propose the representation of the syntax-semantics of identity *yiyang/ buyiyang* and identity comparatives in Mandarin.



Identity Comparatives in Mandarin

Alrenga (2007: 153) propose the following representations for the semantics of *same_{ID}* and *different_{ID}* in English.

$$(114) \textit{same}_{ID} = \lambda P_{\langle\langle e, t \rangle, \langle e, t \rangle, \langle e, t \rangle\rangle} \lambda Q_{\langle\langle r, t \rangle, \langle r, t \rangle, \langle r, t \rangle\rangle}$$

$$\mu_{CARD}((P(R) - Q(R)), (Q(R) - P(R))) = \emptyset$$

$$\text{where } R = \lambda X_{\langle e, t \rangle} \lambda y_e \forall z [(z \leq y \ \& \ \forall x [x \leq z \rightarrow x = z])$$

$$\leftrightarrow z \in X]$$

$$(115) \textit{different}_{ID} = \lambda P_{\langle\langle e, t \rangle, \langle e, t \rangle, \langle e, t \rangle\rangle} \lambda Q_{\langle\langle r, t \rangle, \langle r, t \rangle, \langle r, t \rangle\rangle} \lambda I_{\langle d, t \rangle} : I \subseteq D_{card}$$

$$\mu_{CARD}((P(R) - Q(R)), (Q(R) - P(R))) = I$$

$$\text{where } R = \lambda X_{\langle e, t \rangle} \lambda y_e \forall z [(z \leq y \ \& \ \forall x [x \leq z \rightarrow x = z])$$

$$\leftrightarrow z \in X]$$

According to Alrenga, there are some important differences between the semantic representations of similarity *same/ different* and identity *same/ different*. First, the relation *R*, with respect to which identity *same* and *different* are interpreted, is of type $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$, that is, *R* is a relation between individuals and sets of individuals (subsets of D_e). In contrast, the relation *R*, with respect to which similarity *same* and *different* are interpreted, is of type $\langle\langle d, t \rangle, \langle e, t \rangle\rangle$, and so constitutes a relation between individuals and sets of abstract points. Further, Alrenga elaborates that “*R* is the relation that holds between an individual *y* (atomic or non-atomic) and the set of

individuals X consisting of all and only the atomic parts of y , where ‘ \leq ’ is the “part of” relation defined over the domain of (count) individuals, as in Link (1983). Thus, R simply relates an individual to the set of consisting of its atomic parts” (p. 154). Second, the measure function μ_{CARD} is a fixed feature of the interpretation of *same/different* as identity comparative heads. In particular, μ_{CARD} is a function from two subsets of D_e to positive intervals of the $S_{\text{card}} = (D_{\text{card}}, >_{\text{card}})$ that satisfies the following conditions:

- (116) a. $\mu_{\text{CARD}}(A, B) = \emptyset$ iff $A \cup B = \emptyset$
 b. $\mu_{\text{CARD}}(A, B) \supseteq \mu_{\text{CARD}}(C, D)$ iff $|A \cup B| \geq |C \cup D|$

With these assumptions, Alrenga (2007: 157) further proposes the semantic representations of identity comparatives headed by *same_{ID}*, as shown in (117).

- (117) a. The presenters at this year’s Emmy awards are the same as they were last year.

b. $\text{same}_{\text{ID}}(\lambda G. \mathfrak{I}[G(\text{I})(p))](\lambda G. \mathfrak{I}[G(\text{I})(t)])$

c. $\mu_{\text{CARD}}(P - T, T - P) = \emptyset$

where $P = [\lambda G. \mathfrak{I}[G(\text{I})(p)]] (\lambda X_{\langle e, t \rangle}. \lambda y_e. \forall z[(z \leq y \ \& \ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in X])$

$= \mathfrak{I}[\forall z[(z \leq p \ \& \ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in \text{I}]]$

and $T = [\lambda G. \mathfrak{I}[G(\text{I})(t)]] (\lambda X_{\langle e, t \rangle}. \lambda y_e. \forall z[(z \leq y \ \& \ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in X])$

$= \mathfrak{I}[\forall z[(z \leq t \ \& \ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in \text{I}]]$

According to Alrenga, in (117b), $\lambda G. \mathfrak{I}[G(\text{I})(p)]$ and $\lambda G. \mathfrak{I}[G(\text{I})(t)]$ represent the

interpretations of the complement and matrix clause respectively. These are both functions from relations of type $\langle\langle e,t \rangle, \langle e,t \rangle\rangle$ to subsets of D_e . The individuals p and t are the plural individuals consisting of all and only the presenters at last year's Emmy awards and this year's Emmy awards, respectively. In (117c), the sets P and T are the sets consisting of all and only the atomic individuals that are parts of p and t respectively. In other words, P is simply the set consisting of the presenters at last year's Emmy awards, and T is the set consisting of the presenters at this year's Emmy awards. The truth condition in (118c) amount to the requirement that the symmetric set difference between P and T , given by $(P - T) \cup (T - P)$, be the empty set \emptyset . This is actually another way of saying that P and T are identical (i.e., the set consisting of the presenters at last year is identical in its membership to the set consisting of the presenters at this year).

In a similar line, Alrenga (2007: 158) proposes the semantics representations of identity comparatives headed by *different*_{ID}, as shown in (118).

(118) a. The medicines used to treat malaria today are a lot different than they were fifty years ago.

b. a lot(_{tK} [*different*_{ID} ($\lambda G. \iota I[G(I)(j)]$)($\lambda G. \iota I[G(I)(b)]$)(K)])

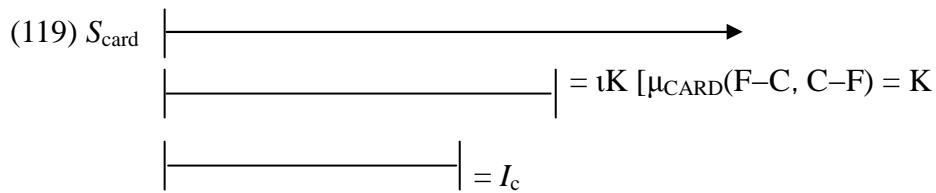
c. $\exists I_c \in ALOT_c$ [_{tK} [$\mu_{CARD}(F - C, C - F) = K$] $\supseteq I_c$]

where $F = [\lambda G. \iota I[G(I)(f)]]$ ($\lambda X_{\langle e,t \rangle}. \lambda y_e. \forall z[(z \leq y \ \& \ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in X]$)

$= \iota I[\forall z[(z \leq f \ \& \ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in I]$

and $C = [\lambda G. \iota I[G(I)(c)]]$ ($\lambda X_{\langle e,t \rangle}. \lambda y_e. \forall z[(z \leq y \ \& \ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in X]$)

$= \iota I[\forall z[(z \leq c \ \& \ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in I]$



According to Alrenga, in (118b), the interpretations of complement and matrix clause, again, are respectively given by $\lambda G.\iota I[G(I)(f)]$ and $\lambda G.\iota I[G(I)(c)]$. The individuals f and c are the plural individuals consisting of all and only the medicines used to treat malaria fifty years ago and today, respectively. The sets F and C in (118c) are then the sets consisting of all and only the atomic individuals that are parts of f and c , respectively. This means that F is the set consisting of the medicines used to treat malaria fifty years ago, while C is the set consisting of the medicines used to treat malaria today. The truth conditions in (118c) require that the symmetric set difference between F and C , given by $(F-C) \cup (C-F)$, be of a sufficiently large cardinality to count as “a lot”.

It is worth noting that there is an important notion underlying Alrenga’s analysis of identity *same* and *different*. That is, an identity comparative takes individual identity to itself constitutes an attribute with respect to which individuals may differ. Put differently, the dimension of comparison relevant to identity comparatives simply is the dimension of individual identity. In this thesis, I also pursue such a line of research. However, before we turn to the Mandarin data, I would like to point out some potential problems for Alrenga’s analysis.

The first problem is an empirical one. It seems that Alrenga’s analysis of *same* leaves no room to account for the combination of proportion adverbs. Consider the following examples.

(120) John’s committee members are {partially, almost, completely} the same as

Mary's committee members.

Recall that, under Alrenga's analysis, identity *same* requires that the intervals returned by their associated measure functions be the zero interval \emptyset . In this way, nothing can be said about the combinations of proportional adverbs. Needless to say, Alrenga's analysis of the similarity *same* suffers the pain as well.

The second problem is theoretical in nature. Under Alrenga's analysis of identity *different*, it seems that identity *different* must combine with proportion adverbs (in order to have a truth value assigned to the comparative sentence). However, there are comparative sentences where identity *different* apparently does not combine with any proportion adverbs. See the following example.

(121) John's committee members are different from Mary's committee members.

Recall that Alrenga assumes an abstract measure phrase *SOME* in his analysis of similarity *different*, as mentioned above. Regarding examples such as (121), it seems that Alrenga has to assume an abstract proportion adverb which combines with identity *different* in the sentence. Obviously, this adds some burdens on the proof of an analysis.

Turning to Mandarin, I propose the following representations for the syntax-semantics of identity *yi yang*_{ID} and identity comparatives headed by *yi yang*_{ID}.

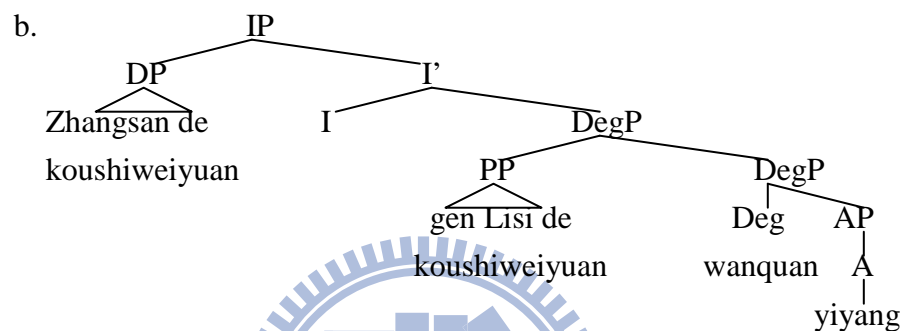
$$(122) \textit{yi yang}_{ID} = \lambda P_{\langle\langle e, t \rangle, \langle e, t \rangle\rangle} \lambda Q_{\langle\langle r, t \rangle, \langle r, t \rangle\rangle} \lambda I_{\langle d, t \rangle} : I \subseteq D_{\text{card-1}}$$

$$\mu_{\text{CARD-1}}(P(R), Q(R)) = I$$

$$\text{where } R = \lambda X_{\langle e, t \rangle} \lambda y_e \forall z [(z \leq y \ \& \ \forall x [x \leq z \rightarrow x = z])$$

$$\leftrightarrow z \in X]$$

- (123) a. Zhangsan de koushiweiyuan he Lisi de koushiweiyuan
 Zhangsan POSS committee-member with Lisi POSS committee member
 wanquan yiyang.
 completely same
 ‘Zhangsan’s committee members are completely the same as Lisi’s
 committee members.’



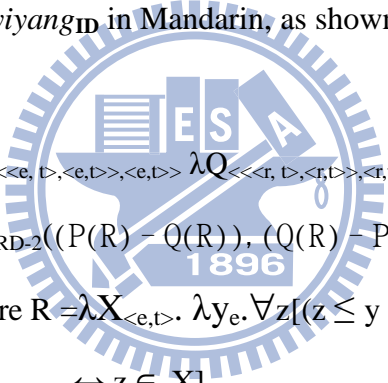
In (122), resembling Alrenga’s analysis, R is the relation that holds between an individual y (atomic or non-atomic) and the set of individuals X consisting of all and only the atomic parts of y , where ‘ \leq ’ is the “part of” relation defined over the domain of (count) individuals. Thus, R simply relates an individual to the set consisting of its atomic parts. Also, the interpretations of complement and matrix clause are given by $P(R)$ and $Q(R)$, respectively. In other words, $P(R)$ is the set consisting of Lisi’s committee members and $Q(R)$ is the set consisting of Zhangsan’s committee members. On the other hand, like my analysis of similarity *yiyang*, the intersection of these two sets $P(R)$ and $Q(R)$ is a set consisting of the members of D_e occurring in both sets. In this way, the semantics of identity *yiyang* is **directly** derived, and *yiyang* is required to return a positive interval.²⁴ In order to make a truth value assign to the sentence,

²⁴ In fact, the terms $D_{\text{card-1}}$ and $\mu_{\text{CARD-1}}$ are quite misleading. However, the idea here is that since individual identity itself constitutes as a dimension of comparison, resembling other quantitative attributes (e.g., height, weight, width), $D_{\text{card-1}}$ can be understood as the “positive” members on the

iyang needs further to combine with a proportion adverb such as *wanquan* ‘completely’.

In (123), identity *iyang*, like a gradable adjective, syntactically projects a functional projection DegP, which is headed by the proportion adverb *wanquan* ‘completely’. This allows us to understand how modifiers such as *jihu* ‘almost’ and *wanquan* ‘completely’ contribute semantically to identity comparatives: when such modifiers occur with identity *iyang* and *buyiyang*, they provide some indications of the extent of the (non-)overlap amongst collections of individuals.

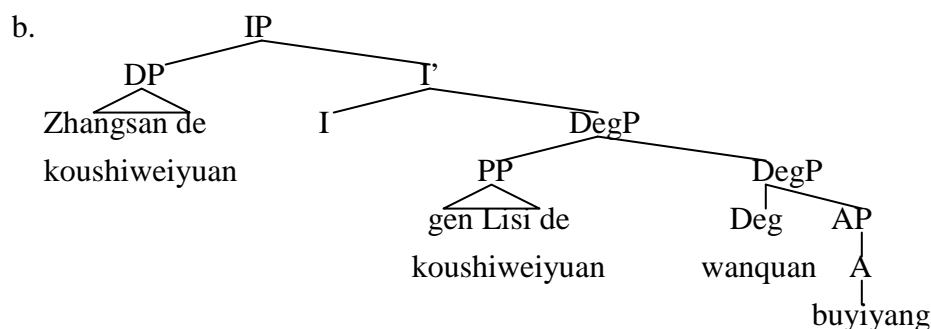
In a similar vein, despite the theoretical problem indicated above, I propose the representations of the syntax-semantics of identity *buyiyang*_{ID} and identity comparatives headed by *buyiyang*_{ID} in Mandarin, as shown in (124) and (125).



(124) $buyiyang_{ID} = \lambda P_{\langle \langle e, t \rangle, \langle e, t \rangle, \langle e, t \rangle \rangle} \lambda Q_{\langle \langle r, t \rangle, \langle r, t \rangle, \langle r, t \rangle \rangle} \lambda I_{\langle d, t \rangle} : I \subseteq D_{card-2}$
 $\mu_{CARD-2}((P(R) - Q(R)), (Q(R) - P(R))) = I$
 where $R = \lambda X_{\langle e, t \rangle} \lambda y_e \forall z [(z \leq y \ \& \ \forall x [x \leq z \rightarrow x = z])$
 $\leftrightarrow z \in X]$

- (125) a. Zhangsan de koushiweiyuan gen Lisi de koushiweiyuan
 Zhangsan POSS committee-member with Lisi POSS committee member
 wanquan buyiyang.
 completely different
 ‘Zhangsan’s committee members are completely different from Lisi’s
 committee members.’

cardinality scale, and μ_{CARD-1} returns a positive interval belonging to these positive members.



In (124), R is also a relation between individuals and sets of individuals (subsets of D_e). Again, the interpretations of the complement and matrix clause are represented by $P(R)$ and $Q(R)$, respectively. That is, $P(R)$ is the set consisting of Lisi's committee members and $Q(R)$ is the set consisting of Zhangsan's committee members. Here, the semantics of *buyiyang* are derived by the union of the two set difference, given by $((P(R)-Q(R)) \cup (Q(R)-P(R)))$. Specifically, $(P(R)-Q(R))$ is the set consisting of the members that only belong to **Lisi's committee members** but not to Zhangsan's committee members. Similarly, $(Q(R)-P(R))$ is the set consisting of the members that only belong to **Zhangsan's committee members** but not to Lisi's committee members. So, the union of these two sets $((P(R)-Q(R)) \cup (Q(R)-P(R)))$ is the set consisting of the members occurring in just one of these two sets. On the other hand, *buyiyang* is required to return a positive interval.²⁵ Also, in order to have a truth value assigned to the sentence, *buyiyang* needs to further combine a proportion adverb such as *wanquan* 'completely'.

In (125), identity *buyiyang*, like gradable adjectives, syntactically projects a functional projection DegP, which is headed by the proportion adverb *wanquan* 'completely'. Finally, I would like to make a comparison between the present analysis and Alrenga's. An important aspect of my analysis of identity *iyiyang* and *buyiyang*

²⁵ Recall that individual identity is regarded as the dimension of comparison. Resembling a quantitative dimension, it consists of both positive and negative members on the scale (i.e., cardinality). In this sense, $D_{\text{card-2}}$ can be considered as the "negative" members on the scale, and $\mu_{\text{CARD-2}}$ returns an interval belonging to these members.

concerns the conception that individual identity itself constitutes the dimension of comparison. In this respect, I share with Alrenga's analysis. In other words, individual identity, resembling other dimensions of comparison, consist of both positive and negative members on the scale (i.e., cardinality).

The following is a brief summary of my analysis and Alrenga's. Under Alrenga's analysis, *same* is required by its associated measure function μ_{CARD} to return a zero interval \emptyset (belonging to the negative members) on the scale of cardinality. In contrast, in my analysis, *yiyang* is required by its associated measure function $\mu_{\text{CARD-1}}$ to return an interval belonging to the positive members (i.e., $D_{\text{card-1}}$) on the scale of cardinality. On the other hand, under Alrenga's analysis, *different* is required by its associated measure function μ_{CARD} to return an interval (belonging to the negative members, D_{card}) on the scale of cardinality. In contrast, *buyiyang* is required by its associated measure function $\mu_{\text{CARD-2}}$ to return an interval belonging to the negative members (i.e., $D_{\text{card-2}}$) on the scale of cardinality.

Finally, recall that there are two potential problems for Alrenga's analysis. Regarding the empirical problem, my analysis fares better than Alrenga's, since my analysis clearly tells us how proportion adverbs semantically contribute to identity comparatives. However, regarding the theoretical problem, my analysis suffers the same pain as Alrenga's does.

Conclusions

This thesis explores both syntax and semantics of *yiyang* ‘same’, *buyiyang* ‘different’ and three types of comparative constructions (i.e., scalar (un-)equatives, similarity comparatives, and identity comparatives) headed by them. In chapter two I review some common views on the gradable predicates and comparatives in the formal literature, which I assumed in this thesis. Also, I review some previous analyses on the use of *yiyang* and *buyiyang* in Mandarin. These analyses provide two important observations. One is that *yiyang* and *buyiyang* seem to involve two different syntactic positions, namely, degree adverbs and adjectival predicates. The other is that the categorial status of *gen/he* seems to affect the interpretation of comparatives.

Based on these two basic observations, in chapter three I provide several pieces of evidence (e.g., ellipsis, the scope of question particle and structural ambiguity) for a necessary distinction between those two different uses of *yiyang* and *buyiyang*. In addition, I argue that the comparative marker *gen/he*, which introduces the comparative standard, is prepositional in these three types of comparatives. This in turn suggests an adjunction analysis for the structural configuration of comparatives (e.g., Liu 1996, Kennedy 1999, Lin 2009). On the other hand, I suggest that the (similarity) predicate *yiyang* (but not *buyiyang*) syntactically combine with a clause which is complement in nature, since the extraction of elements from it does not render island effects (i.e., CED effects in the sense of Huang 1982). Thus, a syntactic asymmetry exists between *yiyang* and *buyiyang*. Further, the complement clause functionally serves as a further specification of the dimension of similarity. Finally,

regarding scalar (un-)equatives, I propose that they are both syntactically and semantically headed by degree adverbs *yiyang* and *buyiyang*. Seen in this way, *yiyang* and *buyiyang* resemble the English degree morpheme *more* in two respects. First, all of them are the head of comparatives. Second, all of them are degree morphemes introducing an ordering relation between individuals with respect to possessing some gradable property.

In chapter 4, I deal with similarity comparatives in Mandarin. In particular, I first show that *yiyang* and *buyiyang*, resembling their counterparts *same* and *different* in English, are lexically ambiguous between similarity and identity readings in Mandarin. Further, by relating dimensions of similarity to degrees of similarity, I suggest that the complement clause can be considered as measure phrases in similarity comparatives, by showing both syntactic and semantic parallels between the complement clause and measure phrases. Turning to the syntactic asymmetry, following the suggestion of Alrenga (2007: 140) that the similarity comparative head such as *different* and *like* also determines positive and negative intervals of a scale, dubbed with the fact that the adjectives with negative polarity are incompatible with measure phrases, I suggest that the syntactic asymmetry between *yiyang* and *buyiyang* should not be attributed to the idiosyncrasy of lexicons; rather, it is better considered as a reflex of the deeper syntax-semantics of measure phrases and the interval nature of *buyiyang*. Put explicitly, *yiyang* determines a positive interval whereas *buyiyang* determines a negative interval of the scale. It is this interval nature that contributes to the syntactic asymmetry between *yiyang* and *buyiyang* in Mandarin.

If the above line of reasoning is on the right track, it suggests a cross-linguistic variation between English and Mandarin: although the adjectives *same* and *different* both introduce a positive interval on different scales (i.e., similarity and dissimilarity), since they are compatible with measure phrases (i.e., *in that S*). In contrast, *yiyang*

introduce a positive interval, whereas *buyiyang* introduces a negative interval on the same scale (i.e., similarity). An important question immediately emerges: Are there more linguistic contrasts along this cross-linguistic variation? I leave this line of research for another occasion.

Finally, I argue against Alrenga's (2007) treatment of similarity predicates *same/different* as a pair of total/partial adjectives, by showing that *same* and *different* both are indeed compatible with degree adverbs such as *slightly* and *completely*. In fact, in Mandarin, *iyang* and *buyiyang* are also perfectly compatible with degree adverbs such as *youdian* 'slightly' and *wanquan* 'completely'. This in turn suggests that the two pairs of adjectives *same/different* and *iyang/buyiyang* be better considered as adjectives with totally closed scale (e.g., *full/empty*, *open/closed*), rather than adjectives with partially closed scale (e.g., *dry/wet*, *straight/bent*). Given these considerations, I propose a syntax-semantics analysis of *iyang/buyiyang* and similarity comparatives in Mandarin. In particular, similarity comparatives are both syntactically and semantically headed by similarity predicates *iyang* and *buyiyang*. In this respect, they not only are the head of similarity comparatives, but also resemble gradable adjectives in determining positive and negative intervals of a scale (i.e., similarity).

In chapter 5, I deal with identity comparatives in Mandarin. Specifically, I first review Alrenga's analysis of *same* and *different*, and then point out two potential problems for his analysis. The first problem is an empirical one, concerning the combination of *same* and proportion modifiers such as *almost* and *completely*. The second one is theoretical in nature, concerning the postulation of an abstract measure phrase. Given these considerations, I propose a syntax-semantics analysis of *iyang/buyiyang* and identity comparatives in Mandarin. To be more specific, following Alrenga's conception that individual identity itself constitutes as the dimension of

comparison in identity comparatives, I propose that identity predicates *yi* and *buyi* not only syntactically and semantically head identity comparatives, but also determine positive and negative intervals of a scale (i.e., cardinality). In this respect, *yi* and *buyi* not only are the head of identity comparatives, but also resemble gradable adjectives in determining positive and negative intervals of a scale (i.e., cardinality). Importantly, our analysis thus fares better than Alrenga's with respect to the empirical problem. Since the present analysis requires *yi* to return a positive interval on the relevant scale, and this move leaves room for how proportion adverbs semantically contribute to identity comparatives. However, with respect to the theoretical problem, the present analysis suffers the same pain as Alrenga's does, since both analyses have to postulate an abstract measure phrase and the truth value of a comparative sentence crucially relies on the combination of such degree morpheme.

Last but not the least, the present analysis of similarity and identity comparatives sheds light on the nature of those comparative-like gradable adjectives such as *yi* 'same' and *buyi* 'different'. More specifically, *yi* and *buyi* not only serve as the head of comparatives (i.e., similarity and identity), but also resemble gradable adjectives in determining an interval on the relevant scale (i.e., similarity and cardinality). Importantly, the present analysis explains why these comparative-like gradable adjectives have properties of comparatives (i.e., they are the head of comparatives) and properties of gradable adjectives (i.e., they determine intervals of a scale). There are other comparative-like adjectives such as *xiangtong* 'identical', *xiangyi* 'distinct', *butong* 'non-identical' and *(bu)xiang* '(dis)similar' in Mandarin. It will be interesting to examine the correlation among these comparative-like gradable adjectives, comparatives, and gradable adjectives in both syntactic and semantic respects. By investigating both syntax and semantics of *yi* and *buyi*, this thesis stands as a first step towards an overall understanding of these comparative-like

gradable adjectives in Mandarin.



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