

SUBJECTIVITY AND NOMINAL PROPERTY CONCEPTS IN MANDARIN CHINESE

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To my parents, Xi Peng and Bin Zhang, who encouraged me to stay curious and taught me to  
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SUBJECTIVITY AND NOMINAL PROPERTY CONCEPTS IN MANDARIN CHINESE

This dissertation focuses on Property Concept (PC) words, which are expressions that are typically realized as adjectives in languages like English that have adjectives, such as ‘tall’ or ‘wise’. Recent cross-linguistic work shows that there are two types of PC words: PC adjectives that are used predicatively and PC nominals that occur in possessive constructions. The details of this alternation remain poorly understood.

This dissertation contributes to the discussion by identifying and solving three puzzles associated with PC nouns in Mandarin Chinese:

Puzzle 1: Possessive PC phrases like *you zhihui* ‘have wisdom’ pattern syntactically like gradable adjectives and unlike other possessive phrases like *you shui* ‘have water’ in admitting intensifiers and other scalar modifiers.

Puzzle 2: Possessive PC phrases pattern like gradable adjectives and unlike gradable transitive verbs in requiring degree modifiers such as *hen* ‘very’ to block comparative interpretations in simple declarative sentences.

Puzzle 3: PC nominals with subjective meaning like *zhihui* ‘wisdom’ can be used in possessive constructions, whereas PC nouns with objective meaning like *gaodu* ‘height’ cannot.

I solve these three puzzles with two main proposals:

First, possessive PC phrases are type-theoretically and syntactically equivalent to gradable adjectives. Both types of expressions semantically denote relations between individuals and intervals and syntactically project as Adjective Phrases. This predicts their similar behavior and solves puzzles 1 and 2.

Second, possessive PC phrases stand in lexical competition with, and are blocked by, simple

adjectival counterparts, which are generally available only for objective and not for some subjective concepts. For example, *you gaodu* ‘have height’ is blocked by *gao* ‘tall’, whereas *you zhihui* ‘have wisdom’ lacks a simple adjectival counterpart. This solves puzzle 3.

The implication of this dissertation is that semantic type, syntactic category, and lexical competition interact to constrain the alternation between PC adjectives and nominals.

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## List of Glossing Conventions

**1SING** first person singular

**2SING** second person singular

**3SING** third person singular

**AGR** agreement

**BA** markers of *BA*-construction

**CL** classifier

**CMP** comparative operator

**CONT** continuous aspect

**COP** copula

**DAT** dative case

**DEM** demonstrative

**DOU** focus marker

**EQ-COP** equative copula (in Malayalam)

**EX.COP** existential copula (in Malayalam)

**FEM** feminine

**FIN** finite

**LE** perfective marker or sentence-final particle

**NEG** negation marker

**OBL** oblique case

**OPT** optative marker

**PAR** particle

**POS** positive operator

**POSS** possessive morpheme

**PR** prefix

**Q** question marker

**SENT-KA** the sentential *ka* marker in Ulwa

**SM** subject marker

**SUB** subordinate

## Chapter 1

### Introduction

#### 1.1 Property Concepts

The recognition of word classes and their language-specific semantic and morpho-syntactic criteria have drawn considerable interest from scholars cross-linguistically. Dixon (1982) points out that almost all languages have the category Noun and Verb, but not all languages have a large and productive class of adjective. In languages that do have the category of adjective, they demonstrate inter-language correspondences involving semantic, and sometimes syntactic, characteristics. To investigate the association between semantic types and parts of speech, Dixon (1982) identifies a class of expressions, such as *big*, *hard* and *wise* in English, that are realized as adjectives in languages that have such a category. Thompson (1989) calls them *Property Concept* lexemes (henceforth PC lexemes), which refer to “properties, qualities or characteristics of referents” (p. 67).

PC lexemes also fall into categories other than adjectives. As pointed out by Dixon, not all languages have the class of adjective; some languages are adjective-deficient, or only have a small, non-productive class of adjective. Logically, in those languages, PC lexemes that are realized as adjectives in other languages are instead realized as other parts of speech. On the other hand, intra-language variation may occur with respect to the realization of PC lexemes.

Francez and Koontz-Garboden (2015, 2017) explore the pattern of *property concept sentences* (henceforth PC sentences) and point out that there are two morphosyntactic types of PC sentences cross-linguistically. The first type is predicative adjective sentences, which are demonstrated by the following English sentence:

- (1) Anna is wise.

The second type of PC sentences are formed with abstract nominals (henceforth PC nominals) that occur in possessive constructions. In English, it is possible to form a possessive sentence with the PC nominal *wisdom* as follows:

- (2) Anna has wisdom.

Francez and Koontz-Garboden (2017) investigate the variation of PC sentences with cross-linguistic data. They argue that, while possessive PC sentences such as (2) are rather marked and limited in English compared to predicative adjective sentences such as (1), the markedness and productivity of these two forms vary cross-linguistically. Possessive PC sentences are also attested in other Germanic and Romance languages; as shown below, the German sentence that can be translated as ‘I am hungry’ can be expressed with a predicative adjective ‘hungrig’ in (3a), or with a PC nominal ‘Hunger’ in possessive construction in (3b):

- (3) a. Ich bin hungrig.  
I am hungry  
‘I am hungry.’
- b. Ich habe Hunger.  
I have hunger  
‘I am hungry.’

While the possessive PC sentences in Germanic and Romance languages such as German are more idiomatic compared to their English counterpart in (2), they are still limited to a certain domain of PC lexemes and are far from productive; the predicative adjective sentences are the dominant form of PC sentences. The pattern is rather different, even reversed, in other languages. One of the languages is Ulwa, a Misumalplan language spoken in Nicaragua that serves as the major source of data in Francez and Koontz-Garboden (2017), which uses the possessive strategy overwhelmingly. The English adjectives would translate to a nominal in Ulwa with the possessive suffix *ka*. As shown below, the predicate *minisih-ka* in (4b) shares the same morphology with the possessive

noun phrase *pan-ka* in (4a):

- (4) a. *alas pan-ka*  
3SING stick-3SING.POSS  
'his/her stick'
- b. *yang as-ki-na minisih-ka.*  
1SING shirt-1SING.POSS dirty-3SING.POSS  
'My shirt is dirty.'

(Green, 2004, as cited in Francez and Koontz-Garboden, 2017, p. 31)

In Mandarin, both types of sentences are attested, and are fairly productive and idiomatic. As illustrated below, the adjective *gao* 'tall' occurs in canonical predicative sentence in (5) and the PC nominal *zhihui* 'wisdom' occurs with the possessive morpheme *you* in (6), and both are directly modified by the degree modifier *hen*:

- (5) *Zhangsan hen gao.*  
*Zhangsan very tall*  
'Zhangsan is (very) tall.' [Adjectives]
- (6) *Zhangsan hen you zhihui.*  
*Zhangsan very POSS wisdom*  
'Zhangsan has (a lot of) wisdom/ is (very) wise.' [PC Nominals]

The distribution of predicative and possessive PC sentences with adjectives and PC nominals respectively in Mandarin is the main motivation of my work, and will serve as the major domain of empirical material in this dissertation.

One question surrounding the variation of PC sentences, both inter- and intra-linguistically, is the association between the variation in forms and the variation in meaning. Francez and Koontz-Garboden (2017) argue that the predicative adjective and possessive PC sentences, such as *Anna is wise* and *Anna has wisdom* in English, can be translationally equivalent, although it does not necessarily suggest that they are model-theoretically identical, that is, that they "express the same

truth conditions derived in the same compositional way from the same model-theoretic parts ”(p. 142). Other scholars, such as Hanink et al. (2019), argue that PC sentences in some languages are indeed model-theoretically equivalent<sup>1</sup>.

Moreover, scholars are divided regarding whether the difference of forms are the result of differences in semantic components, or whether instead they are semantically uniform but differ at the phonological or morpho-syntactic level. They split into the TRANSPARENCY and UNIFORMITY view respectively; the former argues that the variation in form at the surface level reflects variation in meaning, whereas the latter argues that the observed morpho-syntactic differences reflect “the variation in the inventory and phonological realization of functional heads, but not in semantics” (Francez and Koontz-Garboden, 2017, p. 6).

In the empirical domain of PC sentences, while some scholars such as Menon and Pancheva (2014) propose an uniformity view with support from empirical data such as Malayalam, Francez and Koontz-Garboden (2017) pursue the transparency view and argue that the variation in forms of PC sentences is the consequence of semantics. They propose that whether the PC sentences are possessive or non-possessive is determined by the semantics of the property concept lexemes in the sentences. They point out that, intuitively, PC lexemes such as *wise* and *beautiful* describe individuals, while PC lexemes such as *wisdom* and *beauty* denote qualities<sup>2</sup>.

## 1.2 Puzzles

This dissertation explores the empirical domain of PC sentences with a focus on Mandarin Chinese. As stated above, two types of predication are found in PC sentences: the one with adjectives and the one with possessive PC predicates, repeated below:

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<sup>1</sup>See chapter 2.2.4 for more details.

<sup>2</sup>The details of this analysis will be discussed in chapter 2.2.2 - 2.2.4.



- (5) Zhangsan hen gao.  
 Zhangsan very tall  
 ‘Zhangsan is (very) tall.’ [Adjectives]
- (6) Zhangsan hen you zhihui.  
 Zhangsan very POSS wisdom  
 ‘Zhangsan has (a lot of) wisdom/ is (very) wise.’ [PC Nominals]

The pattern of PC sentences in Mandarin, especially the possessive construction with PC nominals, has attracted relatively little research interest in research. Yet the syntactic distribution as well as the semantic component of PC sentences in Mandarin is rather intriguing, with many questions left to answer. The goals of this work are to answer several lingering questions surrounding PC sentences in Mandarin, and to investigate the implication of the pattern of Mandarin PC sentences for the cross-linguistic phenomenon of PC sentences employing possessive predication. Furthermore, I would like to explore how to connect the pattern of Mandarin PC sentences with the important discussions presented in the previous sections, including the translational and model-theoretic equivalence, the syntactic and semantic variation, and the association between meaning and syntactic categories. I identify and aim to solve three puzzles surrounding the PC sentences, especially the possessive constructions with PC nominals in Mandarin.

### 1.2.1 Puzzle 1: PC nominals and mass nouns

The first puzzle concerns the semantic components of PC nominals and possessive PC predicates by comparing the distribution of PC nominals with mass nouns in constructions that involves degree modification.

The quality-based analysis of PC nominals proposed by Francez and Koontz-Garboden (2017) treats qualities as a sort of mass entities ordered by a mereological part relation, which, as Francez and Koontz-Garboden (2017) point out, is a property shared by all mass nouns. Logically, PC nominals and non-PC mass nouns should pattern in the same fashion in environments that are sensitive to

mereological relation. This prediction is borne out in languages such as English. As an example, determiners such as *little* and *much*, which are compatible with mass nouns such as *water* but not count nouns such as *dog*, are also compatible with PC nominals such as *wisdom*, as shown below:

- (7) a. \*little dog  
b. \*much dog
- (8) a. little water  
b. much water
- (9) a. little wisdom  
b. much wisdom

(Modified from Francez and Koontz-Garboden, 2017, p. 106)

In Mandarin, the distinction between count nouns and mass nouns is more implicit due to the fact that all Mandarin nouns seem to be countable with classifiers. One distinction pointed out by researchers (see Croft, 1994, L. L.-S. Cheng and Sybesma, 1998 among others) is that Mandarin count nouns occur with classifiers that simply name the unit that is inherently associated with the noun itself, while mass nouns occur with classifiers that create units of measures that are not associated with the semantics of the noun because they do not come with a built-in partitioning denotation. As shown below, count nouns such as *che* ‘car’ and *gou* ‘dog’ pair with classifiers such as *liang* and *tiao* that are associated with the inherent unit of the nouns, while mass nouns such as *shui* ‘water’ and *mi* ‘rice’ pair with classifiers such as *xie* and *dian* that create measuring units for them<sup>3</sup>:

- (10) a. yi liang che  
one CL car  
‘one car’

---

<sup>3</sup>See chapter 5.3 for a more detailed discussion of the count/mass distinction in Mandarin.

- b. yi tiao gou  
 one CL dog  
 ‘one dog’
- (11) a. yi xie shui  
 one few water  
 ‘a little water’
- b. yi dian mi  
 one bit rice  
 ‘a bit of rice’

PC nominals such as *zhihui* ‘wisdom’ and *yongqi* ‘courage’ behave in the same fashion with other mass nouns by pairing with classifiers such as *xie* and *dian*, as shown below:

- (12) a. yi xie zhihui  
 one few wisdom  
 ‘a little wisdom’
- b. yi dian yongqi  
 one bit courage  
 ‘a bit of courage’

However, non-PC mass nouns and PC nominals behave rather differently in possessive sentences. Although both non-PC mass nouns and PC nominals occur in possessive sentences with *you*, mass noun such as *shui* ‘water’ (13) in possessive sentences cannot be directly modified by degree modifiers such as *hen*, as illustrated below:

- (13) Zhangsan (\*hen) you shui.  
 Zhangsan very POSS water  
 ‘Zhangsan has (\*a lot of) water.’ [Mass Nouns]

Moreover, this distinction goes beyond just intensification with degree modifiers. Both adjectives and PC nominals in possessive predicates can be directly modified by *geng* ‘more’ in comparative sentences ((14) and (15)); on the other hand, concrete nouns such as *shui* ‘water’ have to be modified by a relative clause where *geng* modifies the predicates *duo* ‘many’ that quantifies the amount of water (16):

- (14) Zhangsan geng gao.  
Zhangsan more tall  
'Zhangsan is taller (than someone from the context).'  
[Adjectives, Comparative]
- (15) Zhangsan geng you zhihui.  
Zhangsan more POSS wisdom  
'Zhangsan has more wisdom/is wiser (than someone from the context).'  
[PC Nominals, Comparative]
- (16) Zhangsan you geng-duo de shui.  
Zhangsan POSS more-many DE water  
'Zhangsan has more water (than someone from the context).'  
[Concrete Nouns, Comparative]

The superlative construction involving possessive predicates shares the same pattern with the comparative construction. Both adjectives and PC nominals in possessive predicates can be directly modified by *zui* 'most' in superlative sentences ((17) and (18)); on the other hand, concrete nouns such as *shui* 'water' has to be modified by a relative clause where *zui* modifies the predicates *duo* 'many' that quantifies the amount of water (19):

- (17) Zhangsan zui gao.  
Zhangsan most tall  
'Zhangsan is the tallest (among a group in the context).'  
[Adjectives, Superlative]
- (18) Zhangsan zui you zhihui.  
Zhangsan most POSS wisdom  
'Zhangsan has the most wisdom/is most wise (among a group in the context).'  
[PC Nominals, Superlative]
- (19) Zhangsan you zui-duo de shui.  
Zhangsan POSS most-many DE water  
'Zhangsan has the most water (than someone from the context).'  
[Concrete Nouns, Superlative]

A similar pattern of distribution involving possession of mass nouns and PC nominals is found in Wolof, a Senegambian spoken in Senegal. Baglini (2015) shows that Wolof employs two strategies

to express stative predicates: some are lexicalized as verbs, which translate parallel to English predicative adjectives, and some as stative nouns with possessive morphology. She points out that while nominalized PC lexemes share the same surface form of possessive constructions with other non-PC mass nouns, possessive phrases with PC nominals behave in the same manner under degree modification with adjectives, but not with other mass nouns. For instance, the Wolof degree modifier *lool* is sensitive to the distinction between PC nominals such as *xel* ‘wit’ in (20b) and non-PC mass nouns such as *ceed* ‘rice’ in (20c) in that only the former can be directly modified by *xel* in the same way as adjectives such as *rafet* ‘pretty’ in (20a), as shown below:

- (20) a. Awa rafet-na-∅            (lool).  
           Awa pretty-FIN-3SING very  
           ‘Awa is (very) pretty.’
- b. Awa am na-∅            xel (lool).  
           Awa have FIN-3SING wit very  
           ‘Awa is (very) witty.’
- c. Awa am na-∅            ceed (\*lool).  
           Awa have FIN-3SING rice very  
           ‘Awa has rice.’            (Baglini 2015, p. 17)

The distribution of PC nominals and mass nouns in constructions demonstrated above also connects to more general distinctions between these two types of nominals. They show contrasting behaviors in constructions such as *what* exclamatives in English. For example, while both the PC nominal *courage* and the mass noun *soup* occur in *what* exclamatives that share the surface structure, only the former is equivalent to its *how* exclamatives, as demonstrated in (21) and (22) respectively:

- (21) a. I didn’t know what courage she had.≡  
       b. I didn’t know she had so much courage.
- (22) a. I didn’t know what soup they sell.≠  
       b. I didn’t know they sell so much soup.

Logically, an analysis of the semantic composition of PC nominals and possessive PC predicates that they occur in must be able to distinguish them from non-PC mass nouns, which also occur in possessive constructions with the same surface form. Moreover, such analysis must correctly predict the distribution of PC nominals and mass nouns in environments where the proposed distinction between the two types of nominals is relevant.

### 1.2.2 Puzzle 2: Degree modifiers and positive PC sentences

The second puzzle concerns how the positive meaning is achieved with variations of PC sentences in Mandarin. One of the well-established group of approaches of gradable adjectives is to treat them as measure functions from individual to degrees (see Cresswell, 1976, von Stechow, 1984, Bierwisch, 1989, Kennedy, 1997, Kennedy and McNally, 2005 among others). A null positive operator **POS** is often assumed for positive sentences such as ‘Anna is tall’ in English. The function of POS is to bind the degree argument and only return TRUE if the degree that the individual holds surpasses a contextually determined standard.

Similarly, a comparative operator **CMP** is assumed for comparative meanings, which establishes an ordering between two individuals. Scholars have proposed that the English *-er* suffix takes such function in sentences such as *Anna is taller than Bill*<sup>4</sup>.

Grano (2012) summarizes the descriptive typology of the positive forms and comparative forms cross-linguistically, which reveals three patterns of how POS and COMP are realized: the comparative forms are derived via affixation from the basic positive forms as in English; the comparative forms are derived periphrastically, exemplified by Spanish; the comparative forms and the positive forms are morphologically identical, as in Japanese. The patterns are summarized below:

---

<sup>4</sup>See chapter 2.1.3 for more details.

Language	Positive	Comparative	Pattern
English	tall	taller	derived comparative
Spanish	alto	más alto	periphrastic comparative
Japanese	takai	takai	no contrast

Table 1.1: Cross-linguistic pattern of positive and comparative forms

(Modified from Grano, 2012, p. 515)

Grano (2012) argues that the patterns summarized above suggests a generalization regarding the morphological forms and positive and comparative forms:

- (23) Universally, the morphological comparative form of an adjective is derived from (or identical to) its morphological positive form. (Grano, 2012, p. 515)

The generalization in (23), if correct, implies that there is no putative operator POS that is overt in any language.

However, the pattern of positive and comparative morphology in Mandarin seems to provide a counterexample to (23). In simple declarative sentences with predicative adjectives such as *gao* ‘tall’ in (24), degree modifiers such as *hen* ‘very’ are obligatory to express positive meaning; the sentences express comparative meaning without the degree modifiers (see Grano, 2012 among others):

- (24) Zhangsan (*hen*) *gao*.  
 Zhangsan very tall  
 with *hen*: ‘Zhangsan is (very) tall.’  
 without *hen*: ‘Zhangsan is taller (than someone known from context).’

Many scholars have proposed solutions to the question of why degree modifiers are obligatory in simple declarative clauses for positive interpretation in Mandarin (see S.-Z. Huang, 2006, Liu, 2010b, Gu, 2008 among others). Among them, Liu (2010b) argues that degree modifiers such as

*hen* is an overt realization of POS, which would be a direct contrast to (23).

Grano (2012) argues that the pattern of positive and comparative morphology with gradable adjectives in Mandarin is, in fact, compatible with the generalization in (23). He proposes that, universally, comparative semantics is provided by a morpheme that might be covert or overt, whereas positive semantics is provided by a type-shifting rule that is not realized in syntax. To explain the Mandarin data, he proposes a specific constraint that indicates bare adjective Phrases (APs) are forbidden as complements to Tense in Mandarin:

- (25) **The T[+V] constraint:** In Mandarin, the direct complement to T(ense) must either be (an extended projection of) a verb or a functional morpheme that can in principle combine with (an extended projection of) a verb. (Grano, 2012, p. 518)

According to (25), the covert POS functional head is forbidden because it does not affect the category of APs and hence fails to satisfy the T[+V] constraint. There are two cases where simple declarative sentences with predicative APs are allowed: if there is an overt projection of a verb, or if there is null functional morphology between Tense and the predicative AP. Degree modifiers such as *hen* shift the categorical membership of APs to verbal phrases while providing positive semantics. On the other hand, the null functional morpheme CMP also results in a verbal phrase while providing comparative semantics. Consequently, the T[+V] constraint is satisfied. This proposal also correctly predicts that, in constructions where Tense is not projected or where appropriate functional morphology intervenes between T and AP, bare APs are allowed<sup>5</sup>.

While it is well known that degree modifiers such as *hen* are obligatory to block comparative interpretations with gradable adjectives, the fact that PC nominals demonstrate a parallel pattern is much less discussed. As demonstrated below, degree modifiers such as *hen* are obligatory to block comparative interpretations in simple declarative sentences with PC nominals in possessive

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<sup>5</sup>See chapter 4.3 for more details.



predicates in (26)

- (26) Zhangsan (hen) you zhihui.  
Zhangsan very POSS wisdom

with *hen*: ‘Zhangsan has (a lot of) wisdom/ is (very) wise.’

without *hen*: ‘Zhangsan has more wisdom/ is wiser (than someone known from context).’

While possessive PC predicates seem to be headed by the possessive verb *you* ‘have’, the same pattern is not found with other verb phrases. For example, simple declarative sentences with gradable verbs as predicates such as *xihuan* ‘like’ in (27) can express positive meaning with or without degree modifiers such as *hen*, and do not express the comparative meaning when degree modifiers are not present.

- (27) Zhangsan (hen) xihuan Lisi.  
Zhangsan very like Lisi  
‘Zhangsan likes Lisi (very much).’

with or without *hen*: \*‘Zhangsan likes Lisi more (than someone known from context).’

Moreover, PC nominals and non-PC mass nouns demonstrate distinct behavior with respect to how positive and comparative meaning are expressed. As shown in earlier examples, possessive sentences with non-PC mass nouns express positive meaning when degree modifiers are not present:

- (13) Zhangsan (\*hen) you shui.  
Zhangsan very POSS water

‘Zhangsan has (\*a lot of) water.’

- (16) Zhangsan you geng-duo de shui.  
Zhangsan POSS more-many DE water

‘Zhangsan has more water (than someone from the context).’

An analysis of PC sentences and possessive PC phrases must be able to explain why possessive PC phrases behave in the same fashion with gradable adjectives rather than possessive phrases with

non-PC mass nouns and gradable VPs, and how it connects to the broader typological pattern of positive and comparative morphology cross-linguistically.

### 1.2.3 Puzzle 3: Lexical realization of PC lexemes

The third puzzle concerns the lexical realization of PC lexemes and the syntactic variation of PC sentences. As pointed out by Francez and Koontz-Garboden (2017), PC sentences that vary in syntactic forms can be translationally equivalent yet not necessarily model-theoretically identical. For the following pairs of sentences, the predicative adjective sentence in (a) and the possessive sentence in (b) are translationally equivalent in (28) and (29), yet their underlying semantic components are different:

- (28) a. Anna is tall.  
b. Anna has tallness/height.
- (29) a. Anna is wise.  
b. Anna has wisdom.

Francez and Koontz-Garboden (2017) argue that the variation of PC sentences reflects difference in underlying semantic components. Specifically, they propose that possessive predicating PC lexemes are quality denoting and non-possessive predicating PC lexemes are individual characterizing. According to this analysis, the adjective *gao* ‘tall’ that occurs in non-possessive predication in (5) describes individuals who are tall, while the PC nominal *zhahui* ‘wisdom’ that occurs in possessive predication in (6) denotes the quality of wisdom:

- (5) Zhangsan hen gao.  
Zhangsan very tall  
‘Zhangsan is (very) tall.’
- (6) Zhangsan hen you zhahui.  
Zhangsan very POSS wisdom

‘Zhangsan has (a lot of) wisdom/ is (very) wise.’

However, this hypothesis does not answer the question of why, for PC sentences with varied syntactic forms but meaning the same thing as illustrated in (28) and (29), one form is preferred over another. As discussed previously, different languages may vary in which form is the dominant form for PC sentences. For example, the predicative adjective PC sentence is the dominant form in English and other Germanic and Romance languages such as German and Spanish; although languages such as German and Spanish do have idiomatic possessive sentences with PC nominals, they are still rather limited. On the other end of the spectrum, languages such as Ulwa use the possessive PC sentences overwhelmingly and lack lexical adjectives uniformly.

Moreover, the preference might vary intra-linguistically with different PC lexemes. That is the case with Mandarin. For instance, while the pair of sentences ‘Zhangsan is tall’ and ‘Zhangsan has height’ are arguably equivalent in translation, only the former with the predicative adjective *gao* ‘tall’ is acceptable, but not the latter with the PC nominal *gaodu* ‘height’ in the possessive phrase, as shown in (30) below:

- (30) a. Zhangsan hen gao.  
Zhangsan very tall  
‘Zhangsan is (very) tall.’
- b. \*Zhangsan (hen) you gaodu.  
Zhangsan (very) POSS height  
*Intended:* ‘Zhangsan has (a lot of) height/is (very) tall.’

The contrast between (6) and (30b) suggests that some PC lexemes are allowed to be lexicalized as nominals in possessive predication, while others are not. The question I ask here is, what drives the difference behind such preference of lexicalization? Is it purely arbitrary, or are there any morpho-phonological, morpho-syntactic, or semantic factors that are relevant?

A rather telling example involving a polysemous form indicates that the acceptability of possessive

PC predicates is related to its sense. For the polysemous PC nominal *shendu* ‘depth’, it is allowed in possessive predication only when it denotes a evaluative meaning (31a) but not when it denotes an dimensional meaning (31b):

- (31) a. Zhe-ben shu hen you shendu.  
This-CL book very POSS depth  
‘This book has (a lot of) depth.’
- b. \*Zhe-ge hu (hen) you shendu.  
This-CL lake (very) POSS depth  
*Intended:* ‘This lake has (a lot of ) depth / is (very) deep.’

Based on the examples above, a generalization, which is first pointed out by Li (2017), can be made that all PC nominals in possessive predication have a subjective sense<sup>6</sup>. This generalization is consistent with the fact that PC nominals such as *zhihui* ‘wisdom’ in (6) and *shendu* ‘depth’ with the evaluative sense in (31a) are allowed in PC sentences with possessive predication, but not *gaodu* ‘height’ (30b) and (31b) with a dimensional sense. To verify this generalization, it is necessary to examine the empirical domain of PC nominals in Mandarin to see if the lexicalization of PC lexemes supports this generalization, and more importantly, how to explain why this generalization occurs.

The first two puzzles mainly focus on the distribution and the role of degree modifiers such as *hen* in PC sentences in Mandarin. They are based on the fact that the two types of PC sentences, the adjective predicate type and the possessive type, behave in the same fashion with respect to the distribution of degree modifiers and how positive and comparative interpretations are achieved uniformly. On the other hand, the third puzzle explores the distinction between the two types of PC sentences in Mandarin by examining what factors determine the lexicalization of PC lexemes. In the next section, I will summarize my proposals for the first two puzzles and the third puzzle.

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<sup>6</sup>The term *Subjective* is roughly defined as judge-dependent; that is, a sentence expresses subjective meaning if its truth value depends on personal opinions rather than facts. I will elaborate on the nature of subjectivity in chapter 5.1.

The upcoming chapters are also organized in such a way that the first two puzzles are discussed together, followed by the third puzzle in separate chapters.

### 1.3 Main proposal

Regarding the three puzzles presented above, I propose solutions to each of them.

First of all, regarding the distinction between PC nominals and mass nouns in possessive sentences with degree modifiers, I follow the quality-based analysis of PC nominals proposed by Francez and Koontz-Garboden (2017), which indicates that PC nominals and non-PC mass nouns in Mandarin differ semantically in that the latter lack inherent measures, resulting in two kinds of possessive phrases. There are two possessive morphemes that share the same surface form *you*: one takes PC nominals as complement and another takes other nouns; only the former phrase is gradable. Consequently, degree modifiers such as *hen* as well as other degree morphosyntax, including comparative and superlative, are sensitive to the distinction because they are only compatible with gradable phrases. Moreover, the fact that both Mandarin and Wolof share the same pattern whereby the degree modifiers are only compatible with possessive sentences that are complemented by PC nominals rather than mass nouns, and the fact that the quality-based analysis of PC nominals can explain the pattern of both languages, provide strong support for Francez and Koontz-Garboden's (2017) quality-based approach to PC nominals.

Also, the fact that degree morphosyntax such as *hen* treats predicative adjectives and possessive PC phrases in PC sentences in the same fashion indicates that adjectives and possessive PC phrases share the same semantic component, and that they impose the same condition on models. While the family of degree-based approaches has been well-established for gradable adjectives<sup>7</sup>, I show that the

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<sup>7</sup>See chapter 2.1.3 for more details. Francez and Koontz-Garboden (2017) remain neutral on the analysis of gradable adjectives and point out that their core proposal of the quality-based analysis of PC nominals and the distinction between individual-characterizing and quality-denoting PC lexemes remains intact regardless of the analysis of grad-

quality-based analysis proposed by Francez and Koontz-Garboden (2017) for PC nominals can be extended to gradable adjectives as well as the degree morphosyntax; as a result, the possessive PC predicate and the gradable adjectives both denote the relation between an individual and *intervals* of the quality associated with the predicate that holds if and only if the quality possessed by the individual meets or exceeds a certain contextually supplied threshold. This proposal connects to the analyses of other languages such as Basaá proposed by Hanink et al. (2019) and Wolof proposed by Francez and Koontz-Garboden (2017), which share the same pattern with Mandarin whereby degree morphosyntax treats non-possessive and possessive PC phrases in PC sentences in the same fashion. It also indicates that the quality-based approach has the potential to be applied to a broader domain of empirical data, namely non-possessive predication. Moreover, although model-theoretic equivalence is not a result that follows translational equivalence straight-forwardly, both are arguably achievable in the domain of PC sentences<sup>8</sup>.

For the second puzzle concerning how positive and comparative meaning are expressed in Mandarin PC sentences, I follow Grano's (2012) proposal that degree modifiers such as *hen* are needed in positive sentences with predicative adjectives to satisfy the T[+V] constraint in Mandarin, which requires that the complement to Tense be a verbal projection; without the degree modifiers, a null comparative operator *CMP* is supplied to satisfy the same constraint, causing the sentence to express the comparative meaning. I extend this proposal to possessive PC sentences. Essentially, I propose that possessive PC phrases are APs rather than Verb Phrases (VPs). Hence they need to be transformed into verbal projections with functional support from either the covert comparative operator or overt degree expressions to satisfy the T[+V] constraint. This proposal explains why possessive PC phrases do not behave in the same manner with gradable VPs in sentences with able adjectives. Also, various alternative analyses have been proposed by scholars; see, for instance, Moltmann's (2009) Trope-based analysis, which will be discussed in later chapters.

<sup>8</sup>The concept of model-theoretic equivalence varies among researchers. What I focus on in this dissertation is type-theoretic equivalence. See chapter 2.2.4 for more details.

degree modifiers. Also, it is coherent with the proposal that there are two possessive morphemes that are polysemous forms in Mandarin, and the one that is the head of the possessive PC phrase is a functional head.

Regarding the third puzzle that concerns the lexical realization of PC lexemes and the syntactic variation of PC sentence, I propose that only PC nominals with a subjective sense are allowed in possessive predication because of LEXICAL COMPETITION, which is connected to the extensively-discussed “minimax” principles arguing that the speaker always tries to optimally minimize the surface complexity while maximizing the amount of information (see Carroll and Tanenhaus, 1975, Horn, 2004 among others). It also reflects the general maxims of conversation proposed by Grice (1989), especially the Maxim of Quantity and Maxim of Manner. I argue that subjective PC lexemes are exclusively realized as nominals. For other PC nominals, including dimensional nominals such as *gaodu* ‘height’ or *shendu* with a dimensional sense, there are simple adjective forms such as *gao* ‘tall’ or *shen* ‘deep’ available in Mandarin, thus blocking the more complicated construction of possessive predicates.

#### 1.4 Roadmap

This dissertation is organized as follows.

Chapter 2 reviews previous research on the two types of lexicalizations of PC lexemes observed in PC sentences: adjectives and PC nominals. This chapter begins with an introduction of the general perspective of the traditional focus on the semantic properties of gradability and adjectives and the family of degree-based approaches of gradable adjectives and some well-established compositional analyses. Then I review the cross-linguistic distribution of PC nominals, followed by Francez and Koontz-Garboden’s (2017) quality-based approach to PC nominals in positive and comparative sentences. I also review Francez and Koontz-Garboden’s (2017) account of the distinction between PC nominals and non-PC mass nouns, and the translational and model-theoretic equivalence between

possessive and non-possessive PC sentences supported by cross-linguistic data.

Chapter 3 presents the data on positive and comparative PC sentences with predicative adjectives and possessive PC predicates in Mandarin, followed by the result from a corpus study that shows degree modifiers such as *hen* are obligatory in simple declarative PC sentences with possessive predicates, *contra* Li (2017). Then I present a detailed elaboration of the three puzzles surrounding them.

I present my proposals to the first two puzzles, as discussed in 1.3, in chapter 4.

The focus of this dissertation is then switched to the third puzzle concerning the lexical realization of PC lexemes in chapter 5, in which I will first review the nature of subjectivity and the semantic domain and syntactic distribution of subjective predicates with cross-linguistic data, followed by my proposal to the third puzzle.

Chapter 5 discusses the third puzzle and presents my proposal, as discussed in 1.3.

Finally, chapter 6 provides a summary of the previous chapters, discusses the implications and remaining questions related to the proposed analysis, and concludes this dissertation.



## Chapter 2

### Gradable adjectives and PC nominals

Traditionally, the class of adjectives has attracted significant amount of research on their semantic properties and is the predominant domain for degree, amount, grading and comparison. Dixon (1982) points out that adjective is not a universal word class; he identifies the class of PC lexemes that are realized as adjectives in languages that have such a category, in an effort to explore how languages express the kind of meanings expressed by these lexemes cross-linguistically.

Building on the notion of PC lexemes and Dixon's quest discussed above, Francez and Koontz-Garboden (2017) investigate the two syntactic variations of PC sentences: the non-possessive one that has lexemes often realized as predicative adjectives, and the possessive one that has nominalized lexemes that occur in possessive predication. The semantic properties of adjectives and sentences with predicative adjectives are thus examined within a broader domain of PC lexemes and PC sentences. They demonstrate that the predicative adjective sentence is a type of PC sentence, rather than the universal "default" type, and there are other languages where possessive predication is employed as the dominant form of PC sentences. Moreover, they argue that the variation in morpho-syntactic forms are determined by the semantic components of the PC lexemes; PC lexemes realized as adjectives in non-possessive PC sentences are individual-characterizing, whereas PC lexemes realized as nominals are quality-denoting.

In the following sections, I review the previous literature relevant to the realizations of PC lexemes.

## 2.1 Adjectives: Gradability, Scales, and Degrees

### 2.1.1 Property Concepts and adjectives

Dixon (1982) points out that while nouns and verbs are major classes that arguably occur in all languages, the adjective class is not universal. Many languages are adjective-deficient, or just use adjective as a minor class in the lexicon; examples of these languages include Hausa and Alambak.

To explore how adjective-deficient languages express the kinds of meaning expressed by adjectives in languages that have such a class, he proposes that adjectives fall into the following seven basic semantic categories:

1. DIMENSION: *big, small; long, short; wide, narrow; thick, fat, thin, etc.*
2. PHYSICAL PROPERTY: *hard, soft; heavy, light; rough, smooth; hot, cold; sweet, sour, etc.*
3. COLOUR: *black, white, red, etc.*
4. HUMAN PROPENSITY: *jealous, happy, kind, clever, generous, gay, cruel, rude, proud, wicked etc.*
5. AGE: *new, young, old.*
6. VALUE: *good, bad, proper, perfect, pure, excellent, fine, delicious, atrocious, poor, etc.*
7. SPEED: *fast, quick, slow, etc.* (Dixon, 1982, p. 16)

He further investigates the realizations of these seven semantic types in 16 other languages and summarizes that items in these types are realized in the following two ways:

- (a) all types are associated with either adjectives or verbs;
- (b) some types are associated with adjectives predominantly while other types are associated with nouns or verbs, where other semantic types also belong.

Moreover, Dixon (1982) observes that for languages of type (b), items belonging to the DIMENSION, AGE, VALUE and COLOUR types are often realized as adjectives; the PHYSICAL PROPERTY class is typically associated with verbs and HUMAN PROPENSITY is associated with nouns.

As pointed out previously, not all languages have adjectives, but all languages can express the concepts that adjectives express. Thompson (1989) refers to Dixon's (1982) seven semantic types of adjectives with the broader terminology: 'Property Concept', and defines Property Concept Word as 'a word that expresses one of these types of properties in a language' (p. 168).

In the next section, I will review past literature on adjectives with a focus on gradable adjectives.

### 2.1.2 Gradability and Scales

Adjectives can be classified based on whether they are gradable. Bierwisch (1989) argues that 'gradation' is associated with the quantitative evaluations regarding dimensions or features. He points out that gradable and non-gradable adjectives can be distinguished by the compatibility with degree modifiers such as *very* and comparative construction, though this distinction may not be clear-cut, as we will see below.

Heim and Kennedy (2002) summarize some properties associated with gradable adjectives:

First of all, all gradable adjectives can be modified by degree terms, and can occur in comparative constructions. As shown in (32) and (33) below, gradable adjectives such as *tall* can be modified by degree terms such as *very* and *how*, and can appear in comparative constructions, but non-gradable adjectives such as *extinct* can not:

- (32) a. Hans is very tall.  
b. How tall is Hans?  
c. Hans is taller than Eva.

- (33) a. ??Dinosaurs are very extinct.  
b. ??How extinct are dinosaurs?  
c. ??Dinosaurs are more/less extinct than wooly mammoths. (Heim and Kennedy, 2002, p. 2)

Heim and Kennedy (2002) also point out that non-gradable adjectives can occur with degree terms or in comparative constructions only when they express gradable interpretations, as shown below:

- (34) a. My uncle Javier is very Spanish.  
b. Arnold Schwarzenegger is more American than I am. (Heim and Kennedy, 2002, p. 2)

Another well acknowledged property of gradable adjectives is that their interpretations in positive sentences are context-dependent, and those sentences are often described as being vague. A well established account for this property is to associate the truth conditions of these predicates with a contextually defined Standard of Comparison, which is determined relative to a Comparison Class (see Klein, 1980, Bierwisch, 1989, Kennedy and McNally, 2005 among others). Bierwisch (1989) argues that a sentence such as ‘Hans is tall’ in (35a) is interpreted as (35b) or (35c):

- (35) a. Hans is tall.  
b. Hans is tall for the comparison class C.  
c. Hans is taller than the average of C.

The truth condition varies depending on the comparison class. Suppose Hans (35a) is six feet tall. In a context about the height of basketball players, the comparison class for *tall* could include people that are much taller than six feet, and the high standard of comparison will make (35a) false. If this sentence appears in a context where speakers are discussing the height of secondary school students, then the standard of comparison is rather low, and (35a) would be true.

Not all gradable adjectives pattern like *tall* in exhibiting vagueness. Kennedy and McNally (2005) point out that not all gradable adjectives have context-dependent truth conditions. Some adjectives only require their arguments to possess minimal degree of the gradable property associated with them, as shown below:

- (36) Minimum standards
- a. The baby is awake.
  - b. The spot is visible.
  - c. The door is open.
  - d. The rod is bent.

On the other hand, some adjectives require their arguments to possess a maximal degree of the property they describe, as shown below:

- (37) Maximum standards
- a. The glass is full.
  - b. The road is flat.
  - c. The door is closed
  - d. The rod is straight.

(Kennedy and McNally, 2005, p. 356)

Adjectives such as *awake* in (36a) mean that the baby's level of awakesness surpasses zero, rather than a contextually determined standard of comparison. Adjectives such as *full* in (37a) mean that the glass is *completely* full, which does not vary from context to context.

Kennedy and McNally (2005) refer to gradable adjectives exemplified by those in (36) and (37) as Absolute adjectives, and gradable adjectives such as *tall* as Relative adjectives. They are distinguished according to whether they give rise to context-dependent interpretations.

Gradable adjectives can be further distinguished based on semantic interpretations. Bierwisch (1989) identifies two classes of gradable adjectives: Dimensional adjectives and Evaluative adjectives; the former includes members such as *long*, *old*, and *new*, while the latter includes members such as *lazy*, *industrious*, and *ugly*. Heim and Kennedy (2002) point out that dimensional adjectives are typically associated with physical properties, while evaluative adjectives are associated with subjective, judgement-based properties.

Bierwisch (1989) summarizes the main distinctions between dimensional and evaluative adjectives demonstrated by properties of antonymous relations.

First of all, antonymous pairs of dimensional adjectives refer to the same scale of a given dimension, while antonymous evaluative adjectives refer to different scales or part of scales. For instance, the antonymous pair of dimensional adjectives *tall* and *short* refer to the same scale associated with height, while the evaluative pair *industrious* and *lazy* do not refer to the same scale; a sentence such as *Hans is lazy* does not assign Hans a certain degree of industriousness and hence does not refer to the scale of it.

Secondly, dimensional adjectives have more systematic relations in the antonymous pairs than evaluative adjectives. For a dimensional adjective, its antonym is uniquely determined, although the lexical realization may not be unique, such as *old* vs. *young* and *new*. Antonyms of evaluative adjectives often exist in bundles, such as *brave*, *bold* vs. *cowardly*, *timid*, *fearful* etc. Also, dimensional adjectives always have an antonym, while evaluative adjectives can be isolated, such as *shy* or *frightened*.

Scholars have proposed various approaches to the vagueness of positive sentences with gradable adjectives. In the next section, I will discuss the degree-based approach.<sup>1</sup>

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<sup>1</sup>Apart from the degree-based analysis, another well-known approach is the inherent vagueness approach, also known as the supervaluation analysis (Klein, 1980; see Morzycki, 2015 and Kennedy, 2007 for a review). This analysis treats gradable adjectives as context-sensitive functions from individuals to truth values; gradable adjectives may have

### 2.1.3 Degree-based analysis

The core of the degree-based approach to gradable adjectives treats gradable adjectives as incorporating measure functions from individuals to degrees (Kennedy, 1997). This approach assumes a SCALE for measuring objects, which comes with an ORDERING RELATION that is similar to the  $\leq$  relation. DEGREES are abstract representations of measurement that are formalized as ordered sets along some dimension, such as height, weight, etc.; the set of ordered degrees corresponds to a scale. Gradable adjectives map their arguments onto degrees and thus denote relations between degrees and truth values (see Kennedy, 2007, Morzycki (2015) for more details).

Morzycki (2015) summarizes some crucial assumptions about scales and degrees, as listed below:

- (38) a. A scale is totally ordered; that is, every degree is ordered with respect to every other degree;
- b. A scale has a dense ordering relation; that is, for every pair of degrees, there is a degree between them. (p. 23)

Consequentially, scales must meet the following requirements:

- (39) for all  $d, d'$  in a set of degrees  $S$ :
- a.  $\leq$  is total:  $d \leq d' \vee d' \leq d$
- b.  $\leq$  is dense:  $d \leq d' \rightarrow \exists d'' \in S [d \leq d'' \wedge d'' \leq d']$  (p. 24)

---

positive and negative extensions as well as an ‘extension gap’, which suggests that the predicate is neither true or false of certain objects. This approach explains the vagueness of gradable adjectives by proposing the variability of the positive and negative extensions and the extension gap across contexts. Kennedy (2007) argues that this approach is compositionally simpler than the degree-based approach in that gradable adjectives are treated as basic predicates. However, the distinction between relative and absolute adjectives with respect to vagueness needs further explanation, which is more straight-forward with implementation of scales and degrees. I will skip the details of this approach and focus on the degree-based analysis in this thesis.

The ordering relation  $\leq$  is also transitive, antisymmetric, and reflexive, as defined below:

(40) for all  $d, d', d'' \in S$ :

a.  $\leq$  is transitive:  $[d \leq d' \wedge d' \leq d''] \rightarrow d \leq d''$

‘If one degree is at least as small as a second, and the second at least as small as a third, then the first is at least as small as the third.’

b.  $\leq$  is antisymmetric:  $[d \leq d' \wedge d' \leq d] \rightarrow d = d'$

‘Two degrees can be at least as small as each other only if they are actually identical.’

c.  $\leq$  is reflexive:  $d \leq d$

‘Every degree is at least as small as itself.’ (p. 24)

There is a variety of semantic analyses within the framework of the degree-based approach. In this thesis, I follow the well-established analysis that treats gradable adjectives as relations between individuals and degrees (type  $\langle d, et \rangle$ ) (see Cresswell, 1976, von Stechow, 1984, Bierwisch, 1989, Kennedy, 1997, Kennedy and McNally, 2005 among others). For an adjective such as *tall*, it has the denotation as shown in (41) below, where **height** represents a measure function that takes an individual and returns a degree on the scale of height (Kennedy & McNally, 2005). It denotes a relation between degrees of height  $d$  and individuals  $x$  that holds if and only if  $x$ ’s degree of heights meets or exceeds  $d$ , as shown in (41) below:

$$(41) \quad \llbracket tall \rrbracket_{\langle d, et \rangle} = \lambda d. \lambda x. \mathbf{height}(x) \geq d^2$$

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<sup>2</sup>There are several notational variants following this approach. The measure function **height** is called using the name of the gradable adjective itself such as **tall** or the nominalized form such as **tallness**, while the essence of the function remain the same. Moreover, according to denotations as shown in (1), the function returns true if and only if the degree associated with the adjective equals  $d$ :

$$(1) \quad \llbracket tall \rrbracket = \lambda d. \lambda x. \mathbf{tall}(x) = d \quad \text{(modified from Kennedy and McNally, 2005, p. 349)}$$

The two denotations of gradable adjectives differ in that the denotation in (41) assumes that the measure function



(i.e. *tall* denotes a relation between degrees  $d$  and individuals  $x$  that holds iff  $x$ 's degree of height meets or exceeds  $d$ .)

The vagueness of sentences with gradable adjectives as predicates, such as *Mary is tall*, is often assumed to be achieved by a null morpheme **POS**, which encodes the contextual sensitivity by introducing the standard of comparison, as illustrated in (42) below:

$$(42) \quad \llbracket POS \rrbracket = \lambda g_{\langle d, et \rangle} \lambda x. \exists d [g(d)(x) \wedge d > d_c] \quad (\text{Grano and Davis, 2017, p. 133})$$

Following the denotations above, a sentence such as *Mary is tall* is true if and only if there is some degree  $d$  such that Mary's height is greater than or equal to  $d$  and  $d$  exceeds a contextually determined standard  $d_c$ <sup>3</sup>:

---

**height** maps individuals to their maximal degree of height, while **tall** in (1) does not. As pointed out by Morzycki (2015), the two denotations are essentially equivalent. If a person is 6-feet tall, then he/she is also tall to smaller degrees. I follow the denotations as shown in (41), which has been articulated in works such as Grano and Davis (2017), in this dissertation.

<sup>3</sup>Note that the denotations of gradable adjectives in (41) and POS operator in (42) only applies to gradable adjectives that demonstrate vagueness; that is, relative adjectives according to the Kennedy and McNally (2005) (see chapter 2.1.2 for more details). They point out that, if absolute adjectives have the same semantic type  $\langle d, et \rangle$  as shown in (41), then sentences with absolute adjectives as predicates should have interpretations entailing a contextually determined standard as well, as demonstrated below:

- (1) a. Mary is awake.  
 b. =  $\llbracket POS \rrbracket(\llbracket awake \rrbracket)(\llbracket Mary \rrbracket)$   
 c. =  $\exists d[\mathbf{awake}(m) \geq d \wedge d > d_c]$
- (2) a. The glass is full.  
 b. =  $\llbracket POS \rrbracket(\llbracket full \rrbracket)(\llbracket glass \rrbracket)$   
 c. =  $\exists d[\mathbf{full}(glass) \geq d \wedge d > d_c]$

However, the sentence 'Mary is awake' in (1) does not entail that Mary has a degree of awakesness that exceeds a contextual-determined standard; she just needs to surpass the 'zero' level of awakesness to be awake. Similarly, the sentence 'The glass is full' in (2) does not involve the contextual-determined degree of fullness because the glass has

(43) a. Mary is tall.

b. =  $\llbracket POS \rrbracket(\llbracket tall \rrbracket)(\llbracket Mary \rrbracket)$

c. =  $\exists d[\mathbf{height}(m) \geq d \wedge d > d_c]$

(i.e. There is some degree  $d$  such that Mary's height meets or exceeds  $d$  and  $d$  exceeds a contextually determined threshold  $d_c$ ) (Grano and Davis, 2017, p. 133)

Moreover, the semantics for comparatives can be established in a straight-forward manner following the degree-based approach. According to a popular approach (see Klein, 1980 among others), an ordering is established between two individuals via truth conditions in which a degree is existentially bound and asserted to hold for one individual but not for the other individual. Scholars have proposed that morphemes such as the English *-er* suffix take such function; An implementation of the comparative operator **CMP** is shown in (44) (see Seuren, 1973, Klein, 1980, and Schwarzschild, 2008 among others):

(44)  $\llbracket CMP \rrbracket = \lambda g_{\langle d, et \rangle} \lambda y \lambda x. \exists d[g(d)(x) \wedge \neg g(d)(y)]$  (Grano, 2012, p. 524)

While the POS operator always refers to a contextually dependent standard, the contextual sensitivity is not encoded in comparatives; there is no entailment of whether the two individuals exceeds to be *completely* full for the sentence to be true.

Kennedy and McNally (2005) propose that the positive form is polysemous, with at least three distinct denotations for relative adjectives, absolute minimum and absolute maximum adjectives, as summarized in Kennedy (2006) below:

(3)  $\llbracket POS \rrbracket =$

a.  $\lambda g \lambda x. g(x) \succeq s(g)$

b.  $\lambda g \lambda x. g(x) \succ \mathit{min}(\mathit{SCALE}(g))$

c.  $\lambda g \lambda x. g(x) = \mathit{max}(\mathit{SCALE}(g))$

(Cited from Kennedy, 2006, p. 16)

Kennedy (2007) improved this approach later by arguing that there is just one POS that interacts with a general principle of Interpretive Economy to give rise to these differences.

I mainly focus on the properties of relative adjectives in this dissertation.

the standard of comparison in the context (see Kennedy, 2007 for a detailed discussion). In English, a comparative sentence such as ‘John is taller than Bill’ denotes the meaning that there is some degree  $d$  such that John is  $d$ -tall and Bill is not  $d$ -tall, as shown in (45):

(45) a. John is taller than Bill.

b. =  $\exists d[\text{height}(j) \geq d \wedge \neg \text{height}(b) \geq d]$

(i.e. There is some degree  $d$  such that John’s height meets or exceeds  $d$  and Bill’s height does not meet or exceed  $d$ .) (Grano, 2012, p. 524)

## 2.2 PC nominals: Cross-linguistic Data

### 2.2.1 Cross-linguistic distribution of Property Concept Nominals

Francez and Koontz-Garboden (2017) investigate the cross-linguistic equivalents of copular sentences with adjectives as predicates, such as ‘I am hungry’ in English. They refer to those sentences as *property concept sentences* (henceforth PC sentences), and the lexemes that introduce the ‘property concept’ following Dixon (1982) as the PROPERTY CONCEPT LEXEME (henceforth PC lexemes). They point out that property concept sentences are realized into two forms: those with non-possessive predication, or possessive predication. English employs both strategies, but the possessive predication is very limited. As shown in (46), a copular sentence such as ‘I am hungry’ in (a) can be expressed with a possessive predication in (b), but is very marked; on the other hand, the possessive counterpart of sentences such as ‘I am tall’ is not acceptable, as shown in (47):

(46) a. I am hungry.

b. I have hunger.

(47) a. I am tall.

b. ??I have height/tallness.

The possessive strategy of predication in PC sentences is attested cross-linguistically, with varied ranges and level of markedness.

PC sentences involving possessive predication are attested in Romance and Germanic languages such as Spanish and German. In Spanish, the sentence translated as ‘Kim is tall’ is expressed with a copular sentence that has a predicative adjective (48a) in the same way as predicative nominals (48b), whereas the Spanish counterpart of ‘Kim is tired’ can be expressed with the PC nominal *sueño* ‘tiredness’ in possessive construction in (48c) parallel to the possessive sentence with a concrete noun (48d). In German, the sentence translated to ‘I am hungry’ can be expressed either with the adjective *hungrig* in a copular sentence (49a) in the same way as predicative nominals (49b), or with the PC nominal *Hunger* ‘hunger’ in a possessive sentence (49c) in the same way as concrete nouns (49d):

- (48) a. Kim es alto.  
Kim is tall  
‘Kim is tall.’
- b. Kim es un profesor.  
Kim is a professor  
‘Kim is a professor.’
- c. Kim tiene sueño.  
Kim has tiredness  
Kim is tired.
- d. Kim tiene un carro.  
Kim has a car  
Kim has a car.
- (49) a. Ich bin hungrig.  
I am hungry  
‘I am hungry.’
- b. Ich bin Arzt.  
I am doctor  
‘I am a doctor.’

c. Ich habe Hunger.  
 I have hunger  
 ‘I am hungry.’

d. Ich habe ein Auto.  
 I have a car  
 ‘I have a car.’

(Francez and Koontz-Garboden, 2017, p. 25)

Although possessive PC sentences in Spanish and German are not as marked as in English, they are still quite limited; Francez and Koontz-Garboden (2017) point out that they are limited to lexemes that describes temporary experiences, or those that belong to the *human propensity* class according to Dixon’s (1982) classification.

In some languages, the possessive strategy of PC sentences is employed more extensively, while the canonical strategy with copular sentences still exists.

Baglini (2015) shows that Wolof (Senegambian, Senegal) employs two strategies to express stative predicates: some are lexicalized as verbs, which translate parallel to English predicative adjectives, and some as stative nouns with possessive morphology. As shown below, stative verbs occur in a canonical structure similar to other verbs (50a, b), while stative nouns occur with possessive morphology just like other nouns (51a, b):

(50) a. Aïda muus-na-∅.  
 Aïda smart-FIN-3SING  
 ‘Aïda is smart.’

b. Aïda jooy-na-∅.  
 Aïda cry-FIN-3SING  
 ‘Aïda cries.’

(51) a. Aïda am-na-∅ xel.  
 Aïda have-FIN-3SING mind  
 ‘Aïda is smart.’ (Lit. ‘Aïda has mind’)

b. Aïda am-na-∅ ceeb.  
 Aïda have-FIN-3SING rice

‘Aïda has rice.’

(Baglini, 2015, p. 133-134)

Similarly, Jenks et al. (2018) identify two types of PC sentences in Basaá, a Bantu language spoken in Cameroon: adjectives that occur in copular sentences with the copula *há* (52a), which is also used with predicate nominals (52b); and nominalized PC lexemes (which Jenks et al. (2018) call ‘substance noun’) that occur in possessive sentences in the same manner as possession with concrete nouns (53b)<sup>4</sup>:

(52) a. *hí-nuní hí hí yé hi-kéNí.*  
19-bird 19.that 19.SUB be 19-big  
‘That bird is big.’ (adjective)

b. *Victor a ye m-alêt.*  
Victor 1.SUB be 1-teacher  
‘Victor is a teacher.’ (predicate nominal)

(Jenks et al., 2018, p. 650)

(53) a. *a gweé ma-sódá.*  
1.AGR have 6-luck  
‘(S)he is lucky.’ (substance noun)

b. *Kim a gweé !n-dáp.*  
Kim AGR has 9-house  
‘Kim has a house.’

(Jenks et al., 2018, p. 646)

Another language that has been identified as using the possessive strategy for PC sentences is the

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<sup>4</sup>Jenks et al. (2018) identify a third type of PC sentence that has adjective nouns with the copula, as shown below:

(1) *hí-nuní hí hí yé li-mugkê.*  
19-bird 19.that 19.SUB be 5-quiet  
‘That bird is quiet.’ (adjective noun)

They point out that adjective nouns are semantically similar to adjectives and have individual-characterizing denotations, unlike substance nouns that are substance-denoting (see Francez and Koontz-Garboden (2017) for more details). The details are beyond the scope of this dissertation and will be left out.

Chadic language Hausa. PC lexemes lexicalized as nouns are traditionally called ‘abstract nouns of sensory quality’ (ANSQs) (Parsons, 1955); scholars have identified about sixty such words, including *nauyi* ‘heaviness’, *tsāmi* ‘sourness’, *dādi* ‘pleasantness’, *karfi* ‘strength’, etc. (Newman, 2000; Jaggar, 2001, as cited in Francez and Koontz-Garboden, 2017, p. 26). The class of adjectives is rather limited, whereas the possessive strategy is more widely used.

- (54) a. Audù dōgō nè  
 Audu tall COP  
 ‘Audu is tall.’
- b. Audù dàrāktà nē.  
 Audu director COP  
 ‘Audu is/was the director.’ (Jaggar, 2001, p. 457, as cited in Francez and Koontz-Garboden, 2017, p. 23)
- (55) a. munà dà fkarfī.  
 we.CONT with strength  
 ‘We are strong.’
- b. yāriyà tanà dà zōbè.  
 girl she.CONT with ring  
 ‘The girl has a ring.’ (Newman, 2000, p. 222, as cited in Francez and Koontz-Garboden, 2017, p. 23)

Hausa also notably employs existential constructions to express possession of ANSQs; as shown below, ANSQs can occur in two existential structures depending on whether the pivot is the subject that bears the property (56a) or the pivot is the property itself (56b, c), and they share the same structure with possession of concrete nouns (56d):

- (56) a. àkwai shì dà wàyō.  
 exists him with cleverness  
 ‘He is very clever.’
- b. àkwai fad’i ga kogin nan.  
 exists width at river this

‘This river is wide.’

- c. àkwai hāzifancì gārē shì  
exists cleverness at him

‘This river is wide.’ (Newman, 2000, p. 222, as cited in Francez and Koontz-Garboden, 2017, p. 27)

- d. àkwai kudī̄ gārē shì  
exists money at you

‘Do you have any money on you?’ (Jaggar, 2001, p. 466, as cited in Francez and Koontz-Garboden, 2017, p. 28)

Ulwa (Misumalpan, Nicaragua) also employs the possessive strategy for PC sentences systematically. Interestingly, the possessive strategy is realized with nominal possession rather than predicative ‘have’ sentences. As pointed out by Francez and Koontz-Garboden (2017), PC lexemes are realized as precategorical roots that form nouns with the morpheme *-ka*, which is a marker of possessed noun in a possessive noun phrase as shown in (57)<sup>5</sup>:

- (57) a. yang pan-ki  
1SING stick-1SING.POSS  
‘my stick’

- b. man pan-ma  
2SING stick-2SING.POSS  
‘your stick’

- c. alas pan-ka  
3SING stick-3SING.POSS  
‘his/her stick’ (Green, 1999, p. 78 as cited in Francez and Koontz-Garboden, 2017, p.

31)

- (58) yang as-ki-na minisih-ka.  
1SING shirt-1SING.POSS dirty-3SING.POSS  
‘My shirt is dirty.’ (Green, 2004, as cited in Francez and Koontz-Garboden, 2017, p. 31)

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<sup>5</sup>The possessive marker *-ka* agrees with the possessor, as demonstrated in (57), and the third person singular form *-ka* appears with the property concept roots.



This pattern is different from the sentences with predicative nominals which do not involve *ka*, as shown in (59):

- (59) Alberto ya al as.  
Alberto the man one  
'Alberto is a man.' (Green, 2004, as cited in Francez and Koontz-Garboden, 2017, p. 59)

There are various other languages that demonstrate the possessive strategy for PC sentences, including Hebrew, Huitoto (Colombia), Bisa (Ghana and Burina Faso) (see Francez and Koontz-Garboden (2017) for more details), and some Austronesian languages (Kaufman, 2012). In summary, PC sentences employing the possessive strategy with nominalized PC lexemes are far from exotic, and can be identified cross-linguistically.

### 2.2.2 Quality-based Analysis of PC nominals

After establishing the empirical domain of the syntactic variation in forms of PC sentences, Francez and Koontz-Garboden (2017) investigate whether the difference of forms is the result of differences in semantic components, or whether they are semantically uniform but differ at the phonological or morpho-syntactic level. As discussed in chapter 1.1, they pursue the transparency view with respect to the association between syntactic and semantic variation. They do not argue that all morpho-syntactic variation reflects underlying semantic distinction; rather, they focus on the empirical domain of PC sentences cross-linguistically and argue that the variation in forms is the consequence of semantics. They argue that whether the PC sentences are possessive or non-possessive is determined by the semantics of the property concept lexemes in the sentences. They point out that, intuitively, PC lexemes such as *wise* and *beautiful* describe individuals, while PC lexemes such as *wisdom* and *beauty* denote qualities. They argue that the two classes of PC lexemes, which are referred to as INDIVIDUAL-CHARACTERIZING and QUALITY-DENOTING by Francez and Koontz-Garboden, correspond two different forms of PC sentences, and propose the Lexical Semantic Variation Hypothesis, as repeated below:

- (60) **The Lexical Semantic Variation Hypothesis:** Possessive predicating property concept lexemes are quality denoting and non-possessive predicating property concept lexemes are individual characterizing. (p. 37)

They elaborate on this hypothesis by proposing a model-theoretic analysis of *qualities*, which can be intuitively understood as abstract mass entities following the algebraic approach that has been regarded as a standard analysis for mass nouns following Link (2002). Francez and Koontz-Garboden (2017) argue that PC nominals in possessive constructions are quality-denoting expressions, which are functions that characterize ‘portions’ of relevant qualities. They also point out that portions can be seen as a sort of individuals, and propose that portions are of a primitive type  $p$ , which is a subtype of type  $e$ . In the example (61) below, **strength** is the set of all portions of strength and  $\alpha$  is an expression denoting the quality *strength*:

$$(61) \quad \llbracket \alpha \rrbracket = \lambda p.\mathbf{strength}'(p)$$

Francez and Koontz-Garboden (2017) make several assumptions about qualities:

- (62) a. Qualities are mutually disjoint;<sup>6</sup>  
 b. Qualities are ordered by a total preorder  $\leq$  that is transitive, reflexive, but not antisymmetric, which indicates that two portions of a quality can be of the same size without being identical;  
 c. Qualities are a sort of mass entity under the framework Link (2002), partially ordered by a mereological part relation  $\preceq$ . The size preorder  $\leq$  preserves  $\preceq$ . (p. 39)

They further propose that possessive PC sentences relate individuals and portions of qualities by a binary relation represented by  $\pi$ , which is often expressed by possessive lexemes. Hence,

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<sup>6</sup>That is, no quality-denoting word has in its denotation entities that are in the denotation for another quality-denoting word.

an individual possesses a quality “if and only if there is a portion of that quality such that the individual and the portion stand in the  $\pi$  relation” (Francez and Koontz-Garboden, 2017, p. 41).

A crucial fact to capture is the context sensitivity of the predicative PC sentences. For gradable adjectives, one way to capture this aspect is to invoke a contextually salient degree on a scale. As discussed in chapter 2.1.3, the degree-based approach for gradable adjectives assumes that the positive operator POS holds of a degree  $d$  in cases where it meets a standard determined by the context. For PC nominals, Francez and Koontz-Garboden (2017) propose to incorporate contextual sensitivity as a ‘domain restriction on the existential quantifier over portions’ (p. 45). In other words, to assess whether an individual has a quality or not, the quantification is restricted to those portions that are ranked high enough by the preorder  $\leq$ . Thus, the domain restriction is essentially equivalent to the ‘contextual standard’ according to the degree-based analysis in that the interval argument  $I$  only includes all portions of the relevant quality that rank higher than a contextually determined threshold.

To implement the domain restriction over portions, they introduce the interval variable  $I$  which is a variable over contiguous left-bounded intervals of qualities, and is of the type  $\iota^7$ . They define the relevant intervals as follows:

(63) **Interval:** For any quality  $P$ , an interval  $i \subset P$  is a set of portions such that  $\exists q \in P [I = \{p : q \leq p\}]$

The definition in (63) ensures that it extends to comparatives coherently and grants valid inference. Francez and Koontz-Garboden (2017) provide a compositional analysis for PC sentences in Ulwa. As shown in last section, PC sentences in Ulwa are formed with nominalized PC lexemes affixed with the possessive morpheme *ka*, as repeated below:

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<sup>7</sup>Francez and Koontz-Garboden (2017) use  $I, J$  for intervals and  $\mathcal{I}, \mathcal{J}$  for set of intervals.

- (58) yang as-ki-na minisih-ka.  
 1SING shirt-1SING.POSS dirty-3SING.POSS  
 ‘My shirt is dirty.’ (Green, 2004, as cited in Francez and Koontz-Garboden, 2017, p. 31) ;

As elaborated above, the precategorical root *minisih* in (58) is the expression that denotes the quality associated with ‘dirtiness’, as shown in (64):

$$(64) \llbracket \textit{minisih} \rrbracket = \mathbf{dirtiness} \subseteq D_p$$

They propose a denotation for the possessive suffix *-ka* in (65). As discussed above,  $I$  is a variable over contiguous left-bounded intervals of qualities, and the notation  $\exists^I$  denotes restriction of the existential quantifier only to the portions in  $I$ :

$$(65) \llbracket \textit{ka} \rrbracket = \lambda P_{pt} \lambda x_e \lambda I_l \subset P. \exists^I z [\pi(x, z)]^8$$

Consequentially, a possessed noun such as *minisihka* can be derived as in (66), where the interval  $I$  only includes all portions of dirtiness that rank higher than a contextually-supplied threshold:

$$(66) \llbracket \textit{minisihka} \rrbracket = \lambda x \lambda I \subset \mathbf{dirtiness} \exists^I z [\pi(x, z)]$$

(i.e. *minisihka* denotes a relation between individuals  $x$  and intervals  $I$  of the quality **dirtiness** that holds iff there is a portion of **dirtiness** in  $I$  that  $x$  has; the interval  $I$  includes all and only portions of **dirtiness** that rank above a contextually determined threshold.)

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<sup>8</sup>In their earlier work, Francez and Koontz-Garboden (2015) proposed a similar denotation for *ka*:

$$(1) \llbracket \textit{ka} \rrbracket = \lambda P \lambda x \lambda D. \exists^D z [\pi(x, z) \wedge P(z)]$$

In (1),  $D$  is a variable over sets of portions;  $\exists^D$  represents restriction of the existential quantifier over portions. This denotation is essentially identical with (65). Both denotations restrict the possible values of the domain to “sets of portions that form a left-bounded interval of a substance” (Francez and Koontz-Garboden, 2015, p. 549) except that the latter uses the variable  $I$  explicitly to express the left-bounded intervals.

Following this approach, comparatives in Ulwa can be analyzed in a straight-forward manner. The comparative constructions also involve the possessive strategy with *-ka*, as demonstrated below:

- (67) Abanel ya kanas yûh-ka Clementina karak.  
 Abanel the more tall-3SING.POSS Clementina with  
 ‘Abanel is taller than Clementina.’ (Francez and Koontz-Garboden, 2017, p. 33)

Francez and Koontz-Garboden (2017) argue that (67) expresses the meaning that the portions of height possessed by Abanel outrank those possessed by Clementina by the ordering  $\leq$ . Since the domain restriction over portions of qualities is implemented with intervals, this means that the set of intervals containing portions of tallness possessed by Abanel is a superset of the set of intervals containing portions of tallness possessed by Clementina. the denotation for the comparative morpheme *kanas* ‘more’, which introduces the comparison between the two sets, is proposed as follows:

$$(68) \llbracket \textit{kanas} \rrbracket = \lambda\alpha\lambda x\lambda y.\alpha(y) \subset \alpha(x)$$

The result of combining *kanas* and the property concept nouns such as *yûh-ka* is a relation between individuals, as shown below:

$$(69) \llbracket \textit{kanas yûh-ka} \rrbracket = \lambda x\lambda y.\{I \subset \mathbf{tallness} : \exists z^I[\pi(x, z)]\} \subset \{J \subset \mathbf{tallness} : \exists z^J[\pi(y, z)]\}$$

(i.e. *kanas yûh-ka* denotes a relation between two individuals *x* and *y* that holds iff the interval *I* of the quality **dirtyness**, in which there is a portion that *x* has, is a subset of the interval *J* of the quality **dirtyness** in which there is a portion that *y* has.)

### 2.2.3 PC Nominals vs. Non-PC Mass Nouns

One pattern that has been identified in several languages is that, while it is common for nominalized PC lexemes to share the same surface form of possessive constructions as other non-PC mass nouns, possessive PC phrases behave in the same manner under degree modification with adjectives, but

not with other mass nouns. For instance, the Wolof degree modifier *lool* is sensitive to the distinction between PC nominals and non-quality-denoting mass nouns, as shown below:

- (70) a. Awa rafet-na-∅ (lool).  
 Awa pretty-FIN-3SING very  
 ‘Awa is (very) pretty.’
- b. Awa am na-∅ xel (lool).  
 Awa have FIN-3SING wit very  
 ‘Awa is (very) witty.’
- c. Awa am na-∅ ceed (\*lool).  
 Awa have FIN-3SING rice very  
 ‘Awa has rice.’ (Baglini 2015, p. 17)

Baglini (2015) argues that possessed nouns such as *xel* in (70b) are ‘stative nouns’, which denote stative property concepts that are “integral” properties.<sup>9</sup> Stative nouns and ‘non-stative’ nouns such as *ceed* ‘rice’ in (70c) often employ similar possessive strategies morpho-syntactically, but the latter indicates non-integral/external possession. She calls predicates such as *rafet* ‘being pretty’ in (70a) ‘stative verbs’, which translate parallel to English predicative adjectives. She also points out that stative nouns in possessive phrases headed by *am* ‘have’ such as *am xel* ‘have wit/ witty’ in (70b) patterns with gradable predicates such as *rafet* ‘being pretty’ in licensing degree modifiers like *lool*, but not with non-stative nouns such as *ceed* ‘rice’. Thus, she argues that possessed stative nouns “appear to be compositional predicates with the semantics of underived gradable predicates” (p. 18). This is very similar to the Mandarin data except that the degree modifier *lool* in Wolof is optional, whereas *hen* in Mandarin is obligatory; the Mandarin examples are repeated below:

- (71) a. Zhangsan hen gao.  
 Zhangsan very tall  
 ‘Zhangsan is (very) tall.’
- b. Zhangsan hen you zhihui.  
 Zhangsan very POSS wisdom

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<sup>9</sup>This is similar to what Dixon (1982) called *human propensity* PC lexemes.

‘Zhangsan has (a lot of) wisdom/ is (very) wise.’

- c. Zhangsan (\*hen) you shui.  
Zhangsan very POSS water  
‘Zhangsan has water.’

In Basaá, Hanink et al. (2019) show that the degree modifier *ngandak* ‘very’ modifies the predicative adjective and *have* + PC nominal phrases in the same fashion, but is incompatible with mass nouns in possessive predication, as illustrated in (72) below:

- (72) a. hí-nuní hí hí [yé hi-kéŋí ngandak].  
19-bird 19.that 19.SUB be 19-big very  
‘That bird is big.’
- b. kim a [gweé nguy ngandak]  
kim AGR has strength very  
‘Kim is very strong.’
- c. \*í !béeé î í gwé!é moó ngandak  
DEM well DEM AGR has oil very  
*Intended:* ‘The well has very much oil.’

The pattern of degree modification in Basaá is parallel to that in Wolof; degree modifiers are compatible with both adjectives and possessive PC nominal phrases and modify them in the same fashion, but cannot modify mass nouns that also occur in possessive predication. This indicates that PC nominals and other mass nouns are semantically distinct in these languages.

Francez and Koontz-Garboden (2017) point out that, unlike PC nominals, other mass nouns such as *water* are non-quality-denoting. They can appear in a possessive relation with an individual in sentences such as ‘Mary has water’. Under the framework of Link (2002), PC nominals are similar to non-quality denoting mass nouns in that both are mereologically structured; that is, they are subject to a mereological part relation. However, they are semantically distinct in that PC nominals are subject to a total preorder by size which is not antisymmetric, whereas non-quality-denoting mass nouns are subject to a partial order that is antisymmetric. In other words, two portions of

a quality denoted by PC nominals can be of the same size occupying the same space in the total preorder without being identical, which does not hold for non-quality-denoting mass nouns.

To capture the semantic distinction between quality PC nominals and other mass nouns, Francez and Koontz-Garboden argue that it is necessary to propose a different denotation for the possessive morpheme that takes non-quality-denoting nouns as complements, which may share the same surface form as the possessive morpheme for PC lexemes. They provide a denotation for the *ka* morpheme in Ulwa that takes non-quality-denoting complements, based on Francez (2009):

$$(73) \quad \llbracket ka \rrbracket = \lambda P \lambda x \lambda Q. \{z : \pi(x, z) \wedge P(z)\} \subseteq Q^{10} \quad (\text{Francez \& Koontz-Garboden, 2015})$$

#### 2.2.4 Model-theoretic Equivalence

As discussed in chapter 1.1, Francez and Koontz-Garboden (2017) point out that PC sentences with gradable adjectives and possessive PC phrases as predicates can be truth conditionally equivalent, or in other words, mean the same thing; this can be illustrated with data in English:

- (74) a. Kim is wise.  
 b. Kim has wisdom.

As shown in (74), even though (b) is more marked than (a), they are judged to mean the same thing in the same situation.

Translational equivalence is often implicitly regarded as the sameness of meaning, which further entails sameness of truth conditions. A standard assumption in semantics is that, two sentences

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<sup>10</sup>Francez and Koontz-Garboden (2015, 2017) adopt an analysis elaborated in Francez (2009) that analyzes possessive NPs as generalized quantifiers. The details of this analysis is too complex to elaborate on and beyond the scope of this dissertation. The crucial message here, as pointed out by Francez and Koontz-Garboden, is that there are two denotations proposed for *-ka* in Ulwa; while they differ compositionally and have distinct syntactic distribution, the lexical semantic core of them are similar.



share the same truth conditions if they impose the same restrictions on models, which indicates that they are model-theoretically identical; that is, they express “the same truth conditions derived in the same compositional way from the same model-theoretic parts” (p. 142). Francez and Koontz-Garboden (2017) argue against the idea that model-theoretic equivalence is a direct consequence of translational equivalence. They point out that it is common for sentences of different languages to share the same meaning while differing widely in the forms of expressions, as demonstrated by the English and Spanish sentences that ask another person’s age; the English sentence in (75a) asks for a degree of being old, while the Spanish sentence in (75b) asks about the amount of age that the person possesses:

- (75) a. How old are you?  
 b. Cuantos años tienes?  
 how.many years have.2SING  
 ‘(Lit.) How many years do you have?/ How old are you?’

(Modified from Francez and Koontz-Garboden, 2017, p. 4)

However, in the domain of PC sentences, the argument that non-possessive and possessive PC phrases can be model-theoretically equivalent has been supported by empirical evidence from cross-linguistic data. As shown in the last chapter, degree modifiers in Wolof and Basaá treat adjectives and possessive PC nominal phrases in the same way, as repeated in (70) and (72) below:

- (70) a. Awa rafet-na-∅ (lool).  
 Awa pretty-FIN-3SING very  
 ‘Awa is (very) pretty.’  
 b. Awa am na-∅ xel (lool).  
 Awa have FIN-3SING wit very  
 ‘Awa is (very) witty.’  
 c. Awa am na-∅ ceed (\*lool).  
 Awa have FIN-3SING rice very  
 ‘Awa has rice.’ (Baglini 2015, p. 17)

- (72) a. hí-nuní híí hí [yé hi-kéŋí ŋgandak].  
 19-bird 19.that 19.SUB be 19-big very  
 ‘That bird is big.’
- b. kim a [gweé ŋguy ŋgandak]  
 kim AGR has strength very  
 ‘Kim is very strong.’
- c. \*í !ḡéé î í gwé!é moó ŋgandak  
 DEM well DEM AGR has oil very  
*Intended:* ‘The well has very much oil.’

The resemblance in behaviors of predicative adjectives and possessive PC predicates in PC sentences with degree modifiers leads to the argument that they are type-theoretically identical. Baglini (2015) points out that the type-theoretical equivalence between stative verbs and possessive PC nominal phrases is supported by empirical evidence such as degree modifiers and comparatives in Wolof, where these two phrases show the same pattern.

Hanink et al. (2019) argue that it is implausible to impose different analyses for predicative adjectives and possessive PC predicates when the degree morphology composes with both of them in the same morpho-syntactic manner. They further show that these two types show identical behavior in other structures in Basaá where gradability is involved.

First of all, degree questions with adjectives such as *ŋkéŋí* ‘big’ and possessive PC phrases such as *gweé ŋguy* ‘have strength’ are formed in the same way, as shown below:

- (76) a. kim a ye ŋkéŋí kí !kíí?  
 kim AGR be big how what  
 ‘How big is Kim?’
- b. kim gweé ŋguy kí !kíí?  
 kim has strength how what  
 ‘How strong is Kim?’

(Cited from Hanink et al., 2019, p. 210-211)

Another construction that sheds light on model-theoretic identity of adjectives and PC nominals

is comparative subdeletion (subcomparatives), which is defined by Kennedy (1997) as “form *x is more A1 than A2*, where *A1* and *A2* are lexically distinct” (p. 45). An example in English is shown below:

(77) The desk is higher than the door is wide.

Intuitively, (77) compares the degree to which one entity has some property to the degree to which it (or another entity) has some other property (see Heim (1985) for more details).

In English, adjectives and possessive PC phrases are not mixable in comparative subdeletion; in the examples below, the sentences are acceptable if both the properties being compared are in the form of adjectives or possessive phrases, but not when one is an adjective and the other is a possessive phrase, as shown in (78) and (79) respectively:

- (78) a. This room has more width than it has length.  
b. This room is wider than it is long.

- (79) a. \*This room has more width than it is long.  
b. \*This room is wider than it has length.

(Modified from Hanink et al., 2019, p. 212)

Hanink et al. (2019) argue that subcomparatives can serve as a test for model-theoretic identity of adjectives and possessive PC phrases. In principle, if adjectives and possessive PC phrases are model-theoretically identical, then they should be mixable in subcomparative constructions. However, the fact that mixed subcomparatives are not allowed does not necessarily lead to the conclusion that adjectives and possessive PC phrases are model-theoretically distinct. Alternatively, mixed subcomparatives could be blocked by syntactic constraints that might be specific to English (see Bresnan, 1973 among others).

Comparative subdeletion is also attested in Basaá. Unlike English, this construction can be formed with mixed adjectives and possessive PC phrases. As demonstrated below, both properties being compared can be introduced by adjectives or possessive PC phrases as shown in (80a) and (80b), and moreover, the two forms can be mixed as shown in (80c):

- (80) a. iní !ndáp i ye i-kéńí lɔ́ kíi i ye i-láám  
 this 9.house SM be.PR 9-big pass as SM be.pr 9-beautiful  
 ‘That building is more big than it is beautiful.’
- b. Kim a gweé masódá lɔ́ kíi a gweé ńguy.  
 Kim AGR have luck pass as he has strength  
 ‘Kim has more luck than he has strength.’
- c. kim a ye ńkeńí lɔ́ kíi a gwee ńguy.  
 kim AGR is big pass as he has strength  
 ‘Kim is bigger than he is strong(=has strength).’

(Cited from Hanink et al., 2019, p. 213)

Hanink et al. (2019) point out that the contrast between English and Basaá regarding the acceptability of mixed subcomparatives indicates that, first of all, if there is any syntactic constraint that blocks the mixed subcomparatives in English, it does not apply to Basaá; moreover, adjectives and PC nominals in possessive phrases are built on the same model-theoretic core, regardless of the semantic analysis that applies to the core.

Equatives also demonstrate a similar pattern in Basaá as compared with that in English. As demonstrated below, adjectives and possessive PC phrases cannot be mixed in equatives in English, but can be mixed in Basaá, shown in (81) and (82) respectively:

- (81) a. This room is as wide as that one is long.  
 b. This room has as much width as that one has length.  
 c. \*This room has as much width as that one is long.
- (82) iní !ndáp i ye kéńí nlelem kíi i gweé ńguy.  
 DEM house AGR is big same as it has strength

‘The house is as big as it is strong (=has strength).’

The examples above support the argument that Basaá adjectives and possessive PC nominal phrases have the same semantic type. If the two types of predicates are type-theoretically identical, it is worthwhile to pursue a unified lexical semantics for both types and show that they are built on a common model-theoretic core; that is, they restrict truth conditions in an identical fashion (Hanink et al., 2019).

Note that the concept of model-theoretic equivalence used by Hanink et al. (2019) is different from that in Francez and Koontz-Garboden’s (2017) sense, which requires “the same truth conditions derived in the same compositional way” (p. 142). What matters here is “type-theoretic equivalence”, which does not entail identical truth conditions and underlying compositional procedures.<sup>11</sup> This will be the focus of this dissertation.

In previous sections, I have presented an established degree-based analysis for adjectives as well as the quality-based analysis for PC nominals proposed by Francez and Koontz-Garboden (2017). If adjectives and possessive PC nominal phrases are indeed type-theoretically identical in languages such as Wolof and Basaá, a unified compositional analysis for both types would be preferred.

Although Francez and Koontz-Garboden (2017) do not indicate how to reconcile the quality-based analysis for PC nominals and the degree-based analysis for adjectives, they do discuss an alternative view that PC nominals employ an ontology of scales, which are total-ordered sets of points. They point out that, although qualities and scales differ in that scales are totally ordered whereas qualities are pre-ordered, it is possible to transfer scales as mereological “intervals”, thus parallel to qualities; on the other hand, qualities can be recreated as sets of intervals on a scale as well.

However, they point out that qualities are the right choice for PC nominals in possessive predica-

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<sup>11</sup>See Grano and Zhang (2020) for a detailed discussion of the varieties of semantic equivalence, including model-theoretic equivalence, intensional/logical equivalence and contextual equivalence.

tion given empirical evidence cross-linguistically. In Ulwa, PC nominals in combination with the possessive morpheme *ka* can sometimes occur in contexts where there is another morpheme *watah* that also has possessive meaning:

- (83) Jessica bas-ka                    ya tubak-ka                    watah ka.  
 Jessica hair-3SING.POSS the thick-3SING.POSS have SENT-KA  
 ‘Jessica’s hair is thick.’ (Francez and Koontz-Garboden, 2017, p. 114)

This can be explained if the derived noun *tubak-ka* denotes the set of things that have a portion of ‘thickness’ as a mereological part; the morpheme *ka* is realized as the mereological part relation  $\preceq$  as shown in (84) below, rather than the possessive relation  $\pi$  proposed in (65):

- (84)  $\llbracket \textit{tubak-ka} \rrbracket = \lambda q. \exists p [p \preceq q \wedge \mathbf{thickness}(p)]$   
 (i.e. *tubak-ka* is a function that takes a portion *q* and returns true iff there is a portion *p* such that *p* is a mereological part of *q* and *p* is a portion of the quality **thickness**.)

The explanation above follows from the assumption that qualities are mereologically structured, supporting the proposal that PC nominals denote qualities.

Another reason for favoring the quality-based analysis over the scale-based analysis for PC nominals is the empirical evidence supporting the non-antisymmetric assumption; that is, two portions of a quality can be of the same size without being identical. Moltmann (2009) proposes that adjectives and adjective nominalizations are based on concrete manifestations of a property in an individual which she calls ‘tropes’. Under this framework, a phrase such as *Mary’s beauty* is the concrete manifestation of the property of *beauty* that is particular to Mary; it is distinct from *Kim’s beauty*, even if Mary and Kim are equally beautiful, as illustrated by (85) below:

- (85) Mary has as much beauty as Kim, though their beauties are very different. (adapted from Francez and Koontz-Garboden, 2017, p. 54)

Francez and Koontz-Garboden (2017) regard tropes as the counterparts of portions of qualities in their framework. They point out that the intuition that two equally beautiful individuals may have distinct portions of beauty can be captured in a straight-forward manner following their assumption that portions of qualities are preordered and hence can occupy the same amount of space without being identical. On the contrary, a scale-based analysis of PC nominals cannot capture this intuition easily due to the nature of scales being totally ordered and antisymmetric.

A unified analysis that employs the quality-based approach for both adjectives and PC nominals has been explored with data from Wolof and Basaá. Francez and Koontz-Garboden (2017) argue that, since *lool* modifies possessive PC nominal phrases and stative verbs, a possessive phrase such as *am xel* ‘have wit’ in (70b) has the same semantic type as a gradable stative verb such as *rafet* ‘(being) pretty’ in (70a); crucially, stative verbs denote relations between individuals and intervals of qualities just like PC nominals, as illustrated below:

$$(86) \quad \llbracket am\ xel \rrbracket = \lambda x \lambda I I_l \subset wit. \exists^I z [\pi(x, z)]$$

(i.e. *am xel* denotes a relation between individuals  $x$  and intervals  $I$  of the quality **wit** that holds iff there is a portion  $z$  of **wit** that is in  $I$  and  $x$  has  $z$ ; the interval  $I$  includes all and only portions of **wit** that rank above a contextually determined threshold.)

$$(87) \quad \llbracket rafet \rrbracket = \lambda x \lambda I I_l \subset beauty. \exists^I z [\pi(x, z)]$$

(i.e. *rafet* denotes a relation between individuals  $x$  and intervals  $I$  of the quality **beauty** that holds iff there is a portion  $z$  of **beauty** that is in  $I$  and  $x$  has  $z$ ; the interval  $I$  includes all and only portions of **beauty** that rank above a contextually determined threshold.)

Francez and Koontz-Garboden (2017) propose that the function of *lool* in Wolof is to manipulate the interval of the quality it modifies. It restricts the intervals to those that rank higher than merely ‘having wit’ in the context of (70b). The denotation for *lool* is presented in (88), where  $\alpha$  is a variable over relations between individuals and intervals of qualities, and  $!$  is the modifier

that maps any interval of a quality to portions of which the lower bound meets a threshold that is contextually very high:

$$(88) \quad \llbracket lol \rrbracket = \lambda\alpha\lambda x\lambda J_l.\alpha(x,!(J))$$

The meanings of *am xel lol* and *rafet lol* are derived as follows:

$$(89) \quad \llbracket am\ xel\ lol \rrbracket = \lambda y\lambda J_l \subset wit.\exists^{!(J)}z[\pi(x, z)]$$

(i.e. *am xel lol* denotes a relation between individuals *y* and intervals *J* of the quality **wit** that holds iff there is a portion *z* of **wit** that is in a subinterval of *J* that includes all and only portions that are ranked very high, and *y* has *z*.)

$$(90) \quad \llbracket rafet\ lol \rrbracket = \lambda y\lambda J_l \subset beauty.\exists^{!(J)}z[\pi(x, z)]$$

(i.e. *rafet lol* denotes a relation between individuals *y* and intervals *J* of the quality **beauty** that holds iff there is a portion *z* of **beauty** that is in a subinterval of *J* that includes all and only portions that are ranked very high, and *y* has *z*.)

For the pattern in Basaá, Hanink et al. (2019) propose a unified composition for the Basaá data that follows Francez and Koontz-Garboden’s (2017) quality-based analysis for PC nominals and extends it to adjectives. For the sentence (72b), Hanink et al. (2019) propose that *ɲguy* ‘strength’ denotes qualities, and the possessive morpheme *gweé* takes a quality and returns a relation between individuals and intervals of a quality, as shown in (91a) and (91b):

$$(91) \quad \text{a. } \llbracket \eta g u y \rrbracket = \lambda p.\mathbf{strength}'(p)$$

$$\text{b. } \llbracket g w e \acute{e}\ \eta g u y \rrbracket = \lambda x\lambda i \subset \mathbf{strength}.\exists^i z[\pi(x, z)]$$

(i.e. *gweé ɲguy* denotes a relation between individuals *x* and intervals *i* of the quality **strength** that holds iff there is a portion of **strength** in *i*, which includes all and only portions that rank above a contextually determined threshold, and *x* has that portion.)



They propose that an adjective such as *kéŋí* ‘big’ in (72a) denotes a relation between individuals and intervals of the quality *bigness* as shown below:

$$(92) \quad \llbracket k\acute{e}\eta\acute{i} \rrbracket = \lambda x \lambda i \subset \mathbf{bigness} . \exists^i z [\pi(x, z)]$$

(i.e. *kéŋí* denotes a relation between individuals  $x$  and intervals  $i$  of the quality **bigness** that holds iff there is a portion of **bigness** in  $i$ , which includes all and only portions that rank above a contextually determined threshold, and  $x$  has that portion.)

According to this analysis, the only difference in composition between adjectives as in (91b) and *have* + PC nominal phrases as in (92) is the quality they denote. Logically, a unified analysis for the degree modifier is achievable by restricting the interval of a quality to a context-determined standard denoted by the function **VERY**, as shown below:

$$(93) \quad \llbracket \eta g a n d a k \rrbracket = \lambda Q_{\langle e, \langle i, t \rangle \rangle} \lambda x . \exists^i z [Q(x)(i) \wedge \mathbf{VERY}(\lambda i' \exists x' [Q(x')(i')]) = i]$$

The meanings of *gweé ŋguy ŋgandak* is derived as follows:

$$(94) \quad \llbracket g w e \acute{e} \eta g u y \eta g a n d a k \rrbracket = \lambda x . \exists^{i \subset \mathbf{strength}} z [\pi(x, z) \wedge \mathbf{VERY}(\lambda i' \exists x' \exists^{i' \subset \mathbf{strength}} z' [\pi(x', z')]) = i]$$

(i.e. *gweé ŋguy ŋgandak* denotes a function that takes individuals  $x$  and returns true iff there is a portion  $z$  of the quality **strength** in the intervals  $i$  and  $x$  has  $z$ , and an interval with a contextually very high lowest portion matches  $i$ .)

Menon and Pancheva (2014) also provide insights into the model-theoretic identity of PC lexemes with data from Malayalam, a Dravidian language where there are two classes of lexemes that utilize different strategies to form PC sentences. Class 1 lexemes, such as *nalla* ‘good’, have the suffix *-a* that serves as a relativizer and turn into predicates when bound pronouns are attached, as repeated in (95a). On the other hand, Class 2 lexemes, such as *pokkam* ‘tallness’, have the nominal marker *-am* and occur in PC sentences with possessive morphosyntax that is demonstrated by the existential copula and the dative case that marks possessor, as repeated in (95b):

- (95) a. *ava| nalla-val| aaṇə.*  
 she good-FEM.SING EQ-COP  
 ‘She is good.’
- b. *ava|kkə pokkam uṇṭə*  
 she.DAT tallness EX.COP  
 ‘She is tall.’

(Cited from Menon and Pancheva, 2014, p. 292-94)

Menon and Pancheva argue that all PC lexemes in Malayalam denote properties and PC sentences express that an individual possesses a portion of the property uniformly, which is consistent with the compositional analysis of Wolof and Basaá as shown above. Moreover, they propose that, despite the structural differences as illustrated above, lexemes of both classes in Malayalam are universally precategorical roots, and denote properties. PC sentences with those lexemes are always expressed with possession of such properties associated with the roots.

For possessive sentences with Class 2 lexemes as shown in (95b), the possession is introduced by the possessive construction itself. The property-denoting roots are nominalized by the nominalizing head  $\lambda$ , which is realized as the suffix *-am*; it takes a property and returns a relation between degrees and instances of that property, as shown in (96):

$$(96) \quad \llbracket \text{-am} \rrbracket = \lambda \Pi \lambda d \lambda x. [x \text{ is an instance of } \Pi \ \& \ \mu(y) \geq d]$$

For non-possessive sentences with Class 1 lexemes as shown in (95a), they argue that possession is introduced by a covert categorizing head which has possessive semantics; as shown in (97), the null  $v$  head takes a property-denoting root and creates a function from degrees to a function from individuals to truth values that holds if and only if there is some instance of the denoted property that the individual has and the measure of  $y$  exceeds the degree:

$$(97) \quad \llbracket \emptyset_{v\text{-poss}} \rrbracket = \lambda \Pi \lambda d \lambda x. \exists y [y \text{ is an instance of } \Pi \ \& \ x \text{ has } y \ \& \ \mu(y) \geq d]$$

As discussed previously, their approach reflects the uniformity view that the syntactic variation in

the forms of PC sentences in Malayalam is not caused by the semantic components of PC lexemes; the lexemes of the two classes share the same semantics.

However, Francez and Koontz-Garboden (2017) point out that Menon and Pancheva's (2014) analysis of Malayalam would cause some unappealing consequences both from empirical evidence in Malayalam and cross-linguistic generalization. First of all, the motivation for proposing a phonologically null *v* head, as shown in (97), is purely theory-internal and lacks empirical evidence for its existence. Also, following Menon and Pancheva's (2014) analysis, it is unclear why Class 1 lexemes and Class 2 lexemes behave in distinct ways; in theory, nothing prevents a certain lexeme from appearing in either possessive or non-possessive sentences.

Moreover, Francez and Koontz-Garboden (2017) argue that Menon and Pancheva's (2014) uniform analysis leads to three problematic crosslinguistic predictions. First of all, if categorizing morphology is responsible for introducing the possessive semantics, such as the *v* head in Malayalam, we should expect to see the association between categorizing morphology and possessive semantics cross-linguistically; however, as reported by Francez and Koontz-Garboden (2017), this is not supported by empirical data. Secondly, if PC lexemes denote properties and all categorization is syntactic, and assuming that there are roots in the same syntactic categories that do not denote properties, then there should be distinct categorizing morphology that is used in word formation with them. However, this is not the case, even in languages in which categorizing morphology is overt. Thirdly, according to Menon and Pancheva (2014), categorizers are found in both possessive and non-possessive forms; for instance, the nominalizers *n* in Malayalam, realized as *-am*, is non-possessive, while the nominalizer *ka* in Ulwa is possessive. Logically, we should expect to see the same pattern with the verbal categorizer. However, Francez and Koontz-Garboden (2017) point out that there is no known language that has verbal PC phrases while requiring other external morphosyntax denoting possession, which suggests that there is no evidence that a *v* head can combine with PC roots without carrying possessive semantics.

Furthermore, they show that an analysis following the transparency view provides a natural explanation of the distribution of the two classes of lexemes in Malayalam, and would not cause false cross-linguistic expectations. They propose that Class 1 lexemes in Malayalam are forms with individual-characterizing denotations, while Class 2 lexemes are quality denoting. Following the Lexical Semantic Variation Hypothesis as shown in (60), this explains why Class 1 roots occur in non-possessive PC sentences while Class 2 roots occur in possessive sentences. They argue that the nominalizer *-am* that pairs with Class 2 lexemes is simply a nominalizer and has a trivial denotation.

In summary, past research has provided data from languages such as Ulwa, Wolof and Basaá to support the argument that PC nominals are distinct from non-quality-denoting mass nouns. Moreover, regardless of the lexical semantics of adjectives and PC nominals, empirical evidence shows that adjectives and possessive PC nominals phrases are treated identically in degree constructions in some languages, suggesting that they are type-theoretically equivalent (at least in some languages). In chapter 3, I will show that Mandarin demonstrates the same pattern in that PC nominals and mass nouns are semantically distinct, and gradable adjectives and possessive PC phrases behave in the same fashion in contexts involving gradability, supporting the argument that these two categories are type-theoretically equivalent.

### **2.3 Conclusion**

In this chapter, I reviewed past research on the PC predicates of the two types of PC sentences: the gradable adjectives and the possessed PC nominals. I introduced the general perspective of the traditional focus on the semantic properties of gradability and adjectives. Then I reviewed the family of degree-based approaches of gradable adjectives and some well-established compositional analyses that essentially treat gradable adjectives as measure functions from individual to degree. The way that positive and comparative interpretations are expressed in predicative adjective sentences

following these approaches are also discussed.

I switched the focus to nominalized PC lexemes in chapter 2.2, starting by demonstrating the cross-linguistic distribution of PC nominals. Then I reviewed Francez and Koontz-Garboden's (2017) quality-based approach to PC nominals, which essentially treat PC nominals as functions that characterize 'portions' of relevant qualities. I also showed how positive and comparative meanings are expressed with possessive PC predicates following their analysis. Then I presented the distinction between PC nominals and non-PC mass nouns in various languages and reviewed Francez and Koontz-Garboden's (2017) account of the distinction between PC nominals and non-PC mass nouns arguing that they differ in inherent measures. I also reviewed the translational and type-theoretic equivalence between possessive and non-possessive PC sentences supported by cross-linguistic data.

## Chapter 3

### PC nominals in Mandarin: The Data and The Puzzles

In this chapter, I will present new data that demonstrates the semantic and syntactic features of PC nominals in Mandarin in comparison with gradable adjectives, followed by an elaboration of the three puzzles discussed in chapter 1.

#### 3.1 PC nominals in Mandarin: The Data

As previously shown in chapter 1, PC lexemes are realized both as adjectives in canonical predicative sentences and as nominals in possessive sentences, as repeated below:

- (5) Zhangsan hen gao.  
Zhangsan very tall  
'Zhangsan is (very) tall.' [Adjectives]
- (6) Zhangsan hen you zhihui.  
Zhangsan very POSS wisdom  
'Zhangsan has (a lot of) wisdom/ is (very) wise.' [PC Nominals]

The class of nominalized PC lexemes in Mandarin is fairly large, and is associated with various semantic categories. Below is a summary of gradable adjectives and PC nominals following Dixon's (1982) classification of semantic types:

#### 1. DIMENSION:

- (i) adjectives: *da* 'big', *xiao* 'small', *shen* 'deep', *qian* 'shallow', *chang* 'long', *duan* 'short',  
*hou* 'thick', *bo* 'thin', etc.

- (ii) PC nominals: *daxiao* 'size', *shendu* 'depth', *changdu* 'length', *houdu* 'thickness', etc.

#### 2. PHYSICAL PROPERTY:

(i) adjectives: *ying* ‘hard’, *ruan* ‘soft’, *zhong* ‘heavy’, *qing* ‘light’, *tian* ‘sweet’, *ku* ‘bitter’, etc.

(ii) PC nominals: *yingdu* ‘hardness’, *zhongliang* ‘weight’, *tiandu* ‘sweetness’, etc.

### 3. COLOUR:

(i) adjectives: *hei* ‘black’, *bai* ‘white’, *hong* ‘red’, etc.

(ii) PC nominals: *heise* ‘(the color of) black’, *baise* ‘(the color of) white’, *hongse* ‘(the color of) red’, etc.

### 4. HUMAN PROPENSITY:

(i) adjectives: *kuai* ‘happy’, *canren* ‘cruel’, *jiao’ao* ‘proud’, *congming* ‘clever’, etc.

(ii) PC nominals: *kuai* ‘happiness’, *canren* ‘cruelness’, *jiao’ao* ‘pride’, *zhihui* ‘wisdom’, etc.

### 5. AGE:

(i) adjectives: *xin* ‘new’, *nianqing* ‘young’, *lao* ‘old’

(ii) PC nominals: *nianling* ‘age’

### 6. VALUE:

(i) adjectives: *chun* ‘pure’, *qiong* ‘poor’, *xie’e* ‘wicked’, *zhuoyue* ‘excellent’, *hao* ‘good’, *huai* ‘bad’, etc.

(ii) PC nominals: *chunjie* ‘purity’, *xie’e* ‘wickedness’, *zhuoyue* ‘excellence’, etc.

### 7. SPEED:

(i) adjectives: *kuai* ‘fast’, *man* ‘slow’, etc.

(ii) PC nominals: *sudu* ‘speed’

Several interesting observations can be made from the semantic category of PC nominals. First of all, the PC nominals of the COLOUR class are ambiguous between adjectives and nouns, as shown below:

- (98) a. heise de yifu  
black DE clothes  
'black clothes'
- b. Wo jintian chuan heise.  
I today wear black  
'I wear black today.'

The ambiguity can also be found with some PC nominals of the HUMAN PROPENSITY and VALUE class, such as *kuaile* 'happy/happiness' and *xie'e* 'wicked/wickedness', as shown below:

- (99) a. kuaile de nanhai  
happy DE boy  
'a happy boy'
- b. Ni gei women dailai kuaile.  
you give us bring hapiness  
'You brings hapiness to us.'

Interestingly, the ambiguous PC nominals of the HUMAN PROPENSITY class only occur with lexemes that denotes *affect*. I will discuss this in details in later chapters.

Another noteworthy fact is that PC nominals vary with respect to *absolute nominalizations* or *positive nominalizations*. This distinction is discussed in Moltmann (2009), in which she explores the adjective nominalizations with data from English; the distinction is demonstrated with examples below:

- (100) a. positive nominalizations: *tallness, shortness, heaviness, lightness, wideness, narrowness*
- b. absolute nominalizations: *height, weight, width, length* (Moltmann, 2009, p. 79)



Moltmann argues that positive nominalizations are derived from the positive forms of the adjectives, while the absolute nominalizations are not tied to the positive forms. For instance, the sentence *Mary's tallness exists* implies that *Mary is tall*, but the sentence *Mary's height exists* does not have such implication; that is, Mary's height exists regardless of whether she is tall. This also suggests that only the positive nominalizations are associated with the contextually determined standard of the associated property, as with the positive adjectives.

The Mandarin data shows that those PC nominals of the classes of DIMENSION, PHYSICAL PROPERTY, COLOUR, AGE, and SPEED are all absolute nominalizations, while the classes of HUMAN PROPENSITY and VALUE are positive nominalizations. Moreover, for the classes of PC nominals that are absolute nominalizations, the corresponding positive nominalizations do not exist; that is, there is no Mandarin counterpart of positive nominalizations such as *tallness*. This distinction will be further elaborated in later chapters.

Furthermore, the classes of PC nominals differ in the size of the class. Dixon (1982) summarized that, from the 17 languages he investigated, the VALUE, AGE, COLOUR and SPEED class typically have very restricted size; the DIMENSION and PHYSICAL PROPERTY class have a bit more members, while the HUMAN PROPENSITY class is the largest class. The Mandarin data is mostly consistent with Dixon's summary.

Last but not least, not all PC nominals can occur in the possessive construction in Mandarin. Only some PC nominals of the HUMAN PROPENSITY class are found in this construction. This will be elaborated on in chapter 3.2.

In the following sections, I will show the distribution of PC nominals in positive and comparative sentences in Mandarin in comparison with the positive and comparative sentences that involve adjectives as predicates.

### 3.1.1 Gradable Adjectives and PC nominals in Positive Sentences

In chapter 2.1.3, I discussed the degree-based approach to gradable adjectives and the POS operator that has been proposed to encode the contextual sensitivity by introducing the standard of comparison. POS is overwhelmingly not lexicalized by overt morphology cross-linguistically. However, many scholars have argued that POS is often lexicalized as the degree modifier *hen* in Mandarin (Sybesma, 1999; S.-Z. Huang, 2006; Liu, 2010b, 2018)<sup>1</sup> Other modifiers, such as *feichang* ‘extremely’, *chaoji* ‘super’ etc. can also be found to play a similar role. There are also other ways to manipulate degrees associated with gradable adjectives in Mandarin, as pointed out by Grano (2012), including extent phrases (101), measure phrases (102) and reduplicative morphology (103):

- (101) Zhangsan gao de neng mozhao tianpeng.  
Zhangsan tall DE can touch ceiling  
‘Zhangsan is so tall that he can touch the ceiling.’ (Sybesma, 1999, as cited in Grano, 2012, p. 526)
- (102) Zhangsan liang mi gao.  
Zhangsan two meter tall  
‘Zhangsan is two meters tall.’
- (103) Zhangsan gao-gao-de.  
Zhangsan tall-tall-DE  
‘Zhangsan is really tall.’ (Grano, 2012, p. 526)

Although positive semantics cannot be achieved without some kind of degree expression in simple declarative clauses, there are some constructions that can have positive interpretations without any overt mechanism. Liu (2010b) demonstrates that constructions such as negation (104), contrastive focus (105), *ma* particle questions (106), epistemic adjectival small clause (107), conditionals (108)

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<sup>1</sup>Grano (2012) proposes an opposite view arguing that *hen* is not an overt lexicalization of POS; rather, syntactically projected covert POS is not available in Mandarin and *hen* is a type and category shifter that is needed to approximate positive semantics. This dissertation follows Grano’s approach, which will be discussed in chapter 4.3 and 4.4.

and sentences ending with sentence-final particle *le* (109) do not need any overt degree expression to achieve positive interpretations:

- (104) Zhangsan bu gao. [negation]  
Zhangsan NEG tall  
'Zhangsan is not tall.'
- (105) Zhangsan gao, Lisi ai. [contrastive focus]  
Zhangsan tall Lisi short  
'Zhangsan is tall, but Lisi is short.'
- (106) Zhangsan gao ma? [*ma*-question]  
Zhangsan tall Q  
'Is Zhangsan tall?'
- (107) Zhangsan xiao ni ben. [small clause]  
Zhangsan deride you stupid  
'Zhangsan derided you as being stupid.'
- (108) Zhangsan yaoshi gao dehua, Lisi jiu bu ai. [conditional]  
Zhangsan if tall PAR Lisi then not short  
'If Zhangsan is tall, then Lisi is not short.'
- (109) Hua hong le. [sentence-final *le*]  
flower red LE  
'The flower got red.'<sup>2</sup> (adapted from Liu, 2010b, p. 1019)

Also, Zhu (1980) points out that when gradable adjectives occur in coordinate constructions connected by *you* 'both', overt degree expressions are not required, as illustrated in (110):

- (110) Zhangsan you gao you da.  
Zhangsan both tall both big

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<sup>2</sup>Kennedy and Levin (2008) argue that change-of-state verbs derived from gradable adjectives have a comparative component in which one individual at two different time points is compared with respect to some dimension; for instance, the sentence 'The flower got red' compares the redness of the flower previously and currently. However, Liu points out that this sentence does not allow a bare comparative interpretation; that is, the intended meaning 'The flower got redder' is not possible. Hence the predicate *hong* 'red' indicates a positive and categorical meaning. See footnote 5 for more discussion.

‘Zhangsan is both tall and big.’

In summary, degree expressions other than simple modifiers such as *hen* may appear in PC sentences with gradable adjectives to express positive meaning in simple declarative clauses. Those expressions, including extent phrases (111) and measure phrases (112), are also attested in possessive PC sentences, as illustrated below:

(111) Zhe yi-ji            you ai de ba wo    xin    dou ronghua le.  
this one-episode POSS love DE BA 1SING heart DOU melt    LE  
‘This episode is so full of love that my heart melted.’

(112) Zhangsan you    ji-fen    caihua.  
Zhangsan POSS some-CL talent.  
‘Zhangsan has some talent.’

The reduplicative morphology that can be used by gradable adjectives, as shown in example (103), is not applicable in possessive PC constructions. It is possible that this reduplication process can only apply at the word level, not the phrase level; since the possessive PC predicates are phrases, they would be blocked by this constraint.

Also, in constructions other than simple declaratives where degree modifiers such as *hen* are needed, positive interpretations without overt degree expression are possible for possessive PC sentences. As illustrated below, constructions that hold for gradable adjectives, including negation (113), contrastive focus (114), *ma* particle questions (115), epistemic small clause (116), the conditional (117) and sentences ending with sentence-final particle *le* (118) as presented by Liu (2010b) for gradable adjectives as well as coordination as pointed out by Zhu (1980) (119) are also attested in PC sentences with nominals:

(113) Zhangsan mei you zhihui. [negation]  
Zhangsan NEG POSS wisdom.  
‘Zhangsan does not have wisdom/ is not wise.’

- (114) Zhangsan you zhihui, dan Lisi meiyou zhihui. [contrastive focus]  
 Zhangsan POSS wisdom but Lisi NEG POSS wisdom  
 ‘Zhangsan has wisdom, but Lisi does not.’
- (115) Zhangsan you zhihui ma? [*ma*-question]  
 Zhangsan POSS wisdom Q  
 ‘Does Zhangsan have wisdom?’
- (116) Zhangsan jidu ni you zhihui. [small clause]  
 Zhangsan envy you POSS wisdom  
 ‘Zhangsan envied you for having wisdom.’
- (117) Zhangsan yaoshi you zhihui de-hua, Lisi jiu bu ben. [conditional]  
 Zhangsan if POSS wisdom PAR Lisi then not stupid.  
 ‘If Zhangsan has wisdom, then Lisi is not stupid.’
- (118) Zhangsan you chuxi le! [sentence-final *le*]  
 Zhangsan POSS achievement LE  
 ‘Zhangsan has got some achievements!’
- (119) Zhangsan (you) you zhihui you you quanli. [coordination]  
 Zhangsan both POSS wisdom both POSS power  
 ‘Zhangsan has both wisdom and power.’

### 3.1.2 Gradable adjectives and PC nominals in comparative constructions

Now we switch to the comparative sentences in Mandarin.<sup>3</sup> Unlike many languages that use overt comparative morphology in comparative constructions with gradable adjectives, very few overt morphological signals for comparatives in Mandarin are found. Some scholars have argued that the morpheme *bi* ‘than’ encodes the comparative semantics (see Lin, 2009 among others), as illustrated in (120):

- (120) Zhangsan *bi* Lisi *gao*.  
Zhangsan than Lisi tall  
‘Zhangsan is taller than Lisi.’

However, Liu (2010a) argues against this analysis by pointing out that there are comparative constructions in Mandarin that do not contain the morpheme *bi*; it merely has the same function with the English *than* in introducing the standard of comparison. Grano (2012) argues that it is more reasonable to posit a null comparative operator for Mandarin. He points out that there are at least three constructions in Mandarin that do not have any overt morphological signal of comparative semantics, including the so-called ‘transitive comparative’ (see Xiang, 2005; Erlewine,

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<sup>3</sup>Liu (2010a) distinguishes two types of comparatives in Mandarin: the presupposition comparative and the non-presupposition comparative. As shown below, the sentence in (1) requires both Zhangsan and Lisi to be happy, whereas the sentence in (2) does not require either of them to be happy:

- (1) Zhangsan *hen* *kaixin*, Lisi *geng* *kaixin*.  
Zhangsan very happy Lisi more happy  
‘Zhangsan is very happy, and Lisi is even happier.’
- (2) Zhangsan (*jintian*) *bi* Lisi (*zuotian*) *kaixin*.  
Zhangsan today than Lisi yesterday happy  
‘Zhangsan (today) is happier than Lisi was yesterday.’

Liu (2010a) proposes that the morpheme *geng* is a comparative morpheme that presupposes the properties predicated of the entities must be true. There is also a covert comparative morpheme which occurs in non-presupposition comparatives where the overt *geng* is not present. Due to scope limitations of this dissertation, I will only focus on what Liu (2010a) refers as the non-presupposition comparatives.

2007 and Grano and Kennedy, 2012 among others) as in (121); the ‘intransitive comparative’, which I have demonstrated in (24) previously (repeated in (122)); and the change-of-state comparative as in (123), which encodes a comparison of one individual at two time points with respect to a dimension:

- (121) Zhangsan gao Lisi liang cun. [Transitive]  
 Zhangsan tall Lisi two inch  
 ‘Zhangsan is two inches taller than Lisi.’<sup>4</sup>
- (122) Zhangsan gao. [Intransitive]  
 Zhangsan tall  
 ‘Zhangsan is taller (than someone known from the context).’
- (123) Zhangsan gao le (liang cun). [Change of State]  
 Zhangsan tall LE two inch  
 ‘Zhangsan grew (two inches).’<sup>5</sup> (Grano, 2012, p. 528)

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<sup>4</sup>Note that the post-adjectival measure phrase is obligatory in the transitive comparative. Also, the distribution of the transitive comparative is rather limited. Only adjectives that involve numerically-quantifiable scales such as *gao* ‘tall’ or *da* ‘old’ can be used in this construction; other gradable adjectives, such as *congming* ‘smart’, are not allowed in this construction:

- (1) \*Zhangsan congming Lisi ji fen.  
 Zhangsan smart Lisi some degree  
*Intended:* ‘Zhangsan is a few degrees smarter than Lisi.’

<sup>5</sup> As discussed in footnote 2, scholars have divided opinions towards the interpretations of gradable adjectives in the change-of-state comparative. Grano (2012) argues that sentences such as (123) involves comparative interpretations following Kennedy and Levin’s (2008) analysis. Also, *le* here is analyzed as a perfective or change-of-state marker, rather than a sentence-final marker as analyzed in Liu (2010b). In this particular example, the sentence with the degree expression *liang cun* ‘two inches’ does not indicate an exclusively categorical meaning; in other words, Zhangsan may still be short at the time of utterance. Without the degree expression, the categorical interpretation is still not exclusive. The difference in interpretation between (109) and (123) may be caused by the difference between color adjectives and other gradable adjectives.

Zhang (2018) points out that de-adjectival degree achievements, such as ‘Zhangsan gao le’ in (123), are inchoative statives that denotes a state that has some difference in value in some property from a previous state. Consider the

Grano also points out that the measure phrase *liang cun* ‘two inches’ in the transitive comparative example (121) does not provide comparative morphology. A similar sentence without any standard

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following examples of the stative locational verb *zuo* ‘sit’, the stative psychological verb ‘gaoxing’ ‘happy’ and the change-of-state verb *yanjuan* ‘get tired’:

- (1) a. Ta      zuo le   san-ge xiaoshi.  
       3SING sit  LE three  hours  
       ‘S/He sat (has sit) for three hours.’
- b. Ta      gaoxing le  san-ge xiaoshi.  
       3SING happy LE three  hours  
       ‘S/He is happy for three hours.’
- c. Ta      yanjuan le  san-ge xiaoshi.  
       3SING get.tired LE three  hours  
       Intended: ‘S/He got tired for three hours.’

As shown above, only the locational and the psychological verbs are compatible with ‘san-ge xiaoshi’, a temporal phrase that is equivalent to *for three hours* in English. The contrast indicates that the locational and the psychological verbs are not telic.

Furthermore, the psychological verb *happy* ‘gaoxing’ differ from the locational verb *zuo* ‘sit’ and the change-of-state verb *yanjuan* ‘get tired’ in that only the former can have an inchoative reading:

- (2) a. Meidang kaoshi, ta      dou zuo.  
       whenever test,   3SING DOU sit  
       Intended: ‘Whenever there is a test, s/he always sits.’
- b. Meidang kaoshi, ta      dou gaoxing.  
       whenever test,   3SING DOU happy  
       ‘Whenever there is a test, s/he is always happy.’
- c. ?Meidang kaoshi, ta      dou yanjuan.  
       whenever test,   3SING DOU get.tired  
       Intended: ‘Whenever there is a test, s/he always gets tired.’

Zhang argues that the stative verbs can be divided into pure stative verbs such as *zuo* ‘sit’ and inchoative stative verbs *gaoxing*. They are different from change-of-state verbs, but occasionally the change-of-state meaning can be derived pragmatically because “those inchoative states describe the initial state of the state” (p. 109).

She points out that adjectives such as *gan* ‘dry’ demonstrates stative reading with sentence-final duration phrase, as shown below:

- (3) Yifu   gan le  yi  xiaoshi.  
       clothe dry LE one hour



of comparison such as ‘Lisi’ in (121) can be interpreted as comparative or non-comparative:

- (124) Zhangsan gao yi mi.  
Zhangsan tall one meter  
‘Zhangsan is one meter tall.’ OR  
‘Zhangsan is one meter taller (than someone known from context).’ (Grano, 2012, p. 529)

In summary, the comparatives with gradable adjectives can be formed without any overt comparative morpheme in Mandarin. This also applies to PC nominals in possessive constructions. Comparatives with possessive PC predicates can be formed with the morpheme *bi*, as shown below:

- (125) Zhangsan bi Lisi you zhihui.  
Zhangsan than Lisi POSS wisdom  
‘Zhangsan has more wisdom than Lisi.’

Moreover, possessive PC sentences can achieve comparative interpretations without any overt morphology just like PC sentences with adjectives. Among the three strategies: transitive, intransitive and the change-of-state comparatives that work for gradable adjectives, the latter two (127 and 128) are possible with PC nominals, but not the transitive (126):

- (126) \*Zhangsan you zhihui Lisi ji fen.  
Zhangsan POSS wisdom Lisi some extent  
*Intended:* ‘Zhangsan has more wisdom than Lisi to some extent.’

- (127) Zhangsan you zhihui.  
Zhangsan POSS wisdom  
‘Zhangsan has more wisdom (than someone in this context).’

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*Intended:* ‘The clothes was drying for one hour.’

*Actual Reading:* ‘The clothes has been/was dry for one hour.’ (p. 167)

The example above, as argued by Zhang, shows that degree achievements are not inherently telic. Rather, their default reading is atelic; the change-of-state reading under certain conditions. We will not go into more detail due to scope limitations of this dissertation.

- (128) Zhangsan you zhihui le (ji fen).  
Zhangsan POSS wisdom LE some extent  
'Zhangsan has got more wisdom (to some extent).'<sup>6</sup>

As discussed previously, the transitive strategy is rather limited among gradable adjectives; only adjectives that involve numerically-quantifiable scales such as *gao* 'tall' and *da* 'big/old' can be used in this construction. In later chapters, I will propose that all PC nominals are evaluative, which would be consistent with the fact this construction is unattested for PC nominals altogether.

### 3.1.3 *hen* in sentences with PC nominals: a corpus study

Li (2017) claims that *hen* is optional in possessive PC sentences with positive interpretation. To evaluate this claim, I conducted a corpus study to examine data on PC nominals in possessive construction with degree modifiers such as *hen* in Mandarin.

First, I consulted the BCC corpus (Xun et al., 2016) for the frequencies of the possessed nouns without preceding degree modifiers (N-**you**-N), and the frequencies of possessed nouns preceded by degree modifiers such as *hen* or *da* 'big' (N-degree-*you*). The following is a list of the most frequent phrases of each type:

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<sup>6</sup>(118) and (128) demonstrate the same ambiguity as I discussed with gradable adjective cases in chapter 2.2 and 2.3. For PC nominals, an overt degree expression such as *ji fen* 'some extent' makes the comparative meaning more salient, whereas sentences without overt degree expressions have a stronger categorical flavor.

<i>Top N<sub>1</sub>-you-N<sub>2</sub></i>	<i>Top N<sub>1</sub>-degree-you-N<sub>2</sub></i>
laotian you yan	hua hen you daoli
heaven POSS eye	word very POSS reason
‘Heaven has eyes/ There is justice’	‘There is reason in the words’
shenti you bing	hua hen you liliang
body POSS illness	word very POSS strength
‘Body is sick’	‘Word is powerful’
ren you quan	juzhi hen you paitou
person POSS right	act very POSS style
‘Person has right’	‘Act has style/is stylish’
tui you maobing	ren hen you jingyan
leg POSS problem	people very POSS experience
‘Leg has problem’	‘People has a lot of experience’

Table 3.1: Most frequent *you* + N phrases in Mandarin

As illustrated in Table 3.1, all  $N_2$  in the first column are non-gradable and non-quality denoting nouns such as *yan* ‘eye’, *bing* ‘illness’, *quan* ‘right’ and *maobing* ‘problem’, whereas the  $N_2$  in the second column following *hen you* are gradable and quality-denoting nouns including *daoli* ‘reason’, *liliang* ‘strength’, *paitou* ‘style’ and *jingyan* ‘experience’. This result indicates a rough preference for possessive constructions with degree modifiers for PC nominals.

The second part of the corpus study investigated whether PC nominals can occur without degree expressions such as *hen* in simple declaratives. I examined the four highly frequent *you*-PC nominal phrases as listed in the second column of the previous table as well as four frequently-occurring PC nominals, including *zhihui* ‘wisdom’, *wenhua* ‘knowledge’, *caihua* ‘talent’ and *yongqi* ‘courage’. In the following table, the first column presents the count of all sentences where possessive PC phrases act as the predicate of sentences in which they occur. The second column shows the counts of sentences where overt degree expressions such as *hen* precede the possessive PC phrases among

those sentences identified in the first column, as illustrated in (129) below with the PC predicate *you daoli* ‘have reason’:

- (129) Zhangsan de hua hen you daoli.  
Zhangsan DE word very POSS reason  
‘Zhangsan’s words have a lot of reason / are very reasonable.’

Since positive semantics can be achieved without overt degree expressions preceding the possessive nouns in constructions such as negation and contrastive focus (see chapter 2.2 and 3.1 for more details), the third column presents the number of sentences where morpho-syntactic means other than degree modifiers are used to achieve positive semantics among those sentences identified in the first column. (130) is an example of a negative sentence involving *you daoli* ‘have reason’:

- (130) Zhangsan de hua mei you daoli.  
Zhangsan DE word NEG POSS reason  
‘Zhangsan’s words do not have reason / are not reasonable.’

The fourth column shows the number of sentences that are simple declarative clauses with positive interpretations among sentences presented in the first column where no overt or covert signs of positive semantics exist. As illustrated in (131) below, the possessive predicate *you daoli* ‘have reason’ is the predicate of a simple declarative sentence without any overt degree morphology; this example is ambiguous between a positive and comparative reading:

- (131) Ni de hua you daoli.  
you DE words POSS reason  
‘Your words have reason.’ OR:  
‘Your words have more reason (than some other words known from the context).’<sup>7</sup>

As shown in Table 3.1.3, 89% of PC nominals in the corpus data occur in sentences where overt degree modifiers are present or in the constructions, such as negation or contrastive focus, that

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<sup>7</sup>The positive interpretation of this sentence is marginal or unacceptable among some native speakers. There might be dialectal variation or influence from the context.

	total	overt degree	covert POS	simple declarative
<i>you daoli</i> 'reason'	171	69	79	23
<i>you liliang</i> 'strength'	23	13	9	1
<i>you paitou</i> 'style'	4	4	0	0
<i>you jingyan</i> 'experience'	31	14	14	3
<i>you zhihui</i> 'wisdom'	10	2	7	1
<i>you caihua</i> 'talent'	6	4	2	0
<i>you wenhua</i> 'knowledge'	5	0	5	0
<i>you yongqi</i> 'courage'	8	0	8	0

Table 3.2: Syntactic distributions of most-frequent PC nominals

allow positive interpretations (the second and the third column, as illustrated in (129) and (130)). Approximately 11% of the data are cases where the sentence has neither overt degree expressions nor constructions that allow positive interpretation; among them, 82% of the data have the possessive predicate *you daoli* ‘have reason’, as shown in (131) above.

In summary, some PC nominals tolerate omission of degree modifiers in simple declaratives, unlike gradable adjectives where the lack of overt degree morphology in simple declaratives are judged ungrammatical overwhelmingly among native speakers.

However, for those counterexamples, there are several factors that could affect some speakers’ acceptability judgement of those sentences. First of all, previous studies have shown that PC sentences without overt degree modifiers can be acceptable with a certain intonational pattern, which may indicate covert intensifiers (Liu, 2010b).

Also, nouns such as *daoli* are ambiguous between a PC nominal and a count noun. As discussed earlier, Francez and Koontz-Garboden (2017) treat PC nominals as some kind of ‘mass entities’; that is, a kind of mass nouns. In the cases where *daoli* is a count noun, *daoli* can be modified by classifier phrases, such as *yi-ge* ‘one’ in (132):

- (132) Fuqin gei ta jiang-le yi-ge daoli.  
father give 3SING tell-LE one-CL reason  
‘Father told him a reason.’

Moreover, bare possessive PC nominals occurring in simple declaratives may not have a gradable interpretation, as shown in (133):

- (133) Shangdi zi you daoli.  
God self POSS reason  
‘God himself has (his) reason.’

This sentence intends to express that the subject ‘God’ has a reason (behind his actions, etc.), rather than describing a gradable property of God. Hence this sentence is not a PC sentence.

In summary, the results from the corpus study show that degree modifiers such as *hen* are obligatory in simple declarative sentences with possessive PC phrases. It contrasts with Li's (2017) claim that degree modifiers such as *hen* are optional. A few counterexamples where overt degree modifiers do not occur in these sentences exist, although there are other factors that may cause some speakers to tolerate bare possessive PC phrases. PC nominals in possessive constructions do demonstrate parallel patterns with gradable adjectives in that both require a degree modifier (or other forms of morphology) to achieve positive semantics, although the lack of degree modifiers is a more severe violation in PC sentences with adjectives than nominals.<sup>8</sup>

### 3.2 The puzzles

In the previous chapters, I have demonstrated the semantic domain and syntactic features of PC nominals in Mandarin. In this chapter, I will revisit and elaborate on the puzzles that have been laid out in chapter 1.

As pointed out earlier, the two morphosyntactic types of PC lexemes are both attested in Mandarin: the canonical construction with adjectives and the possessive construction with PC nominals. However, there are two levels of complexities involved here.

The first level of complexity is associated with the function of degree modifiers such as *hen* in simple declarative clauses. As discussed in chapter 1, *hen* is only compatible with possessive PC phrases and gradable adjectives, but not with non-PC nouns, including concrete mass nouns as

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<sup>8</sup>Note that counterexamples exist and speakers may tolerate some PC nominals as bare possessive predicates in simple declarative clauses, such as *jianjie* 'opinion', *yanguang* 'vision', and *wenhua* 'culture', etc. While I acknowledge that, it is worth noting that the frequencies of those counterexamples are very low. Also, those nouns are ambiguous between a PC nominal and a count noun in the same way as shown in (132), and those sentences may have a non-gradable interpretation in the same way as in (133). Hence, those 'counterexamples' do not indicate that *hen* is optional in possessive PC sentences. Future corpus studies with more data as well as acceptability tests might be necessary to further evaluate the status of degree modifiers in this construction.

shown in (134c), concrete count nouns as shown in (134d), and abstract non-PC nouns (134e). The distinction in acceptability between PC nominals and non-PC mass nouns is particularly puzzling; although PC nominals are considered as a kind of mass nouns according to Francez and Koontz-Garboden's (2017) quality-based analysis, possessive phrases can only be directly modified by *hen* when the noun is a PC nominal such as *zhihui* 'wisdom' to express 'have much wisdom', but not when the noun is a non-PC mass noun such as *shui* to express 'have much water': possessive phrases with non-PC nouns, including concrete nouns and abstract non-PC nouns, as shown below:

- (134) a. Zhangsan *hen* *gao*.  
 Zhangsan very tall  
 'Zhangsan is tall.' [Gradable adjectives]
- b. Zhangsan *hen* *you* *zhihui*.  
 Zhangsan very POSS wisdom  
 'Zhangsan has wisdom/is wise.' [PC Nominals]
- c. Zhangsan (\**hen*) *you* *shui*.  
 Zhangsan very POSS water  
 'Zhangsan has water.' [Concrete Mass Nouns]
- d. Zhangsan (\**hen*) *you* *che*.  
 Zhangsan very POSS car  
 'Zhangsan has water.' [Concrete Count Nouns]
- e. Zhangsan (\**hen*) *you* *jihua*.  
 Zhangsan very POSS plan  
 'Zhangsan has plan.' [Abstract Non-PC Nouns]

Moreover, possessed PC nominals pattern with gradable adjectives in that degree modifiers such as *hen* are obligatory to block comparative interpretations with gradable adjectives and PC nominals. While possessive PC predicates seem to be headed by the possessive verb *you* 'have', the same pattern is not found with other VPs, such as the gradable verb phrase *xihuan Lisi* 'like Lisi' as shown in (135e):



- (135) a. Zhangsan *hen* *gao*.  
 Zhangsan very tall  
 ‘Zhangsan is tall.’ [Gradable adjectives, Positive]
- b. Zhangsan *gao*.  
 Zhangsan tall  
 ‘Zhangsan is taller (than someone from the context).’ [Gradable adjectives,  
 Comparative]
- c. Zhangsan *hen* *you* *zhihui*.  
 Zhangsan very POSS wisdom  
 ‘Zhangsan has wisdom/is wise.’ [PC Nominals, Positive]
- d. Zhangsan *you* *zhihui*.  
 Zhangsan POSS wisdom  
 ‘Zhangsan has more wisdom/is wiser (than someone from the context).’ [PC Nominals,  
 Comparative]
- e. Zhangsan (*hen*) *xihuan* *Lisi*.  
 Zhangsan very like Lisi  
 with or without *hen*: ‘Zhangsan likes Lisi more (than someone known from context).’  
 [Gradable Verbs]

As discussed previously, Grano (2012) proposes the T[+V] constraint in Mandarin, as repeated below:

- (136) **The T[+V] constraint:** In Mandarin, the direct complement to T(ense) must either be (an extended projection of) a verb or a functional morpheme that can in principle combine with (an extended projection of) a verb.

He argues that, for simple declarative sentences that contain a predicative AP in Mandarin, there must either be an overt projection of a verb or null functional morphology between Tense and the AP. The former explains the case of positive sentences with degree modifiers, which shift the categorical membership of APs to VPs; the latter explains the case of comparative sentences, where the null morpheme CMP results in a VP that satisfies the constraint.

However, if possessive PC phrases are VPs, then the T[+V] is not violated, and PC sentences with possessive PC predicates are falsely predicted to require degree modifiers for type-shifting to express positive interpretation.

The second level of complexity is tied with the distribution of PC nominals in possessive constructions. While the possessive PC phrases are a fairly large class and are open to new terms, not all PC nominals are allowed in the possessive constructions. Specifically, only some PC nominals of the HUMAN PROPENSITY class can occur in the possessive PC construction, regardless of whether there are the degree modifiers, as demonstrated below for each class of PC nominals:

#### 1. DIMENSION:

(i) adjectives: *da* ‘big’, *xiao* ‘small’, *shen* ‘deep’, *qian* ‘shallow’, *chang* ‘long’, *duan* ‘short’,  
*hou* ‘thick’, *bo* ‘thin’, etc.

(ii) PC nominals: *daxiao* ‘size’, *shendu* ‘depth’, *changdu* ‘length’, *houdu* ‘thickness’, etc.

- (137) a. Zhangsan hen gao.  
 Zhangsan very tall  
 ‘Zhangsan is tall.’
- b. \*Zhangsan hen you gaodu.  
 Zhangsan very POSS height  
*Intended:* ‘Zhangsan has height/is tall.’

#### 2. PHYSICAL PROPERTY:

(i) adjectives: *ying* ‘hard’, *ruan* ‘soft’, *zhong* ‘heavy’, *qing* ‘light’, *tian* ‘sweet’, *ku* ‘bitter’,  
 etc.

(ii) PC nominals: *yingdu* ‘hardness’, *zhongliang* ‘weight’, *tiandu* ‘sweetness’ etc.

- (138) a. Zhangsan hen zhong.  
 Zhangsan very heavy  
 ‘Zhangsan is heavy.’

- b. \*Zhangsan hen you zhongliang.  
 Zhangsan very POSS weight  
*Intended:* ‘Zhangsan has weight/is heavy.’

### 3. COLOUR:

(i) adjectives: *hei* ‘black’, *bai* ‘white’, *hong* ‘red’, etc.

(ii) PC nominals: *heise* ‘(the color of) black’, *baise* ‘(the color of) white’, *hongse* ‘(the color of) red’, etc.

(139) a. Hua hen hong.  
 flower very red  
 ‘The flower is (very) red.’

- b. \*Hua hen you hongse.  
 Zhangsan very POSS red  
*Intended:* ‘Flower has the color of red/is red.’

### 4. HUMAN PROPENSITY:

(i) adjectives: *kuaile* ‘happy’, *canren* ‘cruel’, *jiaobao* ‘pride’, *congming* ‘clever’ etc.

(ii) PC nominals: *kuaile* ‘happiness’, *canren* ‘cruelness’, *jiaobao* ‘pride’, *zhihui* ‘wisdom’, etc.

(140) a. Zhangsan hen kuaile.  
 Zhangsan very happy  
 ‘Zhangsan is happy.’

- b. \*Zhangsan hen you kuaile.  
 Zhangsan very POSS happiness  
*Intended:* ‘Zhangsan has happiness/is happy.’

(141) a. Zhangsan hen mingzhi.  
 Zhangsan very wise  
 ‘Zhangsan is wise.’

- b. Zhangsan hen you zhihui.  
 Zhangsan very POSS wisdom  
 ‘Zhangsan has wisdom/is wise.’

5. AGE:

(i) adjectives: *xin* ‘new’, *nianqing* ‘young’, *lao* ‘old’

(ii) PC nominals: *nianling* ‘age’

- (142) a. Zhangsan hen lao.  
Zhangsan very old  
‘Zhangsan is old.’
- b. \*Zhangsan hen you nianling.  
Zhangsan very POSS age  
*Intended*: ‘Zhangsan has age/is old.’

6. VALUE:

(i) adjectives: *chun* ‘pure’, *qiong* ‘poor’, *xie’e* ‘wicked’, *hao* ‘good’, *huai* ‘bad’, etc.

(ii) PC nominals: *chunjie* ‘purenness’, *pinqiong* ‘poorness’, *xie’e* ‘wickedness’, etc.

- (143) a. Zhangsan hen xie’e.  
Zhangsan very wicked  
‘Zhangsan is wicked.’
- b. \*Zhangsan hen you xie’e.  
Zhangsan very POSS wickedness  
*Intended*: ‘Zhangsan has wickedness.’

7. SPEED:

(i) adjectives: *kuai* ‘fast’, *man* ‘slow’, etc.

(ii) PC nominals: *sudu* ‘speed’

- (144) a. Zhangsan hen kuai.  
Zhangsan very fast  
‘Zhangsan is fast.’
- b. \*Zhangsan hen you sudu.  
Zhangsan very POSS speed  
*Intended*: ‘Zhangsan has speed.’

The distribution of PC lexemes occurring in possessive constructions varies cross-linguistically. In English, while all possessive PC sentences are marked compared to predicative adjective PC sentences, it is clear that only some lexemes of the HUMAN PROPENSITY and VALUE class can occur in possessive constructions, as shown below:

- (145) a. Ann is tall.  
b. \*Ann has tallness/height. [DIMENSION]
- (146) a. This table is heavy.  
b. \*This table has heaviness. [PHYSICAL PROPERTY]
- (147) a. This flower is red.  
b. \*This table has redness. [COLOUR]
- (148) a. Ann is wise.  
b. Ann has wisdom. [HUMAN PROPENSITY]
- (149) a. Ann is old.  
b. \*Ann has age/oldness. [AGE]
- (150) a. Mankind is wicked.  
b. Mankind has wickedness in their hearts. [VALUE]  
(<https://quizlet.com/35080538/bible-flood-story-flash-cards>), accessed Oct 2020)
- (151) a. This car is fast.  
b. \*This car has fastness/speed. [SPEED]

As discussed in previous sections, while possessive PC sentences are less marked and more productive in some Romance and Germanic languages such as Spanish and German, they are still largely limited to lexemes of the HUMAN PROPENSITY class.

For languages that employ the possessive strategy to form PC sentences to a much larger extent, possessed PC nominals are not limited to HUMAN PROPENSITY and VALUE class; rather, they are attested in other classes as well. For example, Hausa uses the existential construction to express possession with PC nominals, whereas the adjective classes are rather limited (see chapter 2.2.1 for more details). As demonstrated below, not only are they found in classes of DIMENSION and HUMAN PROPENSITY such as ‘tallness’ and ‘cleverness’ as shown in (152b) and (153), the sentence with predicative adjective ‘tall’ is not acceptable, as shown in (152a):

- (152) a. \*Bàlki àkwai tà dà doogoo.  
 Bálki exists her with tall  
*Intended:* ‘Balki is really tall.’
- b. Bálki àkwai tà dà tsawoo.  
 Bálki exists her with tallness  
 ‘Balki is really tall.’

- (153) àkwai shì dà wàyō.  
 exists him with cleverness  
 ‘He is very clever.’

As discussed previously, Ulwa notably employs the possessive strategy to form PC sentences and do not have a lexicalized class that would be translated as adjectives in English. PC lexemes of all classes according to Dixon’s categorization are realized as possessed PC nominals, as shown below:

- (154) yâka û-ka                      yâka yûh-ka.                      an tarat watah ka.  
 that house-3SING.POSS that long-3SING.POSS and tall have SENT-KA  
 ‘That house is long. And it’s tall.’(Cited from Francez and Koontz-Garboden, 2017, p. 32)

In the following chapters, I will first address the first two puzzles associated with the function of *hen*, followed by the third puzzle concerning which group of PC nominals are allowed in possessive constructions.

## Chapter 4

### Puzzles 1 and 2: The Role of Degree Modifiers

In chapter 3.1.1 and 3.1.2, I presented the data on PC sentences with gradable adjectives and possessive phrases in Mandarin and demonstrated that they occur in almost identical environments. I also showed that the status of degree modifiers such as *hen* in simple declarative PC sentences is puzzling in two ways: first of all, degree modifiers are only compatible with possessive PC phrases, but not with non-PC possessive phrases; secondly, they are compulsory where comparative interpretations are to be blocked.

I will review the previous research on PC nominals in Mandarin and connect them to broader research on this topic in chapter 4.1. In chapter 4.2, I will present my proposal for the first puzzle. Following Francez and Koontz-Garboden (2017), I propose that PC nominals and non-PC mass nouns differ semantically in that the latter lack inherent measures. As a result, they occur in two possessive constructions with different possessive morphemes that share the same surface form, and the distribution of *hen* is sensitive to that distinction. Furthermore, I argue that Mandarin gradable adjectives and possessive PC phrases are type-theoretically equivalent, and propose a unified compositional analysis for PC sentences in Mandarin.

Switching to the second puzzle in chapter 4.3, I will review Grano's (2012) proposal that degree modifiers such as *hen* are needed to block comparative interpretations in PC sentences with adjectives to satisfy the T[+V] constraint in Mandarin which, as proposed by Grano (2012), requires that the complement to Tense in Mandarin be a verbal projection. In chapter 4.4, I will present my proposal for the second puzzle. I extend Grano's solution to possessive PC sentences with nominals and argue that, despite surface differences, possessive PC phrases share the same categorical status as Adjectival Phrases (APs) with gradable adjectives, which need to be transformed into

verbal projections with functional support from either covert comparative operators or overt degree expressions to satisfy the T[+V] constraint.

#### 4.1 Possession and PC nominals in Mandarin

##### 4.1.1 The multifunctionality of the possessive *you*

Functional morphemes tend to bear more than one function or meaning cross-linguistically. The possessive morpheme, such as the English verb *have*, has been observed to be multifunctional. Apart from the “possessive” meaning, many other uses have been pointed out, as demonstrated in (155) below:

- (155) a. John has a new car. [possession]  
 b. John has a headache today. [experience]  
 c. John just had a talk with his son. [event]  
 d. The room has four windows. [part-whole]  
 e. The couple’s income had a big increase last year. [existential/event]  
 f. John has many visitors today. [experience/receiving]

(modified from Xie, 2014, p. 127)

The multifunctionality of possessive morphemes is also observed in other languages such as Hindi, Tagalog and Yucatec (Francez & Koontz-Garboden, 2017), where existential and possessive sentences occur in very similar structures. In the Hindi examples below, both the existential sentence in (156a) and (156b) are expressed with the copula *hai*:

- (156) a. kamree-mēē aadmii hai.  
 room.OBL-in man COP.3SING.PRES  
 ‘There is a man in the room.’  
 b. larkee-kee paas kuttaa hai.  
 boy.OBL-GEN proximity dog COP.3SING.PRES



‘(Lit.) By the boy is a dog./The boy has a dog.’

(Freeze, 1992, p. 576)

In chapter 2.2.1, I have shown that in languages such as Hausa, sentences that express possession of quality nouns often employ the existential construction. Newman (2000) points out that the morpheme *àkwai*, which translated to “exist”, establishes a possessive relation between a pronoun and an NP; the examples are repeated below:

- (157) a. *àkwai shì dà wàyō.*  
exists him with cleverness  
‘He is very clever.’
- b. *àkwai fad’i ga kogin nan.*  
exists width at river this  
‘This river is wide.’
- c. *àkwai hāzifancì gārē shì*  
exists cleverness at him  
‘This river is wide.’ (Newman, 2000, p. 222, as cited in Francez and Koontz-Garboden, 2017, p. 27)
- d. *àkwai kudī gārē shì*  
exists money at you  
‘Do you have any money on you?’ (Jaggar, 2001, p. 466, as cited in Francez and Koontz-Garboden, 2017, p. 28)

Similarly, many functions of Mandarin *you* have been observed by researchers. Apart from its possessive meaning as demonstrated in (158a), C. J. Huang (1987) points out that *you* can also be used as an existential marker, as shown in (158b):

- (158) a. *Wo you yi-ben shu.*  
I POSS one-CL book.  
‘I have one book.’
- b. *Zhuo-shang you yi-ben shu.*  
table-top have one book.

‘On the table there is a book.’<sup>1</sup>

Xie (2014) argues that *you* occurs in the “X + you + Y + G” construction in Mandarin, where G is a gradable predicate. This construction establishes comparison between X and Y with respect to their degree on the dimension associated with G; it is essentially an equative construction similar to the English “as...as” construction. In (159) below, the sentence expresses a comparison between the height of Zhansan and his brother; specifically, Zhansan’s height is at least equal to that of this brother:

- (159) Zhangsan you ta gege gao.  
Zhangsan have his brother tall  
‘Zhansan is (at least) as tall as his brother.’

Xie (2014) further proposes that the argument of *you* is a small clause. Following Sæbø (2009), he argues that the subject of a *you* sentence must bind a variable in the complement of *you*. This analysis is applicable to non-degree uses of *you* in Mandarin. In the example below, the object of *you*, *yi xie lingjian huai le* ‘some parts broken’, can be treated as a small clause; the matrix subject *jiqu* ‘machine’ binds the internal argument *lingjian* ‘parts’ which expresses a part-whole relation; it can be paraphrased as in (160b), where *you* does not occur:

- (160) a. Jiqu you yixie lingjian huai le.  
machine have part broken LE  
‘The machine has some parts broken.’  
b. Yixie jiqu (de) lingjian huai le.  
some machine DE part broken LE  
‘Some parts of the machine were broken.’ (Modified from Xie (2014), p. 131)

For the degree use of *you* in the “X + you + Y + G” construction, Xie argues that while the phrase “Y + G” itself is not a small clause<sup>2</sup>, *you* is supplemented by a covert predicate which expresses

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<sup>1</sup>To avoid confusion caused by terminology, *you* is only translated as POSS when used as a possessive marker both in PC and non-PC sentences. In all other cases, it is translated as *have*.

<sup>2</sup>See Xie (2014) for more details.

the meaning of “being a sub-interval/subset of  $e$ ” (p. 150); the internal variable is saturated by the matrix subject of *you*. In the example (159) above, the object of *you* is a small clause; augmented by a covert predicate, the clause establishes a comparison between the height of his brother and the height of another individual which will saturate the variable  $e$  (i.e. the matrix subject Zhangsan). Xie’s analysis provides a unified account for the degree and non-degree use of *you*, which has a formal function that binds the subject with a variable in its small clause object.

#### 4.1.2 *you* in PC sentences

In this section, I will discuss the Mandarin PC sentences, where PC nominals occur in possessive constructions with the possessive morpheme *you*, as repeated below:

- (134b) Zhangsan hen you zhihui.  
 Zhangsan very POSS wisdom  
 ‘Zhangsan has (a lot of) wisdom/ is (very) wise.’

Non-quality-denoting nouns, including mass nouns and count nouns, also occur in possessive constructions with the same surface form, but they cannot be modified by degree expressions such as *hen*, as repeated in (134c) and (134d) respectively:

- (134c) Zhangsan (\*hen) you shui.  
 Zhangsan very POSS water  
*Intended:* ‘Zhangsan has (a lot of) water.’

- (134d) Zhangsan (\*hen) you che.  
 Zhangsan very POSS car  
*Intended:* ‘Zhangsan has (a lot of ) cars.’

Li (2017) was among the first to observe this phenomenon in Mandarin. She follows Francez and Koontz-Garboden’s (2017) quality-based analysis for PC nominals and extends it to PC nominals in Mandarin. Moreover, she points out that Mandarin possessive PC phrases share the same

distribution with gradable adjectives (as shown in chapter 1) and proposes to modify the quality-based analysis under the degree-based framework for adjectives to achieve a unified approach.

Li argues that PC nominals and other mass nouns differ in gradability, which is conditioned by the type of measure scale they are associated with: PC nominals are associated with an ordinal or interval scale which does not contain an absolute zero point; other mass nouns are associated with a ratio scale that contains such a point. The possessive morpheme *you* is sensitive to this distinction. It makes reference to the minimum point on a scale, and the relevant substance denoted by the possessed noun phrase is greater than the minimal degree  $d_{minimum}$ . The semantics is demonstrated below:

$$(161) \quad \llbracket you \rrbracket = \lambda P_{\langle e,t \rangle} . \lambda d . \lambda x . \exists z [P(z) \wedge \pi(x, z) \wedge |z| \geq d \wedge d \geq d_{minimum}], \text{ where } d_{minimum} \text{ is an absolute or a relative zero on a scale.}^3 \text{ (p. 11)}$$

The denotation allows *you* to be composed with both PC nominals and other mass nouns, as illustrated below:

$$(162) \quad \llbracket you \ zhihui \rrbracket = \lambda d . \lambda x . \exists z [wisdom(z) \wedge \pi(x, z) \wedge |z| \geq d \wedge d \geq 0_r]$$

(i.e. *you zhihui* denotes a relation between degrees  $d$  and individuals  $x$  that holds iff there is some  $z$  such that  $z$  is a portion of the **wisdom** and  $x$  has  $z$  and the amount of  $z$  meets or exists  $d$  and  $d$  meets or exceeds the relative zero on the relevant scale.)

$$(163) \quad \llbracket you \ shui \rrbracket = \lambda d . \lambda x . \exists z [water(z) \wedge \pi(x, z) \wedge |z| \geq d \wedge d \geq 0_a] \text{ (i.e. } \textit{you shui} \text{ denotes a relation between degrees } d \text{ and individuals } x \text{ that holds iff there is some } z \text{ such that } z \text{ is a portion of the } \mathbf{water} \text{ and } x \text{ has } z \text{ and the amount of } z \text{ meets or exists } d \text{ and } d \text{ meets or exceeds the absolute zero on the relevant scale.)} \quad \text{(Li, 2017)}$$

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<sup>3</sup>Li does not provide any detailed explanation on what  $|z|$  represents, although we can infer that it might be a function that converts substances/portions to degrees.

Li further points out that the last two conjuncts  $|z| \geq d \wedge d \geq 0_a$  in the denotation for *you shui* in (163) are redundant because they are entailed by the existential quantifier  $\exists_z$ , which expresses that there is some  $z$  whose quantity is greater than the absolute zero ( $0_a$ ). Logically, there is no need for the semantics of *you shui* to project a degree argument as the conjuncts involving the degree variable are not necessary; hence (163) can be simplified as below:

$$(164) \quad \llbracket \textit{you shui} \rrbracket = \lambda x. \exists_z [\textit{water}(z) \wedge \pi(x, z)] \quad (\text{Li, 2017})$$

(i.e. *you shui* denotes a function that takes individuals  $x$  and returns true iff there is some  $z$  such that  $z$  is a portion of **water** and  $x$  has  $z$ .)

On the other hand, the denotation for *you zhihui* cannot be further simplified. The conjuncts involving the degree variable  $|z| \geq d \wedge d \geq 0_r$  are not entailed by the existential quantifier because it is not a direct consequence of the existence of some  $z$  that the quantity of  $z$  exceeds the relative zero point ( $0_r$ ).

The result of (164) is that possessive phrases with non-quality-denoting nouns are non-gradable due to lack of inherent measures, which is consistent with Francez and Koontz-Garboden (2017). Consequently, only possessive PC phrases such as (162) are compatible with *hen*, which requires an argument of type  $\langle d, \langle et \rangle \rangle$ . This could explain the puzzle concerning the distribution of *hen* in possessive predicates.

The minimal degree on a scale  $d_{\textit{minimum}}$  interpreted as absolute/relative zero point is parallel to the absolute/relative gradable adjectives distinction that has been established in the literature (see Kennedy and McNally, 2005 for more details); the zero point is essentially a contextually determined standard. Li also points out that speakers are required to associate  $d_{\textit{minimum}}$  with an absolute or relative zero point based on the conventional meaning of the predicates (see Kennedy, 2007).

Li's observation of the pattern of PC nominals in Mandarin and her proposal for a unified analysis

of gradable adjectives and possessive PC phrases provide much insight to the cross-linguistic phenomenon of possessive PC phrases and the type-theoretic equivalence between the two categories of PC phrases.

However, Li's claim fails to explain several questions. First of all, if the possessive predicates with PC nominals are indeed parallel to relative adjectives, then they should not be compatible with degree modifiers picking out the minimal standard (Kennedy and McNally, 2005), yet there are counterexamples as shown in (165) below:

- (165) Ta de caiyi wanquan mei-you daoli.  
3SING DE doubt completely NEG-have reason  
'His doubt is completely without reason.'

The possessive predicate 'have reason' in a negative form is compatible with the modifier *wanquan* 'completely' which picks out the minimal standard.

The example (165) above also raises another problem, namely that it is possible for abstract PC nominals denoting an evaluative sense to include the absolute zero point, *contra* Li's claim.

Last but not least, Li claims that *hen* is optional in PC sentences with possessive predicates. She argues that the relative zero point associated with PC nominals shares similar functions with the contextually salient standard proposed for the positive operator in (42); consequently, possessive PC phrases are positive without any overt or covert positive operator. This claim is challenged by the corpus analysis which I presented in chapter 3.1.3. Furthermore, she argues that the fact that possessive PC sentences can express a positive meaning without any degree expressions whereas PC sentences with adjectives cannot supports her proposal that PC nominals are associated with an ordinal or interval scale which makes reference to a relative zero. But since that is not the case, her proposal would require other independent evidence to provide further support.

In summary, past literature has revealed the distinction between PC nominals and non-PC mass

nouns cross-linguistically; as I have shown in chapter 2.2.3, degree modifiers in languages such as Wolof and Basaá share the pattern that they can modify possessive PC phrases, but not possessive phrases with other mass nouns. The Mandarin data is consistent with this pattern; although both PC nominals and other mass nouns occur with possessive predication that are identical at surface level, empirical evidence indicates that they are semantically different. Moreover, the fact that degree modification is treated in an identical manner in PC sentences with gradable adjectives and possessive PC phrases in Wolof and Basaá suggests that gradable adjectives and possessive PC phrases are type-theoretically identical in those languages. Since the Mandarin data demonstrates the same pattern, it may be appropriate to extend the same claim to Mandarin.

However, while Mandarin PC sentences demonstrate the same pattern with respect to degree modification with those in Wolof and Basaá, they differ in that degree modifiers such as *hen* are obligatory in positive PC sentences in Mandarin, but are optional in positive PC sentences in Wolof and Basaá. Also, the most common degree modifier *hen* in Mandarin is arguably semantically vacuous, which is not the case with its Wolof or Basaá counterpart.

I follow Francez and Koontz-Garboden's (2017) quality-based analysis regarding PC nominals in possessive constructions. I agree with both Francez and Koontz-Garboden (2017) and Li (2017) on the argument that PC nominals and other mass nouns are semantically distinct regarding inherent scales. I will also explore the type-theoretical equivalence between gradable adjectives and possessive PC phrases and propose a compositional analysis that is compatible with the Mandarin data. Furthermore, in chapter 4.4, I will extend the Universal Markedness Principle and the T[+V] constraint proposed by Grano (2012) for Mandarin gradable adjectives (to be discussed in chapter 4.3) to data involving PC nominals and argue that degree modifiers such as *hen* are obligatory to block comparative interpretations in possessive PC constructions in Mandarin, *contra* Li (2017).

## 4.2 Puzzle 1: Gradable adjectives, PC Nominals and Other Mass Nouns

The analyses of Francez and Koontz-Garboden (2015, 2017) and Li (2017) discussed in chapter 2 provide much insight to the first puzzle.

Francez and Koontz-Garboden (2015, 2017) propose the quality-based analysis for PC nominals and recognize that PC nominals such as *wisdom* and ordinary mass nouns such as *water*, although they often occur in possessive constructions that share the same syntactic structure at the surface, do differ in gradability. PC nominals are quality-denoting, while mass nouns such as ‘water’ are not. According to their assumptions, although both types of nouns are mereologically structured, only quality-denoting nouns are subject to a total preorder by size, which is precisely what makes PC nominals gradable. Logically, Francez and Koontz-Garboden (2017) argue that there are two possessive morphemes in languages such as Ulwa, one for PC sentences (repeated in (65)) and another for general nominal possession (repeated in (73)):

$$(65) \quad \llbracket ka \rrbracket = \lambda P_{pt} \lambda x_e \lambda I_t \subset P. \exists^I z [\pi(x, z)]$$

$$(73) \quad \llbracket ka \rrbracket = \lambda P \lambda x \lambda Q. \{z : \pi(x, z) \wedge P(z)\} \subseteq Q$$

Degree modifiers are only compatible with gradable predicates, which explains why they can modify possessive PC phrases but not possessive phrases with mass nouns though they often share the same morpho-syntactic structure. This phenomenon has been observed cross-linguistically, in languages such as Ulwa, Wolof and Basaá (see chapter 2.2 for more details). Francez and Koontz-Garboden (2017) also propose that degree modifiers such as *lool* ‘very’ in Wolof denote relations between individuals and intervals of qualities and map any interval to a subset which is contextually very high, as repeated below:

$$(88) \quad \llbracket lool \rrbracket = \lambda \alpha \lambda x \lambda J_t. \alpha(x, !(J))$$

This proposal correctly predicts that non-quality-denoting mass nouns in possessive predicates



cannot be directly modified by degree expressions. When the possessive morpheme exemplified in (73) takes a non-quality-denoting mass noun such as ‘water’ as its argument, the resulting phrase does not make intervals of qualities available; hence it could not be modified by degree expressions which require relations between individuals and intervals of qualities. This is also consistent with the distribution of *hen* in possessive sentences in Mandarin, as demonstrated in chapter 3.2 earlier, repeated below:

- (134) a. Zhangsan *hen* *gao*.  
 Zhangsan very tall  
 ‘Zhangsan is tall.’ [Gradable adjectives]
- b. Zhangsan *hen* *you* *zhihui*.  
 Zhangsan very POSS wisdom  
 ‘Zhangsan has wisdom/is wise.’ [PC Nominals]
- c. Zhangsan (\**hen*) *you* *shui*.  
 Zhangsan very POSS water  
 ‘Zhangsan has water.’ [Concrete Mass Nouns]
- d. Zhangsan (\**hen*) *you* *che*.  
 Zhangsan very POSS car  
 ‘Zhangsan has water.’ [Concrete Count Nouns]
- e. Zhangsan (\**hen*) *you* *jihua*.  
 Zhangsan very POSS plan  
 ‘Zhangsan has water.’ [Abstract Non-PC Nouns]

On the other hand, Li (2017) argues that the source of difference between PC nominals and other mass nouns in Mandarin Chinese comes from the type of measure scale they are associated with: the former with an ordinal/interval scale and the latter with a ratio scale. Instead of proposing two possessive morphemes that share the same surface form, she argues that the possessive morpheme *you* in Mandarin is sensitive to the difference in measure scale, as repeated below (see chapter 4.1 for more details):

$$(161) \llbracket you \rrbracket = \lambda P_{(e,t)}. \lambda d. \lambda x. \exists z [P(z) \wedge \pi(x, z) \wedge |z| \geq d \wedge d \geq d_{minimum}]$$

Moreover, she points out that although both PC nominals and other mass nouns combine with the same possessive morpheme *you*, the resulting possessive phrases are semantically distinct. There is no need for possessive phrases with ordinary mass nouns such as *you shui* ‘have water’ to project a degree argument as the conjuncts involving the degree variable are not necessary, whereas the degree argument is obligatory for possessive PC phrases. Their denotations are repeated below:

$$(164) \quad \llbracket \textit{you shui} \rrbracket = \lambda x. \exists z [\textit{water}(z) \wedge \pi(x, z)]$$

$$(162) \quad \llbracket \textit{you zhihui} \rrbracket = \lambda d. \lambda x. \exists z [\textit{wisdom}(z) \wedge \pi(x, z) \wedge |z| \geq d \wedge d \geq 0_r]$$

According to Li, possessive PC phrases such as (162) are gradable, whereas possessive phrases with ordinary mass nouns such as (164) are non-gradable. This distinction correlates with the fact that (164) lacks degree arguments. Hence her analysis can predict the distribution of degree modifiers such as *hen* in possessive predicates with PC nominals and other mass nouns.<sup>4</sup>

In summary, the quality-based analysis of PC nominals proposed by Francez and Koontz-Garboden (2015, 2017) can explain the distinction between PC nominals and mass nouns and correctly predicts the distribution of *hen* in possessive constructions. Both Francez and Koontz-Garboden’s (2017) and Li’s (2017) analyses are compatible with the Mandarin data at this point. However, as shown in the corpus study from chapter 3.1.3, simple declarative possessive PC sentences cannot express a positive meaning without *hen*, which contrasts with Li’s claim; consequently, her proposal that PC nominals are associated with a scale which makes reference to a relative zero and the *you* is sensitive to the distinction between relative and absolute zero requires other independent evidence. In this dissertation, I will follow Francez and Koontz-Garboden’s (2017) analysis that there are two separate possessive morphemes for PC nominals and other mass nouns.

In chapter 2.2.1, I presented data from Wolof and Basaá, the two languages where PC lexemes

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<sup>4</sup>Li (2017) follows Grano’s (2012) analysis on the status of *hen* in Mandarin; see chapter 4.3 for more details.

are lexicalized as both nominals and the English equivalent of adjectives<sup>5</sup>. In both languages, degree modifiers treat gradable adjectives and possessive PC nominal phrases in the same fashion, suggesting that they are type-theoretically identical. Since PC sentences in Mandarin demonstrate the same pattern, it would be ideal to propose a compositional analysis that achieves type-theoretic equivalence between adjectives and possessive PC phrases in Mandarin.

The immediate problem here is that the quality-based analysis of PC nominals according to Francez and Koontz-Garboden (2017) does not seem to be compatible with the degree-based analysis of gradable adjectives such as *gao* ‘tall’ and degree modifiers such as *hen* in Mandarin, as repeated below (see chapter 2.1.3 for more details):

$$(41) \quad \llbracket gao \rrbracket_{\langle d, et \rangle} = \lambda d. \lambda x. [height(x) \geq d]$$

$$(42) \quad \llbracket hen \rrbracket = \lambda g_{\langle d, et \rangle} \lambda x. \exists d [g(d)(x) \wedge d > d_c]$$

To solve this problem, there are two options:

1. Convert the quality-based denotation of the possessive morpheme *you* to a degree-based denotation;
2. Convert the degree-based denotations of gradable adjectives and degree modifiers to quality-based denotations.

I will start with the first option; that is, to convert Francez and Koontz-Garboden’s (2017) denotation of the possessive morpheme for PC nominals from the quality-based one (repeated in (65) below) to a degree-based one. Here, I follow Menon and Pancheva’s (2014) analysis for the null possessive in Malayalam. Instead of taking the *I* variable over contiguous left-bounded intervals of qualities, it takes a degree variable *d*. Moreover, the function  $\mu$  maps the instance of the quality *P*

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<sup>5</sup>As discussed in chapter 2.2.1, Baglini (2015) calls predicates such as *rafet* ‘being pretty’ ‘stative verbs’; she points out that they translate parallel to English predicative adjectives.

to a degree; in consequence, the notation  $\exists_z$  denotes restriction of the existential quantifier only to the degrees higher than  $d$  (166)<sup>6</sup>:

$$(65) \quad \llbracket you \rrbracket = \lambda P_{pt} \lambda x_e \lambda I_l \subset P. \exists^I z [\pi(x, z)]$$

$$(166) \quad \llbracket you' \rrbracket = \lambda P_{pt}. \lambda d. \lambda x. \exists_z [P(z) \wedge \pi(x, z) \wedge \mu(z) \geq d] \text{ (modified from Menon and Pancheva, 2014)}$$

The modified denotation for the possessive morpheme renders a denotation for the possessive PC phrases such as *you zhihui* ‘have wisdom’ as follows (167), which achieves the desirable result of type  $\langle d, et \rangle$ :

$$(167) \quad \llbracket you zhihui \rrbracket = \lambda d. \lambda x. \exists_z [wisdom(z) \wedge \pi(x, z) \wedge \mu(z) \geq d]$$

The converted possessive morpheme, combined with PC nominals, can now be combined with *hen* in the same way as gradable adjectives:

$$(168) \quad \text{a. } \llbracket hen gao \rrbracket = \lambda x. \exists d [height(x) \geq d \wedge d > d_c]$$

$$\text{b. } \llbracket hen you zhihui \rrbracket = \lambda x. \exists_z [wisdom(z) \wedge \pi(x, z) \wedge \mu(z) > d_c]$$

Although this solution achieves type-theoretic equivalence between gradable adjectives and possessive PC phrases by shifting the denotation for the possessive morpheme, it is not favored due to the nature of the PC nominals. As discussed in chapter 2.2.4, Francez and Koontz-Garboden (2017) point out that although it is possible to translate intervals of portions to scales, empirical evidence

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<sup>6</sup>This denotation for the possessive morpheme (166) is essentially similar to the denotation (161) proposed by Li (2017), except that Li argues for a single possessive morpheme for both PC nominals and mass nouns, which is achieved by proposing a sensitive  $d_{minimum}$ , whereas the former proposes two possessive morphemes for PC nominals and mass nouns respectively. Also, Li’s (2017) analysis is in line with the first option; the result of her proposal is that both gradable adjectives such as *gao* ‘tall’ (41) and possessive PC phrases such as *you zhihui* ‘have wisdom’ (162) share the type  $\langle d, et \rangle$ . I do not adopt Li’s analysis due to other flaws in her proposal, as explained earlier.

from Ulwa and English support the assumptions that PC nominals are mereologically structured and non-antisymmetrical.

First of all, the assumption that PC nominals are mereologically structured is supported by the double possessive construction in Ulwa, where PC nominals combined with the possessive morpheme *ka* occur in contexts where there is another possessive morpheme *watah*:

- (169) Jessica bas-ka                    ya tubak-ka                    watah ka.  
 Jessica hair-3SING.POSS the thick-3SING.POSS have SENT-KA  
 ‘Jessica’s hair is thick.’ (Francez and Koontz-Garboden, 2017, p. 114)

This can be explained if the derived noun *tubak-ka* denote the set of things that have a portion of ‘thickness’ as a mereological part; the morpheme *ka* is realized as the mereological part relation  $\preceq$  as shown in (170) below, rather than the possessive relation  $\pi$  proposed in (171), as repeated below:

$$(170) \quad \llbracket \textit{tubak-ka} \rrbracket = \lambda q. \exists p [p \preceq q \wedge \textit{thickness}(p)]$$

$$(171) \quad \llbracket \textit{ka} \rrbracket = \lambda P_{pt} \lambda x_e \lambda I_\iota \subset P. \exists^I z [\pi(x, z)]$$

The explanation above follows from the assumption that qualities are mereologically structured, supporting the proposal that PC nominals denote qualities.

Furthermore, the assumption that PC nominals are non-antisymmetrical is supported by empirical evidence in English. As demonstrated previously, following Moltmann’s (2009) trope-based analysis of adjectives and adjective nominalizations, a phrase such as *Mary’s beauty* is the concrete manifestation of the property of *beauty* that is particular to Mary; it is distinct from *Kim’s beauty*, even if Mary and Kim are equally beautiful, as illustrated by (172) below:

- (172) Mary has as much beauty as Kim, though their beauties are very different. (adapted from Francez and Koontz-Garboden, 2017, p. 54)

Francez and Koontz-Garboden (2017) point out that the intuition that two equally beautiful individuals may have distinct portions of beauty can be captured in a straight-forward manner following their assumption that portions of qualities are preordered and hence can occupy the same amount of space without being identical. On the contrary, a scale-based analysis of PC nominals cannot capture this intuition easily due to the nature of scales being total ordered and antisymmetric.

In summary, the empirical evidence favors the quality-based analysis over the scale-based analysis for PC nominals. According to this solution, the possessive morpheme in (166) employs the function  $\mu$  which converts the portion of quality to degrees on a scale. This is an undesirable consequence if we want to maintain the mereological structure and non-antisymmetry of PC nominals. Logically, this solution is not favored.

Now I will move on to the second solution. As discussed in chapter 2.1.3, scholars have proposed frameworks where gradable adjectives have denotations parallel to those of possessed PC nominals. Francez and Koontz-Garboden (2017) propose that Wolof stative verbs such as *rafet* ‘being pretty’ denote relations between individuals and intervals of qualities (87), which is essentially the same as possessive PC phrases such as *am xel* ‘have wit’ (86):

$$(86) \quad \llbracket am\ xel \rrbracket = \lambda x \lambda I_{\iota} \subset wit. \exists^I z [\pi(x, z)]$$

$$(87) \quad \llbracket rafet \rrbracket = \lambda x \lambda I_{\iota} \subset beauty. \exists^I z [\pi(x, z)]$$

Hanink et al. (2019) propose a similar denotation that achieves a relation between individuals and intervals for gradable adjectives such as *kéŋí* ‘big’ in Basaá, which is also parallel to the possessive PC phrases such as *gweé ŋguy* ‘have strength’:

$$(91b) \quad \llbracket gweé\ \eta guy \rrbracket = \lambda x \lambda i \subset strength. \exists^i z [\pi(x, z)]^7$$

<sup>7</sup>Hanink et al. (2019) use *i* to represent left-bounded intervals of a quality, while Francez and Koontz-Garboden (2017) use  $\iota$  in their notations. I will use  $\iota$  in my proposed denotation for adjectives, as shown in (173).

$$(92) \quad \llbracket \text{kéŋí} \rrbracket = \lambda x \lambda i \subset \text{bigness} . \exists^i z [\pi(x, z)]$$

Following this approach, I propose a similar denotation for gradable adjectives such as *gao* ‘tall’ in Mandarin; it denotes a relation between individuals and intervals of the quality **height**, as shown below:

$$(173) \quad \llbracket \text{gao} \rrbracket = \lambda x \lambda I \subset \text{height} . \exists^I z [\pi(x, z)]$$

i.e. *gao* denotes a relation between individuals  $x$  and intervals  $I$  of the quality **height** that holds iff there is a portion  $z$  of **height** that is in  $I$  and  $x$  has  $z$ ; the interval  $I$  includes all and only portions of **height** that rank above a contextually determined threshold.)

Consequently, the positive morpheme *hen* needs to take a variable over relations between individuals and intervals as its argument. I posit a denotation for *hen* following what Francez and Koontz-Garboden (2017) propose for Wolof *lool* ‘very’ (88), where  $\alpha$  is a variable over relations between individuals and intervals of qualities, and  $!$  is a modifier that maps any interval of a quality to a subset of which the lower bound meets a threshold that is contextually very high<sup>8</sup>:

$$(174) \quad \llbracket \text{hen} \rrbracket = \lambda \alpha \lambda x \lambda J \lambda J . \alpha(x, !(J))$$

Note that although the denotation for *hen* in (174) is the same as the denotation for *lool* in (88), these two degree modifiers are different in that Mandarin *hen* is semantically bleached in contexts where it is obligatory<sup>9</sup>, whereas *lool* is contentful in all contexts. Both of them have an interval argument  $J$  that is saturated by those portions of a quality that rank above a contextually determined threshold. However, the  $!$  function in the denotation for *lool* (88) maps the intervals to a subset that consists of portions ranked even higher than that threshold, whereas the  $!$  function in

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<sup>8</sup>Following this analysis, *hen* is actually modifying intervals of a quality rather than degrees; I will still call it a degree modifier in the rest of the dissertation in order to be consistent with the convention in the literature.

<sup>9</sup>See chapter 4.3 for more details. The obligatoriness of *hen* to block comparative interpretation with possessive PC phrases in simple declaratives will be elaborated on in the next chapter.

the denotation for semantically-bleached *hen* is essentially neutralized; hence the threshold is not raised.

Recall that in chapter 3.1.1, I presented Mandarin data showing that degree modifiers other than *hen* can appear in PC sentences. Those modifiers, such as *feichang* ‘extremely’ and *chaoji* ‘super’, are semantically contentful and have a strong intensifying meaning. For those modifiers as well as *hen* in optional contexts, the restriction of the left-bounded interval must be set to a higher lowest bound. Logically, the ! function is not neutralized in those cases and the semantic intensification is achieved in a similar fashion with the Wolof *lool*.

The quality-based denotation of the comparative operator CMP can also be proposed straightforwardly as comparing the intervals of qualities possessed by two individuals. I follow Francez and Koontz-Garboden’s (2017) analysis on the comparative morpheme in Ulwa, whereby the set of intervals containing portions of the quality possessed by *x* outranks the set possessed by *y* if and only if the former set is a superset of the latter set, as shown below:

$$(175) \quad \llbracket CMP \rrbracket = \lambda\alpha_{\langle e, it \rangle} \lambda x. \lambda y. [\alpha(y) \subset \alpha(x)]$$

The converted denotations of gradable adjectives and *hen* would render the following combinations:

$$(176) \quad \text{a. } \llbracket hen\ gao \rrbracket = \lambda y. \lambda J. \lambda I. I \subset height. \exists^{!(J)} z [\pi(x, z)]$$

(i.e. *hen gao* denotes a relation between individuals *y* and intervals *J* of the quality **height** that holds iff there is a portion *z* of **height** that is in a subinterval of *J* that includes all and only portions that are ranked very high, and *y* has *z*.)

$$\text{b. } \llbracket you\ zhihui \rrbracket = \lambda x. \lambda I. \lambda I. I \subset wisdom. \exists^I z [\pi(x, z)]$$

(i.e. *you zhihui* denotes a relation between individuals *x* and intervals *I* of the quality **wisdom** that holds iff there is a portion *z* of **wisdom** that is in *I* and *x* has *z*; the interval *I* includes all and only portions of **wisdom** that rank above a contextually



determined threshold.)

c.  $\llbracket hen\ you\ zhihui \rrbracket = \lambda y. \lambda J. J \subset wisdom. \exists^{!(J)} z [\pi(x, z)]$

(i.e. *hen you zhihui* denotes a relation between individuals  $y$  and intervals  $J$  of the quality **wisdom** that holds iff there is a portion  $z$  of **wisdom** that is in a subinterval of  $J$  that includes all and only portions that are ranked very high, and  $y$  has  $z$ .)

In summary, the puzzle that *hen* is compatible with possessive phrases with PC nominals but not with other mass nouns can be solved by following Francez and Koontz-Garboden’s (2017) analysis that these two categories of nouns are semantically distinct in gradability. Consequently, there are two separate possessive morphemes for each category, and only the one that takes PC nominals as arguments can render a gradable phrase and hence can be modified by *hen*. Moreover, the type-theoretic equivalence between gradable adjectives and possessive PC phrases in Mandarin can be achieved by proposing a quality-based analysis for gradable adjectives as well as degree modifiers.

### 4.3 Universal Markedness and T[+V] Constraint

Grano (2012) discusses the *hen* puzzle in Mandarin: gradable adjectives in matrix declarative clauses must co-occur with overt degree morphology such as *hen* to achieve positive interpretation; otherwise, the sentence is interpreted as comparative.

Following the analysis of positive and comparative semantics in the previous chapters, the puzzle can be summarized as follow:

- (177) a. \*Zhangsan [POS gao]. *Intended*: ‘Zhangsan is tall.’  
b. Zhangsan [CMP gao]. ‘Zhangsan is taller.’  
c. Zhangsan [**hen** gao]. ‘Zhangsan is tall.’

Grano (2012) proposes the *Universal Markedness Principle* as the first step to solve the puzzle:

(178) **Universal Markedness Principle:** Universally, comparative semantics is provided by an explicit morpheme in syntax which is overt in some languages and null in others, whereas positive semantics is provided by a type-shifting rule that does not project in syntax.

This principle predicts that it is possible for a language to have a derived or periphrastic comparative form.<sup>10</sup> Also, it is possible for a language to have a null comparative morpheme with no contrast between positive and comparative form; the Mandarin gradable adjectives fall into this category. Moreover, it should be impossible to find a language in which the positive form is derived from the comparative form. The prediction is borne out typologically.

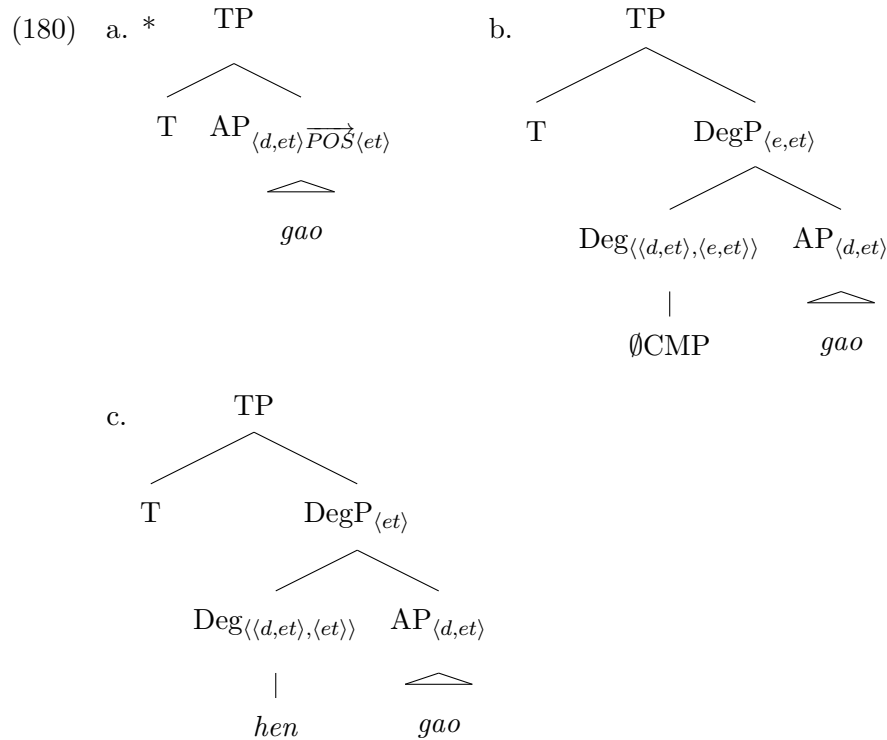
To explain the specific phenomenon involving gradable adjectives in Mandarin as we have seen in (177), Grano proposes *The T[+V] constraint*, which is a syntactic constraint that forbids bare AP complements to T(ense):

(179) **The T[+V] constraint:** In Mandarin, the direct complement to T(ense) must either be (an extended projection of) a verb or a functional morpheme that can in principle combine with (an extended projection of) a verb.

The Universal Markedness Principle and the T[+V] constraint together provide an explanation of the puzzle in (177). (177a) is ruled out because the status of AP would not be changed by POS, which would cause violation of the T[+V] constraint, as illustrated in (180a). On the other hand, both CMP in (177b) as shown in (180b) and the overt morpheme *hen* in (177c) shown in (180c) would result in a projection called DegP (Degree Phrases; see Kennedy, 2002 and Liu, 2010b for more details) and would not violate the T[+V] constraint:

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<sup>10</sup>An example of derived comparative form is the English gradable adjective *tall*, of which the comparative form is *taller*. An example of periphrastic comparative form is the Spanish gradable adjective *alto* ‘high’, of which the comparative form is *más alto*.



Grano (2012) also points out that the type-shifting POS and overt forms such as *hen* in Mandarin have a similar function that bring the contextually salient standard into the denotation and achieves positive semantics. In languages where POS is sufficient for positive semantics, sentences without overt intensifiers express neutral positive meaning while overt intensifiers are used to restrict the standard of comparison to a contextually higher level. However, the T[+V] constraint blocks the simple use of POS in Mandarin. Instead, *hen*, the overt degree modifier with the mildest intensifying meaning, is often used to achieve positive semantics while satisfying the T[+V] constraint. Its meaning as an intensifier is semantically bleached in contexts where it is obligatory, while it still has a mild intensifying meaning in contexts where it is not (Liu, 2010b). Grano (2012) compares the semantic bleaching of *hen* in grammatically obligatory contexts to other phenomena such as English *do*-support; in English, the auxiliary *do* is semantically vacuous where it is required, but it is still contentful in contexts where it is optional.

#### 4.4 Puzzle 2: Gradable adjectives, PC Nominals and Gradable Verbs

As shown in chapter 3.2 previously (repeated below), gradable adjectives such as *gao* ‘tall’ and possessive PC phrases such as *you zhihui* ‘have wisdom’ pattern in the same way in that *hen* is obligatory to block the comparative interpretation, while gradable verbs such as *xihuan* ‘like’ do not:

- (135) a. Zhangsan *hen gao*.  
Zhangsan very tall  
‘Zhangsan is tall.’ [Gradable adjectives, Positive]
- b. Zhangsan *gao*.  
Zhangsan tall  
‘Zhangsan is taller (than someone from the context).’ [Gradable adjectives,  
Comparative]
- c. Zhangsan *hen you zhihui*.  
Zhangsan very POSS wisdom  
‘Zhangsan has wisdom/is wise.’ [PC Nominals, Positive]
- d. Zhangsan *you zhihui*.  
Zhangsan POSS wisdom  
‘Zhangsan has more wisdom/is wiser (than someone from the context).’ [PC Nominals,  
Comparative]
- e. Zhangsan (*hen*) *xihuan Lisi*.  
Zhangsan very like Lisi  
with or without *hen*: ‘Zhangsan likes Lisi more (than someone known from context).’  
[Gradable Verbs]

It is traditionally argued, under the framework of Montague Grammar, that syntactic category and semantic type are systematically related<sup>11</sup>. Since *you* ‘have’ is generally treated as a verb, and both verb phrases in (135c) and (135e) are gradable on some dimension, it is puzzling why those two phrases behave significantly different in contexts with degree modifiers. On the other hand,

<sup>11</sup>This assumption is not adopted in more recent frameworks such as Heim and Kratzer (1998).

the type-theoretic equivalence between gradable adjectives and possessive PC phrases established in the previous chapter may also suggest that those two kinds of phrases share the same syntactic category membership.

Logically, it can be argued that the possessive PC nominal phrase actually constitutes an AP, rather than a VP. To support this claim, it is necessary to find independent evidence that can tease apart an AP analysis and an VP analysis.

This task is not easily achievable because adjectives in Mandarin can function as predicates without overt copula verbs. Nevertheless, some tests have been proposed by scholars (see C. J. Huang et al., 2009 for more details). One of the tests concerns the transitivity of adjectives. For some adjectives in Mandarin, if there are two participants in the same clause, one has to be the subject and the other has to be introduced by a preposition such as *dui* in Mandarin, as shown in (181) and (182):

(181) zhe-ge gongzuo dui ni hen heshi.  
this-CL job on you very suitable  
'This job is suitable for you.'

(182) \*zhe-ge gongzuo hen heshi ni.  
this-CL job very suitable you  
*Intended:* 'This job is suitable for you.' (C. J. Huang et al., 2009, p. 35)

However, when the word *heshi* in (182) is replaced by *shihe* in (183), this construction becomes acceptable:

(183) zhe-ge gongzuo hen shihe ni.  
this-CL job very suit you  
'This job suits you well.'

C. J. Huang et al. (2009) call the noun phrase after the preposition *dui* the 'semantic object' of the adjective. They also point out that objects of Chinese verbs can occur to the right of them in simple clauses. Hence, they explain the difference between (182) and (183) by arguing that the two sentences have different types of predicates; *heshi* is an adjective while *shihe* is a verb.

They also claim that this test works with its English counterpart, as shown in (184) below:

- (184) a. She loves butterflies.  
b. her love \*(of) butterflies  
c. She is fond \*(of) butterflies.

In the example above, the object must be introduced by the preposition *of* when the predicate is a noun (*love*) or an adjective (*fond*).

Another well-known test for adjectives proposed by Zhu (1980) is that the reduplicative form of disyllabic adjectives ‘AB’ is ‘AABB’, whereas the reduplicative form for disyllabic verbs ‘AB’ is ‘ABAB’, as illustrated below:

- (185) AB → AABB: *ganjing* ‘clean’ → *ganganjingjing* ‘extremely clean’, *jiandan* ‘simple’ → *jiandandan* ‘extremely simple’

- (186) AB → ABAB: *jiancha* ‘examine’ → *jianchajiancha* ‘examine a little’, *jihua* ‘plan’ → *jihua-jihua* ‘plan a little’

The first test using the preposition *dui* can be applied to the data with gradable adjectives (187), possessive PC nominals (188) and gradable verbs (189) respectively:

- (187) a. Zhangsan dui Lisi hen youhao.  
Zhangsan on Lisi very friendly.  
‘Zhangsan is very friendly to Lisi.’  
b. \*Zhangsan hen youhao Lisi.  
Zhangsan very friendly Lisi  
*Intended:* ‘Zhangsan is very friendly to Lisi.’
- (188) a. Zhansan dui zhe-zhong shi hen you jingyan.  
Zhangsan on this-CL thing very POSS experience  
‘Zhangsan has a lot of experience on this kind of thing.’  
b. \*Zhangsan hen you jingyan zhe-zhong shi.  
Zhangsan very POSS experience this-CL thing

*Intended:* ‘Zhangsan has a lot of experience on this kind of thing.’

- (189) a. Zhangsan dui Lisi hen xihuan.  
Zhangsan on Lisi very like.  
‘Zhangsan likes Lisi a lot.’
- b. Zhangsan hen xihuan Lisi.  
Zhangsan very like Lisi.  
‘Zhangsan likes Lisi a lot.’

As illustrated above, the ‘semantic object’ of gradable adjectives such as *youhao* ‘friendly’ can occur following the preposition *dui* in (187a), but not to the right of the adjective in (187b). Possessive PC phrases demonstrate parallel patterns; the object ‘this kind of thing’ must occur following the preposition *dui* in (188a). Objects of gradable verbs, to the contrary, can occur either after the preposition *dui* in (189a) or to the right of the verb in (189b).

However, this test might be problematic concerning the data on possessive PC nominals. Verbs, as case-assigners, can take direct objects without the preposition *dui*. However, if the possessive morpheme *you* is indeed a verb in (188b), then it already assigns case to the object *jingyan*, and the object *zhe-zhong shi* requires the preposition *dui* to assign case. Thus, the unacceptability of (188b) in contrasts with (189b) might be irrespective of whether *you jingyan* is a VP or an AP.

As for the reduplication test, it can not provide evidence regarding the categorial status of possessive PC phrases because they are not subject to reduplication, which might be a consequence of the generalization that only words and not phrases can undergo intensifying reduplication in Mandarin.

In summary, existing tests for teasing apart adjectives and verbs are not applicable when dealing with possessive PC phrases.<sup>12</sup>

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<sup>12</sup>The distinction between adjectives and verbs in Mandarin remains a highly debatable issue. Some scholars argue that Mandarin adjectives are stative verbs and should not be treated as a separate category (see Chao, 1968, McCawley, 1992 among others). However, many scholars have provided empirical evidence that support distinguishing

Although lacking independent evidence regarding the categorical status of possessive PC phrases, we can nevertheless explore the semantic properties of gradable adjectives, possessive PC nominal phrases, and gradable verbs.

Scholars have argued that gradable adjectives and possessive PC phrases can be truth-conditionally equivalent (discussed in chapter 2.2.4). This argument also holds for the Mandarin data; As illustrated below, sentences with gradable adjectives (190a) and with possessive PC phrases (190b) can be judged to have the same meaning in the same situation:

- (190) a. Zhangsan hen congming.  
Zhangsan very smart.  
'Zhangsan is very smart.'
- b. Zhangsan hen you tounao.  
Zhangsan very POSS brain.  
'Zhangsan is very smart.'

I have shown that the type-theoretic equivalence between gradable adjectives and possessive PC phrases is supported by empirical evidence from many languages including Wolof and Basaá (see chapter 2.2.4). In chapter 4.2, I pointed out that the Mandarin data demonstrates the same pattern in that the two categories are treated identically in contexts involving gradability, and I proposed a compositional analysis that achieves type-theoretic equivalence between them.

On the other hand, although both possessive PC phrases and gradable verb phrases may arguably have the same syntactic structure with a verbal head and a nominal complement, they differ in the source of gradation. The gradable component of possessive PC phrases is the PC nominal, such as *zhihui* 'wisdom' in *you zhihui* 'have wisdom'. On the other hand, it is the verb head itself that is the adjective category as well. Apart from the tests concerning the transitivity of adjectives and the reduplicative morphology (C. J. Huang et al., 2009) discussed in this chapter, another strong piece of evidence is that many adjectives are non-predicative, such as *gongtong* 'common'; if they are truly verbs, they should be able to function as predicates (see Paul, 2010 among others). My current proposal regards adjectives in Mandarin as a distinct syntactic category.



the source of gradation for gradable verb phrases, such as the verb *xihuan* ‘like’ in *xihuan Lisi* ‘like Lisi’. The nominal in the verb phrase does not contribute to the gradable interpretation.

In summary, the data we saw above shows that possessive PC phrases are semantically more similar to gradable adjective phrases, rather than gradable verb phrases. I propose that the possessive morpheme *you*, when combining with PC nominals, results in an AP rather than VP in Mandarin.

This proposal builds on the work of Grano (2012), which I have discussed in chapter 4.3. His analysis follows Grimshaw (2005), who assumes that although normally the projection of a functional head does not change the category of a phrase, a functional head can sometimes project a category apart from what is provided by its complement. For instance, the English copula can take nouns and adjectives as its complement and render a VP, as shown in (191) below:

- (191) a. John is [<sub>AP</sub> tall].  
b. John is [<sub>DP/NP</sub> a hero].

Grano proposes that degree modifiers such as *hen* can combine with verbs or adjectives and project verbal categories. Moreover, the T[+V] constraint in Mandarin requires the direct complement to the T head to be either (a projection of) a verb or a functional morpheme that can combine with a verb. The covert POS functional head is merely a type-shifting rule that does not affect the categorial status of the adjective phrase it combines with in Mandarin. Consequently, it is obligatory for PC sentences with gradable adjectives to combine with degree expressions such as *hen* to achieve positive interpretations. The result is an extended projection of a VP called DegP that satisfies the constraint.

I propose that there are two possessive morpheme pronounced *you* in Mandarin. The first *you* is for ordinary nominal possession with non-quality-denoting nouns, which projects a VP. The second *you* is a functional head, which combines with a quality-denoting noun phrase and turns the constituent into an AP.

The process of grammaticalization where lexical verbs become functional heads has been observed in many languages. One prominent example is the modal verbs in English. As Roberts and Roussou (2003) point out, modal verbs in Modern English, such as *can* and *shall*, are distinct from main verbs with respect to several syntactic properties, including that the former lack non-finite forms (192a) and cannot be iterated (192b):

- (192) a. \*To can swim is useful.  
 b. \*He shall must do it.

However, in Middle English, modal verbs do not demonstrate such distinctive syntactic properties and thus are inseparable from the main verb class syntactically, as shown below:

- (193) a. but it sufficeth too hem **to kunne** her Pater Noster,...  
           ‘but it suffices to them to know their Pater Noster,...’ [Non-finite forms]  
 b. Who this booke **shal wylle** lerne...  
    He-who this book shall wish learn...  
    ‘He who wishes to master this book’ [Iteration]

(Modified from Roberts and Roussou, 2003, p. 36-37)

Roberts and Roussou (2003) argue that English modal verbs underwent semantic bleaching in which modal verbs lost their lexical content but retained their modal content. There are also cases where the shift from lexical verbs to functional heads has not been completed yet and certain modal verbs may demonstrate syntactic properties of lexical verbs. For example, the modal verb *ought* is compatible with non-finite forms in examples such as *I ought to go*. Iterations of modal verbs, such as triple modal construction, is also observed in certain dialects of Modern English.<sup>13</sup>

It is possible that *you* in Mandarin has been undergoing grammaticalization as well. Historically, *you* was used to denote concrete possession (194a) and existential meaning (194b), as shown below:

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<sup>13</sup>See Roberts and Roussou, 2003 for more details.

- (194) a. you bei                      wu huan.  
           POSS preparation no disaster  
           ‘If one has preparation in advance, one can avoid disasters.’ (excerpted from *Zuozhuan*,  
           written in mid 4th century; cited from Zuo et al., 1996)
- b. Dong you qiming,              xi you changgeng.  
           East have morning-star, west have evening-star  
           ‘There is morning star in the east, and evening star in the west.’ (excerpted from  
           *Shijing*, written between 1046 - 600 BC; cited from J. Cheng et al., 2008)

The use of *you* as a functional head in PC phrases is likely to have developed later, with more abstract sense<sup>14</sup>.

Interestingly, the *you* as a functional head has a function similar to the English derivational suffix *ful*, which combines with a nominal and renders an adjective, such as *beauty* → *beautiful*; *taste* → *tasteful*; *pain* → *painful* etc. In other words, Mandarin achieves syntactically (with *you*) what English often achieves morphologically (with *-ful*)<sup>15</sup>.

Following the current analysis, the parallel pattern between gradable adjectives and possessive PC nominals can be explained in the following way. The current puzzle is summarized below:

- (195) Zhangsan CMP *gao*              [gradable adjectives]  
           Zhangsan CMP tall  
           ‘Zhangsan is taller (than someone known from context).’

- (196) \*Zhangsan POS *gao*  
           Zhangsan POS tall  
           *Intended*: ‘Zhangsan is tall.’

- (197) Zhangsan hen *gao*  
           Zhangsan very tall  
           ‘Zhangsan is (very) tall.’

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<sup>14</sup>The diachronic change of the sense of *you* is beyond the scope of this dissertation. Future research could investigate the historical root of the particular use of *you* with PC nominals as complements.

<sup>15</sup>See also Grano and Zhang (2020), who relate this difference between Mandarin and English to the more general fact that Mandarin is a more analytic language than English in the sense of C. J. Huang (2015).

- (198) Zhangsan CMP *you zhihui* [PC nominals]  
 Zhangsan CMP POSS wisdom  
 ‘Zhangsan has more wisdom/ is wiser (than someone known from context).’
- (199) \*Zhangsan POS *you zhihui*  
 Zhangsan POS POSS wisdom  
*Intended:* ‘Zhangsan has wisdom.’
- (200) Zhangsan *hen you zhihui*  
 Zhangsan very POSS wisdom  
 ‘Zhangsan has (a lot of) wisdom.’
- (201) Zhangsan (\**hen*) *you shui* [other mass nouns]  
 Zhangsan very POSS water  
 ‘Zhangsan has (\*a lot of) water.’
- (202) Zhangsan (*hen*) *xihuan Lisi* [gradable verbs]  
 Zhangsan very like Lisi  
 ‘Zhangsan likes Lisi (very much).’

Gradable adjectives and possessive PC phrases without degree phrases such as (196) and (199) are ruled out because mere APs violate the T[+V] constraint. Gradable adjectives and possessive PC phrases with comparative interpretations such as (195) and (198) are allowed because a covert CMP operator is inserted, which turns the phrases into VPs, satisfying the constraint. (197) and (200) are also allowed because an overt *hen* is inserted, which also turns the phrases into VPs. Ordinary possessive nominals and gradable verbs such as *you shui* ‘have water’ in (201) and *xihuan Lisi* ‘like Lisi’ in (202) are acceptable because the ordinary *you* and the gradable verb *xihuan* head render verbal projections that do not violate the T[+V] constraint.

Grano (2012) argues that his approach to the *hen* puzzle makes two predictions:

- (203) Bare adjectives (with positive semantics) are allowed whenever appropriate functional morphology intervenes between T and AP.
- (204) Bare adjectives with positive semantics are allowed whenever T is not projected. (Grano, 2012, p. 538)

The current analysis concerning possessive PC phrases makes parallel predictions, as listed below:

(205) Bare possessive PC phrases (with positive semantics) are allowed whenever appropriate functional morphology intervenes between T and AP.

(206) Bare possessive PC phrases with positive semantics are allowed whenever T is not projected.

In what follows, I will test these predictions. I will start with the first prediction. First of all, we can see the polar/*wh* asymmetry to test the first prediction, as illustrated below:

(207) Zhangsan you zhihui ma?  
Zhangsan POSS wisdom Q  
'Does Zhangsan have wisdom?'

(208) Shui you zhihui ne?  
who POSS wisdom Q  
'Who has more wisdom?'

A bare possessive PC predicate *you zhihui* is allowed to have a positive interpretation in a polar question in (207), whereas it is interpreted with comparative semantics in a *wh* question in (208), which is parallel to bare adjectives (see Grano, 2012 for more details). This could be explained by following a well-known proposal that polar questions involve a covert morpheme  $\emptyset_{whenever}$  which quantifies over the polarity values of the proposition (see Guerzoni, 2004 among others). Following Laka (1990), Grano (2012) assumes that this morpheme intervenes between T and AP, which satisfies the T[+V] constraint.<sup>16</sup> On the other hand, the sentence-final particle *ne* in the *wh*-

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<sup>16</sup>The assumption that  $\emptyset_{whenever}$  sits below T may seem to conflict with the general idea that the overt 'whether' is located at the Complementizer position. Grano (2012) argues that the covert morpheme  $\emptyset_{whenever}$  is a realization of  $\Sigma$ , a term for the locus of sentential negation and affirmation according to Laka (1990). Grano (2012) also points out that there is independent evidence in Mandarin that supports this assumption. For instance, it is possible to form polar questions using reduplicative morphology, as illustrated in (1), in which the predicate *gao* 'tall' is reduplicated with the negative infix *bu*:

- (1) Zhangsan gao bu gao?  
Zhangsan tall NEG tall

question is located in a complementizer position outside the domain of TP (L. L.-S. Cheng, 1997); hence the sentence violates the T[+V] constraint and has to have a comparative interpretation.

There are some additional constructions where material between T and AP is found. First, polar questions can also be formed by reduplicating the possessive morpheme and infixing the negator *mei*:

- (209) Zhangsan you mei you zhihui?  
Zhangsan POSS NEG POSS wisdom  
'Does Zhangsan have wisdom or not?'

As with (207), this construction also has positive interpretation with a bare possessive predicate. Following Grano (2012), this so-called 'V-not-VP' construction (C. J. Huang et al., 2009) also has a +Q morpheme that can be reasonably analyzed as  $\emptyset_{whether}$  as well, which satisfies the T[+V] constraint.

Similarly, the negation construction with bare possessive PC phrases also has a positive interpretation:

- (210) Zhangsan mei you zhihui.  
Zhangsan NEG POSS wisdom  
'Zhangsan does not have wisdom/ is not wise.'

It is reasonable to assume that the negator *mei* satisfies the T[+V] constraint in (210).

Another environment where positive semantics is found with bare possessive PC phrases is coordination, as illustrated below:

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'Is Zhangsan tall or not?'

C. J. Huang et al. (2009) refer to this construction as the A-not-A construction and argue that there is a morpheme intervening between the subject and the predicate, which gives rise to the interrogative interpretation of this construction. Grano (2012) argues that it is reasonable to assume that this morpheme is the realization of the  $\emptyset_{whether}$  morpheme.

- (211) a. Zhangsan you zhihui he caihua.  
 Zhangsan POSS wisdom and talent  
 ‘Zhangsan has wisdom and talent.’
- b. Zhangsan you qian you shi.  
 Zhangsan POSS fortune POSS power  
 ‘Zhangsan has fortune and power.’

We could argue that the coordinating possessive phrases form a coordinate complex which sits under T, and hence satisfies the T[+V] constraint. Overall, the first prediction is borne out in several constructions as discussed above.

Now I will move on to the second prediction in (204): bare possessive PC phrases are allowed to have positive semantics in environments that do not project T. First of all, let’s consider prenominal possessive PC modifiers. It seems that the degree modifier *hen* is optional when occurring to the right of a numeral+classifier complex, but is obligatory to the left:

- (212) a. Yi ge (hen) you zhihui de haizi  
 one CL very POSS wisdom DE child  
 ‘a wise child / a child with wisdom’
- b. \*(hen) you zhihui de yi ge haizi  
 very POSS wisdom DE one CL child  
 ‘a wise child / a child with wisdom’

Grano (2012) argues that when adjectives follow the numeral+classifier complex, they are parsed as attributive, and hence no projection of T is allowed. On the other hand, prenominal adjectives occurring to the left of the numeral+classifier complex without an overt demonstrative are necessarily parsed as a relative clause, which projects T and hence makes degree modifiers such as *hen* obligatory.<sup>17</sup> The pattern with possessive PC phrases shown by the contrast between (212a)

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<sup>17</sup>The status of prenominal adjectival modifiers in Mandarin has attracted some debate among scholars. Paul (2005) argues against the view that all prenominal adjectives are relative clauses by pointing out that some nongradable adjectives in Mandarin must appear in the *shi...de* construction when acting as predicates, but not when acting as prenominal modifiers, as illustrated in (1a) and (1b) below; the latter is hence better analyzed as attributive

and (212b) parallels the pattern of adjectives when co-occurring with numeral+classifier complex. I argue that bare possessive PC phrases, when parsed as attributive, involve no T projections. Consequently, the T[+V] constraint is not violated.

In summary, I propose that the possessive morpheme *you* that combines with PC nominals projects an AP, and is subject to the T[+V] constraint in Mandarin.

Now I will examine if the compositional analysis proposed in chapter 4.2 is compatible with the proposal elaborated above.

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constructions:

- (1) a. Zhe-ge panzi shi fang de.  
       this-CL plate COP square DE  
       ‘This plate is square.’
- b. (\*shi) fang (de) panzi  
       COP square DE plate  
       ‘square plate’ (Grano, 2012, p. 544)

Following Paul (2005), Grano (2012) points out that only relative clauses can occur to the left of the numeral+classifier construction. As shown in the following examples, the adjective *fang* ‘square’ is allowed to the right of the numeral+classifier complex (2a), but not to the left (2b), whereas the true relative clause *xin lai de* ‘(who) newly arrived’ is allowed both to the left (3b) and right (3a) of the complex:

- (2) a. yi-ge fang (de) panzi  
       one-CL square DE plate  
       ‘one square plate’
- b. \*fang (de) yi-ge panzi  
       square DE one-CL plate  
       *Intended:* ‘one square plate’
- (3) a. liang-ge [xin lai de] laoshi  
       two-CL new come DE teacher  
       ‘Two teachers who have newly arrived’
- b. [xin lai de] liang-ge laoshi  
       new come DE two-CL teacher  
       ‘Two teachers who have newly arrived’ (Yip and Rimmington, 2004, as cited in Grano, 2012, p. 544-545)



Recall that in chapter 4.2, I argued that the degree-based denotations for gradable adjectives and *hen* can be converted to quality-based denotations so that they can be integrated into a unified quality-based analysis for PC phrases. The derived denotations for both gradable adjectives and possessive PC phrases are presented as follow:

$$(173) \quad \llbracket gao \rrbracket = \lambda x \lambda I_\iota \subset height. \exists^I z [\pi(x, z)]$$

$$(61) \quad \llbracket zhihui \rrbracket = \lambda p. wisdom(p)$$

$$(174) \quad \llbracket hen \rrbracket = \lambda \alpha_{\langle e, \iota \rangle} \lambda x \lambda J_\iota. \alpha(x, !(J))$$

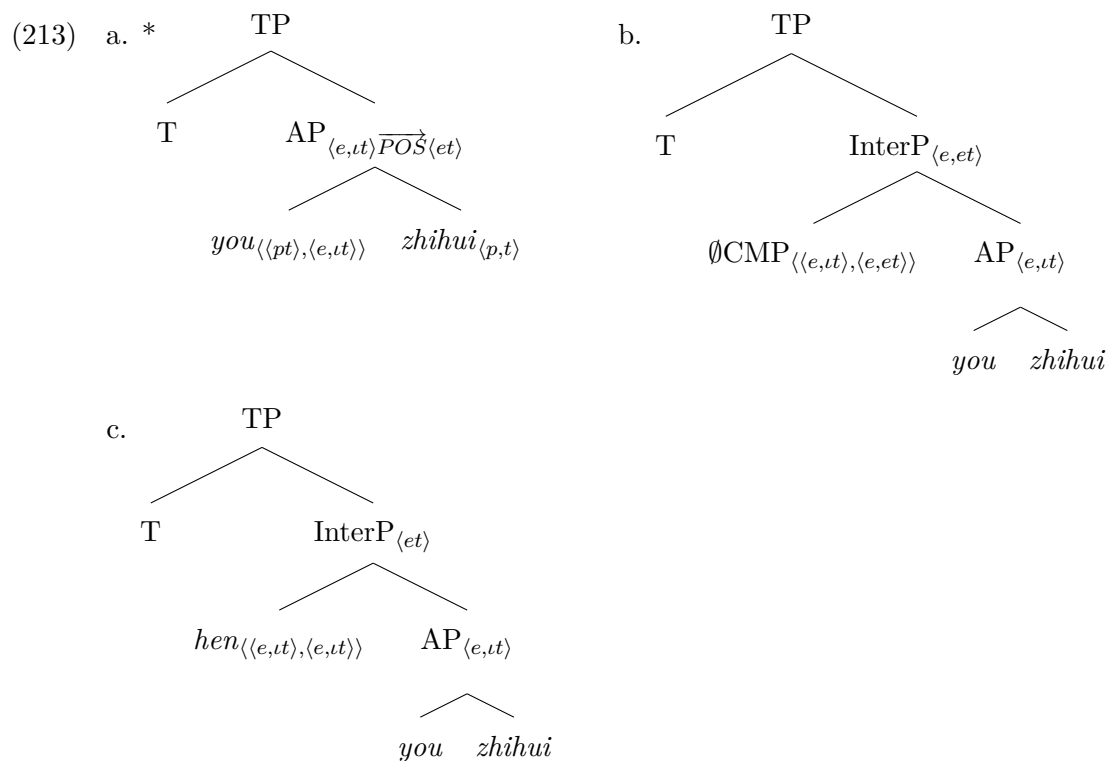
$$(175) \quad \llbracket CMP \rrbracket = \lambda \alpha_{\langle e, \iota \rangle} \lambda x. \lambda y. [\alpha(y) \subset \alpha(x)]$$

$$(176a) \quad \llbracket hen gao \rrbracket = \lambda y. \lambda J_\iota \subset height. \exists^{!(J)} z [\pi(x, z)]$$

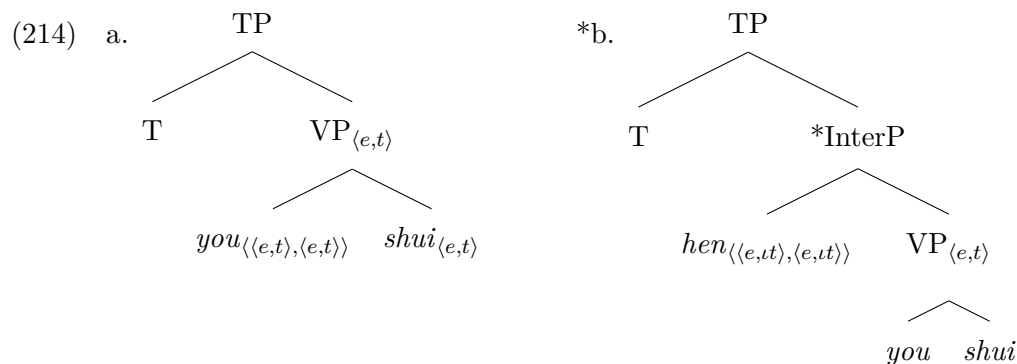
$$(176b) \quad \llbracket you zhihui \rrbracket = \lambda x \lambda I_\iota \subset wisdom. \exists^I z [\pi(x, z)]$$

$$(176c) \quad \llbracket hen you zhihui \rrbracket = \lambda y. \lambda J_\iota \subset wisdom. \exists^{!(J)} z [\pi(x, z)]$$

The following trees demonstrate how the composition works with the quality-based denotations. As discussed previously, bare possessive PC phrases are ruled out because combining an AP with the T head violates the T[+V] constraint, as shown in (213a). On the other hand, a covert comparative operator in (213b) or an overt degree modifier such as *hen* in (213c) combine the AP and renders a VP that satisfies the T[+V] constraint; I call the resulting phrase Interval Phrase (InterP), rather than DegP as used in Grano (2012), since the analysis of gradable adjectives and possessive PC phrases is interval-based rather than degree-based in the current approach:



As for non-quality-denoting mass nouns, a bare possessive predicate is allowed because those mass nouns combine with the possessive predicate and projects a VP, which does not violate the T[+V] constraint when combining with the T head. Degree modifiers such as *hen* are not possible in this construction because the interval argument is not available in the possessive predicate, as illustrated below:



In summary, the quality-based compositional analysis for gradable adjectives, positive and comparative operators, and possessive PC phrases proposed in chapter 4.2 is compatible with the proposal that possessive PC phrases are APs and require either an covert CMP or overt modifiers such as

*hen* to render VPs.

#### 4.5 Conclusion

In this chapter, I presented my proposal for the first two puzzles raised at the beginning of the dissertation, which concern the role of degree modifiers in positive and comparative PC sentences: firstly, why degree modifiers such as *hen* are only compatible with possessive PC phrases and gradable adjectives, but not with possessive phrases consisting of non-PC nouns, especially mass nouns; secondly, why degree modifiers such as *hen* are obligatory to block comparative interpretations with gradable adjectives and PC nominals, but not with gradable verbs.

After reviewing past research on Mandarin PC nominals, I proposed, following Francez and Koontz-Garboden's (2017) analysis, that PC nominals and non-PC mass nouns are semantically distinct in gradability. Consequently, there are two separate possessive morphemes for each category, and only the one that takes PC nominals as arguments can render a gradable phrase and hence can be modified by *hen*.

Moreover, after showing that the Mandarin data parallels the pattern of languages such as Ulwa and Basaá in that gradable adjectives and possessive PC phrases behave in the same manner in environments involving degree modifiers, I argue that the type-theoretical equivalence between gradable adjectives and possessive PC phrases in Mandarin can be achieved by proposing a quality-based analysis for gradable adjectives as well as degree modifiers.

For the second puzzle, I extend Grano's (2012) analysis for gradable adjectives in Mandarin simple declaratives to possessive PC sentences. I propose that there are two possessive morphemes *you* in Mandarin; the one that takes possessive PC nominal phrases is a functional head that actually constitutes an AP, rather than a VP; consequently, degree modifiers such as *hen* act as a type-shifter in possessive PC sentences with positive interpretation, while a null morpheme *CMP* occurs

in possessive PC sentences with comparative interpretation, to satisfy the T[+V] constraint.

While there is a lack of any independent evidence that supports the categorical membership of possessive PC phrases being an AP, I argue that possessive PC phrases share more semantic properties with adjectives than gradable VPs, including the truth-conditional equivalence, the type-theoretic identity, and the source of gradability. Moreover, I showed that the predictions that follow the proposal for the second puzzle, which are borne out with adjective sentences in Mandarin as demonstrated in Grano (2012), are also borne out with possessive PC sentences.

## Chapter 5

### Puzzle 3: objective vs. subjective PC nominals

In this chapter, I will address the third puzzle surrounding PC nominals in possessive constructions in Mandarin: why only PC nominals with a subjective sense can occur in possessive constructions. As demonstrated earlier, For forms such as *shendu*, which is polysemous between the dimensional meaning ‘depth’ and the evaluative meaning ‘depth’, only the PC nominal that denotes the latter sense is allowed in possessive constructions, as repeated below:

- (215) a. \*Zhe-ge hu (hen) you shendu.  
This-CL lake (very) POSS depth  
*Intended:* ‘This lake has (a lot of ) depth / is (very) deep.’
- b. Zhe-ben shu hen you shendu.  
This-CL book very POSS depth  
‘This book has (a lot of) depth.’

In chapter 3.2, we discussed the complexity with respect to the distribution of PC nominals in possessive constructions. Based on Dixon’s (1982) classification of PC lexemes, I presented data on PC nominals in different semantic classes and generalized that only some PC nominals of the HUMAN PROPENSITY class can occur in the possessive PC construction, regardless of whether there are degree modifiers. As shown below, PC lexemes of the DIMENSION class are only allowed in canonical construction as predicative adjectives such as *gao* ‘tall’ in (216a), but not in possessive constructions as PC nominals such as *gaodu* ‘height’ in (216b). On the other hand, some PC lexemes of the HUMAN PROPENSITY class are allowed in possessive constructions as PC nominals such as *zhihui* ‘wisdom’ in (218b), but others such as *kuai* ‘happiness’ in (219b) are not:

- (216) a. Zhangsan hen gao.  
Zhangsan very tall

- ‘Zhangsan is tall.’ [DIMENSION, adjective]
- b. \*Zhangsan hen you gaodu.  
Zhangsan very POSS height  
*Intended:* ‘Zhangsan has height/is tall.’ [DIMENSION, PC nominal]
- (217) a. Zhangsan hen zhuoyue.  
Zhangsan very excellent  
‘Zhangsan is excellent.’ [VALUE, adjective]
- b. \*Zhangsan hen you zhuoyue.  
Zhangsan very POSS excellence  
*Intended:* ‘Zhangsan has excellence/is excellent.’ [VALUE, PC nominal]
- (218) a. Zhangsan hen mingzhi.  
Zhangsan very wise  
‘Zhangsan is wise.’ [HUMAN PROPENSITY, adjective]
- b. Zhangsan hen you zhihui.  
Zhangsan very POSS wisdom  
‘Zhangsan has wisdom/is wise.’ [HUMAN PROPENSITY, PC nominal]
- (219) a. Zhangsan hen kuaile.  
Zhangsan very happy  
‘Zhangsan is happy.’ [HUMAN PROPENSITY, adjective]
- b. \*Zhangsan hen you kuaile.  
Zhangsan very POSS happiness  
*Intended:* ‘Zhangsan has happiness/is happy.’ [HUMAN PROPENSITY, PC nominal]

Li (2017) argues that possessive PC predicates are restricted to *subjective* predicates in Mandarin, including evaluative predicates and predicates of personal taste. This claim is consistent with the association between possessive PC predicates and Dixon’s classification; according to Dixon (1982), the class VALUE and HUMAN PROPENSITY involve judgements and are highly subjective. However, the data paradigm above shows only certain PC nominals of the HUMAN PROPENSITY class can occur in possessive PC predicates; the PC lexemes of the VALUE class, such as *zhuoyue* ‘excellence’ in (217), are not allowed in possessive constructions.

In summary, only a *subset* of subjective PC nominals, which can be further narrowed down to a subset of evaluative PC nominals, can occur in possessive constructions. In the following chapters, I will discuss the nature of subjectivity as well as its syntactic and semantic features. Then I will investigate the association between possessive PC predicates and subjectivity and present a proposal that explains why possessive PC predicates are subjective in Mandarin.

## 5.1 The nature of subjectivity

*Subjectivity* has drawn much attention from researchers for decades. Lyons (1982) characterizes subjectivity in the following way:

“...let me say that ‘subjectivity’, as the term is being used here, denotes the property (or set of properties) of being either a subject of consciousness (i.e., of cognition, feeling and perception) or a subject of action (an agent). It denotes the property of being what Descartes himself called a “thinking entity” (in Latin, ‘res cogitans’) and identified, as others have done, with the self or the ego.” (Lyons, 1995, p. 337)

“The term subjectivity refers to the way in which natural languages, in their structure and their normal manner of operation, provide for the locutionary agent’s expression of himself and his own attitudes and beliefs.” (Lyons, 1982, p. 102)

From a pragmatic perspective, Traugott (2010) argues that the prime semantic or pragmatic meaning of subjective expressions is to index speaker attitude or viewpoint. Finegan (1995) argues that subjectivity concerns expression of self and the representation of a speaker’s perspective or point of view in discourse. He further points out that there are three main arenas in the studies related to subjectivity:

1. a locutionary agent’s perspective as shaping linguistic expression;
2. a locutionary agent’s expression of affect towards the propositions contained in utterances;
3. a locutionary agent’s expression of the modality or epistemic status of the propositions contained in utterances.

An intuitive way to understand the nature of subjectivity is to examine subjective predicates, which are often described as predicates that involve personal preferences or judgements of speakers (Wijnbergen-Huitink, 2016). Some typical examples of subjective predicates are the group of adjectives that are often described as *Predicates of Personal Taste (PPTs)*, such as *fun*, *delicious* and *tasty*, as opposed to adjectives such as *wooden* and *vegetarian*:

- (220) a. This cake is tasty.  
b. This table is wooden.

From a truth-theoretical point view, the truth of sentences expressing subjective meaning depends on opinions of speakers, rather than objective facts (Lasersohn, 2017). For instance, the truth of (220a) is determined by the personal preference of the speaker concerning the ‘tastiness’ of the cake in the context, and may vary from person to person; that is, speaker A might find the cake under discussion tasty, while speaker B might not. On the contrary, the truth of (220b) is determined by the objective fact concerning whether the material of the table under discussion is wood or not, which does not vary from person to person.

One approach to analyzing the truth conditions of sentences with subjective predicates is to propose that the judge varies with the context of the utterance; this approach is called “contextualism”. That is, the same sentence (220a) can be true in a context where speaker A utters the sentence, while being false if uttered by speaker B in another context.

However, Lasersohn (2005) points out that contextualism cannot explain why speakers might ‘disagree’ about subjective judgements:

- (221) a. Ann: This cake is tasty!  
b. Bob: No, it isn’t. It’s disgusting. (Wijnbergen-Huitink, 2016, p. 2)

According to contextualism, the propositions of the two statements are relative to the two speakers;



logically, there is no contradiction between them, which conflicts with the fact that Bob denies Ann's claim in (221).

Lasersohn (2005) proposes that the truth of sentences such as 'This cake is tasty' is relativized to a specific judge; the judge is a parameter in the evaluation of truth conditions of the sentences; as a result, a sentence can express a proposition that is true for Ann, but false for Bob; the contradiction at the level of content can predict the conflict expressed in (221). On the other hand, for sentences such as 'This table is wooden', the truth value does not vary across judges. This approach is referred to as "relativism" (see Wijnbergen-Huitink, 2016 and Lasersohn, 2017 for more details).

Apart from predicates such as *tasty* or *fun*, scholars have identified other linguistic forms that can express subjective meaning. Bréal (1964) points out that, cross-linguistically, subjective elements can occur at word or phrase level, as grammaticalized forms, or as even more general features of languages. He raises many cases that involve judgement from speakers, as summarized below:

1. Adverbs: English examples include *no doubt*, *perhaps*, or *assuredly*, etc.; in the following example:

(222) He has at this very moment *no doubt* arrived.

The adverb *no doubt* refers to the judgement from the speaker, rather than the hearer or the traveller referred to in the sentence.

2. Verb moods: The subjunctive mood is a form of grammaticalization that expresses the subjective element. For instance, French uses the subjunctive to express a wish, as shown below:

(223) Dieu vous entende!  
god you hear.SUB  
'May God hear your prayer!'

Another form of expressing subjectivity is the optative mood in Ancient Greek, as shown

below:

- (224) *τεθναιη!*  
die.OPT  
'May he die!'

Bréal also suggests that expressions of the imperative mood, such as 'Stop!' or 'Let's go!', have the subjective element, in which the will of the speaker is expressed.

3. First person pronouns: The first person pronouns such as *me* and *us* in English also involve the subjective element by expressing the speaker's point of view.

Lasersohn (2017) points out that the contingent future tense also has a relativized truth value. Consider the following sentence:

- (225) There will be a sea-battle tomorrow.

Lasersohn argues that statements involving contingent futures such as (225) are true "in a world  $w$  relative to a perspective  $p$  if in every world identical to  $w$  up to the time of  $p$  there is a sea-battle at some relevant time later than the time of use; false in  $w$  relative to  $p$  if in every such world there is no relevant time later than the time of use at which there is a sea-battle." (p. 219). For (225), suppose this statement is uttered by Ann in the actual world  $w$  at 9 pm on September 11, 2020; this statement, as uttered by Ann, is truth-valueless relative to a context of assessment whose judge is Mary at 9 pm on September 11, 2020 in the world  $w$  if there are worlds identical to  $w$  up to this time that the sea-battle may or may not occur on September 12, 2020, whereas it will be judged false relative to a context of assessment whose judge is Mary at 9 pm on September 13, 2020 in the world  $w$  if there was no sea-battle on September 12, 2020.

Another form Lasersohn proposes that involves relativized truth value is epistemic modality, expressed by auxiliary verbs such as *may* and *must*. Consider the following sentence:

(226) John may be in New Orleans.

Lasersohn points out that (226) is roughly equivalent to the sentence below:

(227) It is consistent with what is known that John is in New Orleans.

While it might be problematic to suggest that the truth of (226) is determined by the knowledge of the speaker, the utterance is true relative to a context of assessment in which the speaker is the judge at a particular time and in a particular world if and only if it is consistent with what the speaker knows at that time in that world that John is in New Orleans at the utterance time. The truth value can vary among judges in different contexts of assessment.

Traugott (2010) suggests several forms expressing subjectivity that are largely grammaticalized, including:

1. The raising constructions of *be going to*, where the judgement or belief is anchored to the speaker, rather than the syntactic subject, such as *There is going to be an earthquake*.
2. Illocutionary uses of speech act and mental attitude verbs, such as *I think, I mean, I guess, you know*;
3. Concessive particles such as *while*;
4. Focus particles such as *even*;
5. Discourse markers such as *besides* or *let alone*.

Due to scope limitations of this dissertation, I will focus on subjective predicates in the following sections.

## 5.2 Semantic domain of subjective predicates

To recognize the semantic domain of subjective predicates, one essential task is to identify diagnostics that can distinguish subjective predicates from other predicates. One of the widely acknowledged tests that can distinguish PPTs from other predicates is *faultless disagreement*; that is, when two speakers disagree on certain topics, it is possible that neither of them is ‘wrong’ or at fault, if the disagreement concerns a matter of opinion, rather than a matter of fact. I have shown an example of faultless disagreement in the previous section with the PPT *tasty*, as repeated below:

- (221) a. Ann: This cake is tasty!  
b. Bob: No, it isn’t. It’s disgusting.

Kölbel (2003) points out that candidate topics for faultless disagreement include aesthetic, culinary or moral value, probability, justification of beliefs, etc. Following this test, predicates involving subjective judgement can be identified if they are able to form faultless disagreement. Anand and Korotkova (2018) summarize domains of subjective predicates as below:

1. PROWESS: passable, acceptable
2. APPRECIATION: beautiful, handsome, ungrammatical
3. AFFECT: pleasant, scary, exhilarating
4. BENEFIT: dangerous, safe
5. ESTEEM: wise, foolish, historic
6. NORMATIVE: good, bad
7. VALUE: important, desirable, valuable
8. PROBABILITY: likely, improbable

The subjective predicates characterized above are consistent with what Bierwisch (1989) classifies as ‘evaluative adjectives’, as oppose to ‘dimensional adjectives’ (see chapter 2.1.2 for more details).

Yet many scholars have argued that it is not just PPTs, but scalar predicates in general, that can pass the faultless disagreement test. Richard (2004) points out that most scalar predicates that demonstrate vagueness can form such disagreement, including dimensional adjectives, as shown below:

- (228) a. Ann: Carla is tall/heavy/old.  
b. Bob: No she’s not!

Richard (2004) argues that the disagreement regarding statements such as ‘Carla is tall’ could arise from two separate manners. The first is that Ann and Bob disagree with each other on the statement because they are comparing Carla to different “comparison classes”; for example, Ann might compare Carla with average women at her age and Bob may compare Carla with basketball players. The other way is that Ann and Bob are comparing Carla with the same comparison class but have different assessment about whether she counts as tall. Logically, vague predicates should be considered as subjective since subjective judgements are involved in determining the truth value of the sentence, even if they are physically measurable. However, PPTs and vague dimensional predicates demonstrate different patterns under other tests that reveal subjectivity. Kennedy (2016) points out that PPTs are acceptable under *find*, while dimensional predicates are not, as illustrated below:

- (229) a. Ann finds it tasty.  
b. #Ann finds it tall.

He also points out that for adjectives that are polysemous between a dimensional sense and a evaluative sense, only the latter can occur under *find*. This can be illustrated with adjectives such

as *heavy* and *light* that are dimensional when describing the weight of objects and evaluative when describing the taste of objects:

(230) a. This table is heavy/light.

b. #I find this table heavy/light.

(231) a. This cake is heavy/light.

b. I find this cake heavy/light. (modified from Kennedy, 2016, p. 110)

Another difference between PPTs and vague dimensional predicates is that PPTs such as *tasty* require firsthand experience, while vague dimensional predicates such as *tall* do not, as demonstrated below:

(232) a. This cake is tasty, #but I've never tried it.

b. This building is tall, but I've never seen it.

A related fact is that PPTs can take overt experiencer arguments with *to* or *for*, but vague dimensional predicates cannot:

(233) a. This cake is tasty to me.

b. #This building is tall to me.<sup>1</sup>

Kennedy (2016) argues that it is necessary to distinguish two kinds of subjectivity: one that is associated with vagueness and concerns whether or not an object surpasses a standard of the

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<sup>1</sup>Note that vague dimensional predicates can co-occur with prepositional phrases headed by *for*, as illustrated below:

(1) a. The John Hancock Center is tall *for a building*.

b. This dress is too long *for me*.

In those cases, the complements of the prepositional phrases indicate the comparison class for the predicates, rather than overt experiencers.

predicate, and one that is associated with evaluativity and concerns an assessment of qualities. The difference explains why PPTs and vague dimensional predicates behave differently in certain environments as discussed above.

In the following sections, I will use *evaluative predicates* to refer to predicates that are associated with qualitative assessment. The domain of evaluative predicates includes what Bierwisch (1989) calls “evaluative adjectives” and the PPTs.

It is also worth noting that while scalar predicates such as *gao* ‘tall’ show subjectivity that is associated with vagueness, they are not allowed in possessive PC predicates, as demonstrated in (216) in the beginning of this chapter. Logically, the domain of PC nominals allowed in possessive constructions in Mandarin can be narrowed down to the evaluative predicates that are associated with qualitative assessment.

In Mandarin, not all evaluative predicates can occur in possessive PC sentences. Interestingly, the pattern of possessive PC predicates corresponds to the classification of attitudinal evaluations according to Martin and White (2005), which I will discuss below.

Martin and White (2005) investigate the means by which speakers encode their attitudes and activate the evaluative stances from the Systemic Functional Linguistic perspective. They analyze how speakers positively or negatively evaluate entities, happenings and states-of-affairs, and categorize attitudinal evaluations into three types: Affect, which deals with emotional reactions; Judgement, which concerns assessing behaviours according to norms; and Appreciation, which concerns the value of things. They point out that Affect is different from Judgement and Appreciation in that the former is associated with the consciousness of individual participants, while the latter refers to institutionalized feelings that target entities or participants’ behaviors.

They provide many instances of predicates of the three classes respectively, as summarized below:

1. **Affect:** refers to positive and negative feelings;

Examples: *grieving, sad, unhappy, fearful, terrorised, anxious, confident*

2. **Judgement:** refers to ethics or moralities; attitudes towards behavior. Specific domain of Judgement include:

- criticise, praise or condemn; feelings that are institutionalized as rules or regulations of behaviors;
- judgements of esteem: normality, capacity, and tenacity,
- judgement of sanction: veracity and propriety

Examples: *lucky, peculiar; powerful, mild; brave, timid; truthful, manipulative; sensitive, vain*

3. **Appreciation:** refers to aesthetics or value; evaluations of phenomena; feelings institutionalised as propositions about values of things. Specific domain of Appreciation include:

- Reaction: impact and quality
- Composition: complexity
- Valuation: worthwhileness

Examples: *engaging, fascinating; lovely, splendid; balanced, consistent; elegant, pure; profound, fake, worthless.*

Concerning the syntactic realization of attitudes, Martin and White (2005) argue that the canonical grammatical realization for attitudinal evaluations is adjectival, and show that they can occur as attributive or predicative, as shown below:

- (234) a. The captain is sad.  
b. a sad captain

Attitudes, especially Affect, are also frequently realized as adverbials when describing the manner



of processes or comments, as shown below:

- (235) a. The captain left sadly.  
b. Sadly, he had to go.

Verbal realizations of Affect are also frequently spotted when describing mental or behavioral processes, as shown below:

- (236) a. His departure upset him.  
b. The captain wept.

Nominalised realizations of attitudes are also frequent, such as the realizations of qualities (*joy, sorrow*) and processes (*grief, sob*). They are not used in predicative manner in English, but possessive predicates containing nominal forms are attested cross-linguistically, as we have seen in chapter 2.2.1.

For the syntactic characteristics of Judgement, Martin and White point out that Judgement is often highly grammaticalized in that it is associated with mood and modality; in the following examples, the Judgement predicate *naughty* is realized in the construction that expresses probability in Mood in (237a), and in the modalities of normality in (237b):

- (237) a. He's certainly naughty.  
b. It's normal for him to be naughty.

Another feature of the realization of Judgement is the lexicalized expressions that convey tenacity or propriety, as shown below:

- (238) a. I'm determined to go.  
b. You are supposed to go.

Martin and White also point out that for all adjectival attitudes, they often occur under certain grammatical frames that are related to mental evaluation. They summarize the frames for each type of attitudes, as shown below:

1. Affect:

(a) [person] feels [**Affect**] about [something]

(239) I feel **happy** that they've come/ about their having come.

(b) It makes [person] feel [Affect] that [proposition]

(240) It makes me feel **happy** that they've come.

2. Judgement:

(a) It was [**Judgement**] for/of [person] to do that

(241) It was **silly** of/for them to do that.

(b) For [person] to do that was [**Judgement**]

(242) (For them) to do that was **silly**.

3. Appreciation:

(a) [Person] consider something [**Appreciation**]

(243) I consider it **beautiful**.

(b) [Person] see something as [**Appreciation**]

(244) They see it as **beautiful**.

### 5.3 The Semantic Domain of Possessive PC Predicates in Mandarin

In the previous sections, I presented cross-linguistic data of subjective predicates and explored the semantic domain of subjective predicates. I also discussed several tests and classifications of subjective predicates. In this section, I will examine the Mandarin data relevant to our third puzzle, that is, what specific domain of PC nominals can occur in possessive constructions.

To understand what kind of PC nominals are allowed in possessive constructions, it is necessary to examine the categorization of nominals. There are many ways to categorize the lexical class of nouns, based on various semantic or morpho-syntactic criteria. The categorization I propose here follows the semantic features of nouns that are relevant to the discussion surrounding PC nominals in Mandarin.

At the top level of the domain of nominals is the domain of *concepts*, which contains the set of entities and qualities. Then, the binary distinction of concrete/abstract nouns can be made. Givón (2001) points out that concrete nouns refer to concepts that are temporally stable and made out of relatively durable materials, such as *tree*; their physical properties, such as size, color, shape and consistency, often change slowly.

The concrete nouns can be further categorized into count nouns and mass nouns. In languages such as English, the count/mass distinction is clear-cut; count nouns can be *individuated*, whereas mass nouns are *indivisible*. The distinction has three major grammatical consequences:

1. Only count nouns can be pluralized, as shown in the example below:

- (245) a. I bought three books.  
b. \*I bought three rices.

2. Count nouns and mass nouns require different quantifiers, as shown below:

- (246) a. I bought one book.  
b. I bought many book\*(s).  
c. \*I bought much book(s).

- (247) a. \*I bought one rice.  
b. \*I bought many rice(s).  
c. I bought much rice.

3. Count nouns and mass nouns require different pronouns. Singular count nouns such as *book* pair with singular third-person pronouns while plural count nouns pair with plural third-person pronouns; on the other hand, mass nouns such as *rice* always require singular third-person pronouns, as shown below:

- (248) a. I bought the book and like it/\*them.  
b. I bought the books and like \*it/them.  
c. I bought the rice and like it/\*them.

(Modified from Givón, 2001, p. 58)

In Mandarin Chinese, the distinction is more complicated due to the fact that all nouns seem to be countable if and only if a classifier is present. As a result, some scholars argue that Chinese nouns are universally mass nouns; Chierchia (1998) proposes that the function of the classifier phrase is to convert mass nouns into sets of atoms. Other researchers argue against this analysis (see Croft, 1994, L. L.-S. Cheng and Sybesma, 1998 among others) by pointing out that there are two different groups of classifiers. The first group creates units of measure that are not associated with any unit that exists in the semantic denotation of the head noun; the second group names the unit that is inherently denoted by the head noun itself. In the examples below, the classifiers *ping* ‘bottle’ and *ba* ‘handful’ pairing with *jiu* ‘liquor’ and *mi* ‘rice’ respectively in (249) are of the first group, while

the classifiers *ge* and *ben* pairing with *ren* ‘people’ and *shu* ‘book’ respectively in (250) are of the first group:

- (249) a. san ping jiu  
three bottle liquor  
‘three bottles of liquor’
- b. san ba mi  
three handful rice  
‘three handfuls of rice’
- (250) a. san ge ren  
three CL people  
‘three persons’
- b. san ben shu  
three CL book  
‘three books’

(Modified from L. L.-S. Cheng and Sybesma, 1998)

L. L.-S. Cheng and Sybesma (1998) argue that, for nouns such as *jiu* ‘liquor’ and *mi* ‘rice’, they are measured via *ping* ‘bottle’ and *ba* ‘handful’ in (249), but they do not necessarily come in bottles or handfuls. In fact, they can co-occur with other classifiers, such as *wan* ‘bowl’ and *dai* ‘bag’, as shown below:

- (251) a. san wan jiu  
three bowl liquor  
‘three bowls of liquor’
- b. san dai mi  
three bag rice  
‘three bags of rice’

These nouns do not have a built in partitioning denotation; logically they are mass nouns. On the other hand, nouns such as *ren* ‘people’ and *shu* ‘book’ carry the information about how to

partition them; the classifiers *ge* and *ben* in (250) simply name the units. Hence, those nouns are count nouns.

The abstract nouns also demonstrate the count/mass distinction; specifically, many abstract nouns are ambiguous between a count and a mass sense, as shown below:

(252) Count:

- a. This is one *right* you cannot take away.
- b. He made an *appearance*.

(253) Mass:

- a. He's here by *right*.
- b. For the sake of *appearance*

(Modified from Givón, 2001, p. 58)

In Mandarin, the same distinction is attested. For abstract nouns such as *zhihui* ‘wisdom’ or *meili* ‘charisma’, they co-occur with classifiers such as *dian* ‘bit’ and *si* ‘trace’ in (254) that create measuring units for them; these nouns do not necessarily come with classifiers, and in fact can co-occur with other measuring units such as *xie* ‘a few’ and *fen* ‘bit’ as shown in (255). On the other hand, abstract nouns such as *jihua* ‘plan’ and *jielun* ‘conclusion’ occur with classifiers such as *ge* in (256), which indicates that they carry the information about how to partition them and the classifiers simply name the units:

- (254) a. yi dian zhihui  
one bit wisdom  
‘one bit of wisdom’
- b. yi si meili  
one trace charisma  
‘a trace of charisma’

- (255) a. yi xie zhihui  
 one few wisdom  
 ‘a few wisdom’
- b. yi fen meili  
 a bit charisma  
 ‘a bit of charisma’
- (256) a. san ge jihua  
 three CL plan  
 ‘three plans’
- b. san ge jielun  
 three CL conclusion  
 ‘three conclusions’

Another distinction relevant to nouns is gradability. As discussed in chapter 2.1, gradability is a well-known property of adjectives. Gradable adjectives can occur in constructions such as comparative, equatives and superlatives, and can be modified by degree morphology, as shown by the gradable adjective *tall* in (257):

- (257) a. Eve is taller than Mary is. [Comparative]
- b. Eve is as tall as Mary is. [Equative]
- c. Eve is the tallest. [Superlatives]
- d. Eve is very tall. [Degree modification]

Yet many researchers point out that the domain of gradable predicates is not limited to the class of adjectives; nouns have been acknowledged to demonstrate gradability. This argument has drawn some debate because nouns are typically not compatible with the constructions that are compatible with gradable adjectives discussed above, as shown by the noun *bird* in (258):

- (258) a. \*Tweety is more (a) bird than Tan is. [Comparative]
- b. \*Tweety is as a bird as Tan is. [Equative]

- c. \*Tweety is the birdest. [Superlatives]  
d. \*Tweety is very (a) bird. [Degree modification]

(Modified from Sassoon, 2007, p. 10)

However, many scholars argue that nouns can occur in constructions associated with gradation. Sassoon (2007) points out that nouns can occur in comparative constructions when the particle *of* is added or when the modifier *typical* is present, or in between predicate comparisons, as shown in (259a) and (259b) respectively:

- (259) a. A robin is more (typical) of a bird than an ostrich.  
b. This is more a chair than a table.

Another example pointed out by Sassoon is that nouns can take degree modifications, as shown below:

- (260) This is pretty much a chair.

Moreover, nouns can occur in certain reinforcements and hedges where the subject is assessed by the *typicality* of membership of certain groups, as demonstrated below:

- (261) a. Technically speaking a chicken is a bird.  
b. A penguin is virtually a bird.  
c. Loosely speaking a bat is a bird.

(Modified from Sassoon, 2007, p. 27)

Morzycki (2009) points out that nouns can occur as gradable predicates when they are modified by size adjectives that receive degree readings, as shown below:

- (262) a. Bill is an enormous idiot.



- b. Hans is a big stamp-collector.

(Modified from Morzycki, 2009, p. 2)

In Mandarin, it has been observed that some nouns can be used in gradable constructions. As shown in the following example, the nouns *shunü* ‘fair-lady’ and *tuhao* ‘local tycoon’ occur in the same position as gradable adjectives, and are directly modified by the degree modifier *hen* in (263) and in comparatives in (264):

- (263) a. Zhangsan *hen shunü*.  
Zhangsan very fair-lady  
‘Zhangsan is very lady-like.’
- b. Lisi *hen tuhao*.  
Lisi very local-tycoon  
‘Lisi is very tycoon-like.’
- (264) a. Zhangsan *bi Lisi geng shunü*.  
Zhangsan than Lisi more fairlady  
‘Zhangsan is more lady-like than Lisi.’
- b. Lisi *bi Zhangsan geng tuhao*.  
Lisi than Zhangsan more local-tycoon  
‘Lisi is more tycoon-like than Zhangsan.’

He and Jiang (2011) point out that the sentences shown in (263) express the meaning that the subject has some attributes of the predicative nouns; for example, (a) means Zhangsan has some attributes of a fair lady, but does not entail that Zhangsan *is* a fair lady. The noun is used so that the individual is measured on the scale of the quality associated with the noun; thus, it is essentially equivalent to an adjective.

The next level of classification that is relevant to abstract nouns is the distinction between nouns that are realizations of PC lexemes and nouns that are not. Throughout this dissertation, I refer to the first class of nouns as PC nominals. Following Francez and Koontz-Garboden’s (2017) argument that PC nominals are quality-denoting, the distinction can be made by examining whether the noun

is associated with a certain quality; that is, whether it must characterize all the entities with such a quality. Thus, nouns such as *height* and *wisdom* are quality-denoting, but not nouns such as *idiot* and *genius* because the latter do not characterize, in these cases, all stupid or genius objects, since their denotations only include people. Since qualities themselves are abstract entities, as pointed out by Francez and Koontz-Garboden (2017), the quality-denoting feature of PC nominals leads to the following conclusions:

1. All PC nominals are abstract nouns;
2. Some abstract nouns are not PC nominals;
3. No concrete nouns are PC nominals.

In Mandarin, the distinction between PC nominals and non-PC abstract nouns is attested, as shown with the examples below:

- (265) a. PC nominals: *gaodu* ‘height’, *zhihui* ‘wisdom’, *caihua* ‘talent’, etc.  
b. Non-PC abstract nouns: *zhunbei* ‘preparation’, *yugan* ‘hunch’, etc.

The PC nominals can be further distinguished into two classes: dimensional and evaluative PC nominals. This distinction corresponds to the distinction between dimensional and evaluative adjectives made by Bierwisch (1989); dimensional adjectives are adjectives that are associated with physical properties of an object, while evaluative adjectives are associated with properties involving subjective judgements (see chapter 2.1.2 for more details; see also Heim and Kennedy, 2002). This distinction also roughly parallels Dixon’s (1982) classifications of property concepts; dimensional adjectives are lexemes of the DIMENSION, PHYSICAL PROPERTY, COLOUR, AGE, and SPEED class, and evaluative adjectives are lexemes that belong to the VALUE and HUMAN PROPENSITY class. Consequently, the distinction between dimensional and evaluative PC nominals can be made by examining their memberships according to Dixon’s classification, as

summarized below:

(266) a. Dimensional PC nominals:

1. DIMENSION: *daxiao* ‘size’, *shendu* ‘depth’, *changdu* ‘length’, *houdu* ‘thickness’, etc.
2. PHYSICAL PROPERTY: *yingdu* ‘hardness’, *zhongliang* ‘weight’, *tiandu* ‘sweetness’ etc.
3. COLOUR: *heise* ‘(the color of) black’, *baise* ‘(the color of) white’, *hongse* ‘(the color of) red’, etc.
4. AGE: *nianling* ‘age’
5. SPEED: *sudu* ‘speed’

b. Evaluative PC nominals:

1. VALUE: *chunjie* ‘purenness’, *xie’e* ‘wickedness’, *zhuoyue* ‘excellence’, etc.
2. HUMAN PROPENSITY: *kuaijie* ‘happiness’, *canren* ‘cruelty’, *jiao’ao* ‘pride’, *zhihui* ‘wisdom’, etc.

Last but not least, the evaluative PC nominals can be further distinguished according to their semantic denotation. In chapter 5.2, I discussed Martin and White’s (2005) study about the categorization of attitudinal evaluation. Following their analysis, evaluative PC nominals can be categorized into three types: Affect, Judgement and Appreciation, which concerns emotional reactions, behaviour assessment according to norms, and values of things, respectively (see chapter 5.2 for more details). The evaluative adjectives and PC nominals in Mandarin can be categorized into these three types, as shown below:

(267) a. Affect:

1. adjectives: *kuaijie* ‘happy’, *jinzhang* ‘nervous’, *zixin* ‘confident’, etc.
2. PC Nominals: *kuaijie* ‘happiness’, *jinzhang* ‘nervousness’, *zixin* ‘confidence’, etc.

b. Judgement:

1. adjectives: *xingyun* ‘lucky’, *yonggan* ‘brave’, *mingan* ‘sensitive’, etc.
2. PC Nominals: *xuewen* ‘knowledge’, *fengdu* ‘grace’, *yongqi* ‘courage’,  
*meili* ‘charisma’, *liliang* ‘power’, etc.

c. Appreciation:

1. adjectives: *ke'ai* ‘lovely’, *youya* ‘elegant’, *xujia* ‘fake’
2. PC Nominals: *qifaxing* ‘inspiring’, *haozhaoli* ‘appeal’, *youhuoli* ‘allure’,  
*jiazhi* ‘value’, etc.

In summary, I have shown that the domain of entities that are lexicalized as nouns can be categorized into concrete and abstract nouns; both can be distinguished into count and mass nouns, as well as gradable and non-gradable nouns. For abstract nouns, they can be further categorized into PC nominals and non-PC nouns. PC nominals can be distinguished into dimensional and evaluative types, and the latter can be categorized into Affect, Judgement and Appreciation.

I will now revisit the puzzle that was laid out in the beginning of this chapter; that is, what specific domain of PC nominals can occur in possessive constructions. Based on the categorization of nouns as discussed above, the pattern of nouns and their distributions in bare possessive constructions as well as possessive construction with degree modifiers is summarized below:

(268) a. Concrete count/mass nouns: *che* ‘car’, *shui* ‘water’

(i) possessive: Yes

(ii) possessive with degree modifiers: No

(a) Zhangsan (\*hen) you shui.  
Zhangsan very POSS water  
‘Zhangsan has (\*a lot of) water.’

(b) Zhangsan (\*hen) you che.  
Zhangsan very POSS car

‘Zhangsan has (\*a lot of) car(s).’

b. Abstract non-PC nouns:

(i) possessive: Yes

(ii) possessive with degree modifiers: No

(a) Zhangsan (\*hen) you jihua.  
Zhangsan very POSS plan  
‘Zhangsan has (\*a lot of) plan(s).’

(b) Zhangsan (\*hen) you yugan.  
Zhangsan very POSS hunch  
‘Zhangsan has (\*a lot of) hunch.’

c. Dimensional PC nominals:

(i) possessive: No

(ii) possessive with degree modifiers: No

(a) \*Zhangsan (hen) you gaodu.  
Zhangsan (very) POSS height  
*Intended:* ‘Zhangsan has (a lot of) height/is (very) tall.’

(b) \*Zhe-ge hu (hen) you shendu.  
This-CL lake (very) POSS depth  
*Intended:* ‘This lake has (a lot of ) depth / is (very) deep.’

d. Evaluative Affect nouns:

(i) possessive: No

(ii) possessive with degree modifiers: No

(a) \*Zhangsan (hen) you kuaile.  
Zhangsan (very) POSS hapiness  
*Intended:* ‘Zhangsan has (a lot of) hapiness/is (very) happy.’

(b) \*Zhe-ge hu (hen) you fennu.  
This-CL lake (very) POSS anger  
*Intended:* ‘This lake has (a lot of ) anger / is (very) angry.’

e. Evaluative Judgement and Appreciation nouns:

- (i) possessive: Yes
- (a) Zhangsan you zhihui.  
Zhangsan POSS wisdom  
'Zhangsan has more wisdom (than someone from the context).'
- (b) Zhe-ben shu you shendu.  
This-CL book POSS depth  
'This book has more depth (than some book from the context).'
- (ii) possessive with degree modifiers: Yes
- (a) Zhangsan hen you zhihui.  
Zhangsan very POSS wisdom  
'Zhangsan has (a lot of) wisdom/ is (very) wise.'
- (b) Zhe-ben shu hen you shendu.  
This-CL book very POSS depth  
'This book has (a lot of) depth.'

The pattern is summarized in the chart below:

Type	possessive	possessive with modifiers
Concrete count/mass N	ok	#
Non-PC abstract N	ok	#
Dimensional abstract N	#	#
Evaluative Affect abstract N	#	#
Evaluative Judgement & Appreciation abstract N	ok	ok

Table 5.1: The distribution of nouns in possessive constructions in Mandarin

The first and second puzzles concern the fact that concrete mass nouns such as *shui* 'water' are acceptable in bare possessive constructions but cannot be directly modified by degree modifiers. My proposal argues that concrete mass nouns are not quality-denoting and hence are not inherently gradable, and this explains the incompatibility with degree modifiers and other constructions involving degree morphology. This proposal is naturally extendable to all concrete nouns and non-PC abstract nouns; since they are all non-quality-denoting, it follows straight-forwardly from our

proposal that they lack inherent measures and are hence non-gradable.

Our third puzzle concerns why only certain PC nominals are acceptable in possessive PC predicates, with or without the degree modifiers. Our initial observation, as Li (2017) has pointed out, is that all the PC nominals allowed in possessive PC predicates have a subjective sense. In chapter (5.2), I discussed the distinction between the subjectivity that is associated with vagueness and the subjectivity that is related to qualitative assessment; this distinction leads to the clarification that only evaluative PC nominals can occur in possessive PC predicates, as stated at the beginning of this chapter. Furthermore, the data pattern and categorization discussed in this chapter demonstrates yet another interesting observation about the domain of PC nominals in possessive PC predicates; that is, following Martin and White's (2005) classification of attitudinal evaluation, only PC nominals of the Judgement and Appreciation class, but not the Affect class, are allowed in possessive PC predicates. Consequently, the third puzzle is updated as follows:

**Puzzle 3 (modified):** why is it that only evaluative PC nominals denoting judgment or appreciation are allowed in possessive predication with or without degree modifiers?

In the next sections, I will lay out two hypotheses regarding this puzzle, and evaluate their explanatory power with respect to the Mandarin data.

#### 5.4 Hypothesis A: Pragmatic Triviality

The intuition of this hypothesis comes from the observation that in Mandarin, all dimensional PC nominals are absolute nominalizations, as discussed in chapter 3.1. Recall that Moltmann (2009) points out that adjective nominalizations can be distinguished into positive nominalizations, such as *tallness* and *heaviness*, and absolute nominalization, such as *height* and *weight*. The former is tied to the positive forms of adjectives, but the latter is not. As shown in the example below, the positive nominalization *tallness* and the absolute nominalization *height* have different implications

in that (269a) implies (269c), but (269b) does not:

- (269) a. Mary's tallness exists.  
b. Mary's height exists.  
c. Mary is tall.

In fact, for any physical object X in this world, the statement that 'X's height exists' is always true regardless of whether X is tall or not.

In chapter 3.1, I made the observation from the Mandarin data that PC nominals of the classes of DIMENSION, PHYSICAL PROPERTY, COLOUR, AGE, and SPEED are all absolute nominalizations, while the classes of HUMAN PROPENSITY and VALUE are positive nominalizations. Unlike languages such as English where both absolute and positive nominalization exist for adjectives such as *tall*, the Mandarin counterpart of *tallness* is not attested. Consequently, for the following sentence (270) in Mandarin:

- (270) \*Zhangsan you gaodu.  
Zhangsan POSS height  
*Intended*: 'Zhangsan has height/is tall.'

It is always true that Zhangsan, as a physical object in this world, has height; hence the meaning expressed by the sentence is pragmatically trivial.

The first hypothesis concerning our third puzzle is developed from such a perspective, as described below:

(271) **Hypothesis A: pragmatic triviality**

For a PC nominal X:

- a. it is not allowed in possessive predication if it is trivial to express that something has X because it is impossible for an object to lack the property associated with X completely;



- b. if it is not trivial to express that something has X because it is possible for an object to lack the property associated with X completely, then it is allowed in possessive predication.

Now we test the predictions of the hypothesis by examining whether there is a correspondence between whether a PC nominal is allowed in possessive predication and whether it is associated with a property that an object can completely lack. Recall that none of the dimensional and evaluative affect PC nominals can occur in possessive predication, while evaluative judgement and appreciation PC nominals can. I will start testing the predictions by examining whether objects can completely lack the properties named by dimensional PC nominals, based on Dixon's (1982) classification:

- (272) a. DIMENSION: no
- b. PHYSICAL PROPERTY: no
- c. COLOUR: ?
- d. AGE: no
- e. SPEED: ?

It is obvious that PC nominals of DIMENSION, PHYSICAL PROPERTY and AGE are properties that no objects in this world can completely lack. The PC nominals of the SPEED class seem to be problematic, since an object can be completely still. However, a still object would arguably have a speed of zero, rather than having no speed.

Another problematic class is COLOUR. There are two kinds of nominal realizations of this class: the general noun *yanse* 'color', and the nouns referring to names of specific colors such as *hongse* '(the color of) red'. For the former noun *yanse*, the existence of words such as *colorless* indicates that objects could arguably lack color. In fact, if we consider the physical reality of color, then

technically speaking color is not a stable physical attribute of any object. They absorb some wavelengths of light and reflect others, and the latter, if in a visible range to human eyes, are received and processed in our brain, which determines the “color” of the objects by the received wavelengths. Hence “colorless” objects are objects that do not reflect any wavelengths of light in a visible range to human beings. This situation is further complicated by the fact that people frequently describe white or dark objects as “colorless”, as shown in the example below:

- (273) Diannaο turan meiyou yanse le.  
computer suddenly no-exist color LE  
*Literal*: ‘My computer is suddenly colorless.’

‘My computer suddenly won’t display any color other than black and white.’

For the latter group of nouns that refer to names of specific colors, the physical reality of colors also indicates that an object may not have a specific color if it does not reflect the wavelengths of light that will be processed as that color in the human brain.

In summary, color as a physical property is complicated because whether an object has a certain color is determined by the light that it reflects and how human brains process them. However, given the fact that people often describe something as colorless if it doesn’t reflect any visible wavelength of light or if it is only black and white, then it is sensible to say something completely lacks color.

Now we move on to examine evaluative affect PC nominals and if objects can completely lack the properties associated with them. Recall that almost all Mandarin evaluative affect PC nominals are ambiguous between adjectives and nouns, such as *kuai*le ‘happy/happiness’ or *fennu* ‘angry/anger’. Intuitively, animate objects can lack certain emotional responses completely. This intuition is supported by the fact that the adjective counterparts of those PC nominals are compatible with *wanquan bu* ‘completely not’, as shown below:

- (274) a. Zhangsan wanquan bu kuaile.  
Zhangsan completely not happy

‘Zhangsan is completely unhappy.’

- b. Zhangsan wanquan bu fennu.  
Zhangsan completely not angry  
‘Zhangsan is completely not angry.’

The examples in (274) are consistent with the predictions of Hypothesis A.

At the theoretical level, a problem with this hypothesis is that, according to the quality-based analysis following Francez and Koontz-Garboden (2017), possessive predicates should have a positive interpretation because the constraint on the interval of the quality (see Francez and Koontz-Garboden (2017) and chapter 2.2.2 for more details). Recall the Ulwa positive PC sentence repeated below:

- (58) yang as-ki-na minisih-ka.  
1SING shirt-1SING.POSS dirty-3SING.POSS  
‘My shirt is dirty.’ (Green, 2004, as cited in Francez and Koontz-Garboden, 2017, p. 31)

The proposed quality-based analysis of the possessive predicate *minish-ka* is composed in the following way, where the interval  $I$  only includes all portions of dirtiness that rank higher than a contextually-supplied threshold:

- (66)  $\llbracket \textit{minisihka} \rrbracket = \lambda x \lambda I \subset \mathbf{dirtiness} \exists^I z [\pi(x, z)]$

The fact that *hen* is required in positive PC sentences is due to the T[+V] constraint that we have discussed in chapter 4.4. Then it should not be trivial to say that *Zhe-ge hu you shendu* ‘This lake has depth’, which contradicts the Mandarin data.

Another problem with the pragmatic triviality account is that, if the unacceptable PC nominals in possessive constructions are rejected pragmatically, then the possessive phrase itself should be syntactically and semantically well-formed. Then, if a semantically contentful degree modifier such

as *chaoji* ‘super’ is added, the sentence is no longer trivial. However, this contradicts the Mandarin data, as shown below:

- (275) \*Zhangsan chaoji you gaodu.  
Zhangsan super POSS height  
*Intended:* ‘Zhangsan has super (amount of) height/is super tall.’

In summary, the pragmatic triviality fails to explain the data in Mandarin, and has flaws at the theoretical level.

### 5.5 Hypothesis B: Pragmatic Blocking

Now we move on to the second hypothesis.

The intuition behind this hypothesis is two-fold. First of all, for dimensional and evaluative affect PC nominals in Mandarin, almost all of them have corresponding adjective forms, while the corresponding adjective forms of evaluative judgement and appreciation PC nominals rarely exist. Since Mandarin predicative adjectives are single words while possessive predicates are phrases containing a possessive head and a noun phrase, it is obvious that adjective forms are structurally simpler as predicates. Hence I propose the following hypothesis:

(276) **Hypothesis B: pragmatic blocking:**

For a PC lexeme X, the corresponding simple adjective form, if it exists, is always favored over the nominal form.

On the other hand, although the corresponding adjective forms of evaluative judgement and appreciation PC nominals are very rare, they do exist, as shown below:

- (277) a. Adj: *mingzhi* ‘wise’; *you* + N: *you zhihui* ‘have wisdom’  
b. Adj: *yonggan* ‘brave’; *you* + N: *you yongqi* ‘have courage’

- c. Adj: *fuyou* ‘wealthy’; *you* + N: *you qian* ‘have money’

It is necessary for our hypothesis to be able to explain the co-existence of the PC adjective and the possessive PC phrases that seem to express very similar meaning. However, after closer examination, it is worth noting that there are subtle differences between these pairs of phrases, such as *mingzhi* ‘wise’ and *you zhihui* ‘have wisdom’, which will be elaborated upon later.

Thus I propose to modify the hypothesis in (276) as follows:

(278) **Hypothesis B: pragmatic blocking:**

For a PC lexeme X, the lexicalized simple adjective form is always favored over the nominal form if:

- a. the adjective form exists;
- b. the adjective form has the same meaning as the possessive PC form.

This hypothesis will have the following predictions concerning the realization of a PC lexeme X in predicative sentences:

- (279)
- a. If the adjective form exists and the nominal form does not exist, then X is realized as the adjective;
  - b. If the nominal form exists and the adjective form does not exist, the possessive predication with the nominal form is allowed.
  - c. If both the adjective and nominal forms exist, then:
    - i. If they share the same meaning, then the existence of the adjective form blocks the possessive predication with the nominal form;
    - ii. If they express different meaning, then they can co-exist.

This hypothesis connects to the extensively discussed pragmatic principles proposed by Grice

(1989), demonstrated by the general maxims as follows:

- (280) a. QUALITY: Try to make your contribution one that is true.
- i. Do not say what you believe to be false.
  - ii. Do not say that for which you lack evidence.
- b. QUANTITY:
- i. Make your contribution as informative as is required (for the current purposes of the exchange).
  - ii. Do not make your contribution more informative than is required.
- c. RELATION: Be relevant.
- d. MANNER: Be perspicuous.
- i. Avoid obscurity of expression.
  - ii. Avoid ambiguity.
  - iii. Be brief. (Avoid unnecessary prolixity.)
  - iv. Be orderly.

(Grice, 1989, p. 26-7)

Horn (1984) points out that the first submaxim of Quantity, as shown in (280b-i), yields upper-bounding generalized conversational implicature associated with the interpretation of scalar values. This is demonstrated by the contrast between the pair of weaker and stronger quantifiers *some* and *all*. For propositions such as *You ate **some** of the cake*, it strongly suggests *You ate some but **not all** of the cake*; presumably, as mutual knowledge between speakers and hearers, one would have used the stronger proposition instead if it is necessary. The same effect is applicable to quantity-based scalar predication:

(281) a. Pat has 3 children.

*Implicature:* Pat has exactly 3 children.

b. It's possible she'll win.

*Implicature:* It's possible but not certain that she will win.

c. He's a knave or a fool.

*Implicature:* He's a knave or a fool, but not both.

d. It's warm.

*Implicature:* It's warm but not hot.

(Modified from Horn, 2004, p. 10)

The contrast is demonstrated by the crosslinguistic tendency of LEXICALIZATION CONSTRAINT. In English, the quantifier *\*nall*, which means 'not all', is absent, and is expressed by the more complex form *not all*. Levinson (2000) argues that, since *some* implies *not all*, they carry the same overall communicational load; furthermore, *some* is lexicalized but *not all* is not (*\*nall*) because a positive term is favored over a negative term if they carry the same communicational load. Similarly, while quantificational adverbs such as *sometimes* exist, there is no lexicalized *\*nalways* meaning 'not always or sometimes not' because *sometimes* implies the same meaning conveyed by *\*nalways*.

Another relevant phenomenon derived from the Gricean maxims is the DIVISION OF PRAGMATIC LABOR. It concerns the economy of linguistic information, and is associated with the extensively discussed "minimax" principles arguing that the speaker always tries to optimally minimize surface complexity while maximizing the amount of information (see Carroll and Tanenhaus, 1975 among others). Horn (1984) summarises the relevant maxims into two fundamental principles according to Zipf's speaker's and hearer's economies (Zipf, 1949), as shown below:

(282) a. The Q Principle

Make your contribution sufficient.

b. The R Principle

Say no more than you must.

The Q principle is a summary of the first two submaxims of Manner in (280d-i) and (280d-ii) and the first Quantity maxim in (280b-i), which we have discussed with the case of lexical constraint regarding scalar implicature above. The R principle collects the Relation maxim in (280c), the second Quantity maxim in (280b-ii), and the third and fourth submaxims of Manner in (280d-iii) and (280d-iv).

Horn (1984) argues that while the Q principle and the R principle seem to be opposed forces, their conflict is resolved with the general pattern that the use of a marked (and often more complex) expression when a corresponding unmarked (and often simpler) form is available tends to be interpreted as expressing a marked message, or situations outside the stereotypical meaning. If the speaker used a marked expression without conveying an “extra” message, then it would be in conflict with the R principle. As a result, the unmarked expression is associated with an unmarked situation conveying a stereotypical meaning; the marked expression becomes associated with marked, non-stereotypical meaning, as restricted by the Q principle. Horn refers to this phenomenon as the division of pragmatic labor.

This phenomenon has been observed and investigated in the study of the lexicon. Aronoff (1976) argues that the existence of a simple lexical item can block an otherwise expected derivation if they are synonymous. One example is the formation of an *-ity* nominalization of an *-ous* adjective; if a simple nominal underlying the adjective exists, then the *-ity* formation is blocked, as shown below:

- (283) a. fury furious \*furiousity  
b. \*cury curious curiosity  
c. fallacy fallacious \*fallacity  
d. \*tenacy tenacious tenacity



Kiparsky (1982) points out that the blocking paradigm proposed by Aronoff is problematic; some derivational processes are not always blocked by the existence of a corresponding form. In the examples below, while the *-ness* nominalization is blocked by the existence of the simple nominal form that is less productive in (284), it is not in (285):

- (284) a. decency decent \*decentness  
b. aberrancy aberrant \*aberrantness
- (285) a. glory glorious gloriousness  
b. fury furious furiousness

Kiparsky (1982) argues that the blocking process could be partial when the less productive affix is associated with some restricted meaning and the more productive affix is associated with the remaining meaning. Full blocking only happens when there is no extra meaning that requires a separate form. He summarizes the condition as follows:

- (286) Avoid Synonymy: The output of a lexical rule may not be synonymous with an existing lexical item.

Horn (1984) points out that while the Avoid Synonymy condition is an improvement on Aronoff (1976), it is still too strong. The notion of “corresponding item” should be relativized to a given register; otherwise, it fails to explain why synonymous words such as *fridge*, *icebox* and *refrigerator* co-exist.

McCawley (1978) presents several examples where the appropriate use of an expression formed by a relatively productive process is restricted by the existence of an expression formed by a relatively non-productive process. One example attested in several languages is the distribution of lexical causative, as demonstrated below:

- (287) a. Black Bart killed the sheriff.  
       b. Black Bart caused the sheriff to die.
- (288) a. Lee stopped the machine.  
       b. Lee got the machine to stop.

(Modified from Horn (1984), p. 27)

In both pairs of sentences, the periphrastic causative in (287b) and (288b) is more morphologically complex and relatively marked, and is associated with the situation outside the stereotype. The use of (287b) suggests that it refers to a situation where (287a) cannot be used; that is, Black Bart did not kill the sheriff directly. Similarly, (288b) is restricted to a situation where the action happened in a non-conventional way.

McCawley (1978) also points out that when no lexicalized causative is available, the use of the periphrastic causative carries no extra meaning and there is no contrast with respect to implicature. In (289), there is no implicature that Bill made Mary laugh in any means outside the stereotypical situations:

- (289) Bill made Mary laugh.

Other examples that demonstrate this contrast in implications of meaning include color words such as *pink* and *pale red* (290a), modal auxiliaries and their periphrastic counterparts (290b), direct positive and the double negation (290c), and noun phrases carrying social conventions and its alternative (290d), as shown below:

- (290) a. i. Her blouse was pink.  
           ii. Her blouse was pale red.
- b. i. Can you pass the salt?  
           ii. Are you able to pass the salt?

- c. i. It's possible that you will solve the problem.
- ii. It's not impossible that you will solve the problem.
- d. i. That's my mother.
- ii. That's my father's wife.

(Modified from Horn (2004) and Horn (1984))

In each of these cases, the use of a more complex and less lexicalized expression in (ii) in lieu of a simpler alternative in (i) suggests that the former is associated with a marked meaning associated with a non-stereotypical situation.

To test this hypothesis, it is necessary to investigate the availability of adjective forms and nominal forms for different types of PC lexemes and see if the predictions in (279) are borne out. I will explore the lexicalization of PC lexemes as adjectives and PC nominals respectively of different classes of dimensional, evaluative affect, and evaluative judgment and appreciation PC lexemes in Mandarin. The goal of the exploration is to find out whether corresponding adjective forms of dimensional and evaluative affect PC nominals exist systematically, whereas the judgment and appreciation PC nominals uniformly lack corresponding adjective forms. Moreover, if both forms exist, it is necessary to examine if one form conveys meaning that the other form does not.

I will start with the dimensional PC nominals by looking into the classes of PC lexemes following Dixon's (1982) classifications: DIMENSION, PHYSICAL PROPERTY, COLOUR, AGE, and SPEED. Recall that in chapter 3.1 I demonstrated the data concerning realizations of PC lexemes in those classes, as repeated below:

#### 1. DIMENSION:

- (i) adjectives: *da* 'big', *xiao* 'small', *shen* 'deep', *qian* 'shallow', *chang* 'long', *duan* 'short',  
*hou* 'thick', *bo* 'thin', etc.

(ii) PC nominals: *daxiao* ‘size’, *shendu* ‘depth’, *changdu* ‘length’, *houdu* ‘thickness’, etc.

## 2. PHYSICAL PROPERTY:

(i) adjectives: *ying* ‘hard’, *ruan* ‘soft’, *zhong* ‘heavy’, *qing* ‘light’, *tian* ‘sweet’, *ku* ‘bitter’, etc.

(ii) PC nominals: *yingdu* ‘hardness’, *zhongliang* ‘weight’, *tiandu* ‘sweetness’, etc.

## 3. COLOUR:

(i) adjectives: *hei* ‘black’, *bai* ‘white’, *hong* ‘red’, etc.

(ii) PC nominals: *heise* ‘(the color of) black’, *baise* ‘(the color of) white’, *hongse* ‘(the color of) red’, etc.

## 4. AGE:

(i) adjectives: *xin* ‘new’, *nianqing* ‘young’, *lao* ‘old’

(ii) PC nominals: *nianling* ‘age’

## 5. SPEED:

(i) adjectives: *kuai* ‘fast’, *man* ‘slow’, etc.

(ii) PC nominals: *sudu* ‘speed’

The data presented above show that for the five classes of dimensional PC nominals, the corresponding adjective forms do exist.

One noteworthy fact is that, as discussed previously, the adjectival realization of PC lexemes of these classes are positive nominalizations, whereas the nominal realizations of those PC lexemes are absolute nominalizations, following Moltmann’s (2009) distinction. That is, there is no corresponding nominal forms of *gao* ‘tall’ in Mandarin that parallels the English counterparts *tall* and *tallness*, as oppose to *height*. One might argue that, since the dimensional PC nominals are not tied to the

positive adjectives, then the adjective forms are not necessarily the corresponding forms of those PC nominals in Mandarin, and the lexical competition does not apply in this case. Furthermore, it might be the case that the possessive predication requires positive nominalizations of PC lexemes, which do not exist in Mandarin Chinese for the dimensional PC nominals.

However, as discussed in the previous section, the quality-based approach to PC nominals suggests that the possessive predicates with PC nominals should denote a positive meaning; thus the adjectives and the possessive predicates are at least translationally equivalent with respect to expressing the positive meaning associated with the PC lexemes.

For evaluative affect PC nominals, their adjectival and nominal forms are often homophonous, as demonstrated below:

- (291) a. adjective forms: *kuaile* ‘happy’, *beishang* ‘sad’, *fennu* ‘angry’, *jimo* ‘lonely’, etc.  
b. Nominal forms: *kuaile* ‘happiness’, *beishang* ‘sorrow’, *fennu* ‘anger’, *jimo* ‘loneliness’, etc.

The data above show a clear pattern that PC lexemes of this class are lexicalized both as adjectives and as nominals. The fact that PC nominals of this class are not allowed in possessive predication supports the lexical competition account; the simpler adjective forms are favored over the nominal forms in possessive predicates.

Now we move on to the class of evaluative judgement and appreciation PC nominals. Recall that this hypothesis aims to explain the pattern that all PC nominals allowed in possessive predication are of the evaluative judgement and appreciation PC nominals, but not dimensional and evaluative affect PC nominals. According to the predictions of this hypothesis, we should find that for all PC nominals that are allowed in possessive predication, there are no corresponding adjective forms. It is not necessarily the case that all evaluative judgement and appreciation PC nominals lack corresponding adjective forms. But if such form of a PC nominal does exist, then the PC nominal

should not be allowed in possessive predication.

Logically, to test the hypothesis in this domain, it is reasonable to examine the existing PC nominals that *are allowed* in possessive predication and see if there are corresponding adjective forms available. However, due to scope limitations and the extensive productivity of the possessive predication with PC nominals in Mandarin, it is almost impossible to examine *every* PC nominal that is allowed in possessive predication.

Recall that in chapter 3.1.3, I presented the result from a corpus study, where I listed the most-frequent PC nominals in possessive predication. I will start with those PC nominals and examine if there are corresponding forms for them. The result is listed below<sup>2</sup>:

possessive predicates	idiomatic translation	adjective forms
<i>you daoli</i> ‘have reason’	reasonable	#
<i>you liliang</i> ‘have strength’	powerful	#
<i>you paitou</i> ‘have style’	stylish	#
<i>you jingyan</i> ‘have experience’	experienced	#
<i>you zhihui</i> ‘have wisdom’	wise	<i>mingzhi</i> ‘wise’
<i>you caihua</i> ‘have talent’	talented	#
<i>you wenhua</i> ‘have culture’	cultured	#
<i>you yongqi</i> ‘have courage’	courageous	<i>yonggan</i> ‘brave’

Table 5.2: The distribution of corresponding adjective forms of most-frequent PC nominals

Out of the eight most frequent possessive predicates, two seem to have corresponding adjective

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<sup>2</sup>Note that, for some possessive predicates, the literal translation and the PC lexemes represented by the English adjectives do not cover the full denotation of the predicates. For example, for the possessive predicate *you paitou*, the literal translation ‘have style’ or the English adjective ‘stylish’ is only part of what it means. For a sentence such as *Zhangsan hen you paitou*, it expresses the meaning that Zhangsan not only “has style”, but also acts in a dignified manner. Consequently, although the Mandarin adjective *shishang* ‘stylish’ does exist, it is not considered a corresponding form of the PC nominal *paitou* in this case.

forms: *you zhihui* ‘have wisdom’, and *you yongqi* ‘have courage’. Another example we have seen in (277) is the possessive predicate *you qian* ‘have money’, which corresponds to the adjective *wealthy* ‘rich’. In these two cases, the possessive predicates and the corresponding adjectives are translationally equivalent.

However, while *you zhihui* ‘have wisdom’ and *mingzhi* ‘wise’ express the same meaning as predicates, they are used in different environments. Specifically, results of searches on Google show that the former often describes a stable property of people, while the latter usually assess the quality of an action or choice, as illustrated below:

- (292) a. Xianzai de ren hen you zhihui.  
 Now DE people very POSS wisdom  
 ‘People nowadays have (a lot of) wisdom/is (very) wise.’
- b. Haha, zumu hen you zhihui.  
 haha grandmother very POSS wisdom  
 ‘Haha, the grandmother has (a lot of) wisdom/is (very) wise.’
- (293) a. Hanguo de jue ding hen mingzhi.  
 Korea DE decision very wise  
 ‘Korea’s decision is very wise.’
- b. Qishi pinyong linsai hen mingzhi.  
 Cavaliers hire Lindsay very wise  
 ‘It is very wise for the Cavaliers to hire Lindsay.’

Moreover, the predicates *you zhihui* ‘have wisdom’ and *mingzhi* ‘wise’ are not mutually exchangeable in the examples above. Specifically, *you zhihui* ‘have wisdom’ almost exclusively describes *human* propensity, and is unacceptable as predicates in sentences shown in (293). In summary, while the meaning of *you zhihui* ‘have wisdom’ and *mingzhi* ‘wise’ are similar, they are associated with different situations and describe distinct domain of objects.

The case of *you yongqi* ‘have courage’ versus *yonggan* ‘brave/courageous’ is more complicated. It expresses the same meaning as the adjective *yonggan* ‘brave’ as predicates. The results of searches

on Google do not show that they are used in different contexts; both often describe properties of humans:

- (294) a. Anna Kalieningna jiu hen you yongqi.  
Anna Karenina in-fact very POSS courage  
'In fact, Anna Karenina has (a lot of) courage.'
- b. Yuedan jundui hen yonggan.  
Jordan army very brave  
'The Jordan Army is very brave.'

Unlike *you zhihui* 'have wisdom' and *mingzhi* 'wise', the predicates *you yongqi* 'have courage' and *yonggan* 'brave/courageous' are mutually exchangeable in the examples above.

However, their meanings do differ. *yonggan* 'brave' often describes a stable property of a person, whereas *you yongqi* means a person demonstrates the spirit of courage by having no fears to do something. This distinction is supported by results of searches on Google. The example below shows that it is acceptable to say that someone that possesses courage may not be brave, but not vice versa:

- (295) You yongqi de ren bu yiding yonggan, dan yonggan de ren yinggai shi  
POSS courage DE person not certain brave, but brave DE person should be  
you yongqi de.  
footnotesizePOSS courage DE  
'A person who has courage is not certainly brave, but a brave person should have courage.'

For the case of *you qian* 'have money' and *fuyou* 'wealthy', the distinction in the meaning associated with these two phrases is parallel to the distinction between *rich* and *wealthy* in English; namely, only people with sustainable wealth are considered wealthy. In an article published in Wall Street Journal (Chinese version) titled 'Do you know the difference between rich and wealthy', the difference between *you qian* 'have money' and *fuyou* 'wealthy' is explained as follows:

- (296) Xuduo you qian ren bing bu fuyou, yinwei tamen juede you biyao  
many POSS money person actually not wealthy, because they think POSS necessity



hua henduo qian xiang bieren zhanshi ziji duo you qian.  
 spend much money to others show themselves much POSS money.  
 ‘Many people who have money are actually not wealthy, because they think it is necessary  
 to spend much money to show others how much money they have.’ (Zweig, 2020)

In summary, the three possessive predicates *you zhihui* ‘have wisdom’, *you yongqi* ‘have courage’, and *you qian* ‘have money’ and their corresponding adjective forms differ in the conveyed meaning and how they are used in Mandarin respectively.

In conclusion, the PC nominals of the dimensional and the evaluative affect class are not allowed in possessive predication because there are corresponding simple adjective forms that are favored. For the PC nominals of the evaluative judgment and appreciation class that are allowed in possessive predication, there are either no corresponding adjective forms, or the forms do not have the same meaning as the possessive predicates. The predictions of Hypothesis B are borne out.

This hypothesis is also supported by data outside Mandarin. In Ulwa, where there are no lexicalized adjectives, all the dimensional and evaluative PC lexemes occur in possessive predication; as repeated below, the dimensional lexeme *dirty* is realized with possessive predicates *minisih-ka*:

- (58) yang as-ki-na minisih-ka.  
 1SING shirt-1SING.POSS dirty-3SING.POSS  
 ‘My shirt is dirty.’

The distribution of PC lexemes in Ulwa is consistent with the lexical competition account; since there are uniformly no corresponding adjective forms uniformly in Ulwa, all PC lexemes are realized as possessive predicates.

Moreover, it is worth exploring whether the pragmatic blocking hypothesis is applicable in other languages where predicative adjectives and possessive PC phrases co-exist. As we have seen in chapter 2.2, many languages adopt both adjective and possessive strategy of predication in PC sentences, with lexicalized adjectives and PC nominals respectively. For example, in both German

and Portuguese, the sentence that translated to ‘I am hungry’ in English can be expressed with both strategies, as shown below:

- (297) a. Ich bin hungrig.  
I am hungry  
‘I am hungry.’
- b. Ich habe Hunger.  
I have hunger  
‘(Lit.) I have hunger/I am hungry.’ [German]
- (298) a. Estou faminta.  
be hungry  
‘I am hungry.’
- b. Tenho fome.  
have hunger  
‘I have hunger.’ [Portuguese]

While the difference in markedness between the predicative adjective and possessive PC sentences in (a) and (b) of both examples are not as significant as their English counterparts, some German speakers argue that the possessive sentence in (297b) is more common or colloquial than the copular sentence in (297a); others point out that they have subtle difference in pragmatic implication. Similarly, Amaral (2020) points out that the predicative adjective sentence in (298a) suggests a very high degree of hunger that could translates to “starving”, while the possessive sentence in (298b) is used in common situation and is unmarked. These data is coherent with the predictions of our hypothesis; that is, possessive PC phrases and their corresponding adjective forms can co-exist if they do not convey the same meaning or associated with the same situation<sup>3</sup>.

One hanging question with this hypothesis is that it is almost impossible to extensively investigate *all* PC nominals allowed in possessive predication. While the fact that the most frequently occurring

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<sup>3</sup>I will not investigate more cross-linguistic examples due to scope limitations of this dissertation. However, a cross-linguistic investigation of the lexicalization and implicatures of PC phrases and their corresponding adjective forms would be very interesting and add crucial insight to the more general topics in pragmatics discussed above.

possessive predicates uniformly lack corresponding adjective forms or adjectives that have the exact same meaning with them demonstrates a clear pattern of distribution, it is still possible that there might be certain possessive predicates that have corresponding adjectives with the same meaning, thus contradicting the hypothesis. Unfortunately, this question is beyond the scope of this dissertation. For future studies, an extensive corpus study regarding the distribution of possessive predicates in Mandarin would help clarify this question.

Another interesting question that naturally follows this hypothesis is why it is the case that, in Mandarin, the PC lexemes that are lexicalized as dimensional and evaluative affect PC nominals have adjective forms systematically, but those that are lexicalized as evaluative judgement and appreciation do not. One possibility that is worth further exploration is that it might be related to the diachronic development of the possessive predicates. As discussed in earlier chapters, I argue that the possessive morpheme *you* is polysemous; it is ambiguous between a verbal head and a functional head. It would be interesting to explore how the split from the regular verbal head happened, and with what kind of nouns.

Also, the distinction between the evaluative affect and the evaluative judgement and appreciation attitudes may shed some light on the distribution of PC nominals of these classes. Recall that in the last chapter, we discussed the categorization of these predicates made by Martin and White (2005); they point out that affect is associated with the consciousness of individual participants, while the latter refers to institutionalized feelings that target participant's behaviors or things. Moreover, regarding the subjective elements involved, it is interesting that the former is not acceptable under *find*, but the latter two are:

- (299) a. \*Ann finds Hans happy. [Affect]  
b. Ann finds Hans lucky. [Judgement]  
c. Ann finds Hans lovely. [Appreciation]

Kennedy (2016) points out for the *find* test, that the subject of *find* must be understood as the judge of the embedded predicate. For the affect predicates, the judge must be the experiencer herself. In the example (299a), only Hans can experience and hence judge his own degree of happiness, while Ann cannot. On the other hand, the institutionalized feelings expressed by the judgement and appreciation predicates can be judged by the subjects, as shown in (299b) and (299c).

## 5.6 Conclusion

This chapter addresses the puzzle of why only PC nominals with a subjective sense can occur in possessive constructions. With a closer examination of the Mandarin data, I point out that the domain of PC nominals allowed in possessive constructions in Mandarin can be narrowed down to the evaluative predicates that are associated with qualitative assessment; following Dixon's classification of PC lexemes, only some PC nominals of the HUMAN PROPENSITY class can occur in possessive PC predicates.

To better understand the semantic domain of possessive PC predicates in Mandarin, I presented a way of categorizing nouns based on their semantic features, including the concrete/abstract distinction, the count/mass distinction, and the gradable/non-gradable distinction. For abstract nouns, they can be further categorized into PC nominals and non-PC abstract nouns. The former can be further grouped into dimensional and evaluative PC nominals. Finally, evaluative PC nominals can be categorized into Affect, Judgement and Appreciation, according to Martin and White's classification. Following this categorization of nouns, I reviewed the distribution of PC nominals in possessive constructions in Mandarin, and narrowed down the domain of PC nominals allowed in possessive predication as evaluative PC nominals denoting judgment or appreciation. Then I proposed two hypotheses regarding this puzzle.

The Pragmatic Triviality hypothesis argues that, if it is trivial to express that something has a quality that is associated with a PC nominal, then it is not allowed in possessive predication.

However, this hypothesis fails to explain the data in Mandarin, and has flaws at the theoretical level.

The Pragmatic Blocking hypothesis argues that, if a PC lexeme has an existing adjective form and the adjective form has the same meaning as the possessive PC phrase, then the adjective form is favored over the nominal form and the PC nominal is not allowed in possessive predication. The two forms can co-exist if they do not convey the same meaning. This hypothesis is congruent with the pattern of distribution of PC nominals in Mandarin, and is also supported by cross-linguistic data.

## Chapter 6

### Concluding Remarks

This dissertation explores the empirical domain of PC sentences with a focus on Mandarin Chinese. Regarding the two types of predication that are attested in Mandarin: the predicative adjective sentences and the possessive sentences with PC nominals, I presented three puzzles:

1. Why degree modifiers such as *hen* are only compatible with possessive PC phrases and gradable adjectives, but not with non-PC nouns, especially non-PC mass nouns;
2. Why possessed PC nominals pattern with gradable adjectives in that degree modifiers such as *hen* are obligatory to block comparative interpretations with gradable adjectives and PC nominals;
3. Why only some PC nominals with subjective sense can occur in the possessive PC construction, regardless of whether there are degree modifiers.

These puzzles are connected to several broader theoretical issues cross-linguistically, which will be discussed in the following sections.

#### 6.1 Translational Equivalence and Model-theoretic Identity

The first two puzzles mainly focus on the distribution and the role of degree modifiers such as *hen* in PC sentences in Mandarin. They are based on the fact that the two types of PC sentences, the adjective predicate type and the possessive type, behave in the same fashion with respect to the distribution of degree modifiers and how positive and comparative interpretations are achieved uniformly.

For the first puzzle, I follow the quality-based analysis of PC nominals proposed by Francez and

Koontz-Garboden (2017), which holds that PC nominals and non-PC mass nouns in Mandarin differ semantically in that the latter lack inherent measures, resulting in two possessive phrases. There are two possessive morphemes that share the same surface form *you*: one takes PC nominals as complement and another takes other nouns; only the former phrase is gradable. Consequently, degree modifiers such as *hen* as well as other degree morphosyntax, including comparative and superlative, are sensitive to the distinction because they are only compatible with gradable phrases. Furthermore, the shared behavior between gradable adjectives and possessive PC phrases in constructions involving degree modification in Mandarin is also observed in other languages, such as Wolof (Baglini, 2015) and Basaá (Hanink et al., 2019). The consistent pattern cross-linguistically provides strong support that the two forms of PC sentences can not only achieve translational equivalence, but also be type-theoretically identical. To show that this argument works compositionally, I extended the quality-based analysis for PC nominals to gradable adjectives and degree morphosyntax, and showed that possessive PC predicates and gradable adjectives both denote relations between individual and intervals of the quality associated with the predicate that holds if and only if the quality possessed by the individual meets or exceeds a certain contextually supplied threshold. While I do not argue that model-theoretic identity directly follows from translational equivalence, I do argue that there is strong evidence supporting the proposal that gradable adjectives and possessive PC phrases are type-theoretically identical in the domain of PC sentences. Also, this analysis provides an alternative view that gradable adjectives denote relations between individuals and qualities in the same way as possessive PC phrases, which has been proposed for languages that uses possessive morphology for PC lexemes, as well as adjectival nominalizations in languages such as English.

For the second puzzle concerning the role of degree modifiers in simple declarative PC sentences with positive interpretation, I follow the proposal of Grano (2012) that degree modifiers such as *hen* are needed in positive sentences with predicative adjectives to satisfy the T[+V] constraint in Mandarin,

which requires that the complement to Tense be a verbal projection; without the degree modifiers, a null comparative operator CMP is supplied to satisfy the same constraint, causing the sentence to express a comparative meaning. I extend this proposal to possessive PC sentences, and propose that the possessive morpheme *you* that takes PC nominals as complements is a functional head that projects an AP, rather than VP. Consequently, possessive PC phrases also need to be transformed into verbal projection with functional support from either the covert comparative operator or overt degree expressions to satisfy the T[+V] constraint. This analysis treats the possessive PC phrases, which looks “verbal” on the surface, as adjectival phrases. Since possessive PC phrases and adjectival PC phrases share the same semantic type, this corresponds to the classic view under Montague grammar that syntactic category and semantic type are systematically related.

## 6.2 Semantic Domain and Syntactic Realization

The third puzzle explores the distinction between the two types of PC sentences in Mandarin by examining what factors determine the lexicalization of PC lexemes.

With a closer examination of the Mandarin data, I point out that the domain of PC nominals allowed in possessive constructions in Mandarin can be narrowed down to the evaluative predicates that, following Dixon’s (1982) classification of PC lexemes, are a subset of PC nominals of the HUMAN PROPENSITY class. I also showed that this particular subset corresponds to Martin and White’s (2005) classification in that only evaluative PC nominals denoting Judgment or Appreciation, but not Affect, can occur in possessive predication. I presented two hypotheses: the Pragmatic Triviality account, and the Pragmatic Blocking account. After examining the empirical evidence, I argue that the latter, which argues that if a PC lexeme has an existing adjective form and the adjective form has the same meaning as the possessive PC phrase, then the adjective form is favored over the nominal form and the PC nominal is not allowed in possessive predication, is congruent with the pattern of distribution of PC nominals in Mandarin, and is also supported by cross-linguistic data.



This hypothesis is based on the ideas of lexicalization constraint and division of pragmatic labor, which reflects the general maxims of conversation proposed by Grice (1989), especially the Maxim of Quantity and Maxim of Manner, and are connected to the extensively discussed “minimax” principles arguing that the speaker always tries to optimally minimize the surface complexity while maximizing the amount of information (see among others Carroll and Tanenhaus, 1975, Horn, 2004).

### 6.3 Open Questions

There are some open questions that are noteworthy and might be interesting for future studies.

First of all, there are some issues left unsolved regarding the empirical data in Mandarin. First of all, while I argue that the results of the corpus study presented in 3.1.3 support my argument that degree modifiers such as *hen* are obligatory in simple declarative clauses expressing positive interpretation, it is acknowledged that counterexamples exist and speakers may tolerate some PC nominals as bare possessive predicates in simple declarative clauses. Although the frequencies of those counterexamples are rather low, and some cases actually involve ambiguous count nouns rather than PC nominals, future corpus studies with more data as well as acceptability tests might be necessary to further evaluate the status of degree modifiers in this construction.

Also, one problem for my hypotheses regarding the third puzzle is that it is almost impossible to extensively investigate all PC nominals allowed in possessive predication, which makes it difficult to thoroughly evaluate the predictions of the hypotheses. Moreover, among the limited data that I did investigate, there are counterexamples such as *you zhihui* ‘have wisdom’ and *you yongqi* ‘have courage’, whose corresponding adjective forms can be found in Mandarin. While there are subtle difference in the domain of objects they describe, the markedness and the frequencies between the possessive form and its corresponding adjective form, they might not be strong enough to indicate that the two forms differ in meaning. For future studies, an extensive corpus study regarding the

distribution of possessive predicates in Mandarin would help clarify this question.

Moreover, regarding the proposal that possessive PC phrases share the same categorical membership as APs with gradable adjectives, there lacks independent evidence that support this argument. The distinction between adjectives and verbs in Mandarin remains a highly debatable issue. Future research on this topic could hopefully shed some light on the categorical status of possessive PC phrases.

Last but not least, following my Pragmatic Blocking hypothesis for the third puzzle, it still remains a mystery why only the set of evaluative predicates that belong to Dixon's HUMAN PROPENSITY class, specifically the PC lexemes denoting Judgement and Appreciation following Martin and White's (2005) classification, are systematically realized as possessed PC nominals but not adjectives, and why other evaluative predicates and dimensional predicates are not. This also corresponds to the generalization from other languages that employ possessive PC sentences to a limited extent. For example, while all possessive PC sentences are marked in English, those with dimensional nouns such as 'He has height' are strictly unacceptable; other Romance and Germanic languages such as Spanish and German systematically limit the use of possessive PC sentences in the class of HUMAN PROPENSITY lexemes. This cross-linguistic pattern might suggest some universal preferences of how PC lexemes are lexicalized, which might be related to human cognition. Future research could look into languages that employ both predicative adjective and possessive PC sentences to reveal the pattern in more detail.

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2. Grano, T. and **Zhang, Y.** (2020). Morphosyntax-semantics mapping in the grammar of property concepts: The view from English, Mandarin, and beyond. *Manuscript submitted*.
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4. Xu, L., Hu, H., Zhang, X., Li, L., Cao, C., Li, Y., Xu, Y., Sun, K., Yu, D., Yu, C., Tian, Y., Dong, Q., Liu, W., Shi, B., Cui, Y., Li, J., Zeng, J., Wang, R., Xie, W., Li, Y., Patterson, Y., Tian, Z., **Zhang, Y.**, Zhou, H., Liu, S., Zhao, Z., Zhao, Q., Yue, C., Zhang, X., Yang, Z., Richardson, K., and Lan, Z. (2020). CLUE: A Chinese Language Understanding Evaluation Benchmark. In *Proceedings of the 28th International Conference on Computational Linguistics (COLING)* (pp. 4762–4772). Barcelona, Spain: International Committee on Computational Linguistics.
5. Grano, T. and **Zhang, Y.** (2019). Getting aspectual -guo under control in Mandarin Chinese: An experimental investigation. In *Proceedings of the 30th North American Conference on Chinese Linguistics (NACCL-30)*. Vol.1. Columbus, Ohio: The Ohio State University. pp. 208-215.
6. Hu, H., Li, W., Zhou, H., Tian, Z., **Zhang, Y.** and Zou, L. (2019). Ensemble Methods to Distinguish Mainland and Taiwan Chinese. In *Proceedings of the Sixth Workshop on NLP for Similar Languages, Varieties and Dialects at NAACL 2019* (pp. 165–171). Ann Arbor, Michigan: Association for Computational Linguistics.
7. Hu, H. and **Zhang, Y.** (2017). Path of Vowel Raising in Chengdu Dialect of Mandarin. In *Proceedings of the 29th North America Conference on Chinese Linguistics*. Vol.1. Rutgers, NJ. pp. 481-498.

## Selected Presentations

- *Vowel Raising in the Chengdu Dialect of Mandarin.* (With Hai Hu and Aini Li.) Poster Presentation, The 93rd Annual Meeting of the Linguistic Society of America, New York City, NY, January 2019.
- *Nouns and Verbs Behave Differently as Fillers: Expectation and Interference in Constructing Long-Distance Dependencies.* (With Hai Hu and Charles Chien-Jer Lin.) Poster Presentation, the 31st Annual CUNY Sentence Processing Conference, Davis, CA, March 2018.
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