Chapter 1

<div style="text-align: right">

INTRODUCTION

</div>

The goal of this thesis is to investigate degree questions in Hakka and Mandarin Chinese. The comparison of degree questions among Hakka, Mandarin Chinese and English is also the concern here. Speaking of degree questions, there are two types; one is gradability questions, and the other is quantity questions. Gradability questions in Hakka and Chinese are expressed with *gid* and *duo* respectively (1a-b). *Gid-do* in Hakka and *duo-shao* in Chinese are then used to express quantity questions (2a-b). Additionally, *ji* in Chinese is also used to express a quantity question (2c); note that when *ji* is used, a classifier is required.

(1)   Gradability questions

    a. ngin   gid   go?   (Hakka)

        you   how   tall

        'How tall are you?'

    b. ni   duo   gao?   (Chinese)

        you   how   tall

        'How tall are you?'

(2)   Quantity questions

    a.   ngin   mai   gid-do   (ben)   shu   (Hakka)

        you   buy   how-many   Cl.   book

        'How many books did you buy?'

b. ni   mai   duo-shao   (ben)   shu   (Chinese)

you   buy   how-many   Cl.   book

'How many books do you buy?'

c. ni   mai   ji   *(ben)   shu   (Chinese)

you   buy   how-many   Cl.   book

The following chart presents degree words in Hakka and Chinese.

	Degree words in quantity		Degree words in gradability	
	Character	Pronunciation	Character	Pronunciation
Hakka	幾多	gid-do	幾	gid
Chinese	多少	duo-shao	多	duo
	幾	ji		

Both types of questions are involved with the complicated role of 'how.' (1a-b) shows that in gradability questions, the counterpart of English *how* is *gid* in Hakka, suggesting that the meaning of *gid* equals English *how*. Moreover, the quantity question (2a) indicates that the meaning of *do* equals *many*. Thus, a temporary conclusion can be derived here for English and Hakka:

(3)   a. English *how* = Hakka *gid*

b. English *many* = Hakka *do*

Here the degree word *gid-duo* is taken to be a complex word syntactically based on the fact that *gid* can independently occur without *duo* in gradability questions. Then

moving on to Mandarin Chinese gradability questions, (1b) shows that English *how* equals Chinese *duo*. The quantity question (2b-2c) further shows that *how-many* equals to *duo-shao/ji*, so the following temporal generalization is generated (4a-b).

(4)   a. English *how* = Chinese *duo*

   b. English *how-many* = Chinese *duo-shao/ji*

The comparison between (3a-b) and (4a-b) presents an interesting mismatch. If Hakka *do* is equal to English *many* and Hakka *gid* equals *how*, it is expected that the *gid* and *do* also contribute similar meanings to Chinese since Hakka is actually inherent with some properties of ancient Chinese as (5) shows (Hakka *gid* is pronounced as *ji* in Chinese, and Hakka *do* is pronounced as *duo* in Chinese). In ancient Chinese, *ji-duo* is used for expressing quantity about abstract nouns (5a), uncountable nouns (5b), and countable nouns (5c).

(5)   a.   ji-duo   chou

         how-much   sadness

         'how sad'

   b.   ji-duo   gan-yu-he-feng[1]

         how-much   fine-rain-and-breeze

         'How much fine rain and breeze is there?'

   c.   ji-duo   louge   jiu shi   zong[2]

         how-much   tower   old time   trace

         'How many towers there reveal the trace of old times?'

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[1] It is extracted from <清史稿> which was written in 1920s.

[2] It is extracted from <雲居山志> whose early version was written in Xing Dynasty and then revised and published in 1950s.

3

However, countered to the expectations, *duo* in modern Chinese does not equal English *many* as Hakka and ancient Chinese do. Instead, modern Chinese *duo* seems to function as a degree operator in gradability questions. Besides, in quantity questions, it is *duo-shao* that is characterized to have the meaning of *how-many*. What's more, *gid* in Hakka is used in both gradability questions and quantity questions; however, in Chinese, *ji,* which seems to have similar function with *duo-shao* (6a-b), is only used in quantity questions (6b-6c).

(6) a. ni   you   duo-shao   ben   shu?

you   have   how-many   Cl.   book

'How many books do you have?'
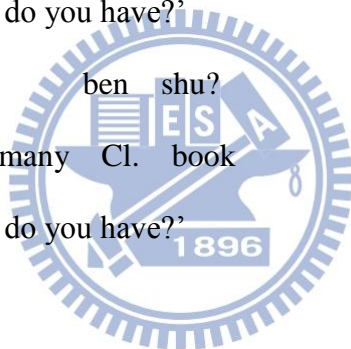
b. ni   you   ji   ben   shu?

you   have   how-many   Cl.   book

'How many books do you have?'

c. *ni   ji   gao?

you   how tall

Thus, *gid* and *ji* possess a very different meaning in Chinese from Hakka. Within this data, it is found that *gid/ji* and *do/duo* function differently in Hakka and Mandarin Chinese. Therefore, how *gid/ji* and *do/duo* play their role in the degree system of Hakka and Mandarin Chinese is the main concern of this thesis. Furthermore, in Mandarin Chinese, if *duo-shao* and *ji* both are used for asking quantity in questions; whether they behave identically in their syntactic structure and semantic contribution is also a question. In a word, the main issue of the thesis is to deal with the degree systems in Hakka and Mandarin Chinese. Also, a cross-language comparison of the degree systems among English, Hakka and Chinese is discussed.

Aside from the degree elements, movement or not is another issue that cannot be ignored when speaking of wh-questions. Numerous attempts have been devoted to the study of wh-questions (Chomsky 1986, Huang 1982, LLS Cheng 1991, Aoun Li 1993, Tsai 1994). It is generally agreed that wh-questions are involved with wh-movement (except for some wh in situ languages) and thus they are sensitive to islands. As pointed out by Rullman (1995), degree questions expressed by wh-word *how* also show this phenomenon:

(7) Complex NP Island:

   a. *I wonder how tall Marcus can beat the opponent who is.

(8) Wh-island:

   a. *I wonder how tall Mary asked whether Marcus was.

   b. *How much do you wonder who weighs?   (from Rizzi, 1990)

(9) Negative island:

   a. *I wonder how tall Marcus isn't.

   b. *I wonder how tall no basketball player is.

How-many questions involved with measurement also show the island effect under negative environment:

(10) a. *I wonder how many pounds Marcus doesn't weigh.

    b. *I wonder how many miles no one run.

It is well known that the sentences are ungrammatical because of the island effect.

Moreover, for the ungrammaticality of (8b), Rizzi (1990) resorts it to the difference between referential and non referential theta roles. According to Rizzi, the ungrammaticalilty is because of the non-referential theta-role assigned to 'how much' (referential theta roles are agent, patient, theme, goal, experiencer; non-referential theta roles refer to manner and measure). Those that receive referential theta roles form a chain via binding. Then for those that receive non-referential theta role, a chain via antecedent government is formed, which is a more local relation. Therefore, under the principle of Rizzi's Relativized Minimality (1990), in (8b), wh-extraction is blocked by the A' position of the moved *who*, resulting in the failure of antecedent government.

Then turning back to wh in situ languages like Chinese and Hakka. One of the most influential studies of Chinese wh-words is provided by Huang (1982), who suggests that Chinese does have wh-movement, though not overt; Chinese has covert movement at LF. More recently, Tsai (1994) proposes an alternative unselective binding approach for wh-movement. According to Tsai (1994), Chinese wh-nominals do not involve movement but are licensed by an implicit question operator at [Spec CP] through unselective binding. In contrast, wh-adverbials which are inherently interrogative must undergo covert movement at LF. Under Tsai's framework, Chinese *duo-shao/ji* is considered to be wh-nominals that introduce variables in situ; thus no violation is observed under wh-island (11) and CNPC (12). (from Tsai 1994)

(11) ni   xiang-zhidao   [shei   zhong   duoshao/ji   bang]   ne?

      you want-know   who   weigh   how-many   pound   Q_wh

      a. Who is the person x such that you wonder how many pounds x weighs?

      b. What is the number/amount x such that you wonder who weighs x pounds?

(12) [zhong duoshao/ji pang] de   zhu] cai keyi canjia bisai   ne?

weigh how-many pound   PNM pig   just can join   competition Q_{wh}

What is the number/amount x such that pigs which have weigh x pounds just

can join the competition?

In contrast, *duo* is viewed as a wh-adverbial element that does not introduce a

variable; thus *duo*+AP is not allowed to appear in an island as (13) show: (from Tsai,

1994)

(13) ni   xiang-zhidao   [she (you)   duo zhong] ne?

you want-know   who (have)   how heavy Q_{wh}

a. Who is the person x such that you wonder how heavy x is?

b. *What is the degree such that you wonder who is x heavy?"

According to Tsai, (13b) observes ECP and subjacency because *duo* needs to move to

[Spec CP]. Then (11) and (13) clearly presents the noun-adverb asymmetry in

wh-words. However, some Chinese native speakers consider the interpretation of (13b)

to be grammatical. What's more, it is found that *duo*-expression is allowed to appear

in CNPC as (14) shows.

(14) [duo zhong] de   zhu] cai keyi canjia bisai   ne?

how   heavy PNM   pig   just can   join   competition Q_{wh}

'What is the number/amount x such that pigs are x weights can join the

competition?'

If this is so, then the following question arises: if wh-adverbials need to move at LF,

why does wh-adverbial *duo* not sensitive to a island effect? There are two possible solutions for the question. One is to assume that Chinese *duo* is not wh-adverbial and thus does not move. The other is to assume that it does move at LF but some other mechanism saves the structures to be grammatical. In this thesis, the first solution is adopted. I assume that *duo* does not move to matrix CP level at LF for checking wh-feature; instead, an implicit question operator binds *duo* at LF. However if the first solution is adopted, one needs to deal with the challenge that why *duo* does not belong to wh-adverbials. Within this observation, part of the thesis would be covering the issue of wh-movement of Chinese *duo*. Also, wh-movement of Hakka degree questions would be discussed.

Briefly summarizing the main issues that will be addressed in this thesis, the first issue that I want to explore is about the syntactic structure and semantic contribution about Hakka *gid*, *gid-do* and Mandarin Chinese *duo*, *duo-shao*, *ji* in degree questions. Then to further explore the issue, a comparison would be made between English, Hakka, and Mandarin Chinese. The analysis that I adopt in this thesis is based on Corver's modified split degree system, and Hackle's theory of comparative quantifiers. Another issue that will be covered here is the problem of wh-movement in Hakka and Mandarin Chinese.

The thesis is organized as follows. Chapter 2 starts with a brief introduction about previous analysis on degree systems. The degree system of ancient Chinese is discussed in chapter 3. Chapter 4 gives a detailed discussion about gradability questions and quantity questions in Hakka. The counterpart phenomenon in Mandarin Chinese is then discussed in chapter 5. Then a thoroughly comparison between English, Hakka and Chinese would be given in chapter 6. Chapter 7 finally concludes this thesis.

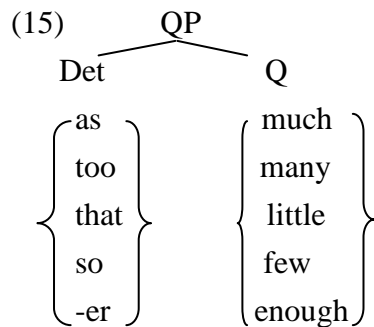<div align="right">**THEORETICAL BACKGROUND**</div>

Immediately below, a brief background of previous analysis on a degree system and different approaches toward the role of *many* in how-many questions are provided.

2.1 Degree Expressions within Adjective Phrases

Gradability questions usually come up with interrogative meaning about the gradable predicate. Thus, we start with the structure of gradable predicate. Since most studies focus on the degree structure of adjectival expressions, the discussion in the next section is about adjectival phrases (Bresnan 1973, Jakendoff 1977, Corver 1997, Doetjes 1997). Generally speaking, the studies can be divided to what Corver called the split degree system and the uniform degree system.

2.1.1 Bresnan (1973)

For the split degree system, Bresnan (1973) proposes one of the most influential analyses. Bresnan suggests that every comparative contains a partitive or quantifier-like element much, many, little, few, generating the following structure.

(15)
```
              QP
       Det         Q
      ┌ as  ┐    ┌ much   ┐
      │ too │    │ many   │
      │ that│    │ little  │
      │ so  │    │ few    │
      └ -er ┘    └ enough ┘
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To generate a comparative expression, it is then assumed that the comparative morpheme *more* and *less* are not base generated at Q^0, but are derived from a combination of *much/many/litter* and an affix *-er*. The affix *–er*, which is at the position of Det, is then right adjoined to *much/many/little*, which are based generated at $Q^{0,}$ via a suppletion rule (16).

(16)   a. -er + much → more

   b. -er + many → more

   c. -er + little → less

So, the comparative form like *more intelligent/less intelligent* is derived from the comparative affix *–er*, which is then right adjoined to *much/little* (17):

(17) $[_{AP} [_{QP} [_{DegP}\text{-er} [_{Q'} \text{much/little}]] [_{A'} \text{intelligent}]]$
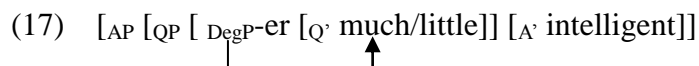
To avoid ungrammatical phrases like [*as much intelligent*] or [*as much clearly*], Bresnan further proposes a rule that obligatory deletes *much* when it modifies an adjective or an adverb. The rule is written as (18):

(18) Much Deletion

  much → ∅ / [... -- A]AP

  where A(P) = Adjective or Adverb (Phrase)

Furthermore, under the framework of lexical head hypothesis, there is always a QP, headed by *much*, at the specifier position of AP, and QP, on the other hand, selects DegP; thus generates the following structure of AP:

(19) [$_{AP}$ [$_{QP}$ [$_{DegP}$ Deg] [$_{Q'}$ Q]] [$_{A'}$ A]]

Therefore, the degree system is split in the sense that quantifier-like degree items should be distinguished from determiner-like degree items. The former (much, little, enough) is base generated at Q^0, while the latter (how, too, as) is base generated at deg^0. The reason that *much, little*, and *enough* are classified as quantifier-like degree items is that only those Q^0s can select adjectives and adverbs (since *more* and *less* are decomposed into much/many/less + -er); they can also semantically signify degree or extent as well as amount.

    Another interesting evidence for the presence of underlying *much* and Much Deletion, noticed by Bresnan, comes from two inherently comparative adjectives: *different* and *alike*. It is observed that adjectives *different* and *alike* can optionally occur with the quantifier *much* (20):

(20) a. A tangerine isn't as (much) different from an orange as I'd thought.

      b. You and I are as much alike as a horse and a cow.

The sentences further corroborate the fact that *much* is an underlyingly existed

element so that it can appear before adjectives in the sentence. They also show the need for Much Deletion rule so that *much* can be deleted when occurring before the adjective like *different* and *alike*.

However, as noted by Corver (1990), these examples (20a-b) are at the same time as exceptions to Bresnan's analysis. Much Deletion rule states that *much* should be obligatory deleted when linearly preceded by an adjective or an adverb. The rule correctly predicts *so much intelligent* to surface as *so intelligent* rather than *so much intelligent*, but it becomes optional in sentences (20). In the examples with *different* and *alike*, one might wonder why the Much Deletion rule then becomes optional. Then how to decide when the rule should apply and when it should not is a challenge. Another difficulty that Bresnan's theory faces, pointed out by Jackeddoff (1977) and Brame (1986), is the criticism that the presence of *much* at the underlying structure is not convincing enough because *much* is actually absent in many contexts. Moreover, this analysis also raises a question of why *more* and *less* can appear in front of adjectives while *much* and *little* cannot. Although Much Deletion rule can explain the nonexistence of *much intelligent*, it fails to account for the nonexistence of *little intelligent* (Jackendoff, 1977). To conclude, the most notorious aspect of this theory is the lack of explanatory force of much-deletion, which is a stipulation rule.

2.1.2 Jackendoff (1977)

An alternative analysis to the split degree system is the uniform degree system proposed by Jackendoff (1977). He proposes that there is no quantifier at the underlying level within adjectival expressions; instead, degree elements are uniformly treated as Deg^0 under DegP at the specifier position of AP (21):

(21) $[_{AP} [_{DegP} so] [_{A'} intelligent]]$

Under Jackendoff's analysis, DegP is obligatory selected as a specifier by AP; in contrast, for a non-adjectival head, QP is selected:

(22) a. [$_{AP}$ [$_{DegP}$ too] [$_{A'}$ fond of Mary]]

   b. *[$_{AP}$ [$_{QP}$ [$_{DegP}$ too] [$_{Q'}$ much] [$_{A'}$ fond of Mary]]

   c. [$_{XP}$ [$_{QP}$ [$_{DegP}$ too] [$_{Q'}$ much] [$_{X'}$ so]]

(22b) is ungrammatical because the presence of QP is not allowed at the specifier position of AP. As for (22c), the word *so*, though can partially or completely substitute for AP under some contexts, is not inherently adjectival, so it selects QP as its specifier. In contrast to Bresnan, who argues that there is an underlying QP, Jackendoff does not argue for the stipulated QP but resorts it to the selection of categories by AP and non-AP, which is the lexical property of a head. Moreover, for the comparative form, Jackendoff suggests that the comparative form *more/less intelligent* is not derived from [-er much/little] but is base generated under deg^0. That is to say, *more/less* cannot be decomposed into a quantifier-like element plus an affix.

Jackendoff provides a uniform analysis of adjectival expressions; however, the theory fails to explain the occurrence of *much* before a non-adjectival expression: (Doetjes, 2004).

(23) a. [$_{XP}$ [$_{QP}$ [$_{DegP}$ too] [$_{Q'}$ much] [$_{X'}$ so]]

   b. *[$_{XP}$ [$_{QP}$ [$_{DegP}$ more] [$_{Q'}$ much] [$_{X'}$ so]]

If QP is selected as the specifier for a non-adjectival category, then the presence of *much* before *so* should be grammatical in sentence (23b), just like it does in (23a). Another difficulty, which is correlated to Bresnan's exception to much-deletion rule,

is about adjectives *different* and *alike*. Just like Bresnan, who allows much-deletion to be optionally applied in (20), Jackendoff also adopts the optionally account. Without QP, the uniform degree system has to accommodate (24a) by allowing not only DegP but also QP at the specifier position of AP:

(24) a. [AP [QP as much][A' [A alike/different]]]

　　 b. [AP [DegP as][A' [A alike/different]]]

This explanation, however, makes one to question whether AP has to obligatory take DegP as its specifier.

2.1.3 Corver (1997)

Following Bresnan's split degree system hypothesis, Corver (1997) proposes a modified version of the split degree system hypothesis under the framework of functional head analysis (Abney 1987, Corver 1991, 1994). Agreeing with Bresnan, Corver argues that there is an underlying QP within an adjectival expression. He also suggests that a distinction should be made between quantifier-like degree words and determiner-like degree words. Moreover, departing from Bresnan, he assumes that the comparative form *more/less intelligent* is not derived from a transformational rule [much/many/little + -er] but, in consistent to what Jackendoff (1977) proposes, is base generated at Q^0. As a result, the quantifier-like degree words that Corver refers to are *more, less, enough,* and dummy *much*. Corver further argues that there are two types of *much* in English: the lexical quantifier *much* and the functional dummy quantifier *much*. Since how the two *much* differ from each other is irrelevant to the main subject here, it's not necessary for us to go into details of it; instead, I will give a brief introduction about how Corver argues the presence of QP.

14

First, Corver proposes the following structure for adjectival expressions where QP and DegP are all extended functional projections of AP (25):

(25)   [DegP Deg [QP Q [AP A]]]

To support the fact the QP does exist, Corver provides the empirical evidence of the presence of QP with so-pronominalization. In English, the pro-form *so* can either replace the entire adjectival phrase (26a) or part of the adjectival phrase (25b):

(26)   a.   John seems very fond of Mary, and Bill seems so too.

      b.   John is fond of Mary. Bill seems much less so.

In (26a), *so* replaces the entire AP [very fond of Mary], and in (26b) *so* replaces part of AP [fond of Mary]. However, it is noted that not all degree words can precede *so* as shown by the comparison between (27) and (28): (from Corver 1997)

(27)   a. John is fond of Mary. Bill seems **more so**.

      b. John is fond of Mary. Bill seems **less so**.

      c. John is good at mathematics. He seems **enough so** to enter our graduate program.

(28)   a. John is fond of Mary. *Maybe he is **too so**.

      b. John is fond of Mary. *Maybe he is **as so** as Bill.

      c. *The weather was hot in Cairo— **so so**, that we stayed indoors all day.

      d. *John told me he was afraid of spiders, but I wonder **how so** he really is.

      e. *John is wild about Madonna, but I am not really **that so**.

The appearance of dummy quantifier *much* saves the above ungrammatical sentences in (29):

(29) a. John is fond of Mary. Maybe he is **too much so**.

  b. John is fond of Mary. Maybe he is **as much so** as Bill.

  c. John weather was hot in Cairo— **so much so**, that we stayed indoors all day.

  d. John told me he was afraid of spiders, but I wonder **how much so** he really is.

  e. ?John is wild about Madonna, but I am not really **that much so**.

To account for the above contrast, it is suggested that degree words in (29) are determiner-like degree words, heading DegP and degree words in (27) are quantifier-like words, heading QP. Both determiner-like and quantifier-like degree words are operators that need to bind a degree variable <g> in AP (Zwart, 1992). G is usually carried by adjectives or by *so* when the adjective is replaced. Moreover, a local relation is required which regulates that no potential blocker can interfere between degree words and <g>. (30) and (31) then show the difference between determiner-like degree words and quantifier-like degree words in terms of their relation with AP and *so*.

(30) Determiner-like degree words

  a. [$_{DegP}$ too [$_{QP}$ Q [$_{AP}$ intelligent<g>]]] → [$_{DegP}$ too [$_{QP}$ intelligent$_i$ <g> [$_{AP}$ t$_i$]]]

  b. *[$_{DegP}$ too [$_{QP}$ Q [$_{AP}$ so<g>]]]

  c. [$_{DegP}$ too [$_{QP}$ much<g> [$_{AP}$ so<g>]]]

(31)   Quantifier-like degree words

      a. [$_{QP}$ more [$_{AP}$ intelligent<g>]]

      b. [$_{QP}$ more [$_{AP}$ so<g>]]

Adjective *intelligent* in (30a) is raised to Q^0, for the purpose of local binding relation between degree operator and <g>, resulting in a A^0-to-Q^0 movement (for much evidence for adjective raising, see more details in Corver (1997)). If the adjective is not raised, and to assume that there is an empty operator at Q^0 binding <g>, then it will cause vacuous quantification for Deg^0, which ultimately fails to be convergent under Full Interpretation (Chomsky, 1986). Furthermore, the pro-form so in (30b) is not able to be raised because of the non-adjectival nature of *so* blocks A^0-to-Q^0 movement.[3] As a result, *much* insertion, being a last resort based on the principle of economy (Chomsky, 1995), takes place to save the structure (30c). On the other hand, for quantifier degree words, there is no need for adjectives to move because they are already in the minimal local relation. Thus, *more* at Q^0 binds the degree variable carried by *intelligent* and *so* respectively.

    The above examples evidently show that degree words in (32) are different from that of (33), supporting the hypothesis of split degree system. The former, quantifier-like degree words, base generated at Q^0 can precede the pro-form *so*, while the latter, determiner-like degree words, base generated at deg^0 need the presence of

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[3]   Corver(1997) proposes that "partial substitution" is permitted only when the adjectival expression is recoverable from some element that is adjectival in nature. (i) is recoverable from the word *much*, which is assumed to be adjectival in nature. (ii) is ungrammatical because both *too/so/as/how* and *so* are not adjectival in nature.

(i)   too much so

(ii)   *too/so/as/how so

As pointed out by Corver, a parallel is observed in a verbal projection. In (iii), the word *did*, which is a verb in nature, recovers the verbal expression, while (iv) is ungrammatical since there is no verbal element for recovering.

(iii) I believe that John did so too.

(iv) *I believe that so.

quantifier *much* to mediate between determiner-like degree words and adjectives, which further supports the existence of QP between DegP and AP.


(32) [$_{QP}$ more/less/enough [$_{AP}$ so]]

(33) [$_{DegP}$ too/as/so/how [$_{QP}$ much [$_{AP}$ so]]]

Furthermore, the ill-formedness of the co-occurrence of the Deg^0 and Q^0 can also be explained under vacuous quantification that both Deg^0 and Q^{0}need to bind a degree variable. If they co-occur, then one of them will have no variable to bind, and cause a sentence to be ungrammatical as (34a) shows, but (34b) is grammatical since *much* copies the variable from *so*.

(34) a. *[$_{DegP}$ too [$_{QP}$ more [$_{AP}$ intelligent<g>]]]

      b. [$_{DegP}$ too [$_{QP}$ much<g> [$_{AP}$ so<g>]]][4]
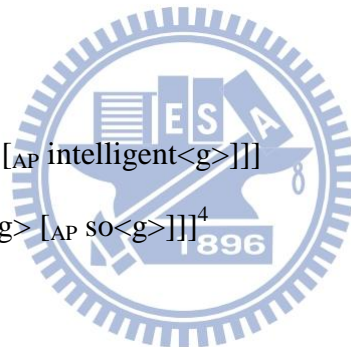
    To sum up, the split degree system originally proposed by Bresnan (1973) is modified by Corver (1997) with the evidence of so-pronominalization.

2.2 Comparison: Degree as Modifier Approach vs. Degree as Determiner
Approach

    Speaking of quantity expressions, the complicated role of *many, much, few, little* have been one of the controversial issues among linguists. It's hard to define the exact semantics and syntactic position of those words because of their wide distribution. They can appear with NP, PP, comparative construction and so on: (the following

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[4]   According to Corver(1997), the variable carried by *so* is bound via copying by *much*. Then the variable copied by lexical dummy *much* is then bound by *too*.

examples are extracted from Stephanie Solt, 2013)

(35)   Many & few

a. Many/few students attended the lecture.   (quantificational)

b. John's friends are many/few.   (predicative)

c. The many/few students who attended enjoyed the lecture.   (attributive)

d. Many more/few more/many fewer than 100 students attended the lecture .

(differential)

(36)   Much & little

a. Much/little water is left in the bucket.   (quantificational)

b. *The water in the bucket was much/little.   (predicative)

c. The little/*much water in the bucket.   (attributive)

d. Much/little more than a liter of water is left in the bucket.   (differential)

To account for the distribution and meaning contributed by *many, much, little,* and *few*, numerous attempts have been made. Most of them, according to Rett (2008) can be divided to two approaches: (1) Degree Determiner Approach (DDA) (Barwise and Cooper 1981, Westerstahl 1985; Lappin 1988, 2000; Partee 1989; Diesing 1992; Kamp and Reyle 1993; Higginbotham 1995; Herburger 1997; Chierchia 1998; Heim and Kratzer 1998, Hackle 2000), and (2) Degree Modifier Approach (DMA) (Wheeler 1972; McConnell-Ginet 1973; Klein 1982; Hoeksema 1983; Schwarzschild 2006; Rett, 2008). For the former, degree words like *many, much, few* and *little* (m-words) are viewed as determiner quantifiers or are analyzed as possessing quantificational force (38); as for the latter, those words are taken to be modifiers of degrees, which do not possess quantificational force in nature (37). Furthermore, as pointed out by Rett (2008; 27), "an important difference between accounts that characterize m-words as

modifiers (DMAs) and those that characterize them as determiners (DDAs) is whether or not they view m-words as contributing individual quantification to a sentence."

(37) [[m-word$_{mod}$]]= $\lambda D_{<d,t>}\lambda d'$. size(D) = d' $\wedge$ d > s, s a contextually-valued standard.

(38) [[m-word$_{det}$]]= $\lambda d\lambda P\lambda Q\exists x[|x| = d \wedge P(x) \wedge Q(x)]$

As shown above, m-words in modifier approach provide no existential quantifier. In contrast, m-words in quantificational approach provide an existential quantification over variable. More details about the two approaches are given in next two sections; in section 2.2.1, I will introduce DMA on the basis of Rett's proposal (2008). Then section 2.2.2 includes a modified analysis of DDA claimed by Hackle (2000)

2.2.1 Degree as Modifier Approach

For simplicity, *many, much, little, few* are grouped into m-words in the following discussion (Rett, 2008). In modifier approach, m-words do not quantify over a variable. Instead, they are viewed as functions from a set of degrees to a set of degrees (type <<d, t>, <d, t>>); therefore, they do not change the semantic type of the modified argument. The definition of m-words is defined as (l is a measure operator, whose domain is a set of D to the measure of that set of degrees):

(39)　[[m-word]]= $\lambda D\lambda d$. l (D) = d'(final)

Besides, it is assumed that a null quantity operator QUANTITY does the work of quantification, whose meaning is independent of m-words. The null quantity operator, which only occurs in the presence of overt degree morphology, is a function from a set of individuals plus a degree plus a property to a truth value. Below is the definition:

(μ is a function from individual to measure)

(40) $[[QUANTITY]]= \lambda P \lambda d \lambda Q \exists X.P(X) \wedge Q(X) \wedge \mu(X) = d$

Then the questions "how many boys ran" would yield the following structure:

(41) $[_{CP}$ how-many$_d$ λd $[_{IP}$ $[_{DP}$ t$_d$ QUANTITY boys] $[_{VP}$ ran]]]

Some evidence is brought up to against DDA. First, m-words are able to co-occur with some determiners (42a-b); undermining the analysis that m-words are themselves determiners. (Rett, 2008, 65)

(42) a. The many guests brought.

    b. These few students have managed to excel in the class.

Second, DDA fails to account for the ambiguous meaning of French "split-NP construction". To understand it, here a brief explanation is given to the phenomenon of ambiguous reading in quantity questions. The interaction of an individual quantifier with a modal operator results in the ambiguous reading in quantity questions: object reading and amount reading. When an individual quantifier scopes over a universal modal, the object reading is generated. In contrast, the amount reading is derived when a universal modal scopes over an individual operator. This ambiguity can be observed in the English example (43). (43a) has the amount reading while (43b) has the object reading: (from Rett 2008)

(43) How many books must John read?

    a. Amount reading : must $\gg \exists X$

$\lambda p \exists d[p(w^a) \wedge p = \lambda w.\text{must}(w)[\ \lambda w'\exists X[\text{books}(w')(X) \wedge \text{read}(w')(j,X) \wedge |X| = d]]$

b. Object reading : $\exists X \gg \text{must}$

$\lambda p \exists d[p(w^a) \wedge p = \lambda w\ \exists X[\text{books}(w)(X) \wedge \text{must}(w)[\ \lambda w'.\text{read}(w')(j,X)] \wedge |X| = d]]]$

According to Rett (2008), (43a) is interpreted as "For what d must it be the case that John read d-many books X?" In this reading, the d-many books that John is required to read do not refer to any particular books. Only the amount of books is asked. On the contrary, d-many books in (43b) then do refer to some particular books. Thus, (43b) is interpreted as "For what d are there d-many books X such that John must read X?" Then turning back to French, an ambiguous reading is also observed in French quantity construction. (44a) shows that an ambiguous meaning arises (amount/object reading) when a NP is not split from *how-many* (Combien); however, when the NP is split from *how-many*, the ambiguous meaning disappears; only amount reading is generated (44b). (from Rizzi 1990; Dobrovie-Sorin 1992; Obenauer 1994)

(44) a. Combien   de livres   faut-il   que   vous   lisiez?

     How-many   of books   it's necessary   that   you   read

     'For what d must it be the case that you read d-many books X?'   (Amount)

     'For what d are there d-many books X such that you must read X'   (Object)

   b. Combien   faut-il   que   vous   lisiez   de livres   ?

     How-many   it's necessary   that   you   read   of books

     'For what d must it be the case that you read d-many books X?'   (Amount)

     '*For what d are there d-many books X such that you must read X' (Object)

If, as what DDA proposes that an existential quantifier is encoded in m-words, then it

is unexpected why the split-NP disambiguates the scope problem since an individual quantifier is always encoded in *how-many*. Nevertheless, it should be noticed that the point here is not that the theory of DDA does not predict the ambiguous reading. Under DDA's framework, the ambiguous meaning in quantity questions is derived from some kind of machinery movement of operators encoded in *how-many* at LF. Therefore, how to explain the disambiguous meaning in split-NP construction needs further exploration from DDA

Third, some languages do not have m-words in their quantity questions. The absence of m-words means that the quantificational force is provided by other element, but not m-words. The just mentioned three arguments are the challenges to DDA that brought up by Rett (2008).

Then how DDA deals with the m-words is discussed in the next section.

2.2.2 Degree as Determiner Approach

In this section, the discussion is based on the modified DDA proposed by Hackle (2000). That DDA considers the meaning of m-words to include an existential quantifier is based on the distribution of m-words at pronominal positions, which parallels to *every/some/all* + NP. Generally, from the perspective of Generalized Quantifier Theory (GQT), quantificational expressions like *every student, some student, no student*, etc are analyzed as quantificational determiner *every*, *some* and *no* which quantify over *student*; therefore quantifiers like *every, some* and *no* + NP are labeled as QP (quantificational DP). Similar to it, quantity expressions like *more student, more than three students, most students* are viewed as QP that *more, more than three* and *most* are considered to be quantificational determiner. However, as pointed out by Hackle (2000, the difference between those quantifiers (every, some, no, etc) and quantificational determiners (more, more than three, most, etc.) lies in the

fact that the latter further denote measure function and comparative relation.

In Hackle's theory (2000, comparative quantifiers are considered to be comparative constructions in the sense that the comparative quantifiers are also characterized with a measure function, a comparative relation and a standard of comparison. Take *more than three students* as an example. The simple version of the LF would be [-er than 3 [d-many students]]. In the structure, *more* is decomposed into *many+er*; *many* as a scalar determiner expresses measure function. *Three* provides a degree for standard of comparison which is embedded in [-er than 3]. The comparative relation is encoded in the degree quantifier [-er than]. That's how the comparative quantifier to be analyzed under the framework of comparative constructions. Under this analysis, comparative quantifiers are formed compositionally in the syntax, which is contrary to the traditional analysis. Traditionally, GQT views comparative quantifiers as an opaque and idiom-like lexical items that are not be able to decompose. However, by showing that those syntactically encoded elements (measure phrase, degree quantifier, and degree function) can have interaction with other elements independently, Hackle proposes that the comparative quantifiers can and must be decomposed syntactically to derive the correct meaning.

The evidence that supports Hackle's argument that *many* is a parameterized determiner comes from the interaction between a measure phrase and the minimal number requirement of participants. For the minimal number requirement, it means that only when the minimal number of participants satisfies the requirement of a predicate could the sentence be true. (45a) is ungrammatical due to the fact that "one" person cannot do this surrounding event; in contrast, (45b) is grammatical.

(45)   a. *One policeman surrounded the bank.

       b. Many policemen surrounded the bank.

This is the same story for comparative determiners in (46). If, as what GQT states that comparative quantification cannot be further decomposed, then it's unexpected why (46a) is ungrammatical and (46b) is ungrammatical since *more that n-1* and *at least N* are denotationally equivalent determiners.

(46) a. ??More than one student is meeting in the hallway.

      b. At least two students are meeting in the hallway.

Since *more than n-1 NP* and *at least n* are denotationally equivalent quantifiers, the ungrammaticality of (46a) then comes from the offending clash between the numeral and the predicate. That is to say, the measure phrase/number embedded in comparative determiners should have been "projected out" to interact with the main predicate. To get the correct meaning of comparative quantifiers (47a &48a), Hackle then gives the paraphrases as the following (47b & 48b) :

(47) a. ?? More than one student is meeting in the hallway.

      b. ?? "More students are meeting in the hallway than how many students there are in a meeting of one student in the hallway ."

(48) a. No fewer than two students are meeting in the hallway.

      b. No fewer students are meeting in the hallway than how many students there are in a meeting of two students in the hallway .

From the paraphrase, it is explicit that a semantic clash between the numeral and the number requirement of the predicate happens in the than-clause in (47b) but not in (48b). An important fact here is that the matrix-VP *meet in the hallway* is interpreted

both inside the than-clause and in the matrix-clause. However, as we can see from the traditional analysis (49) that there is no way for such structure to have matrix-VP being interpreted in the than-clause.

(49) a. There are more than three students at the party.

   b. [-er than 3]1 [there are d-many students at the party]
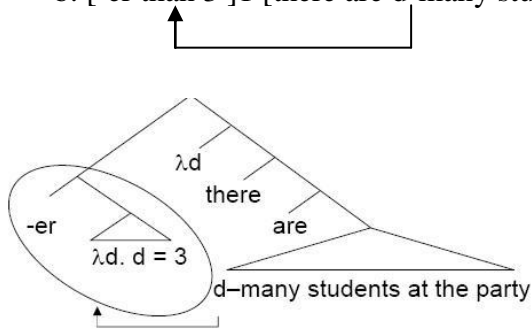
Thus, in comparative determiners, *many* plays the role of introducing matrix-VP to be also interpreted in the than-clause. It is argued by Hackle that (1) the degree function *many* is interpreted in the than-clause as well as in the matrix; (2) being a parameterized determiner, *many* needs to take not only a degree argument but also NP and VP for the interpretation to be complete. Thus, the following denotation of *many* is derived (50):

(50) $[[many]] = \lambda d\, \lambda P_{<e, t>} \lambda Q_{<e, t>}. \exists x\, [|x| = d \,\&\, P(x) \,\&\, Q(x) = 1]$

From (50), *many* is considered to be a degree function which also expresses measure function with the property of a determiner. Based on the proposal of *many*, the interpretation of the comparative quantifiers than is given as following (51):
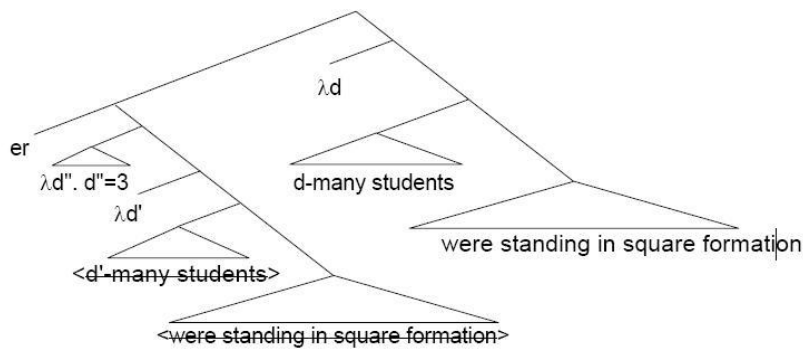
(51)

a. ?? More than three students were standing in square formation.

b. [-er λd. d=3 & ~~d-many students were standing in square formation~~] [λd. d-many
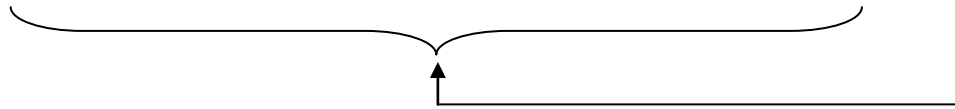
students were standing in square formation]

As shown, (51) is treated as comparative between clauses. The semantic clash between *three* and VP-*standing in square formation* occurs in the left clause; thus, the sentence is ungrammatical

Aside from *many*, it is also argued by Hackle (2000) that quantification over degrees and quantification over individuals are resorted to two differently independent scope bearers. The degree quantifier, on the one hand, is encoded in degree operator like [-er], *how*; the individual quantifier, on the other hand, is carried by *many*. The empirical evidence that supports this argument comes from the scope splitting phenomenon in *how-many* questions. As (52) shows, two meanings are derived from the quantity questions; one is object reading (52a), the other is amount reading (52b): (from Rullman, 1995)

(52) How many books does Chris want to buy?

    a. 'What is the number n such that there are n books that Chris wants to buy?'

    b. 'What is the number n such that Chris wants it to be the case that there are n

       books that he buys?'

Two quantifiers are encoded within *how-many,* a degree quantifier and an individual quantifier; the degree quantifier is encoded in *how*, and the individual quantifier is encoded in *many*. The ambiguous reading of the *how-many* questions above is thus caused by the scopal interaction of two independent quantifiers. For object reading (52a), both the degree quantifier and the individual quantifier scope over the modal verb *want*, generating the meaning that if Chris has any specific books that he wants to buy in mind. In amount reading (52b), the individual quantifier is split from the degree quantifier because of the intervention of the modal verb. That is to say, although the degree quantifier scopes over the modal verb *want*, the individual quantifier, in contrast, is under the scope of the modal verb *want*, generating the narrow scope reading that though there is no any specific book in Chris's mind, only the amount of the books that Chris will buy is concerned. The independent scopes of two different quantifiers supports Hackle's assumption that degree words are encoded with degree quantifiers and many is encoded with the individual quantifier.

2.3 Summary

    To conclude this chapter, a brief summary is provided. Section 2.1 presents different analysis toward the structure of degree system: the uniform degree system and the split degree system. With the empirical data of so-pronominalization, a modified split degree system that distinguishes quantifier-like degree words from determiner-like degree words is then argued by Corver (1997). Furthermore, as far as

the role of *many* is concerned, there are two perspectives: DDA and DMA. Section 2.2 thus shows the difference between these two views. For the former, *many* is considered to be a scalar determiner which is encoded with an existential quantifier according to Hackle (2000). As for the latter, *many* is not quantificational in nature, it is only a modifier.

DEGREE SYSTEM IN ANCIENT CHINESE

Based on the fact that both Hakka and modern Chinese preserve some property of ancient Chinese, we'll first take a look at degree questions in middle Chinese and early modern Chinese to see how a language changes before we go into the detail of Hakka and Mandarin Chinese. In old Chinese, the usage of *ji* being used to ask an amount is already prevailed as it shows in (53).

(53) gengtian   zhili   **ji**   bei   (Intrigues of the Warring States)

flow-farmland   strength   how-many times

'How much strength it takes to flow farmland?'

What's more, although the occurrence of *ji* always comes with a classifier in modern usage, this requirement tends to be looser in ancient Chinese (54).

(54) a. jin   yu   fa   chu,   yong **ji**   bing[5]

now want attack Chu-dynasty   use   how-many soldier

'How many soldiers do we need to attack Chu?'

b. gulai   zhengzhan **ji**   ren   hui[6]   (Tang-Wanghan-Liangzhouci)

old times   fight   how-many people   come-back

'How many people come back after wars in old times?'

---

[5] It is extracted from <敦煌變文集新書> in middle Chinese.

[6] It is extracted from <涼州詞> in Tang Dynasty.

This usage is inherited in Mandarin Chinese that we still use *ji* to ask a specific amount of something now. As for *ji-duo* (which is pronounced as *gid-do* in Hakka to express quantity questions), it is found to be used in late middle Chinese (55).

(55) ru   nian   ji-duo[7]

    you age   how-many

    'How old are you?'

Although the usage of *ji-duo* can be traced back to late middle Chinese, it was not until late early Chinese that the usage of *ji-duo* in degree questions became much productive. (56a) is an example being found in late early Chinese. (56b-c) are the examples from early modern Chinese

(56) a. ni zheli dao na   jieyangshan   you ji-duo lucheng(The Journey to the West)

    you here get there jieyang-mountain need how-many routepath

    'How far is it to go to that Jieyang mountain from here?'

    b. ji-duo   gan-yu-he-feng   (Qingshigao)

     how-much   fine-rain-and-breeze

    c. ji-duo   louge   jiu shi   zong   (Minguo-yunjiushanzhi)

     how-much   tower   old time   trace

Moreover, *ji-duo* is found to be used not only in quantity questions but also in gradability questions as (57) shows, although *ji-duo* is found mostly to be used in quantity question. The usage of *ji-duo* in gradability questions is rarely found.

---

[7] It is extracted from <大唐三藏取經詩話> in late middle Chinese.

(57) na-yi-duo lainhua you ji-duo   da   (The Plum in Golden Vase)

     that-Cl.   lotus   have how much   big

     'How big is that lutos?'

Sentence (57) provides a very important implication for my assumption in Hakka in the next chapter. *Jiduo* can never appear with a scalar predicate in modern Hakka (which is pronounced as *gid-do*), which is very different from the usage in (57) that *jiduo* occurs with a nominal complement. In my theory, I suggest that when a scalar predicate shows up in a degree question, there is a covert *DO* which has the function of restricting the type of degree variables. This assumption is corroborated by the old usage shown in (57).

     Modern Chinese uses *duo* for expressing gradability questions. According to Tatsuo (1958), that *duo* being used to denote question meaning stems from Yuan dynasty (58).
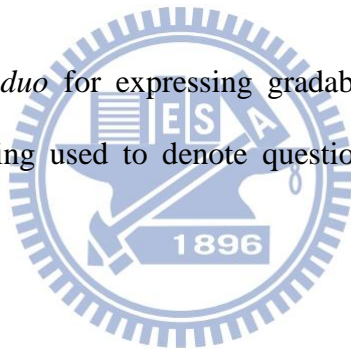
(58) xiao niangzi   jia   you   duo   yuan[8]

     young-lady   house   have   how   far

     'How far is that young lady's house?'

Furthermore, it is mentioned by Tatsuo (1958) that *duo* may be a reduction form from *duo-shao*, though they are not encoded with the same meaning. This assumption is not out of evidence. Both *duo* and *duo-shao* can be found to use in old Chinese. However, the usage of *duo-shao* in a degree question seems to start from late middle Chinese (59), which thus suggests that *duo-shao* appears in the Chinese degree system of degree questions earlier than *duo* does.

---

[8] It is extracted from <碧桃花> which is a poetic drama in Yuan Dynasty.

(59) ni   zhu shang-zhong duo-shao nian[9]

you live mountain-in how-much year

'How long have you been living in the mountain?'

However, if *duo* is the reduction form of *duo-shao*, it is expected that *duo* and *duo-shao* will have the similar function in a degree construction, and the expectations are not met. Based on (58) and (59), it is found that *duo-shao* comes with a nominal and *duo* comes with a scalar predicate; therefore, it shows that things are more complicated than reduction.

Furthermore, according to the above data, it is found that those degree words *duo*, *duoshao*, *jiduo*, and *ji* are not just separately lexical items, the interaction between *ji*, *duo*, and *shao* interweaves the complicated usage of a degree system in Chinese. What's more, based on what the old data show, we then have the following brief assumption about the structure of a degree system in degree questions in ancient Chinese.

(60) a. old Chinese: *ji*

```
        JP
       /  \
          J'
         /  \
       J⁰   ClP
        |
        ji
```

---
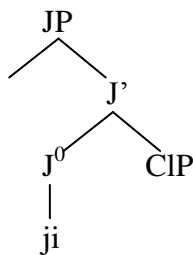
[9] It is extracted from <敦煌變文集新書> in middle Chinese

b.late middle Chinese: *duo-shao*

```
          JP
         /  \
            J'
           /  \
         J⁰    QP
         |    /  \
        duo       Q'
                 /  \
               Q⁰    NP
               |
              shao
```
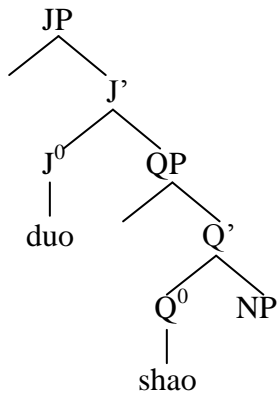
c. early Chinese: *ji-duo, duo*

```
          JP                           JP
         /  \                         /  \
            J'                           J'
           /  \                         /  \
         J⁰    QP                     J⁰    QP
         |    /  \                    |    /  \
         ji        Q'                duo       Q'
                  /  \                        /  \
                Q⁰    XP                          AP/VP
                |
               duo
```

d. the degree system in modern Chinese

```
          JP
         /  \
            J'
           /  \
         J⁰    QP
              /  \
                  Q'
                 /  \
               Q⁰    XP
```
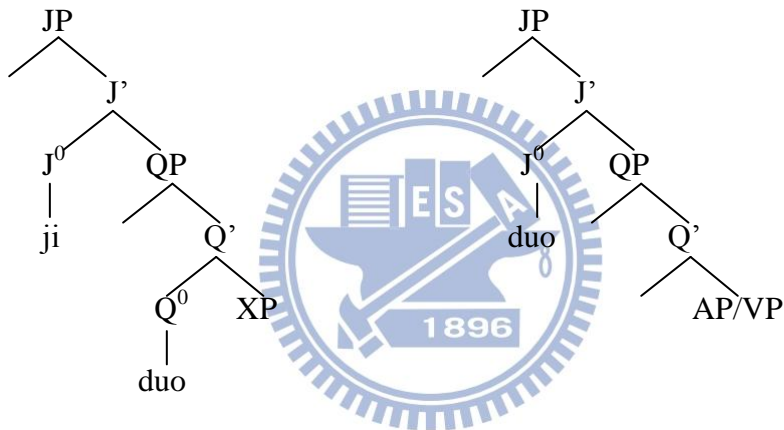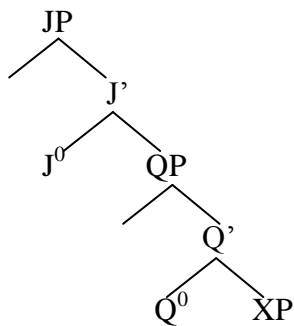
As (60a-d) the show, it seems that the degree system changes from a single layer to
two layers when undergoing the current of the times. The presence of *ji-duo* and *duo*
in early Chinese clearly shows the evolution. Since Chinese vary across territories,

34

how a degree question is being used may differ. For example, Hakka preserves the old usage of *ji-duo* while Mandarin Chinese does not. *Duo-shao* and *duo* are used in Mandarin Chinese but not in Hakka. We will see in the following chapters that how the structure (60d) is presented in Hakka and Mandarin Chinese.

Chapter 4

<div style="text-align: right">DEGREE QUESTIONS IN HAKKA</div>

In this chapter, the account for the syntactic structure of degree questions in Hakka is provided. As far as degree questions are concerned, two types of degree questions should be distinguished: gradability questions and quantity questions. In gradability questions, only the degree word *gid* is used (61a, 61c), and *gid-do* is not allowed (61b, 61d). In contrast, for quantity questions, the degree word *gid* needs to co-occur with *do* (62a).

(61) Gradability questions

    a. ngin gid go

        you   how tall

        "How tall are you?"

    b. *ngin gid-do   go

         you   how-many tall

    c. ngin gid hifon gi

        you   how like   him

        "How much do you like him?"

    d. *ngin gid-do   hifon gi

         you   how-many   like   him

(62) Quantity questions

    a. ngin   mai   gid-do   lingguo

        you   buy   how-many   apple

        "How many apples do you buy?"

    b. *ngin   mai   gid   lingguo

         you   buy   how-many   apple

For the two types of questions above, the syntactic structures of them are argued to be what (63) and (64) show:

(63) Gradability questions: [$_{JP}$ [$_{J'}$gid [$_{QP}$ [$_{Q'}$ DO [$_{AP/VP}$ A/V]]]]]]

(64) Quantity questions: [$_{JP}$ [$_{J'}$gid [$_{QP}$ [$_{Q'}$do[$_{CIP}$ N']]]]]

A multiple-layer syntactic structure is proposed under my analysis: JP and QP. JP is projected by a degree operator which needs to bind a degree variable. The degree operator in Hakka is *gid*; thus, *gid* projects JP in both gradability questions and quantity questions. In addition, QP is headed by *do*. As shown in (63-64), it is assumed that the morpheme *do* has two allomorphs, one is the covert DO, and the other is the overt *do* that forms a complex word with *gid*. Both *dos* are base-generated under the head of QP. The presence of overt *do* requires the presence of nominal expression and it copies the quantity variable <q> carried by a noun. As for the covert *do*, the presence of covert *do* depends on a grade variable <g>. The grade variable <g> carried by scalar predicate is then bound by the degree word *gid*. Within this framework, section 4.1 then discusses the properties of the degree system in Hakka. Section 4.2 gives the analysis of Hakka degree system in questions. 4.3 talks about the semantic property of the m-word do. The island effect in degree questions is discussed

in section 4.4.

4.1 The Properties of Hakka Degree System

The degree system in Hakka possesses the following important properties. First of all, the scalar predicate can be replaced by a word "*gai*" paralleling to the pro-form *so* in English (65). Besides, the degree adverb *dong* is required to make the sentence grammatical.

(65) gi dong-gai

he very-GAI

'He is too much so.'

The meaning of the scalar predicate that replaced by *gai* can be recovered from a context. However, "*gai*" differs from the English pro-form *so* in partial substitution. The English pro-form *so* can partially replace a predicate (66a) while Hakka *gai* cannot (66b).

(66) a. English: John seems <u>very fond of Mary</u>, and Bill seems <u>so</u> too.

b. Hakka: J chiung-ngin <u>dong-hifon M</u>, B me *(dong)-gai

As shown in (66b), a degree adverb is needed in front of *gai* in Hakka while English *so* can replace the whole DegP, "very fond of Mary." Besides, the *gai* in Hakka somehow connotes a negative intention, while English *so* does not. Furthermore, speaking of this so-pronominalization, the lexical dummy *much* is inserted between *so* and *too/so/that/how/as* (67a). When *so* is preceded by *more/less/enough*, *much* is not required (67b). In contrast, no counterpart of such dummy *much* is found in Hakka.

38

(67) a. John is fond of Mary. Maybe he is too <u>much</u> so.

b. John is fond of Mary. Maybe Bill is more so

Second, the m-words in Hakka cannot co-occur with a demonstrative.

(68)   *liadel gid-shau/gid-do hogsang   du   gai   shi   linggo

these   few/many   students   at   there   eat   apple

'These few/many students are eating apples there.'

Third, *gid* behaves as a degree operator occurs in both gradability questions and quantity questions. Moreover, *gid* is itself a word independent from *do*; in short, *gid-do* is not a lexical word but are two independent words. In gradability questions, *gid* independently occurs without *do* (69), resembling to that of *how* in English, which is itself a word.

(69) ngin   gid-(*do)   go?

you   how-(*many)   tall

'How tall are you?'

Then in quantity questions, *do* is required; the absence of *do* causes the sentence to be ungrammatical (71). That the presence of *do* is ungrammatical in (69) but is required in (70) suggests that *do* has a lot to do with scalar expressions in Hakka which leads to the forth property of Hakka degree system which will be discussed later.

(70) ngin   mai   gid-do   zha   linggo

　　you   buy   how-many   Cl.   apple

　　"How many apples did you buy?"

(71) ??ngin mai gid   zha lingo

　　 you buy how   Cl. apple

In addition, although the older native speakers of Hakka consider (71) to be ungrammatical when *do* is not occurred, some younger native speakers of Hakka consider (71) to be acceptable.[10] It's not for sure what causes this change in Hakka; probably it's because of the influence from Chinese. However, the discussion here is mainly focused on intuitions from the older native speakers who consider that the overt *do* is needed in quantity questions.

Forth, *do* in Hakka has two allomorphs: overt *do* and covert *DO* (capitalized *DO* would be used to refer to the covert DO in the following discussion). The overt *do* copies a quantity variable carried by a noun. Therefore, it provides the quantity variable <q> for quantity questions, and thus the overt *do* requires its complement to be nominal. However, in gradability questions, scalar predicates carried with a grade variable <g> are bound by a degree operator directly; therefore, there is no overt *do* in gradability questions. The function of covert *do* then is to regulate the variable carried by scalar predicates to be <g> but not other variables. This contrast between overt *do* and covert *DO* is shown in (72-73).

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[10]　　From my survey of native Hakka speakers, speakers who accept quantity questions without *do* tend to be much younger, aging below 50. In contrast, speakers from 50 years old to 65 years old do not accept the disappearance of *do*.

(72) DO selects <g>

    a. ngin   gid-DO   go <g>?

      you   how   tall

      "How tall are you?"

    b. ngin   gid-DO   hifon <g> gi?

     you   how-much   like   him

     "How much do you like him?"

    c.*ngin   gid-do<q> go<g>?

      you   how   tall

      *ngin   gid-do<q>   hifon<g>   gi?

      you   how-much   like   him?

(73) do copies <q>

   a. ngin   mai   gid-do<q>   linggo<q>?

    you   buy how-many   apple

    "How many apples did you buy?"
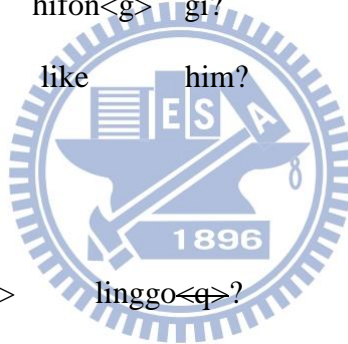
That there are two *dos* in Hakka successfully explain the fact that why predicates carrying <g> is incompatible with *gid-do* and that why nominal expression needs the overt *do* for providing a degree variable.

4.2 The Degree System in Hakka

    From the properties mentioned in 3.1, I thus argue that *gid* and *do* projects two different functional layers (74-75)

(74) Gradability questions:　　[_JP_ [_J'_ gid [_QP_ [_Q'_ DO [_AP/VP_ A/V]]]]]]

(75) Quantity questions:　　[_JP_ [_J'_ gid [_QP_ [_Q'_ do [_CIP_ N']]]]]]

JP is projected by a degree operator *gid*, QP is headed by *do/DO*. Following Zwart (1992), Corver (1997) and Doetjes (1997), it is argued that there is a grade variable <g> carrying by scalar adjectives and a quantity variable carried by nouns. Then in quantity questions, I assume that a quantity variable carried by is further introduced by *do*. That is to say, the presence of *do* requires its complement to be nominal, and it copies the quantity variable carried by the noun. Then a binding relation is formed between the degree operator *gid* and the overt *do*. On the contrary, the presence of *DO* only regulates its complement to carry with a grade variable <g>, which is usually with scalar adjectival or verbal expressions; it does not copy the grade variable.

Additionally, solid evidence which is involved with different variables carried by verbal expressions is found to support the view that a selection function is required by covert *DO*. According to Doetjes (1997), an individual-level psych verb parallels to an adjective that it carries a grade variable <g>. In addition, a stage-level verb contains a quantity variable <q>. Therefore, from the below examples, it is shown that the individual-level psych verb is able to be modified by a gradable degree adverb *dong* (76a) while the stage-level predicate cannot.

(76) a. dong hifon

　　　very　like

　　b. *dong shi

　　　very　eat

(77) shi dong-shao

    eat a little

Since stage-level verb *eat* carries a quantity variable, it is incompatible with *dong*. In addition, (77) shows that *dong* modifies the grade variable carried by the scalar adjective *shao*; *dong-shao* "a little" then modifies the quantity variable carried by *shi* "eat." The comparison between (76) and (77) thus presents that verbs carry different types of variables. Following this reasoning, if no covert *DO* is present to set a restriction that only grade variable is allowed to appear in gradability questions, stage-level verbs with quantity variables are expected to appear in gradability questions since the degree operator *gid* is able to bind a quantity variable. However, this prediction is not born out. (78) shows that the sentence is ungrammatical, suggesting that there must be some mechanisms to rule out the presence of a quantity variable.
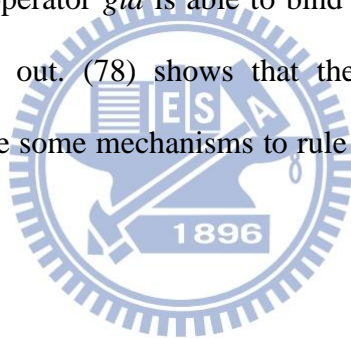
(78) *ngin gid shi

    you how eat

If there is a covert *DO*, (78) then does not pose any problem to the analysis. Therefore, it is believed that the appearance of the covert *DO* is needed.

    Besides, it is further assumed that a A^0-to-Q^0 movement is observed since the binding relation between a degree operator and a degree variable needs to be local. Therefore, it is suggested that the scalar adjective/verb moves to Q^0 and incorporates with the covert *DO* on the surface structure (79).


(79) $[_{JP} [_{JP'} gid [_{QP} [_{Q'} DO\text{-}A/V_i [_{AP/VP} t_i]]]]]]$

No such A^0-to-Q^0 movement is observed in quantity questions; however, there is a Q^0-to-J^0 movement as shown in (80).

(80) [$_{JP}$ [$_{JP'}$gid-do$_i$ [$_{QP}$ [$_{Q'}$ t$_i$ [$_{CIP}$ N']]]]]

Given the fact that *do* cannot appear independently without other degree words; its affixal feature forces *do* to move to J^0 and then incorporates with *gid*. Therefore, a head-to-head movement is then observed in Hakka quantity questions on the surface structure.

The above analysis that *gid* acts as a degree operator and that *do/DO* have a lot to do with the type of degree variables thus explains my motivation of analyzing the Hakka degree system as a multiple-layer system (81b) rather than a singular layer system (81a).
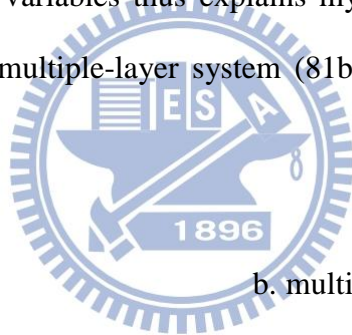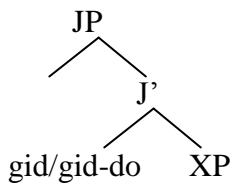
(81) a. single layers   b. multiple layer
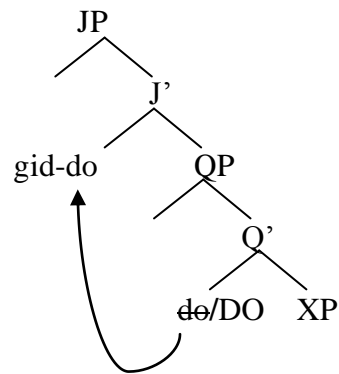
Furthermore, it is mentioned by Bresnan (1973) that one of the differences between words under Deg^0 and the words under Q^0 is that items under Q^0 are able to select adjectives and adverbs (see 2.1.1 for the different words under Deg^0 and Q^0). Although my analysis is not exactly as the same with Bresnan's, the fact that *do/DO* is able to select the type of variables accounts for their presence under Q^0. In addition to

it, to present a cross-language uniform analysis is another motivation of proposing a multiple layers structure. If a single-layer analysis is adopted (81a), not only the different functions of *gid* and *do/DO* cannot be well accounted for but also a uniform analysis cross languages is missed.

What's more, that Hakka preserves some property of ancient Chinese suggests that we should not ignore how a language changes from old times. What is being discussed in chapter two about the degree system in ancient Chinese shows that a multiple layer analysis might be on the right track instead of a singular layer analysis.

If a multiple layer is adopted, it seems to parallel English in some way. However, although both the degree systems in English (82a) and Hakka (82b) are extended functional layers, several differences are observed.

(82) a. Cover's split degree system   b. Hakka split degree system
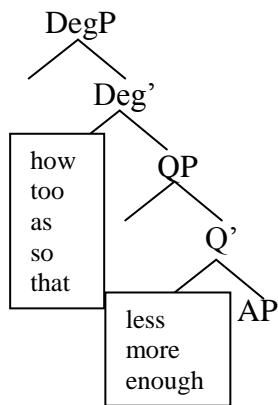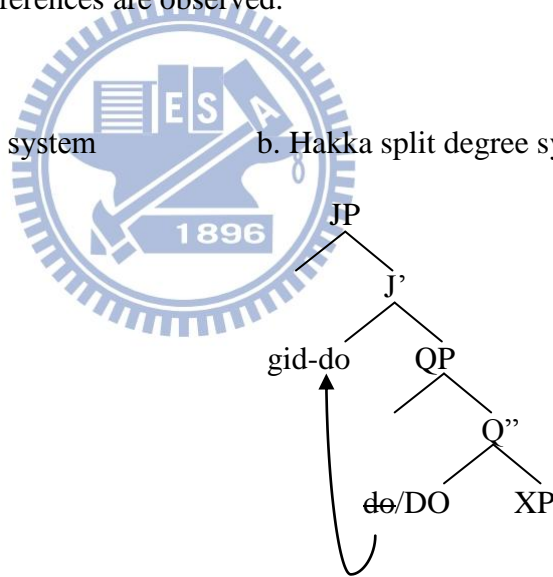
Under Corver's framework, the head of DegP is determiner-like degree element, and the head of QP are quantifiers without determiner-nature. My analysis is different from Cover's in four aspects. First of all, in English both the head of DegP and QP need to bind a variable, but in Hakka degree questions, only *gid* has the ability to bind a variable; *DO/do* are not able to bind a variable. Second, there is a Q^0-to-J^0 movement of the overt *do* due to its affixal property; however, no such movement is

found in English. Third, elements under DegP in English are determiner-like, and elements under QP are quantification-like. In Hakka, the item under JP (*gid*) is not a determiner-like word, but only a degree operator. Besides, it is the overt *do* that possesses the determiner-like feature (more details about the nature of overt do will be given in the next chapter). Last, under Corver's analysis, the degree system is split based on the evidence of so-pronominalization (see 2.1.3). No such so-pronominalization is found in Hakka; nevertheless, the evidence that supports a split degree system in Hakka comes from the unique character of do/DO's ability of selection and the independent role of *gid* in degree questions.

4.2.1 The Syntax of Gradability Questions

In degree constructions, the value of the degree is manipulated to the extent that the measured property of the degree argument to be true (Grano, & Kennedy, 2012). Thus, when the gradability is asked, what the question concerns is how the degree object is mapped onto the dimension of interval-based or point-based scale structure (Kennedy, 2005). Although the discussion about degree expression introduced in Chapter 2 mostly focuses on the degree system in an adjectival expressions (Bresnan 1973, Jackendoff 1977, Corver1997, Doetjes1997); as already pointed out by much research, gradability is not a property exclusive for adjective, but is also for nouns, verbs, adverbs, and prepositions as well (Sapir 1944, Bolinger 1972, Doetjes 1997, Kennedy & McNally 1999, Hay et al. 1999, Tsujimura 2001, Vanden Wyngaerd 2001, Paradis 2001, and Wechsler 2005). The fact that gradability is a cross-category feature is corroborated by Kennedy and McNally's study (2005), which claims that:

"…the scalar properties of gradable expressions are largely predictable from properties of the events to which they are related or of the individuals to which they apply to…. This result reinforces the larger claim advanced by Bolinger and Sapir:

46

gradability is a fundamentally important semantic property, whose influence extends beyond adjectives to other lexical categories." Doetjes (1997), who has made a thorough analysis about degree quantifiers in AP, VP, and NP domain also states that the presence of degree quantifiers, which are independent from adjectives, are dependent on the presence of scalar positions, q (quantity) and g (grade).

Moreover, although degree is a cross-category feature, it needs to be kept in mind that only those predicates that are gradable are able to take their role in degree expressions; for those non-gradable predicates, they are incompatible with degree expressions. Take adjectives as examples, the difference between gradable adjectives (83a) and non-gradable adjectives (83b) is easily seen in their denotations. Only a gradable adjective like tall denotes a function that can take a degree argument:

(83) a. $[[tall]] = \lambda d \in D\ d\ .\lambda x \in D_e$. x is d-tall (gradable)

b. $[[rectangular]] = \lambda x \in D_e$. x is rectangular (non gradable)

Within these lines, degree questions are compatible with events or individuals as long as they are gradable. Therefore, it is not surprised to find that in gradability questions, what are being asked could be the scalar property of an event or the scalar property of an individual. For English, wh-word *how* plays the role of introducing gradability questions; as for Hakka, it is *gid+DO* that plays the role. Both *how* and *gid* can express degree not only about adjectival expressions (84a-b) but also about verbal expressions (85a-b) just as the following show (both of them belong to the verbal domain):

(84) a. How tall are you?

   b. ngi gid go?   (Hakka)

      you how tall

      'How tall are you?'

(85) a. How much do you like him?

   b. ngi gid   hifon gi?   (Hakka)

      you how-much like him

      'How much do you like him?'

Then the syntactic structure of Hakka gradability questions is derived as the following

shows (86):

(86a) ngin   gid   go

       you   how   tall

      "How tall are you?"
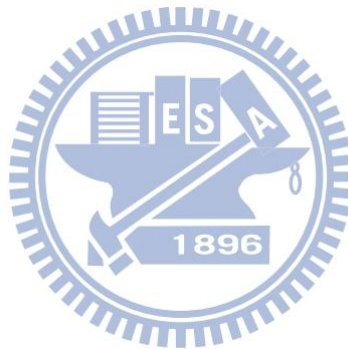
(86b)   CP   . (* represents the saturation of a variable through binding).
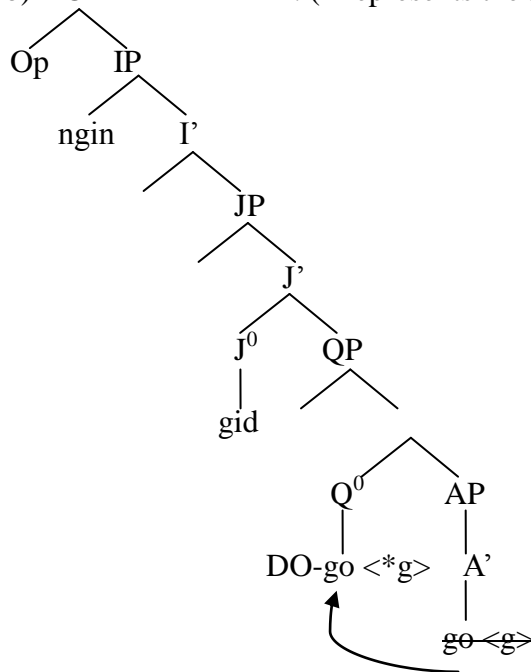
Gid, as a degree word heading JP, acts as a binder that binds the grade variable <g>carried by *go* "tall." Based on the fact that degree binding relation needs to be local and that *DO* is affixal in nature, a A^0-to-Q^0 movement is thus assumed. As mentioned before, the presence of *DO* requires a predicate to carry <g>; thus *DO* is compatible with *go* which carries the grade variable. Furthermore, the question meaning is given by a question operator under [Spec CP]. The counterpart of (86) in English is shown in (87) which is derived under Corver (1997)'s theory, who claims that the degrees expression in adjectival phrase is [$_{DegP}$ Deg [$_{QP}$ Q [$_{AP}$ A]]].

(87) How tall is John?
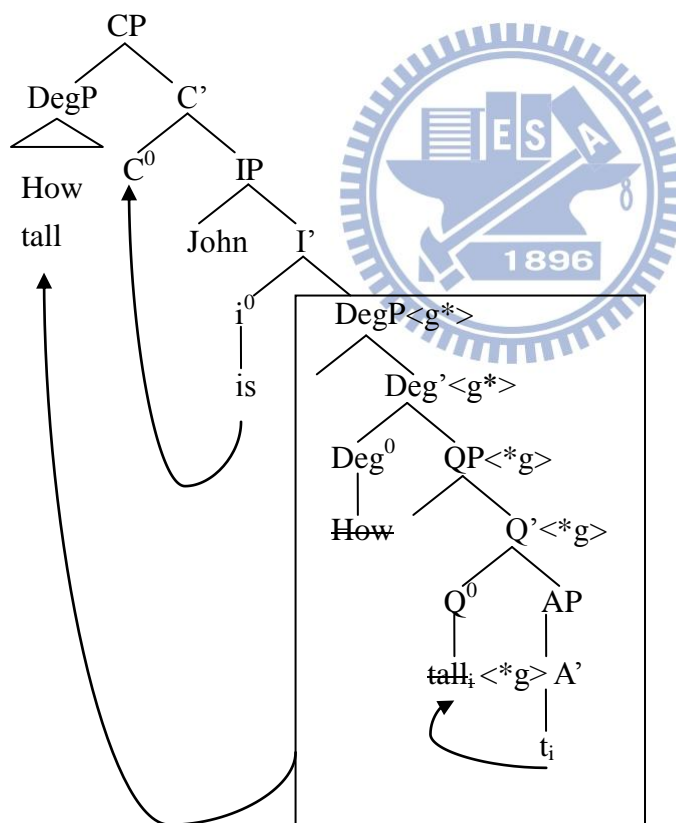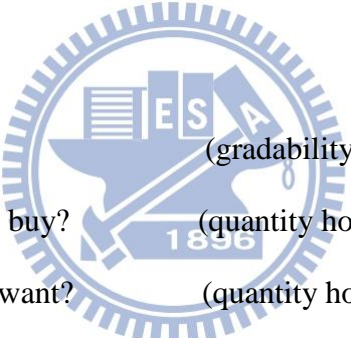
According to Corver (1997), *how* is a determiner-like degree word, so it is generated under Deg^0 and *tall* under AP. Following Zwarts (1992), Corver also claims that scalar adjectives carrying a grade variable <g> needed to be bound. Since *how* needs to bind

a degree variable carried by adjective *tall* via local binding relation, tall needs to move to the minimalist complement position of Deg^0, which is under Q^0. After that, the whole degree phrase then is pied-piping to the position where a wh-word is required to move to.

From (86) and (87), the difference between Hakka and English is explicit. First, the degree system in English projects DegP by the determiner-like *how;* whereas, the degree system in Hakka is projected by *gid*. One thing that should be noted here is that although *how* and *gid* seem to possess similar function in expressing degree questions, English *how* does not equal to Hakka *gid* as we can see from the following examples (88-89).

(88)

a. How tall are you?   (gradability how)

b. How many apples do you buy?   (quantity how)

c. How much water do you want?   (quantity how)

d. How did you handle this problem?   (instrumental how/manner how)

e. How come you arrived so late?   (causal)

f. How could you do this to me?   (causal/denial)

(89) Hakka examples

a. ngi gid   go?   (gradability how)

   you how tall

   'How tall are you?'

b. ngi mai gid-do   linggio?   (quantity how)

   you buy how-many   apple

   'How many apples do you buy?'

c. ngi siongoi gid-do   shui?   (quantity how)

    you want   how-much   water

    'How much water do you want?'

d. ngi ngiungbannging miendui munti?   (instrumental how/manner how)

    you how   handle problem

    'How did you handle this problem?'

e. ngi ngiungnging dong man   loi?   (causal)

    you how   so   slow come

    'How come you arrived so late?'

As (88-89) shows, if we translate the meaning of *how* to Hakka literally, the meanings of instrumental *how*, manner *how*, causal *how* and denial *how* is not expressed by *gid* but by other lexical words. This implies that English *how* is not equal to Hakka *gid* though they seem to have the similar function in the degree systems.

Second, like Chinese, as a wh in-situ language, *gid* though being a wh-word does not need to move to [Spec CP] on the surface form. In contrast, *how* in English undergoes pied-piping to [Spec CP] at SS.

Another type of gradability questions is about asking the scalar property of VP. (90) shows that syntactic structure in Hakka:

(90a) ngin   gid   hifon   gi?

you   how-much   like   him

"How much do you like him?"

(90b)

```
              CP
            /    \
        OP_i      IP
                /    \
             ngin     I'
                    /    \
                   I      JP
                         /
                        J'
                      /    \
                    J^0     QP
                    |      /   \
                   gid    Q'
                        /    \
                      Q^0     VP
                             /   \
                    DO-hifon <*g>  V'
                                 /    \
                               V^0     NP
                               |       |
                            hifon <g>   N
                                        |
                                        gi
```
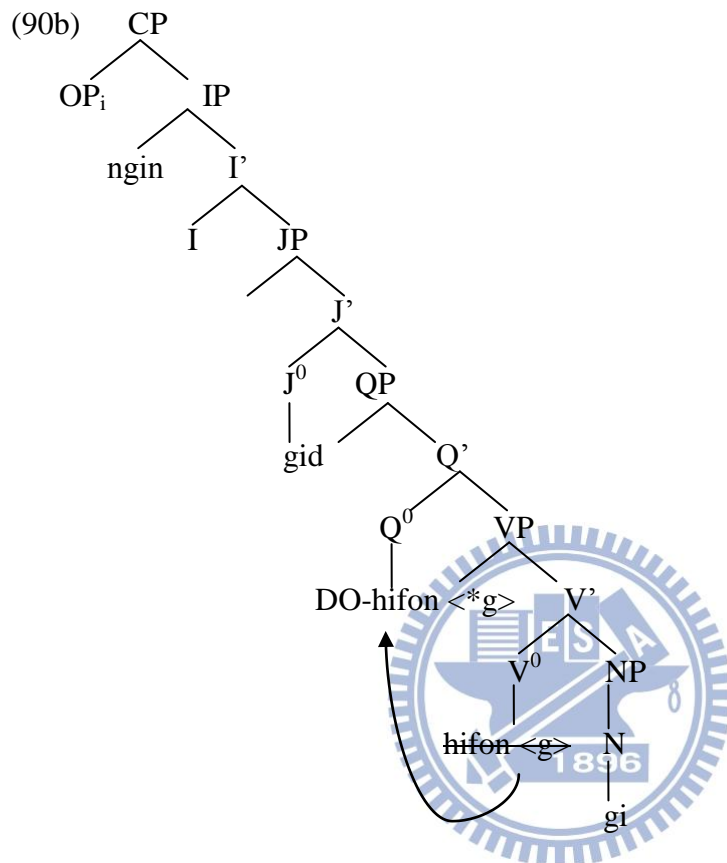
The structure in (90) is the same as (86); except for the substitution of AP with VP. The presence of *DO* selects a scalar predicate with a grade variable <g>. *Gid*, as a degree word, then behaves as a binder that binds the grade variable <g>carried by the verb *hifon* "like."

Although no difference is found between the gradability question with AP and the gradability question with VP in Hakka, this is not the story for the counterparts in English. In English, the most salient difference between the degree system of AP and VP lies in the fact that the former is modified by the word *how* alone, while the latter is modified by *how much*. According to Doetjes's analysis (1997), the role of *how much* is different from that of *how*. *How*, heads a degree head, categorically selects AP.

However, *how much* belongs to the group of degree quantifiers which do not categorically select AP. As pointed out by Doetjes, degree quantifiers (DQs) are underspecified for a category that they modify. Therefore, they do not form a head-complement structure with the modified category like DegP does; instead, they behave like adjuncts, occupying specifier positions. DQs do not select categories; they select a scalar position of variables. Below is the evidence provided by Doetjes to support the claim that DQs behave like adjuncts (Doetjes 1997, p.94):

(91) a. Combien $_i$ as-tu   lu   [$_{NP}$ t$_i$ de livres]?

   how-many   have-you   read   of books

   "How many books did you read?"

   b. Combien$_i$ les   enfants   ont-ils   [$_{VP}$ ri t$_i$]?

   how-much   the   children   have-they   laughed

   "How much did the children laugh?"

   c. Vous   verrez   combien$_i$ il est   [$_{AP}$ t$_i$ méchant]

   you   will-see   how-much   he is   evil

   "You will see how evil he is"

The French data shows (91a-c) that *combien* is able to be extracted and leave behind *de livres*. If *combine* functions as a head selecting *de livres,* the wh-extraction would not be possible since a movement of a head to a specifier position is not allowed (Chomsky, 1986). The other evidence comes from the adverbial use of DQs (92).

(92) [$_{IP}$ Sylvie [$_{IP}$ danse$_i$ [$_{VP}$ beaucoup [$_{VP}$ t$_i$ la salsa]]]]

   Sylvie   dances   a-lot   the salsa

If *beaucoup* behaves as a degree head that selects VP, then the V-to-I movement of *danse* would be barred because of Head Movement Constraint (Travis, 1984); *beaucoup* would be a blocker of the movement. However, the movement does not cause the sentence to be ungrammatical, suggesting that *beaucoup* is not an intervener; therefore, it must be occupying the specifier position of VP. The above French data about wh-extraction and head movement supports Doetjes's claim that DQs, behave differently from degree heads that select categories. As mentioned, the only selection criterion for DQs is the presence of <q> and <g>.

Then on the basis of Doetjes's analysis (1997), *how much*, which consists of a degree head and a degree quantifier *much*, yields a complex DQ. As a result, *how much* in a gradability question like *how much do you like it* does not itself form an extended functional layer of VP, but occupies the specifier position of VP. In contrast, in a quantity question, *many*, which categorically selects a plural NP, does not belong to DQ; therefore, when we talk about quantity questions in 4.2.2 later, how-many does not occupy the specifier position of NP, but is behaved as an extended functional layer of NP (93b).

(93)

a.   b.

```
        VP                                          DegP
       /  \                                        /    \
     DQ    VP                                    Deg'    NP
```
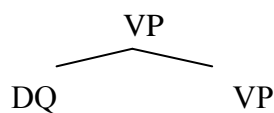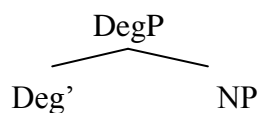
Combining Corver's analysis (1997) about the internal structure of *how much* and the syntactic position of *how much* from Doetjes (1997), the sentence *how much do you like John* would have the following structure (94).

54

(94) How much do you like John?

```
                    CP
                  /    \
              DegP      C'
             /    \    /   \
        How much  C⁰     IP
                  |     /   \
                  do  you    I'
                           /   \
                         i⁰    VP2 <*g²>
                         |    /        \
                        -s  DegP        VP1<g²>
                           /   \        /    \
                       Deg' <*g¹>     V' <g²>
                      /      \        /     \
                   Deg⁰    QP<*g¹>  V⁰      NP
                    |      /    \   |        |
                   how   Q'<g¹>  like <g²>  N
                        /   \              |
                      Q⁰    AP           John
                      |      |
                   much_i <g¹>  A
                                |
                                t_i
```
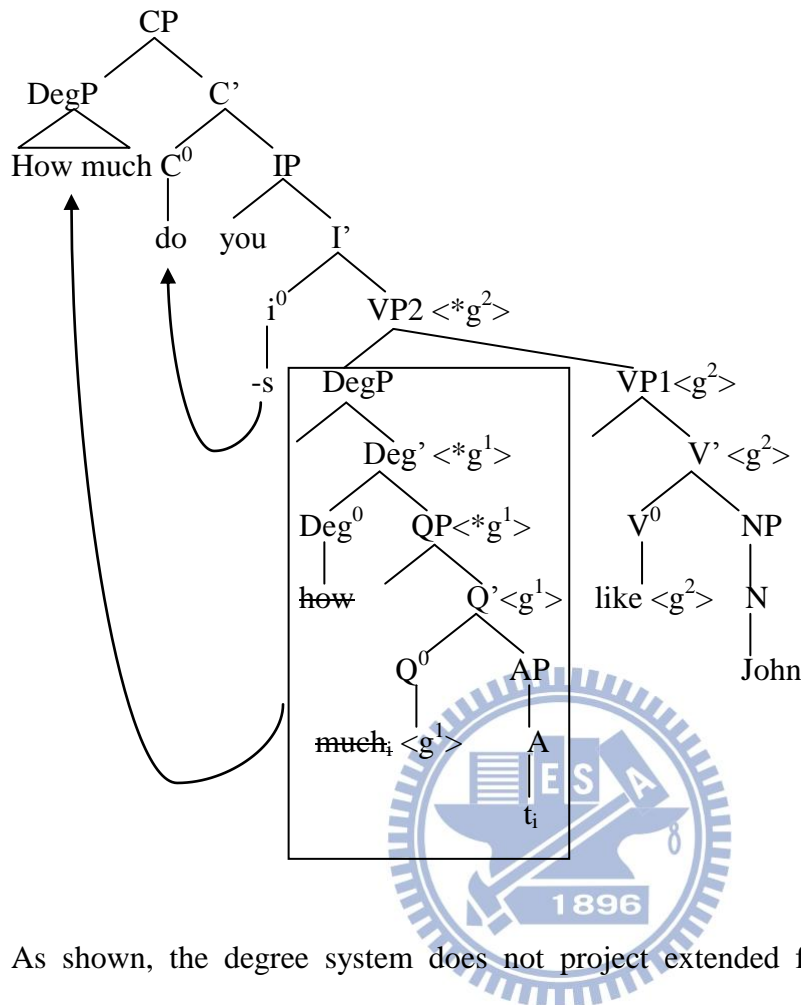
As shown, the degree system does not project extended functional layers to VP. Instead, the degree system of VP modifies VP via adjunction. *How much*, being a complex DQ, stands at the specifier position of VP base on Doetjes's analysis. As for its internal structure, according to Corver (1997), the lexical *much* is an adjectival predicate, which heads a modifying adjective phrase. *Much* is then moved to Q^0 for local binding relation. In (94), there are two grade variables, one is carried by *much* $<g^1>$; the other is carried by VP $<g^2>$. $<g^1>$ is bound by the operator *how*, and $<g^2>$ is bound by the whole DegP *how much*.

Some differences between English (94) and Hakka (90) are noted. Firstly, DegP in English behaves as a modifier which is placed at the specifier position of VP. Contrary to English, JP does not adjoin to VP but acts as extended functional layers of VP in Hakka. As mentioned by Doetjes (1997), the reason that DegP in English

functions as a specifier is because its status of complex DQ. DQ does not select any specific category, so they are generated under the specifier position. However, unlike *much* in English which has its wide distribution, *gid-do* in Hakka has limited distribution. Only when a grade variable is present can it be used. Secondly, *much* is needed when the predicate is VP; in contrast, when the predicate is AP, no *much* is required. Although both VP and AP are able to carry <g>, different degree words are chosen to express their degree expression; one is *how*, the other is *how much*. They cannot be used interchangeably. As for Hakka, both the degree system in AP and VP requires the same degree words *gid+DO*. Thirdly, wh-movement of *how much* in English also implies that *how much* itself is a maximal projection. If *how much* is an extended functional layer of VP, it is not possible for *how much* to move unless the whole VP is also being pied-piping; however, the sentence actually becomes ungrammatical when the whole VP is moved. In contrast, no such movement is observed in Hakka.

Besides from the above analysis about the role of *how much* in English, PF pied-piping may be the other possible way to account for the appearance of *much* in the gradability question. Thus, what is the role that *much* play in gradability questions needs much exploration. Since this interesting issue is not my concern, I then leave it opened here

Before moving on to the next section, there is still one interesting thing being left. It is found that not all verbs can be put in the gradability questions.

(95) a. ngin   gid   hifon   gi

      You   how-much like   him

      'How much do you like him?'

b. *ngin gid   pau?

  you how-much   run

'*How run?'

c. *ngin gid   hog?

  you how-much   study

'*How study?'

Those data (95) imply that not all verbs can carry a grade variable. It seems that only those verbs that express psychological feelings are able to occur with *gid* in gradability questions.

(96) ngin   gid   himshong /oi/hifong gi?

You   how-much   appreciate/love/like   him

"How much do you appreciate/love/like/hate him?"

This phenomenon, which is already pointed out by Doetjes (1997), demonstrates that an individual-level verb is similar to AP in the way that it contains a g-position. Besides, a stage-level verb and NP contain a q-position. This paradigm is also found in other languages (though for some languages, it is possible for both stage-level and individual-level VPs to contain a g-position). For example, in Dutch, the DQ "veel" (a lot) modifies stage-level predicates, while "erg" (badly) is used with individual-level psych verbs (97). (cf. Obenauer 1983, 1984)

(97) a. Stage-level verbs (veel/*erg)

Jan wandelt veel/*erg de laatste tijd

'Jan walks a lot lately.'

b. NOUNS (veel/*erg)

Jan heeft veel/*erg boeken

'Jan has a lot of books.'

(98) a. Psych verbs (erg/*veel)

Jan waardeert Marie erg/*veel

'Jan appreciates Marie a lot.'

b. Adjectives (erg/*veel)

Jan is erg/*veel slim

'Jan is very clever.'

(97), which only quantity meaning is derived, shows that the DQ *veel* is allowed, but *erg* is not allowed. As for (98), where only *erg* is allowed to appear, only gradablility meaning is derived. Thus, the data further corroborates Doetjes's thought that an individual-level verb only contains a g-position but not a q-position. Based on this explanation, the fact that in gradability questions where *gid+DO* is used to ask about the gradability of predicates, only individual-level psych verbs are compatible with the questions, while others cause ungrammaticality, can be accounted for.

4.2.2 The Syntax of Quantity Questions

Section 4.1 has already described the basic properties about Hakka degree questions. Based on those properties, few more things needed to be pointed out here. On the first hand, there are two *dos* in Hakka, one is the overt *do* which copies <q>, and the other is the covert *DO* which selects <g>. In quantity questions, overt *do* is used to provides <q> but not <g>. On the second hand, I propose that JP and QP project the extended functional layers to ClP. However, what's the fine structure of

NumP, ClP and NP is not my concern, so I will not go into the detail of it.

Then below is the syntactic structure of Hakka quantity questions:

(99a) ngin mai gid-do   zha lingguo ?

    you buy how-many   ke apples

    "How many apples do you buy?"

(99b)

CP
OP$_i$ IP
  ngin I'
    VP
    V'
V^0 JP
mai J'
  J^0 QP
gid-do$_i$<*q> Q'
  Q^0 ClP
  do$_i$<q> zha NP
    N
    liinggo<q>
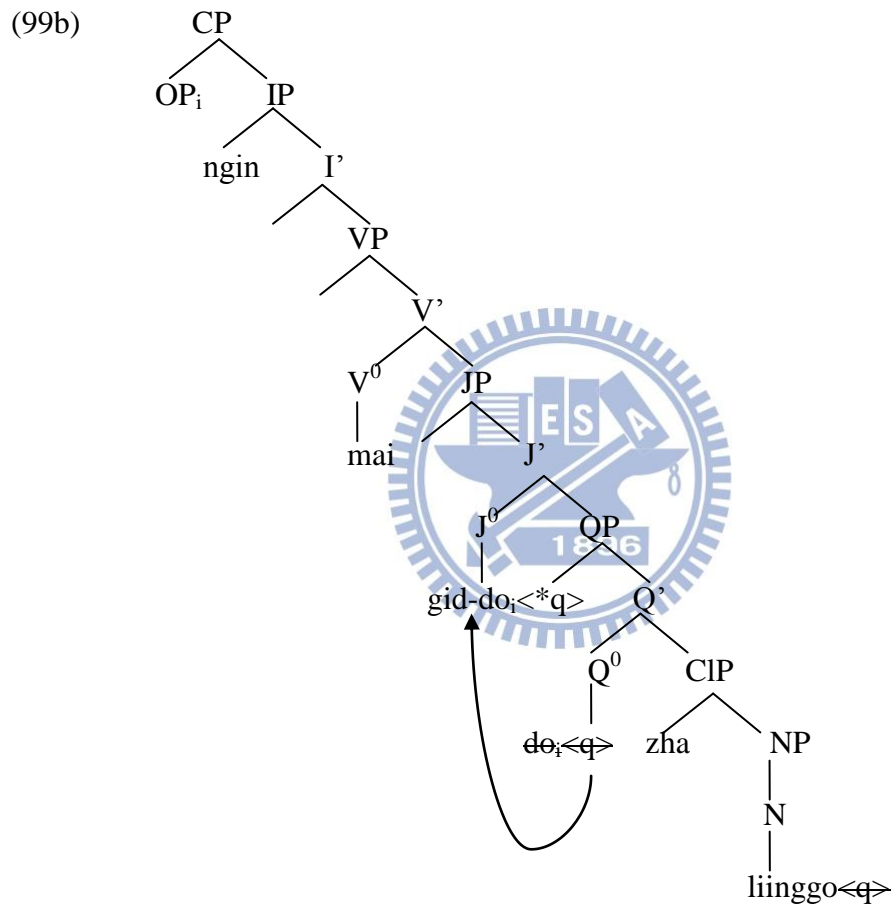
In (99), JP selects QP, which in turn selects ClP. The presence of the overt *do* thus copies the quantity variable from a noun in order to form a binding relation with the degree operator. Moreover, with its affixal nature, *do* undergoes a head-to-head movement to J^0 and incorporates with *gid*. The questions meaning is derived from the question operator at [Spec CP].

As for quantity questions in English, *how many* and *how much* are used because

a clear cut is made between mass and count noun in English. When the amount of a countable noun is asked, *many* is used. Likewise, when the amount of an uncountable noun is questioned, *much* is used in how-much questions. For simplicity, when discussing the structure of *how-many* question, only the example of *many* will be given since there is not much difference between *many* and *much* except for their function of introducing countable or uncountable nouns.

According to Rullman (1995), the quantity questions like *how many books does John need* has the following structure (100):

(100) [$_{CP}$ [$_{NP}$ [how many][$_{N'}$ books]] [$_{C'}$ does [$_{IP}$ John [$_{I'}$ −s [$_{VP}$ [need [t1]]]]]]]]

From Rullman's perspective, *how-many* is viewed as a determiner of NP, and thus it occupies the specifier position of NP. Moreover, it is claimed that the wh-feature of *how-many* is percolated to the whole NP so that the feature characterizes the whole NP as wh-phrase. Under this structural description, no further detail is given to the internal structure of *how-many*. Thus, I follow the degree system proposed by Cover (1997), yielding the following structure (101):

(101) How many books does John buy
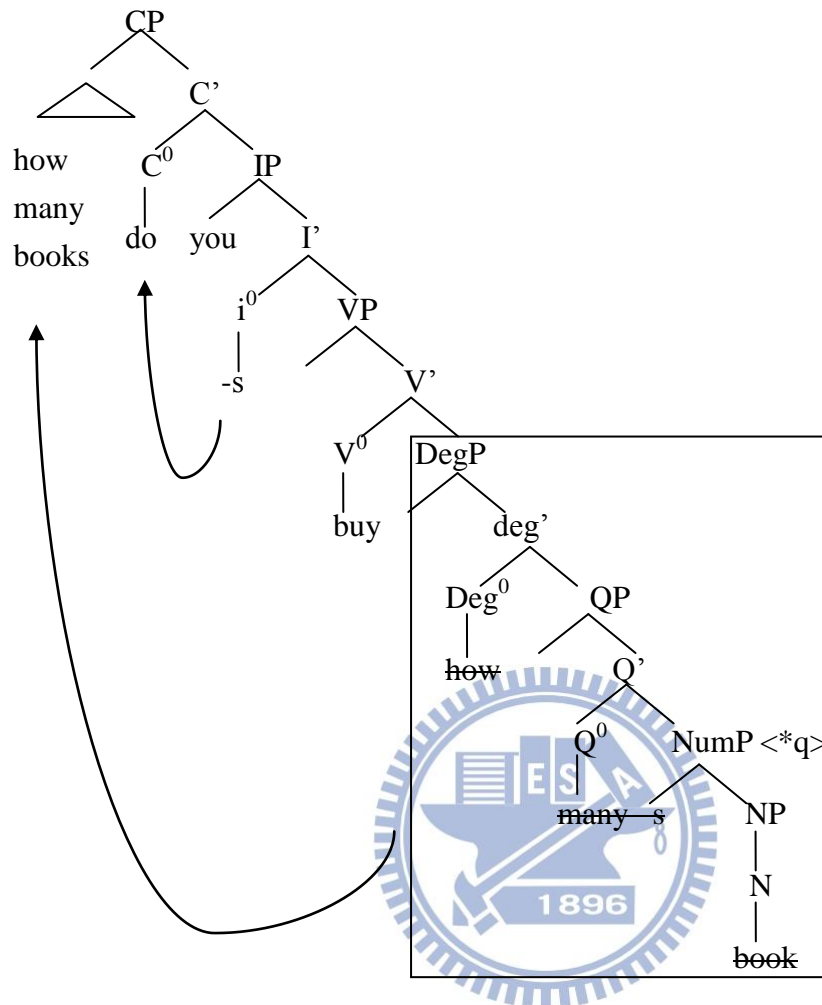
Many, a quantifier-like degree item in Corver's degree system, is base-generated under Q^0, and *how* is base-generated under $\deg^0$; the two heads project extended functional layers of NP. Although Corver's system does not include NP, I adjust his system with Doetjes's analysis (1997). According to Doetjes, because *many* invariantly selects NP and cannot modify other categories, it is argued by Doetjes that *many,* heading QP, does not adjoin to NP but acts as an extended functional layer of NP. However, both Q^0 and Deg^0 have to bind a variable if Corver's analysis needs to be preserved. If *many* in (100) binds <q>, then *how* can bind nothing and the vacuous quantification would be caused. To solve the problem, I assume that *many* is just like *much* that it is able to function as an adjective predicate base on its prenominal

position. Then the structure will be adjusts to the following one:

(102) How many books

```
            DegP
             |
            Deg'
          /      \
       Deg⁰       QP
        |        /  \
       how     Q'
              /    \
            Q⁰      AP
             |     /   \
          manyᵢ <*g>  A'
                    /     \
                  A⁰      NumP <*q>
                   |      /    \
                  tᵢ    -s     NP
                               |
                               N
                               |
                             book
```
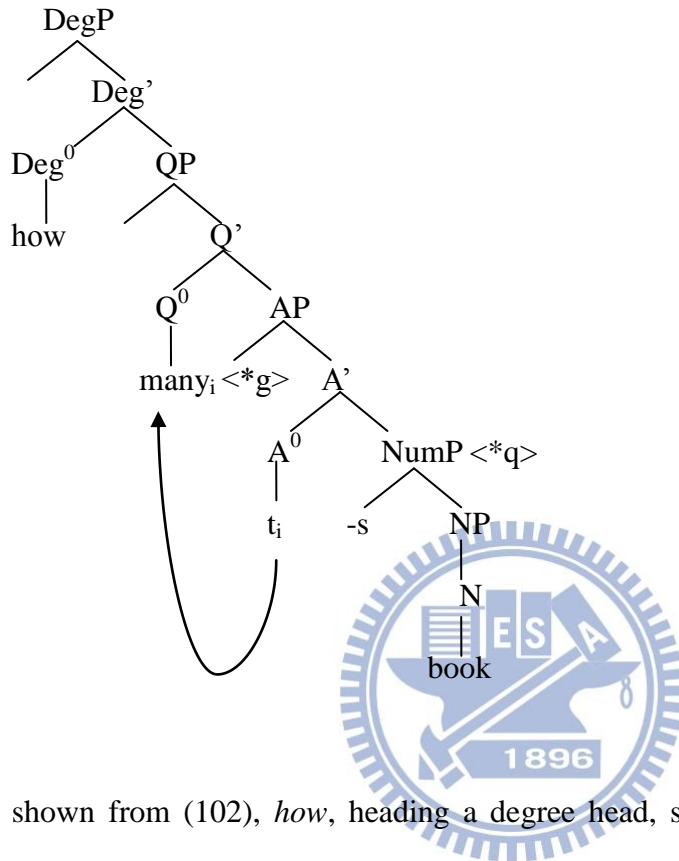
As shown from (102), *how*, heading a degree head, selects AP as its complement. *Many*, heading an adjectival phrase, selects NP as its complement. Moreover, being an adjectival predicate, *many* contains a gradability variable <g> which is bound by *how*. Paralleling to the analysis that the whole degree phrase *how much* binds <g> in (94), the degree phrase *how many* also binds <q>. By this way, the structure in (102) not only solves the problem of vacuous quantification but also supports Rett's argument (2008) that the only semantic difference between how and how many lies in the fact that the former binds a gradability variable and the latter binds a quantity variable. That is to say, the presence of *many* implies that the bound variable is a quantity variable but not a gradability degree when *many* is not present.

The structure in (99) and (102) presents some differences between Hakka and English. For one thing, to preserve Corver's split degree system (1997), AP layer is

needed, while no such layer is needed in Hakka. For another thing, no pied-piping is observed in Hakka; instead, there is a Q^0-to-J^0 movement of *do*. Lastly, there is a ClP in Hakka but not in English, which may be resorted to the property of Hakka nouns. Like Chinese, whose noun system does not have a clear cut between countable nouns and uncountable nouns, classifiers are used as the means to classify nouns. Therefore, under most circumstances, the appearance of numerals requires classifiers.

4.3 The Semantics of the Overt *Do*

This section talks about the semantics of the overt do in a quantity question. Recall that in 2.2.2, it is mentioned that due to the minimal number requirement of the predicate, *many* is viewed as a scalar determiner according to Hackle (2000). As (103) shows, to derive the meaning correctly, the comparative construction is considered to be a clausal comparative where matrix-VP and NP is introduced by *many*. The semantic clash between the numeral 3 and the minimal number requirement of the VP (more than three) in the left clause results in the ungrammatical of the sentence.

(103)

a. ?? More than three students were standing in square formation.

b. [-er λd. d=3 & ~~d-many students were standing in square formation~~] [λd. d-many
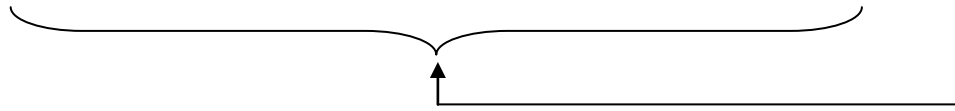
students were standing in square formation]
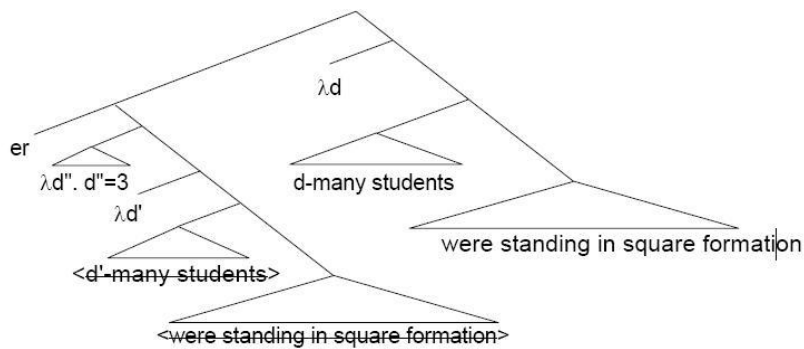
As a result, *many* then have the following denotation (104).

(104) [[many]]= λd λP$_{<e, t>}$λQ$_{<e, t>}$.∃x [|x|= d & P (x) & Q(x)=1]

The same phenomenon of minimal number requirement is also observed in Hakka (105).

(105) a. ??chaugo sam-gai hogsang kido   si-zha gogteu

       more   3-Cl   student   stand at 4-Cl-corner

    '??More than three students are standing at four corners.'

  b. zui-shao rhiu si -gai hogsang   kido   si-zha gogteu

    at least have   4-Cl   student   stand-at   4-Cl corner

    'At least four students are standing at four corners.'

Then, based on the observation that Hakka also exists the minimal number requirement of the predicate, it is inferred that the m-words in Hakka and Chinese also behave as parameterized determiners.

Furthermore, as shown in (104) that *many* as a scalar determiner is encoded with an existential operator. If the overt *do* in Hakka is also encoded with an existential operator, the scopal interaction between the overt *do* and the degree operator carried by *gid* is predicted. This prediction is born out. Quantity questions in Hakka do not exhibit ambiguous reading when gid-do+NP is placed under the modal verb want syntactically; only the amount meaning can be derived (106b). However, when *gid-do+NP "how-many+NP"* is placed in front of modal verb *want*, the object reading is generated (106b):

(106) a. liabai-e shuzhan,   Lisi   siongoi mai   gid-do   shu

       this-E   book exhibition   Lisi   want   buy   how-many book

    '*For this book exhibition, what is the number n such that there are n books

      that Lisi wants to buy?'   (Object reading)

    'For this book exhibition, what is the number n such that Lisi wants it to be the

      case that there are n books that he buys?'   (Amount reading)

  b. liabai-e shuzhan,   gid-do   shu   he   Lisi   siongoi   mai?

    this-E   book exhibitiom   how-many book   is   he   want   buy

   'For this book exhibition, what is the number n such that there are n books that

    Lisi wants to buy?'   (Object reading)

   'For this book exhibition, what is the number n such that Lisi wants it to be the

    case that there are n books that he buys?'   (Amount reading)

In (106a), *gid* scopes over the modal verb want, while *do* is under the scope of *want;*
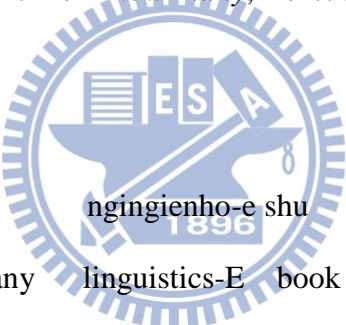
this is how an amount reading is generated at LF. Then in (106b), an object reading is possible that both *gid* and *do* scope over the modal verb *want*. As a result, for the two questions, both of them can express indefinite meaning of NP; that is, the speaker does not care about whether Lisi has any specific book in mind that he wants to buy; the only thing that the speaker cares about is the amount of the books that he intends to buy. However, from the intuition of native Hakkanese, it is shown that in question (106b), NP can refer to specific books. In other words, the speaker is not just asking the amount of books, but s/he is also asking about the specific books that Lisi has in mind and what is being concerned is the totality of those books. Therefore, the above questions clearly show that an individual (existential) quantifier and a degree quantifier is separately encoded that the former is encoded in the overt *do* and the latter is encoded in *gid*, which causes the scopal interaction.

Additionally, in chapter 2, I have mentioned that there are two approaches toward the analysis of m-words in a degree system (DDA vs DMA). As a reminder, at least three points are brought up to against DDA by Rett (2008) who adopts DMA. First, determiners are able to co-occur with m-words; therefore, whether m-words themselves act as determiners is controversial. Second, DDA fails to explain the disambiguating meaning of split-NP construction in French (see example 44 in chapter 2). Third, some languages do not have m-words; thus how to incorporate the analysis of m-words as determiners to those languages is a problem. Although the three arguments pose challenges for DDA, they do not behave as counterexamples to the role of *do* in Hakka as a determiner for the following reasoning. For the argument that determiners are able to co-occur with m-words, this phenomenon is not found in Hakka. Though there seems to be no counterpart of English "the" in Hakka, demonstratives, which are believed to be involved with definiteness are not able to co-occur with m-words as (107) show:

(107) *liadel   gid-do/gid-shau   hogsang   du   gai   shi   linggo

these   few/many   students   at   there   eat   apple

'These few/many students are eating apples there.'

As shown, the counterparts of m-words in Hakka (*shao/do*) are not able to co-occur with demonstratives, which suggests that m-words in Hakka do contribute determining meaning, causing them to be incompatible with demonstratives

For the other argument that DDA fails to explain split-NP construction in French, this phenomenon is also not found in Hakka. As (108) shows, no ambiguous meaning is derived from quantity questions in Hakka and Chinese. Ever when NP (linguistic books) is topicalized and split from *how-many*, no such reading (object reading) is generated:

(108) a. gi sirhau kon gid-do   ngingienho-e shu

He need read how-many   linguistics-E   book

'For what d must it be the case that he read d-many linguistic books X?"

'*For what d are there d-many linguistic books X such that he must read X"

b. ngingienho-e   shu   gi   sirhau kon gid-do

linguistics-E   book   he   need read how many

"For what d must it be the case that he read d-many linguistic books X?'

"*For what d are there d-many linguistic books X such that he must read X'

If we follow DMA that a noun is preceded by a null QUANTITY operator, the object reading should have been derived. As a result, it is claimed that there is no QUANTITY before NP in Chinese and Hakka. Instead, the individual quantifier is encoded in the overt *do* as what DDA proposes. Therefore, the fact that the individual

quantifier is always under a modal operator in (108) accounts for the failure of generating the object reading when a NP is placed at the topic position.

Lastly, one more point should be noted to support the view that the overt *do* is determiner-like. According to Williams (1981) and Higginbotham (1985), there is a theta binding relation between a determiner and a noun. That is, a noun contains a r-position which is bound by a determiner. Then a descriptive association given by Doetjes (1997) is that the presence of <q> depends on the presence of r-position, suggesting an interrelated relation among r-positions, determiners, and <q>. Therefore, only when a determiner is present could <q> also have its position. However, in Hakka quantity questions, no typical determiner is allowed to co-occur with *gid-do*; as a result, it is reasonable to assume that *do*, as a scalar determiner, realizes the presence of r-position and thus realizes the presence of <q> which would be bound by a degree word.

Within these lines, the role of the overt *do* in Hakka degree system is believed to be a scalar determiner which has the following denotation (109) according to Hackle (2000).

(109) $[[do]] = \lambda d. \lambda P_{<e, t>} \lambda Q_{<e, t>}. \exists x [|x| = d \ \& \ P(x) \ \& \ Q(x) = 1$

4.4 Island Effect

According to the following sentences that no island effect is observed in degree questions, I suggest that the degree operator itself is not a wh-word and does not undergo the movement to [Spec CP].

Gradability questions

(110) Subject island

sang gid go-gai ngin zhang zo de zo moteer?

grow how tall-GAI person are able to be model?

'To become a model, how tall does a person need to be?''

(111) Complex NP island

ngi hifon gid go-gai ngin

you like how tall-GAI person

"How tall a person do you like?"

(112) Adjunct island

gi sang gid go rhiheu si tingzhi sang go

he grow how tall after then stop grow tall

"After how tall did he reach, then he started growing?"

Quantity questions

(113) Subject island

oi gid-do linggo ha hau

need how-many apple better

'How many apples would be better?'

(114) Complex NP island

ngo zhu liazha liauli oi gid-do-gai luan zhangla?

I cook this cook need how-many-GAI egg enough

'How many eggs do I need to cook this meal?'

(115) Adjunct island

    gi con gid-do   cien rhiheu si koishi lon facien la`?

    he earn how-much money after then start waste money

    'After he earned how much money then he started to waste it'

As a result, a question meaning is derived via an implicit question operator at CP as (116) shows.

(116) [$_{CP}$ Op$_i$ [...[$_{JP}$ gid-do/do$_i$ [......]]

According to Tsai (1994), a wh-nominal stays in situ and is bound by an operator, but a wh-adverbial undergoes wh-movement to [Spec CP] in Chinese. Then, I suggest that the degree words in Hakka tend to behave more like a wh-nominal than a wh-adverbial in their way of forming a question.

4.5 Summary

    This chapter provides a thorough analysis of the syntactic structure of Hakka degree system. That is, JP and QP function as extended functional layers to scalar AP/VP and ClP, forming a split degree system. JP is headed by a degree operator *gid*, and QP is headed by *DO/do* which set a restriction on the type of variables. Additionally, the overt *do* is considered to be a scalar determiner in quantity questions. Lastly, the meaning of questions is derived via binding form a question operator.

DEGREE QUESTIONS IN MANDARIN CHINESE

In this chapter, the analysis of Chinese gradability questions and quantity questions will be presented. As a reminder, (117) shows the typical example of Chinese gradability questions, which is expressed with *duo*. (118) then presents the Chinese quantity questions with *duo-shao* and *ji*.

(117) Gradability questions

    a. ni   duo   gao?

       you   how   tall

       'How tall are you?'

(118) Quantity questions

    a. ni   you   duo-shao   qian?

       you   have   how-much   money

       'How much money do you have?'

    b. ni   you   ji   ben   shu?

       you   have   how-many   Cl.   book

       'How many books do you have?'

For the two types of questions above, the syntactic structures of them are argued to be what (119) and (120) show:

71

(119)   Gradability questions: [$_{JP}$ [$_{J'}$ duo [$_{QP}$ [$_{Q'}$ A/V [$_{AP/VP}$ t$_i$]]]]]]

(120)   Quantity questions: [$_{JP}$ [$_{J'}$ duo [$_{QP}$ [$_{Q'}$ shao [$_{NP}$ N]]]]]]

Under my proposal, JP is headed by the degree operator *duo* in both gradability questions and quantity questions. As for the QP layer, a difference is presented between the two types of questions. There is a A/V-to-Q movement happening to the gradability questions. Although such movement cannot be found in quantity questions, the Q in quantity questions is inserted with *shao* whose function is to introduce a quantity variable. Before going to the detailed analysis of the degree system in Chinese, 5.1 presents some important properties of degree questions in Chinese. Section 5.2 then gives a thorough discussion about Chinese gradability questions. The syntactic analysis of quantity questions is given in section 5.3. Then a comparison between *ji* and *duo-shao* is dealt with in section 5.4. Section 5.5 talks about the semantic property of *shao* in quantity questions. The island effect of questions is discussed in 5.6. The final section then concludes this chapter.

5.1 The Properties of Chinese Degree Questions

The degree system in Chinese possesses the following important properties. First of all, there is no counterpart of English pro-form *so* in Mandarin Chinese. (English from Cover 1997):

 (121) a. John seems very fond of Mary, and Bill seems so too.

    b. John is fond of Mary. Maybe he is too much so.

It is by the performance of the pro-form *so* that Corver (1997) argues that there is a clear distinction between determiner-like degree items and quantifier-like degree

items as already mentioned in chapter 2. Therefore, just as what is observed in Hakka, it's not for sure whether there is such distinction in Chinese.

Second, the m-words in Chinse (*duo*/*shao*) cannot co-occur with a determiner.

(122) *zhexie   henduo/shao   xuesheng   zai   nali   chi   pingguo

      these   few/many   students   at   there   eat   apple

      'These few/many students are eating apples there.'

As shown, the fact that m-words are not able to co-occur with demonstratives suggests that m-words are determiner-like in nature. Third, quantity questions could be formed in two ways: by *ji* (123a) or *duo-shao* (123b).

(123) a.   ni   mai   ji   *(ke)   pingguo

      you buy   how-many   Cl.   apple

      'How many apples do you buy?'

   b.   ni   mai   duo-shao   (ke)   pingguo

      you buy   how-many   Cl.   apple

      'How many apples do you buy?'

Besides, when *duo-shao* is used, the occurrence of a classifier is not necessarily required; however, when *ji* is used, the absence of a classifier will cause the sentence to be ungrammatical.

For the degree system in Chinese, most research agrees that there is a functional DegP over AP. However, in the thesis, I argue a multiple layer analysis for degree questions (both gradability questions and quantity questions). In the degree questions, the degree operator *duo* projects JP. JP selects QP; QP then selects the complement
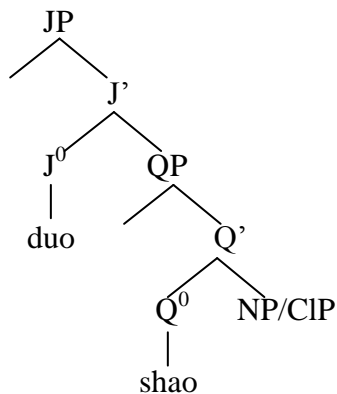
that contains a degree variable <q> or <g>. Again, that a multiple layer analysis is corroborated with ancient usage of degree words as what have already been talked about in chapter three. As a result, I assume that the degree system in modern Chinese has the following structure.
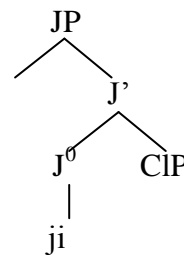
(124) modern Chinese

    a. Gradability questions
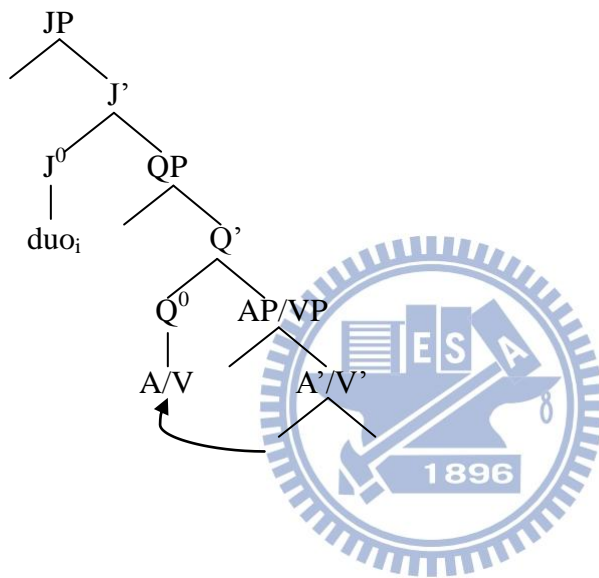
    b. Quantity questions with *duo-shao*   c. Quantity questions with *ji*

As (124a) shows, scalar verbal predicates are raised to Q^0 in gradability questions. The motivation for movement comes from a local binding relation between the degree

binder and the degree variable (Corver, 1997). When the element carrying with a degree variable is not allowed to move to QP, the sentence become ungrammatical; therefore, *duo* is not able to express a quantity question, To present a quantity question, QP must be inserted with *shao* whose presence save the binding relation between the degree operator and the quantity variable by copying the variable carried by a noun. This phenomenon can also be found in ancient Chinese which we have briefly discussed in chapter 2. *Duo* in ancient Chinese has dual indentify. It is based generated under QP in quantity questions and appears at the head of JP in gradability questions. However, for the unknown reasons of language change, it moves up to JP, replacing the function of *ji* in gradability questions in modern Chinese, and it combines with *shao* in quantity questions.

(124c) shows another formation of quantity questions with *ji*. It seems to preserve the ancient usage in old Chinese so that I suggest that when *ji* is used in a quantity question, there might not be QP layer just as what it does in old Chinese.

5.2 The Syntax of Gradability Questions

Following Corver (1997), it is assumed that JP and QP are extended functional layers of AP. And based on Zwart (1992), Corver (1997), and Doetjes (1997), it is argued that the scalar adjective carries a grade variable <g> which is bound by a degree operator. Moreover, different from what Corver claims, I suggest that in the degree system of Chinese, like Hakka, the degree binder heads JP, and QP is not itself a binder. Therefore, no vacuous quantification occurs, when both the head of DegP and QP co-occur. The following shows the syntactic structure of gradability questions in Chinese.

(125) ni   duo gao?

you how tall

'How tall are you?'

```
        CP
       /  \
          IP
         /  \
       ni    I'
            /  \
          i⁰    JP
               /  \
                  J' <*g>
                 /  \
               J⁰    QP <*g>
               |    /  \
              duo      Q' <*g>
                      /  \
                    Q⁰    AP
                    |      |
                gao<*g>   A'
                           |
                           tᵢ
```
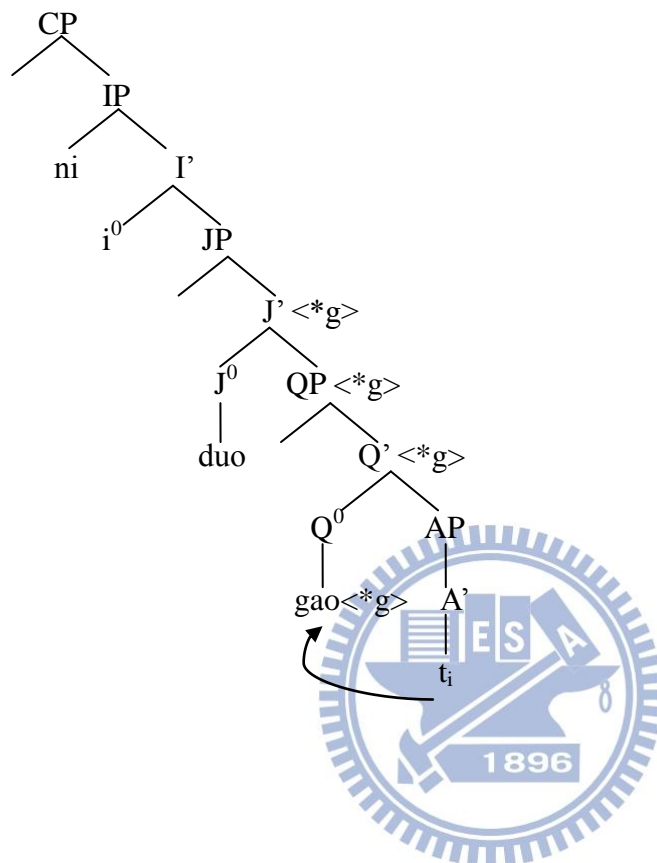
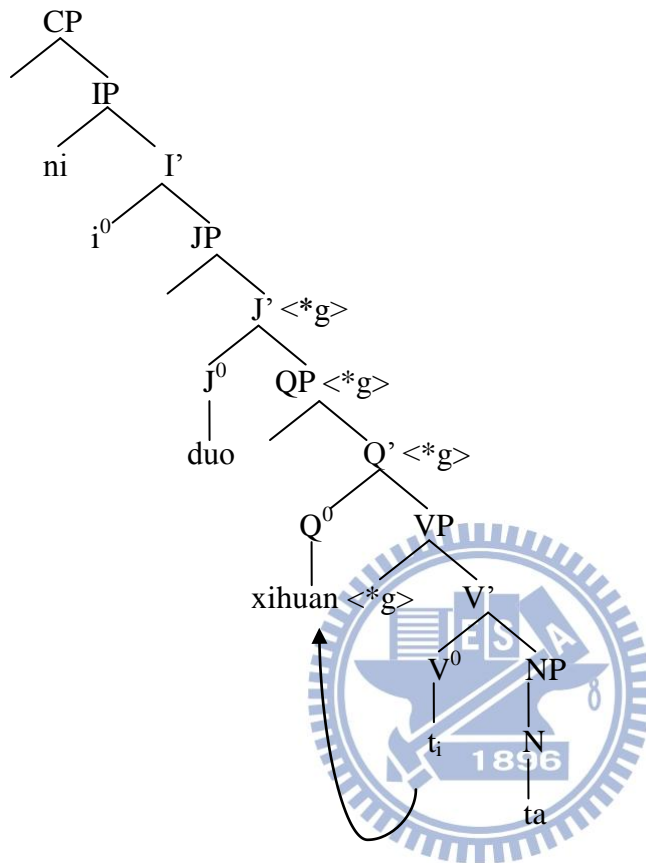As the structure shows, following the principle of local binding relation that a degree binder needs to bind its variable locally proposed by Corver (1997)[11], there is a A^0-to-Q^0 movement. The gradable adjective, *gao*, moves from A^0 to Q^0 carrying a grade variable, which is bound by the degree operator *duo*.

(126) shows the syntactic structure of a gradability question of VP.

---

[11] See 2.1.3 for reminder.

(126) ni duo   xihuan ta

    you how-much like him

    'How much do you like him?'

```
          CP
         /  \
           IP
          /  \
        ni    I'
             /  \
           i⁰    JP
                /  \
              J' <*g>
             /  \
           J⁰    QP <*g>
           |    /  \
          duo   Q' <*g>
               /  \
             Q⁰    VP
             |    /  \
          xihuan <*g>  V'
                      /  \
                    V⁰    NP
                    |     |
                    tᵢ    N
                          |
                          ta
```

The gradable predicate with a grade variable raises to Q^0 position for local binding

relation between the binder *duo* and the degree variable.

In chapter 4, when discussing the gradability questions in Hakka, I have shown

that stage-level verbs are unable to show up in gradability questions since they carry a

quantity variable and that only scalar psycho-individual verbs are carrying with a

grade variable. More examples (127) are given in Mandarin Chinese here to prove the

statement.

(127) a. ta pao   san   gongli   le

         he run three kilometers   SFP

         'He has run for three kilometers.'

      b. ta chi-le   ban   ke   pingguo

         he eat-LE   half   Cl.   apple

         'He has eaten half of the apple.'

As shown, how long the distance a runner has completed in the running event is measured in (127a); three kilometers presents the quantity of distance. The same story can be observed in (127b) where the event of eating is measured by how much food has been eaten, and half of the apple show the quantity of that event. The examples validate the assumption that stage-level verbs are able to carry a quantity variable so that the event that denoted by verbs can be measured.
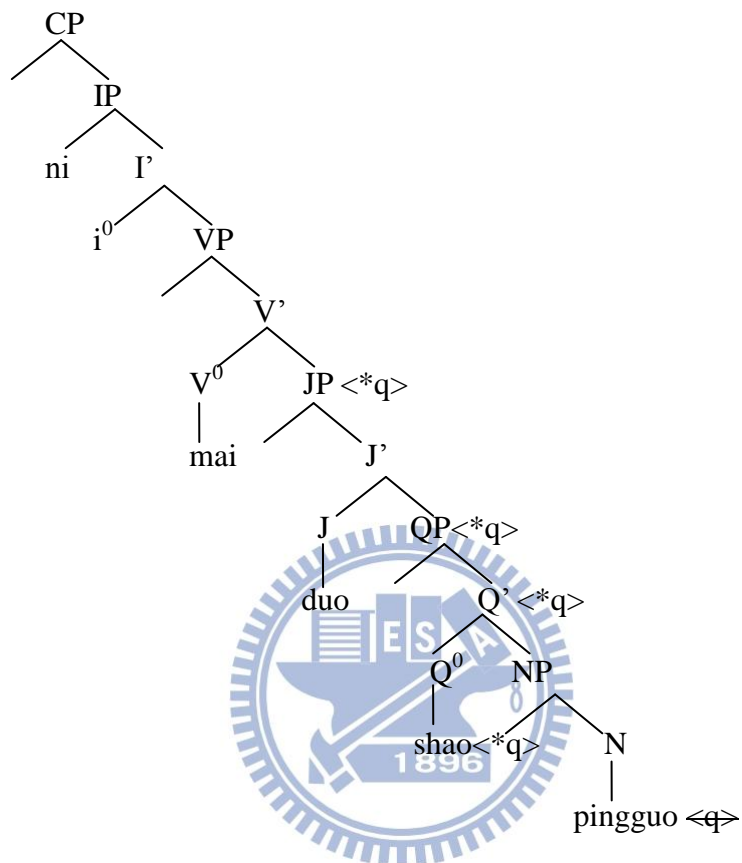

5.3 The Syntax of Quantity Questions

    Based on the description in 4.1, the syntactic structure of degree questions with *duo-shao* then have the following structure:

(128) ni mai duo-shao pingguo?

you buy how-many apple

'How many apples did you buy?'

```
                    CP
                   /  \
                      IP
                     /  \
                   ni    I'
                        /  \
                      i⁰    VP
                           /  \
                          V'
                         /  \
                       V⁰    JP <*q>
                       |    /  \
                      mai      J'
                              /  \
                             J    QP<*q>
                             |   /  \
                            duo      Q' <*q>
                                    /  \
                                  Q⁰    NP
                                  |    /  \
                              shao<*q>   N
                                         |
                                    pingguo <q>
```

In quantity questions, a noun carrying a quantity variable is bound by the degree operator *duo* to form a degree structure JP. Importantly, the quantity variable here is not allowed to be bound by *duo* directly based on the reason that *duo* itself can only directly bind or modify a gradable verbal predicate. Since the noun *pingguo* is not a gradable verbal predicate, the binding relation cannot be directly established between them.

This explains the appearance of *shao* whose function is much like a supporter to save the binding relation between a noun and *duo*[12]. Here *shao* copies the quantity variable carried by *pingguo*; then a local binding relation is formed between *duo* and the quantity variable.

Different from gradability questions which show a movement to QP, no such movement is observed in quantity questions. Instead, Q^0 in (128) is inserted with *shao* whose function parallels to English *much* in *too much so* that much copies the grade variable carried by *so* and *too* binds that variable (Corver, 1997).

5.4 *Duo-shao* versus *Ji*

This section focuses on the similarities and differences among the degree words in Chinese questions.

Both *ji* and *duo-shao* are able to question the amount of an object in degree questions. However, they do not contribute to the same meaning under the same contexts. For *ji*, Chao (1968) points out that it acts as a numeral which is able to appear with classifiers and that it has both question and indefinite meaning. Hsieh (2008) also states that *ji* is a vague numeral which cannot appear without classifiers. It is claimed that the only difference between *ji* and a normal numeral is that the formal denotes a vague number. In addition to it, Hsieh assumes that *ji* occupies the same position as a numeral does. Agreeing with Chao (1968) and Hsieh (2008), I follow their analysis that *ji* is a numeral. Besides, when *ji* expresses indefinite meaning, it is generated under NumP (129b); however, when *ji* denotes a question (129a), a degree

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[12] Some may argue that *duo-shao* forms a compound word so that the two characters should not be placed under different layers on the syntax structure. It is possible that *shao* moves up to JP and forms a compound with *duo*, but this does not affect the fact that *shao* carrying a syntactic function of assisting the binding relation between *duo* and a quantity variable. Furthermore, since *duo* and *shao* can appear independently without each other under other contexts, placing *duo* and *shao* under different layers may cause no trouble here.

system JP is projected, thus *ji* is generated under JP.

(129) ta   mai-le   ji   ke   pingguo

    he   buy-LE   how-many/some   Cl.   apples

    a. 'How many apple did he buy?'

    b. 'He bought some apples.'

The syntactic position of *ji* is presented in (130).

(130)
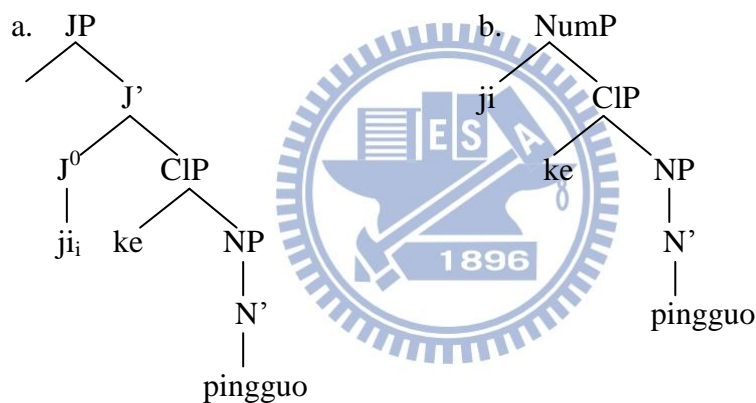
    (130) exhibits the ambiguous meaning of *ji*. (130a) denotes the question meaning and (130b) has an indefinite numeral meaning. When *ji* is used as expressing a question, it is a degree operator binding <q>; when it carries with an indefinite meaning, it has the same position as a numeral does. It should be noticed that although in (130a), *ji* acts as a degree operator, it is still itself a numeral-like element. This explains why there is no element under Q^0, deciding the type of variables for *ji*. Since *ji* itself in Chinese is a numeral, it asks for a specific number of an object, and thus its presence requires the modified domain to be nominal. Interestingly, when a determiner occurs, no ambiguous meaning is generated; only the indefinite meaning is

generated (131).

(131) ta mai-le   zhe   ji   ke   pingguo

    he buy-LE   the some Cl.   apple

    a. 'He bought some apples.'

    b. '*How many apples did he buy?'

The other thing that makes *ji* differ from *duo-shao* on their surface forms is the appearance of a classifier. The absence of a classifier will not result in the ungrammaticality in a *duo-shao* questions; however, it will result in the ungrammaticality of a *ji* question as the following shows (132).

(132) a. ni   mai-le   duoshao   (ke) pingguo?

    you buy-LE how-many   Cl. apples

    'How many apples did you buy?'

   b. ni   mai-le   ji   *(ke) pingguo?

    you buy-LE   how-many   Cl. apples

    'How many apples did you buy?'

The fact that *ji* is a numeral-like lexical word accounts for the requirement of a classifier since numerals in Chinese are not able to be separated without classifiers under most contexts. In contrast, *duo-shao* is not a numeral, so a classifier is not required to present obligatorily.

(133) a. zhexie   duo-shao   qian?

      these   how-much   money

      'How much is it?'

  b.*zhexie   ji   qian?

      these   how-much money

  c. zhexie   ji   kua qian?

      these   how-much   Cl. money

      'How much is it?'

For some noun that usually occurs without a classifier, it usually comes with *duo-shao* but not *ji*, unless a suitable classifier is inserted (133c).

Then for a non-numeral degree word, *duo-shao*, why is it the case that a classifier can optionally occur like what (134) shows?

(134) a. ni   mai duo-shao   ke pingguo

      you buy how-many Cl. apples

      'How many apples did you buy?'

  b. ni   mai duo-shao   pingguo

      you buy how-many apples

      'How many apples did you buy?'

It is found that classifiers in quantity questions are optionally occurred. When a classifier is used, it provides the dimension of measurement. Then the receiver needs to give an answer based on the amount/cardinality of an object with the same counting unit. In contrast, when a classifier is absent, any dimension of measurement is acceptable as long as that classifier is compatible with the lexical selection of the

counted object. For a language that the distinction between mass noun and count noun is unclear, usually there is some other tool for the language to show how nouns are calculated and classified. Furthermore, the presence of numerals usually requires the presence of classifiers, revealing the tight relation between numerals and classifiers. Therefore, as mentioned, the optionality of classifiers suggests the fact that *duo-shao* is not a numeral.

The following examples further demonstrate the difference between *duo-shao* and *ji*:
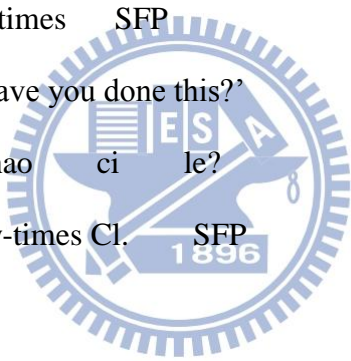
(135) a. zhe shi   di-ji-ci   le?

   this is   how-many-times   SFP

   'How many times have you done this?'

  b. *zhe shi   di-duo-shao   ci   le?

   this is   how-many-times Cl.   SFP

From (135), it's obvious that *ji* can be used as an ordinal number like a numeral while *duo-shao* cannot be used in the same way.

In addition to the just mentioned differences, another difference between *ji* and *duo-shao* involves their semantic contribution to the question. For one thing, *duo-shao* and *ji* looks at their complements from different aspects. *Duo-shao* is involved with a cumulative property of its complement, while *ji* asks a specific number of its complement. As a result, *duo-shao* is ungrammatical in (136b) because the question is about the specific point of a time; it does not involve the cumulating property or the duration of time. In (137), both *ji* and *duo-shao* are perfect. (137a) and (137b) encode almost the same meaning with slight difference. (137a) asks the cumulating time of one's duration of running. In contrast, the duration of time is then

viewed as an amount of the time, so what the *ji* question concerns is the exact number of that amount. Therefore, both (137a) and (137b) are grammatical.

(136) a. zhanlan   shi   ji-dian   kaishi?

     exhibition   is   how-many-times start

     'When does the exhibition start?'

   b. *zhanlan   shi   duo-shao-dian   kaishi?

     exhibition is   how-many-times start

(137) a. ni   pao-le   ji   ge   zhongtou?

     you run-LE   how-many Cl,   hour

     'How many hours did you run?'

   b. ni   pao-le   duo-shao   ge zhongtou?

     you run-LE   how-many Cl. hour

     'How many hours did you run?'

(138)   ni   daodi   yiayi-le   duo-shao   cingxu

     you on-earth repress-LE   how-much emotion

     'How much emotion on earth did you repress?'

(138) further shows that *duo-shao* is related to the cumulative property of the abstract noun, and it is hard to find an appropriate classifier with *ji* to quantify that abstract noun.

    Lastly, the difference between *ji* and *duo-shao*, as already pointed out by Chao (1968), lies in the phenomenon that the amount that *ji* can refer to is much smaller than *duo-shao*.

(139) a. Question: lai   le   ji   ge   xuesheng?

　　　　　　　come   how-many   Cl.   student

　　　　　　'How many students come?'

　　　Answer: (a) lai   le si   ge   xuesheng

　　　　　　　come   four   Cl.   student

　　　　　　'Four students come.'

　　　　　(b) ?? lai   le   si-qian   ge   xuesheng

　　　　　　　come   four-thousand   Cl.   student

　　　　　　'Four hundred students come.'

As (139) show, if the answer to the question is four thousand, it tends to be unacceptable under the context. Therefore, if the asked amount is expected to be big, we usually use *duo-shao* instead of *ji*.

　　To sum up, *ji* differs from *duo-shao* in three aspects: (1) the ambiguous meaning, (2) the occurrence of classifiers, (3) cumulative property or specific number, (4) the amount it can refer to.

5.5 The Semantics of *Shao*

　　Just like what we see in Hakka that *do* is a scalar determiner based on Hackle's assumption (2000), I assume that *shao* in Mandarin Chinese also plays the same role of scalar determiner in degree questions according to the observation that minimal number requirement is observed.

(140) a. ??chaoguo san ge xuesheng zhan zai   si   ge   jiaoluo

　　　　　more   three   Cl. student   stand at   four   Cl.   corner

　　　　'??More than three students are standing at four corners.'

b. zui-shao   you si   ge xuesheng zhan zai   si   ge   jiaoluo

at-least   have four Cl. student   stand at   four   Cl.   corner

'At least four students are standing at four corners.'

That is, *more than three* and *at least four* are the so called semantically equivalent quantifier, therefore, the two sentences should have the same grammaticality, but it seems that (140b) is better than (140a). According to Hackle (2000), it's because that the quantifier itself has to be decomposed to the scalar determiner *many*, a degree quantifier and a measure phrase. Within this analysis, the structure is viewed as a comparison between two clauses (see chapter 2 section 2.2.2). The other clause-like structure is introduced by the scalar determiner *many* which thus resulting in the semantic clash between 3 and 4 in (140a) that fails to satisfied the minimal number requirement. In Mandarin Chinese, the scalar determiner in (140b) is thought to be *shao* and that no semantic clash is found between 4 (from matrix clause) and 4 (from comparative clause) in (140a)

Furthermore, *many* as a scalar determiner is encoded with an existential operator. If *shao* in Mandain Chinese is also encoded with an existential operator, the scopal interaction between *shao* and *duo* is predicted. This prediction is born out. (141) shows that quantity questions in Mandarin Chinese do not exhibit ambiguous reading when *duo-shao*+NP is placed under the modal verb *want* syntactically; only the amount meaning can be derived (141a). However, when *duo-shao +NP* is placed in front of modal verb *want*, the object reading is generated (141b):

(141) a. zhe ci-de   shuzhan,   Lisi   xiangyao mai   duo-shao   shu

　　this Cl.-DE book exhibition   Lisi   want   buy   how-many book

　　'*For this book exhibition, what is the number n such that there are n books

　　　that Lisi wants to buy?'   (Object reading)

　　'For this book exhibition, what is the number n such that Lisi wants it to be

　　　the case that there are n books that he buys?'   (Amount reading)

　　b. zhe ci-de   shuzhan,   duo-shao   shu shi Lisi xiangyao   mai-de?

　　this Cl.-DE book exhibitiom   how-many book is Lisi   want   buy-DE

　　'For this book exhibition, what is the number n such that there are n books

　　　that Lisi wants to buy?'   (Object reading)

　　'For this book exhibition, what is the number n such that Lisi wants it to be

　　　the case that there are n books that he buys?'   (Amount reading)

An amount reading in (141a) is generated when *duo* scopes over the modal verb want

and *shao* is under the scope of *want*. When both *duo* and *shao* scope over the modal

verb *want* in (141b), an object reading is interpreted. Therefore, (141) clearly show

that an individual (existential) quantifier and a degree quantifier is separately encoded

that the former is encoded in *shao* and the latter is encoded in *duo* so that the scopal

interaction happens.

Following this reasoning, I suggest that *shao* has the following denotation (142)

which is adopted from Hackle (2000).

(142) [[shao]]= λd. λP$_{<e, t>}$λQ$_{<e, t>}$.∃x [|x|= d & P (x) & Q(x)=1]

5.6 Island Effect

The following sentences show that no island effect is observed when a degree

phrase is in the island environment.

Gradability questions

(143) Subject island

    zhang duo   gao-de   ren   caineng dang moteer?

    grow how   tall-DE   person   can   be   model?

    'To become a model, how tall does a person need to be?'

(144) Complex NP island

    ni   xihuan duo gao-de   ren

    you like   how tall-DE   person

    'How tall a person do you like?'

(145) Adjunct island

    ta   zhang duo gao   yihou cai   tingzhi zhanggao

    he   grow how tall   after   can   stop   grow-tall

    'After how tall did he reach, then he started growing?'

Quantity questions

(146) Subject island

    yiao jia   duo-shao   pinggo   bijiao hao

    need add   how-many   apple   much good

    'How many apples does it need to add would be better?'

(147) Complex NP island

wo zhu zhe daoliaoli xuyao jia duo-shao-de   dan   caigou?

I cook this cook need add how-many-DE egg enough

'How many eggs do I need to cook this meal?'

(148) Adjunct island

ta zhuan duo-shao   qian   yihou cai kaishi luan   huaqian`?

he earn how-much money after then start waste spend-money

'After he earned how much money then he started to waste it?'

Therefore, it is assumed that those degree words in Mandarin Chinese are not wh-words, so they do not undergo wh-movement causing no island effect. Instead, an implicit question operator at [Spec CP] denotes the question meaning as (149) shows.

(149) $[_{CP}$ Op_i $[\ldots[_{JP}$ duo-shao/duo$_i$ $[\ldots\ldots]]$

As what I have claimed in Hakka, degree words in Mandarin Chinese also tends to behave more like a wh-nominal than a wh-adverbial in their way of forming a question.

Chapter 6

COMPARISON: ENGLISH, HAKKA AND MANDARIN CHINESE

This chapter aims to illustrate a thorough comparison among English, Hakka, and Chinese in degree questions. Section 7.1 deals with the differences between degree systems cross languages. Section 7.2 the wh-movement and island effect.

6.1 Degree Systems cross Languages: English, Hakka, and Mandarin Chinese

The degree system in English projects DegP and QP, but projects JP and QP in Hakka and Chinese. The reason that DegP is termed as JP is that no so-pronominalizion is found in Hakka and Chinese, so the distinction between determiner-like elements and quantifier-like element is not clear. However, as discussed in the previous chapters, the fact that degree words in Hakka and Chinese play different roles, suggesting that two layers are required for the degree system. The split degree system in English is separated to determiner-like degree elements under DegP and quantifier-like degree elements under QP. Both the two types are operators that need to bind a degree variable. In contrast, the split degree system in Hakka and Chinese are divided to JP and QP. Elements under the JP layer are degree operators such as Hakka *gid* and Chinese *duo*. For the QP layer, since it quantifies the following complements, the head of QP has the ability to select the type of degree variables, deciding the type of degree questions. What's more, the most important similarity among English, Hakka and Mandarin Chinese is that a A-to-Q movement is observed in gradability questions for the reason of local binding relation in the three languages.

Furthermore, elements under JP and QP exhibit differences between Hakka and

Chinese. In Hakka, it is shown that the elements (*do* and *DO*) under the head of QP possess an important function of selecting the presence of a variable. That is, the overt *do* selects and copies a quantity variable and the covert *DO* selects a grade variable. However, there is no such *DO* and *do* for selection in Chinese. In Chinese, *duo* and *shao* play the role of selection.

In gradability questions, *gid-DUO* is used in Hakka and *duo* is used in Chinese. Morevoer, Chinese *duo* actually possesses a much more restricted distribution than Hakka *gid* does. *Gid* can bind a quantity variable and a grade variable in Hakka. As for Chinese *duo*, it is only used in gradability questions. To form a quantity question, the support from *shao* is needed.

Besides, the obvious difference among the three languages is that DegP acts as an adjunct to VP in English gradability questions but not in Hakka and Chinese. According to Doetjes (1997), *much* in English has a wide distribution, and does not categorically select VP; therefore it behaves as an adjunct, and adjoins to VP. This can be further supported by the fact that *how much* moves without VP. It is well known that only a constituent can be moved. As for Hakka and Chinese, both the null element and *duo* selects <g> in degree questions. As a result, they do not act as adjuncts.

In quantity questions, *many* in English is restricted to nominal domain and thus *how many* behaves as extended functional layers of NumP but not as an adjunct that adjoins to NumP. Moreover, the variable that *many* carries is bound by *how,* and *how many* binds another variable <q> provided by NumP. That is to say, there are two degree variables in English in quantity questions. However, this is not the case in Hakka and Chinese. As mentioned, the only binder in Hakka and Chinese is the element that occupies the head position of JP, which is *gid* and *duo/ji* in quantity questions. Moreover, both Hakka and Chinese contain the word *ji* in their degree

92

systems. However, in Hakka, the *gid* always obligatorily occurs in every degree questions. In contrast, the *ji* in Chinese is not obligatorily required in all degree questions. It occurs only in quantity questions, and it is only used to ask the specific number of an object. And it is not able to co-occur with *duoshao*. As a result, *ji* in Chinese is characterized like a numeral whose meaning is much more concrete than that of *gid* in Hakka.

6.2 Wh-movement and Island Effect

Wh-words are obligatorily required to move to [Spec CP], thus island effect is found in English degree questions but usually not in Hakka and Chinese since degree words in Hakka and Chinese are not wh-words, they do not move to the highest CP level.

The fact that degree expression cannot occur within islands in English but can in Hakka and Chinese shows that degree expressions in Hakka and Chinese do not move to the matrix clausal position at LF. The test of PLA further supports this argument. The Principle of Lexical Association (PLA) is proposed by Tancredi (1990):

(150) Principle of Lexical Association

An operator like only must be associated with a lexical constituent in its

c-command domain.

Aoun and Li (1993) further argue that PLA should be applied to both overt and covert movement. Thus, it provides a test for the presence of a movement. Based on Tsai's analysis (1994) that wh-nominals do not undergo movement but wh-adverbials undergo covert movement, wh-nominals are predicted to occur with *only* while wh-adverbials cause ungrammaticality (151-152).

(151) wh-nominals

    a. ta   zhi xihuan shui?

    he only like   who

    'Who is the only person that he likes?'

    b. ta   zhi xihuan zuo   sheme?

    he only like   do   what

    'What is the only thing that he likes to do?'
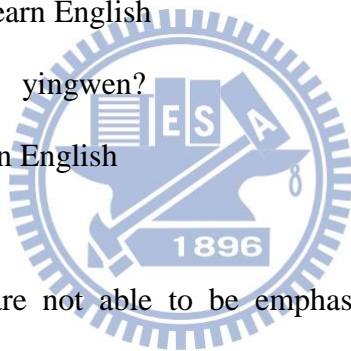
(152) wh-adverbials

    a. *ta zhi weishenme xue   yingwen?

    he only why   learn English

    b.*ta zhi   zenme xue   yingwen?

    he only how   learn English

As shown, wh-adverbials are not able to be emphasized by *only* because of the violation of PLA. If degree words in Hakka and Chinese are wh-adverbials that move at LF, the violation should also be observed. However, (153) shows that degree words do not move but stay in situ.

(153) a. ta zhi   xihuan duo gao   de ren?

    he only like   how tall   person

    'How tall a person does he only like?'

    b. ta zhi   mai duoshao   ke pinggou?

    he only buy how many Cl. apple

    'How many apples did he only buy?'

From the observed data, it is then reasonable to infer that the counterpart of degree *how* in Chinese and Hakka is not wh-adverbials but parallels much to wh-nominals. Or as the analysis given in this thesis, degree words themselves do not belong to wh-words.

Chapter 7
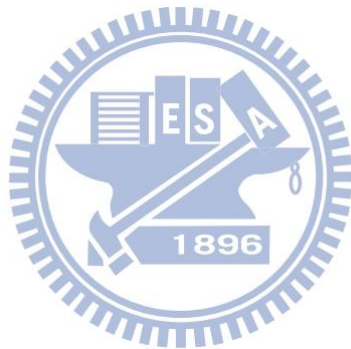
CONCLUSION

This thesis examines syntactic structure and semantic properties of degree systems in Hakka and Mandarin Chinese. Two types of degree questions are on the concern: gradability questions (expressed with *gid* in Hakka and *duo* in Mandarin Chinese) and quantity questions (expressed with *gid-do* in Hakka and *duo-shao* in Mandarin Chinese). Since both Hakka and Mandarin Chinese have a lot to do with ancient Chinese, the exhibition of degree questions in ancient Chinese is discussed in chapter 3. It is shown that the usage of degree questions on *ji* occurs in old Chinese. *Duo-shao* and *ji-duo* are found in late middle Chinese to have the usage of expressing degree questions. As for *duo*, it is not until Yuan Dynasty does its usage in degree questions being found. Therefore, the data from ancient Chinese show that the degree system in Chinese evolves from single layer to two layers. Thus, I propose a multiple layer analysis for both Hakka and Mandarin Chinese for their degree systems. The property of Hakka degree questions is discussed in chapter 4. It is shown that the degree operator *gid* heads JP which selects QP as its complement. Under QP, two elements might occur; one is the overt *do*, the other is the covert *DO*. On the one hand, the appearance of the overt *do* requires the presence of a quantity variable. Therefore, only nominal items with quantity variables are allowed to show up with the overt *do*. The overt *do* then copies the variable from the following noun and forms a local binding relation with *gid*; this is how a quantity question is constructed. On the other hand, the covert *DO* requires the presence of a grade variable. As a result, only scalar verbal predicates with grade variables can co-occur with *DO* in gradability questions.

Aside from its syntactic structure, it is proposed that the overt *do* plays a role of scalar determiner in forming a quantity questions based on the observation of minimal number requirement (Hackle, 2000) and the scopal interaction of different quantifiers. Then in chapter 5, how the degree questions are constructed in Mandarin Chinese is discussed. In Mandarin Chinese, I also propose a multiple layer analysis. JP is headed by *duo*, and QP is headed by *shao*. In gradability questions, a scalar predicate is raised to QP to form a binding relation with the binder *duo*. No such movement is observed for nouns in quantity questions. The quantity variable carried by a noun is copied by *shao* whose function is to regulate and copy the type of variables in order to form a binding relation with the degree operator *duo* to construct a quantity question. Moreover, it is also argued that *shao* behaves as a scalar determiner in Mandarin Chinese. Furthermore, it is argued that the degree operator *gid* does not move to the highest [Spec CP] at LF based on the fact that no island effect is observed when a degree phrase occurs in an island environment. This also is what happens to Hakka. Therefore, I suggest that there is a question operator in degree questions to form a question through binding in Hakka and Mandarin Chinese. Lastly, in chapter 6, a comparison among English, Hakka, and Mandarin Chinese is made.

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