# The Degree Argument and the Definiteness Effect

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## 0. Introduction

Traditionally, gradable adjectives are considered as relating individuals to degrees, and comparatives are analyzed as involving quantification over degrees (Cresswell 1976, Hoeksema 1983, von Stechow 1984, Heim 1985). For example, the gradable adjective *tall* can be interpreted as in (1), and a simple comparative structure in (2) is interpreted as in (2b), assuming the maximality operator in (2a) (Rullmann 1995).

(1) $[[\text{tall}]] = \lambda d_d.\lambda x_e.$ x is tall to degree d (Heim 2000)

(2) X is taller than Y is.

a. $_{MAX}(D) = \iota d \in D\ [\forall d' \in D: d \geq d']$ (Rullmann 1995)

b. $\exists d_1[d_1 > {}_{MAX}(\lambda d_2 \text{ tall } (y, d_2))][\text{tall } (x, d_1)]$

Syntactically speaking, this analysis suggests that the two seemingly discrete elements, the degree head *–er*, and the *than*-phrase, form one constituent which serves as the degree argument at some point of the derivation. One advantage of this proposal is that it naturally connects comparatives with other degree constructions (Bresnan 1973):

(3) a. X is **[-er than Y is]** tall

|

the degree argument

|

b. X is **[six-feet]** tall.

Both the semantic and the syntactic analyses of the degree argument have attracted some attentions in the literature. First, there is a debate as to whether we need to postulate a degree argument. Second, the conclusion drawn from this debate directly affects the syntactic structure of comparatives. This paper mainly addresses the first issue, and defends the traditional view that comparatives involve quantification over degrees. At the end of this paper, I will also briefly discuss some consequence that the current analysis will imply for the syntactic structure of comparatives.

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## 1. Quantificational degree argument—the debate

Semantic ambiguity arising from scope ambiguity between two quantificational elements is very common in language. For example, depending on the scope interaction between the two quantificational DPs in (1), example (4) has two different meanings.

(4) Everybody likes a teacher.
  a. $\forall x \exists y$ [teacher (y) & x likes y]
  b. $\exists y \forall x$[teacher (y) & x likes y]

Under the interpretation of (4a), each person likes a different teacher; but under (4b) there is a specific teacher that everybody likes. If the inherent semantics of adjectives involve quantification over a degree argument, we expect to see their interaction with other quantificational elements, for example, quantifiers, negation, and intensional operators. Kennedy (1997) discusses these issues and finds no evidence to support that. Let's take a look at one example in which the subject of the comparative construction is a universal quantifier.

(5) Every squirrel on campus is bigger than my cat.
  a. $\forall x$[squirrel (x)][$\exists d_1$[$d_1 >_{MAX} (\lambda d_2$ big (my cat, $d_2$))]][big(x, $d_1$)]]
  b. $\exists d_1$[$d_1 >_{MAX} (\lambda d_2$ big (my cat, $d_2$))][$\forall x$[squirrel (x)] [big(x, $d_1$)]

If the degree argument of the adjective *big* (i.e. $d_1$) participates in scope ambiguities in sentence (5), we should have two interpretations as represented in (5a) and (5b). In (5a), the universal quantifier *every squirrel* takes scope over the degree argument $d_1$. (5a) says that every squirrel possesses a degree of bigness $d_1$, and $d_1$ exceeds $d_2$, which is the degree of bigness of my cat. This amounts to saying that each squirrel is bigger than my cat, and that is the natural reading we get for (5). When the scope between the two inverts, as shown in (5b), we get an interpretation that there exists a degree $d_1$ which exceeds $d_2$, the bigness of my cat, and every squirrel is $d_1$-big. (5b) forces a reading that every squirrel is the same size, which is not the natural reading we get from (5). Kennedy argues that similar facts also hold for negation and intensional operators, i.e., the degree argument fails to scope over them and does not give rise to semantic ambiguity. These facts cast serious doubts on the quantificational nature of the degree argument and Kennedy takes them further to argue that such a degree argument does not exist.

Heim (2000) argues that although Kennedy's observations are largely correct, the degree argument does show scope ambiguity in a number of limited cases. In particular, although the degree argument cannot scope over a higher quantificational DP, as in (5), nor over a higher negation, it can scope over some intensional predicates, for example, possibility sentence as in (6).

(6) (This draft is 10 pages) The paper is allowed to be less long than that.
  a. allowed [less than that]$_i$ [the paper is $d_i$ -long]
    i.e. the paper is not allowed to be longer than 10 pages.
  b. [less than that]$_i$ [required] [the paper is $d_i$ -long]
    i.e. the paper is not allowed to be as long as 10 pages

Heim acknowledges that the conclusion drawn from intensional predicates (also see Stateva 1999) is tentative, because besides the movement of the degree argument, there might be other ways to explain the ambiguity in (6). A stronger argument for the covert movement of the degree argument comes from its behavior in comparatives that contain Antecedent Contained Deletion (ACD). Following Wold (1995), Heim argues that moving the degree argument at LF is the crucial step to resolve ACD in (7).

(7) John was climbing higher trees than Bill was.

To understand (7), we have to first understand a similar sentence in (8).

(8) *John was climbing trees that Bill was.

Carlson (1975) noticed that ACD is degraded in a relative clause as (8), in which the head of the relative clause is a weak indefinite, especially an existentially read weak plural. This was explained in Diesing (1992) as a conflict between two contrary conditions. On the one hand, to resolve ACD, the DP *trees that Bill was* has to undergo quantifier raising (QR); on the other hand, on independent grounds Diesing claimed that existential bare plurals do not QR, instead they stay inside VP to get existentially bound via existential closure. In contrast to (8), the ACD in (7) can be resolved by only raising the degree argument but still leaving the bare plural inside the VP, as shown in (9).

(9) [-er than Bill was ~~-climbing $d_i$ -high trees~~]$_i$ [John was climbing $d_i$ -high trees]

To summarize, the scope property of the degree argument has been the main area for linguists to investigate whether there should be a quantificational degree argument. This approach seems to give us a mixed result. Following the discussion of ACD constructions in Heim (2000), in this paper I will further explore a different approach, namely, the degree argument and its syntactic movements. If we can find cases where the movement of the degree argument is absolutely necessary, we will have a strong case to support the existence of such an argument. Specifically, I will investigate the definiteness effect (DE) in attributive comparatives. I argue that the DE arises because, similar to some other LF wh-movements (Beck 1996), the movement of the degree argument is blocked by intervening quantifiers.

## 2. The Definiteness Effect

### 2.1. The definiteness effect in attributive comparatives

Lerner and Pinkal (1995) notice that attributive comparatives show a definiteness effect (DE). As shown below, the comparative DP has to be an indefinite DP.

(10) a. George owns a/some/a few faster car(s) than Bill (does).
b. *George owns every/the faster car than Bill (does).

They also notice that the indefiniteness effect is dependent on the explicit occurrence of a complement phrase (i.e., the *than*-phrase), since all of the examples in (11), which have no complement, are acceptable.

(11) a. George owns a faster car.
b. George owns every faster car.
c. George owns the faster car.

Beil (1997) attributes the DE above to a requirement on strong DPs that their domain has to be presupposed in previous context. Although his proposal might be independently needed for comparatives anyway, I will argue in the next section that it is not sufficient to account for the whole range of data of the definiteness effect in comparatives.

### 2.2. Beil (1997)

Beil (1997) noticed that for strong determiners, the observation about the lack of a complement phrase is correct only when there is a presupposed comparison set in the previous context. Consider the examples below:

(12) a. Of those cars, Sue bought one. George bought every faster car.
b. Sue bought a car. *George bought every faster car.
c. Sue bought a car. George bought a faster car.

Intuitively (12a) is preferred over (12b) because in (12a) there is a contextually given comparative instance (namely, Sue's car) that is taken from a contextually presupposed set (namely, of those cars). The absence of such a presupposed set does not matter for the weak DP in (12c). Beil attributes the difference to a general rule that strong quantifiers always presuppose their domain (Moltmann 1996), but weak ones do not. The interpretation of *every faster car* in (12a) depends on the presupposition of a set of cars, and that set is provided in context. Notice that the single instance *Sue's car* has to be a subset of some set of cars whose definition can have various instantiations, but mentioning Sue's car in the context of (12b) does not eliminate the ungrammaticality. Based on the contrast between (12a) and (12b), Beil argues that it is crucial that the domain of the strong quantifier is not just non-empty, but is also defined in the previous context.

The presupposition difference between strong and weak DPs is independently motivated by some other linguists too. Milsark (1974) argues that strong determiners are unambiguously presuppositional, whereas weak determiners are ambiguous between a presuppositional interpretation and a nonpresuppositional one, for example, the cardinal reading. For instance, the strong determiners in (13) presuppose the existence of ghosts. If there are no ghosts, the truth value of (13) is undefined.

(13) a. Every ghost danced in my house.
b. Most ghosts danced in my house.

On the other hand, the weak determiners in (14) are ambiguous. (14a) only asserts the existence of ghosts, it does not presuppose it. If it turns out there is no ghost in the house, the sentence is false, but if there are ghosts in the house the sentence is true. The sentence in (14b), usually with a stressed reading of the determiner, carries a presupposition of the existence of the ghost. It is read more like a partitive determiner, such as *some of the ghosts, three of the ghosts*.

(14) a. There is/are a/some/a few ghost(s) dancing in my house.
b. A/SOME/A FEW ghost(s) is/are dancing in my house, (the others are dancing in the street).

However, the presupposition property alone is not sufficient to explain the definiteness effect in attributive comparatives. For example, it is not clear how Beil's analysis can be extended to explain the cases where the comparative complements are explicit, although Beil claims it does. If we add a context to the original examples in Lerner and Pinkal (1995), the judgments are still similar:

(15) Of those cars, Bill owns some. George owns a/some/a few faster car(s) than Bill (does).
(16) Of those cars, Bill owns some. *George owns every/the faster car than Bill (does).

As Beil notes himself, in the following examples, even if there is a presupposed set (because *contestant* lexically presupposes the set of participants in a contest), there is a difference between the weak comparative DP and strong comparative DP.

(17) Sue defeated a stronger contestant than Al.
a. Sue defeated a contestant that is stronger than Al is.
b. Sue defeated a stronger contestant than Al did. (i.e. the contestant defeated by Sue is stronger than the contestant defeated by Al.)
(18) ?Sue defeated every stronger contestant than Al.[1]
a. Sue defeated every contestant stronger than Al.
b. *Sue defeated every stronger contestant than Al did (i.e. every contestant defeated by Sue is stronger than every contestant defeated by Al).

(17) has two interpretations. In the first reading, we are comparing the contestant defeated by Sue with another person Al; in the second reading we are comparing the person Sue defeated and the person Al defeated. When we change the indefinite DP in (17) to a definite DP in (18), we lose the second interpretation. If the domain presupposition requirement is the only difference between a weak and a strong DP, the contrast above is left unexplained. The same problem exists in the following examples:

[1] For some reasons, (18) sounds degraded to native speakers. Most people would prefer a word order like "…every contestant stronger than Al.". But the contrast between (18a) and (18b) is nevertheless robust.

(19) a. ?Of those cars, Sue bought a BMW. George bought every faster car than that BMW.
b. *Of those cars, George bought every faster car than Sue did.

The context "*of those cars,…*" provides a presupposed set of cars in both examples. However, the DE is avoided only in the (a) example.

To summarize, the presupposition account alone is not the desired solution. The alternative I will propose reduces DE in comparatives to an LF intervention effect laid out in Beck (1996). The basic idea is that at LF, in order to yield a final interpretation, the degree argument of the gradable adjective has to move across the DP head, namely, the determiner. Being quantificational, strong determiners will block such movements, but weak determiners will not. In the next section, I will review the discussion on the quantifier intervention effect, and propose my analysis of the DE.

## 3. The DE as an indication of the degree argument movement

### 3.1. The quantifier intervention effect at LF

The main finding in Beck (1996) is informally schematized as below, which indicates that quantifiers block LF movements.

(20) *[….$X_i$….[Q…[…$t_i$…]]]

The main arguments come from German split-quantifiers, as shown in (21) and (22).

(21) a. **Wen alles** hat Luise gesehen?
Whom all has Luise seen
Who-all did Luise see?
b. **Wen** hat Luise **alles** gesehen?
Whom has Luise all seen
Who-all did Luise see?

(22) a. **Wen von den Musikern** hat Luise getroffen
Whom of the musicians has Luise met
Which of the musicians did Luise meet?
b. **Wen** hat Luise **von den Musikern** getroffen
Whom has Luise of the musicians met
Which of the musicians did Luise meet?

In (21a), *wen alles* is originally one argument, but it can split in (21b); a similar case holds for *wen von den musikern* in (22). Since in the (b) sentences what is left behind is the restriction of the wh-phrase, the natural conclusion is that there are LF movements for the (b) sentences in order to have a complete quantifier argument to derive the correct interpretation. So *alles* in (21b) and *von den Musikern* in (22b) will move at LF to join *wen*. Interestingly, quantifier splitting is not allowed if there is another intervening quantifier.

(23) a. ?? **Wen** hat niemand **alles** gesehen?
Whom has nobody all seen
Who-all did nobody see?

b. ?? **Wen** hat keine studentin **von den Musikern** getroffen
Whom has no student of the musicians met
Which of the musicians did no student meet?

In (23), the quantifier *niemand 'nobody'* is intervening between the split quantifiers. Since that degrades the acceptability of the sentence, Beck concludes that the LF movement of *alles* and *von den Musikern* is blocked.

The above discussion is formalized into the following two definitions:

(24) **Quantifier-Induced Barrier (QUIB):**
The first node that dominates a quantifier, its restriction, and its nuclear scope is a Quantifier-Induced Barrier.

**Minimal Quantified Structure Constraint (MQSC)**
If an LF trace $\beta$ is dominated by a QUIB $\alpha$, then the binder of $\beta$ must also be dominated by $\alpha$.

Beck also notices that indefinite DPs do not generate the same kind of LF blocking effect as other quantificational structures. She suggests that only inherently quantificational elements can induce the LF blocking effect. Following Heim (1983), indefinites are variables with no inherent quantification force, so they do not induce the LF blocking effect.

Interestingly, the distinction between indefinite DPs and other DPs in terms of their quantificational status seems to find support in the discussion in Diesing (1994). Diesing argues that strong and weak DPs differ with their ability to QR. Strong DPs are quantificational; hence they can be raised by QR. On the other hand, only presuppositional weak DPs are quantificational and undergo QR. Cardinal (non-presuppositional) weak DPs are not quantificational and stay in-situ at LF. If this analysis is on the right track, it suggests that strong determiners or weak but presuppositional determiners will induce the LF intervention effect, but weak determiners will not. This assumption will become crucial for the discussion in the next section.

To summarize, strong determiners block LF movements, because they are genuinely quantificational, but weak non-presuppositional determiners are just variables with no inherent quantificational force, so they do not block LF movements. In my analysis in the next section, I will show that the DE arises as the result of an interaction between the LF movement of the degree argument and the strong/weak determiners.

### 3.2. A new proposal

Consider (25). Following Lerner and Pinkal (1995), (25a) is elliptical just as (25b) is. I also follow Chomsky (1977) in treating the clausal complement as a wh-construction.

(25) a. George ate a bigger cake than [Op Bill e].
b. George ate a bigger cake than [Op Bill did].

Following the traditional QR solution for ACD cases, (25a) will receive a derivation at LF as in (26):

(26) a. [a bigger cake than [Op Bill [e]]]$_2$ [George$_1$ [$t_1$ ate $t_2$]]

⇓

b. [a bigger cake than [Op$_j$ Bill [ate $t_j$]]]$_2$ [George$_1$ [$t_1$ ate $t_2$]]

As noted by Lerner and Pinkal, there is a problem for the above syntactic analysis. In the resulting structure in (26b), the wh-operator binds an individual variable. We know it is of an individual type because it is copied from another individual type variable, $t_2$. However, to derive a sensible interpretation, the wh-operator has to bind a degree variable. How can we connect the individual cake introduced by $t_j$ to its degree of bigness? Lerner and Pinkal's solution is to introduce an implicit anaphoric element that relates individuals to degrees. Let's call this anaphoric component $P_0$ and give it a semantic interpretation as (27), and the semantics of the comparative site of (26b) is given in (28):

(27) $\lambda Q \exists y[P_0(y,d) \wedge Q(y)]$

(28) $\exists y[P_0(y, d) \wedge \text{ate}(\text{Bill}, y)]$

Now we have a degree variable *d* that is derived from the individual variable. The wh-operator needs to be re-interpreted as binding the degree variable.

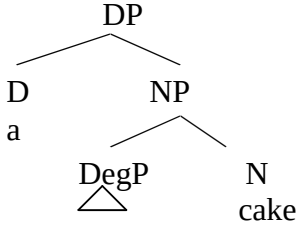
Although this analysis can give us the desired semantics, it is not an ideal solution. We not only need to introduce a hidden anaphoric element, but also have to reinterpret the wh-operator with no obvious syntactic support. I will suggest that we can apply QR again to solve the problem. Since the problem only arises for the DP in (26b), in my discussion I will separate it from the rest of the structure. The problem now is how to derive a degree variable that can replace the individual variable $t_j$ in (29):

(29) [$_{DP}$ a bigger cake than [Op$_j$ Bill [ate $t_j$]]]

If the gradable adjective *big* takes a degree argument, (29) actually has the structure in (30), namely *[-er than Bill ate]* is the degree argument of *big*. Following the tradition that modifiers are generated at [Spec, NP] position, (30) has a tree structure as (31):

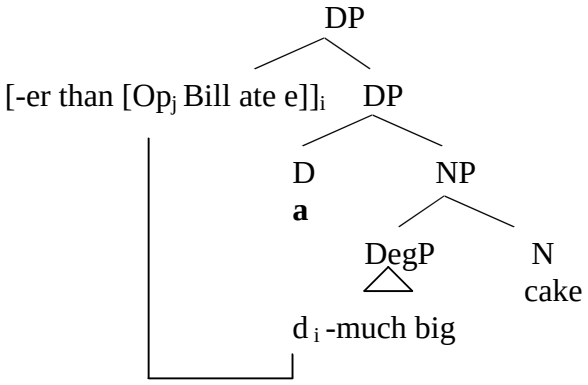
(30) [$_{DP}$ a [-er than [Op$_j$ Bill [ate $t_j$]]] big cake]

(31)



Since the degree argument is quantificational, it is able to QR again, as shown in (32):

(32) [-er than [Bill ate [e]] ]$_i$ [$_{DP}$ a [$_{NP}$ $d_i$-much big cake]]




Now a degree variable is available inside the NP. What we need is only copying that NP into the object position of *ate*, and that gives us (33):

(33) [-er than [Op$_j$ Bill ate [$d_j$-much big cake]] ]$_i$ [$_{DP}$ a [$_{NP}$ $d_i$-much big cake]]

In (33), we let the wh-operator bind the degree variable that is copied from the NP. Combining (33) with (26b), the final LF structure we derive is (34):

(34) [$_{DP}$[-er than [Op$_j$ Bill ate [$d_j$-much big cake]] ]$_i$ [$_{DP}$ a [$_{NP}$ $d_i$-much big cake]]]$_2$ [George$_1$ [$t_1$ ate $t_2$]]

Now we can read the meaning of (34) with no problems. (34) says George ate a cake that is $d_i$-much big such that $d_i$ exceeds the degree of bigness $d_j$ which is the size of the cake eaten by Bill.

One point is worth mentioning. In (33) what is copied is only the NP, not the DP, because there are reasons to believe that the determiner is not copied back to the ellipsis site (Lerner & Pinkal 1995, Lencher 1999). As shown below, the sentence *George ate a bigger cake than Bill* only has the interpretation in (35a), not (35b). The same point is shown by examples with other determiners, as in (36).

(35) George ate a bigger cake than Bill
  a. George ate a bigger cake than [Op$_i$ Bill ate **any** $d_i$-much big cake] (i.e. George ate a bigger cake than any of the cakes Bill ate)
  b. *George ate a bigger cake than [Op$_i$ Bill ate **a** $d_i$-much big cake] (i.e. George ate a bigger cake than a cake Bill ate)

(36) George ate at least two/three/at most three bigger cakes than Bill
  a. George ate at least two/three/at most three bigger cake than [Op$_i$ Bill ate **any** $d_i$-much big cake]
  b. *George ate a bigger cake than [Op$_i$ Bill ate **at least two/three/at most three** $d_i$-much big cake]

To summarize, we derive the interpretation of the sentence *George ate a bigger cake than Bill* by applying QR twice. First, the object DP undergoes QR in order to resolve ACD and recover the materials in the ellipsis site; second, the degree argument undergoes QR in order to establish a degree variable in the *than*-phrase. It is at the second step that the DE arises. As discussed in the last section, strong and weak determiners have different ability to block LF movements. When we QR the degree argument, as in (32), if there is a strong determiner in the way, that movement will be blocked, and derivation crashes.

## 4. Predictions

Since the current analysis crucially makes use of the movement of the degree argument, it makes two predictions. First, in cases where movement is not needed to derive the final interpretation, the DE will not emerge; second, if movement has to cross over an island, the derivation will fail. I will argue in this section that both predictions are borne out.

So far in my discussion the movement of the object DP is necessary in order to resolve ACD, and consequently one needs to move the degree argument. However, not all comparatives face the ACD issue. Lerner and Pinkal (1995) distinguish two kinds of attributive comparatives: the narrow reading (NRA) as in (37a), and the wide reading (WRA) as in (37b):

(37) a. George owns a faster car than this BMW.
b. George owns a faster car than Bill.

Crucially, Lerner and Pinkal argue that we should treat the two readings differently. The NRA readings are genuine phrasal comparatives and receive a direct analysis in the way Heim (1982) proposed. On the other hand, the WRA constructions are genuinely elliptical ACD constructions. To derive the WRA readings, the missing material in the comparative site (i.e. the materials contained in the *than*-phrase) has to be recovered first. The structural difference between two readings is demonstrated below:

(38) NRA: a. George owns a faster car than [$_{DP}$ this BTW]
b. Sue defeated a stronger contestant than [$_{DP}$ Al].
c. Sue defeated every stronger contestant than [$_{DP}$ Al]
(39) WRA: a. George owns a faster car than [$_{CP}$ Bill does]
b. Sue defeated a stronger contestant than [$_{CP}$ Al did].
c. Sue defeated every stronger contestant than [$_{CP}$ Al did]

For more details of this analysis, I refer readers to Lerner and Pinkal (1995). At this point, what is crucial for my purpose is that the NRA readings do not involve movements, but the WRA readings do. Interestingly, this explains some old data that are problematic for Beil (1997). Consider his original data again.

(40) Sue defeated a stronger contestant than Al.
a. Sue defeated a contestant that is stronger than Al is.
b. Sue defeated a stronger contestant than Al did. (i.e. the contestant defeated by Sue is stronger than the contestant defeated by Al.)

(41) ?Sue defeated every stronger contestant than Al.
   a. Sue defeated every contestant stronger than Al.
   b. *Sue defeated every stronger contestant than Al did (i.e. every contestant defeated by Sue is stronger than every contestant defeated by Al).

Recall the problem is that the presence of a weak determiner in (40) allows two interpretations of the sentence, but the strong determiner in (41) blocks one interpretation. In other words, the DE only arises for the (b) interpretations, but not the (a) interpretations. Interestingly, the (a) interpretations are exactly the same kind of interpretation as the NRA readings of (38), and the (b) interpretations are the same as the WRA readings of (39). That is to say, no movement is needed to derive the (a) interpretations, but (b) interpretations require movements. The contrast between (40) and (41) suggests that the DE is sensitive to syntactic movements, and this is exactly what the current analysis can capture. Specifically, weak determiners never induce the DE, as shown in (40). Strong determiners induce DE only when there is movement, as shown in (41). I summarize the results in the following table:

(42)

| | Involves Ellipsis? | Definiteness Effect? |
|---|---|---|
| Phrasal comparatives (the (a) interpretations) | NO | NO |
| Clausal comparatives (the (b) interpretation) | YES | YES |

The same approach extends to another contrasting pair observed earlier, repeated below for convenience:

(43) a. ?Of those cars, Sue bought a BMW. George bought every faster car than that BMW.
   b. *Of those cars, George bought every faster car than Sue did.

Again, (43a) is a case of NRA, and (43b) a WRA. The strong determiner *every* only shows a DE effect in (43b).

Let's use the following data to test the second prediction. As shown in (44), there exists a contrast between a pre-nominal modifier and a post-nominal modifier.[2]

(44) a. John met a taller girl than Bill did.
   b. *John met a girl who is taller than Bill did.

I hope it is clear now how (44a) can be derived. It should be derived in the same way as (25a). The exact same process applies to (44b), but problems arise as shown below. First, the whole object DP undergoes QR, and the predicate VP is copied into the ellipsis site,

[2] I thank Chris Wilder for pointing out this to me.

as shown in (45a) and (45b); in (45b) what is needed is a degree variable in the ellipsis site, but we have an individual variable, so the degree argument, as shown in (45c), needs to undergo QR again, as in (45d). It is at this step problems arise. The degree argument can not undergo QR because it is within a relative clause island. Since (45d) and (45e) can not proceed, the semantic interpretation would fail because there is no degree generated in the ellipsis site.

(45) a. [a girl who is taller than Bill [e]]$_j$ [John met $t_j$]
b. [a girl who is taller than Bill [met t]]$_j$ [John met $t_j$]
c. [a girl who is [-er than Bill met t] tall]$_j$ [ John met $t_j$]
d. *[[-er than Bill met t]$_k$ [ a girl who is $d_k$ -much tall]]$_j$ [ John met $t_j$]
e. *[[-er than Bill met [girl who is d-much tall]]$_k$ [ a girl who is $d_k$ -much tall]]$_j$ [ John met $t_j$]

## 5. The structure of comparatives

I have shown that, as has been assumed traditionally, comparative constructions do involve quantification over a degree argument. This conclusion has an interesting consequence on the structure of comparative constructions. First of all, structures that do not take into account such an argument need to be reconsidered. For example, the following structure proposed in Corver (1997) and Kennedy (1997) can not be completely correct.

(46) John is [$_{DegP}$ [$_{DegP}$ *–er* [$_{AP}$ tall] ] [$_{PP}$ than Bill is]]

Since the degree argument [–er than X (is)] is not a constituent on the surface of any comparative constructions, any proposal that integrates the degree argument into the structure has to account for the discrepancy between the surface word order and the degree argument. In the literature, there are two main syntactic proposals to handle this problem. The first one, which is also the traditional one, is proposed in Bresnan 1973, as shown in (47):

(47) John is [$_{AP}$ [$_{DegP}$ *–er* than Bill is] tall]

In this structure, the degree argument, *[-er than Bill is]*, is generated at the [Spec, AP] position, and some sort of extraposition takes place to move the PP, *than Bill is*, to the right of the AP and derive the correct word order. However, the process of extrapostion is empirically ungrounded (Lechner 1999).

The second proposal, which can derive the correct word order and also maintain the degree argument[3], is the shell structure (Larson 1991, Izvorski 1995, Xiang 2005), as shown in (48).

[3] There is a third proposal that can main the degree argument as well as the surface word order, which is the late merge analysis proposed in Bhatt and Pancheva (2004). However, evidence from Chinese (see below) does not seem to be easily accounted for by it.

(48) $[_{DegP}$ -er$_i$ $[_{DegP}$ $[_{AP}$ tall] $[_{Deg'}$ t$_i$ $[_{PP}$ than Bill is] ]]]

In this structure, the degree phrase has a complex shell structure. The degree head and the *than*-phrase form a constituent at the lower shell position. The degree head then moves to the higher DegP position to derive the correct word order[4].

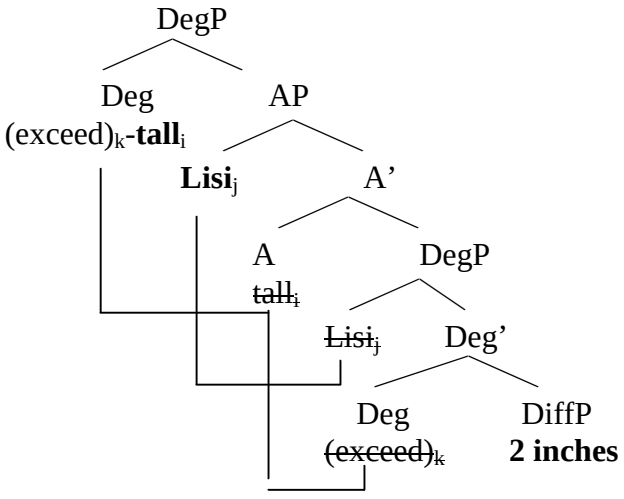
In the rest of this section, I will draw some preliminary data from Chinese (Xiang 2005) to support the shell analysis. Chinese in general has two ways to express the simple comparatives, as shown in (49):

(49) a. Zhangsan **gao** Lisi liang-cun (bare comparatives)
Zhangsan tall Lisi two-inch
'Zhangsan is two inches taller than Lisi'

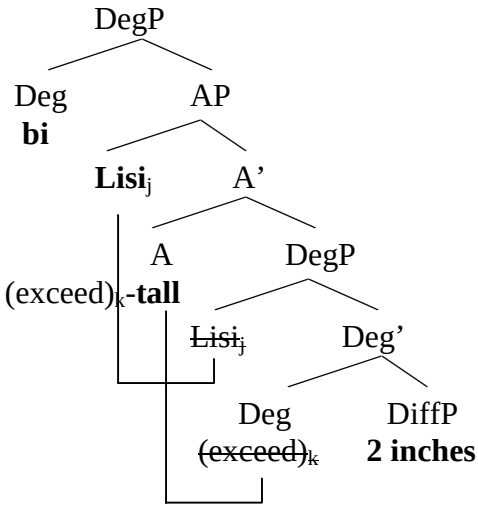
b. Zhangsan **bi** Lisi **gao** liang-cun (bi-comparative)
Zhangsan than Lisi tall two-inch
'Zhangsan is two inches taller than Lisi'.

In (49a), the standard degree argument *Lisi* is directly introduced by the adjective *tall*, but in (49b), the same argument is introduced by a functional morpheme *bi*. I will call (49a) the bare comparative, and (49b) the *bi*-comparative. Note that the two kinds of comparatives express the same meaning, but they have different word orders. As shown in (50), the two kinds of comparatives are easily connected in the shell structure through head movements.

(50) a. bare comparatives




b. bi-comparatives




I assume that there is an implicit degree head generated at the lower DegP structure. It undergoes head movement and incorporates into the adjective head. If the complex *Deg-A* head continues to move up to the higher Deg head position, it derives the bare

[4] This is an oversimplification. The movement of the degree head to the higher DegP position is actually motivated by the argument structure.

comparative. If on the other hand, a functional morpheme *bi* externally merges into the higher Deg head position, the *bi*-comparative is derived. One piece of evidence for the head movement analysis comes from reduplication facts in Chinese. Note that in the above analysis, the two structures differ minimally with respect to the head movement of the *Deg-A* complex head. Interestingly, in bare comparatives, the lower copy on the head movement chain can be spelled out in some circumstances. For example, when the lower copy of the Deg-A complex head is accompanied by focus, as in (51), or negation, as in (52), it emerges as a reduplication of the higher copy. Under these circumstances, the bare comparatives and the *bi*-comparatives share the exact same pattern.

(51) a. Ta **gao** wo jiu **gao** yi-diandian
He **tall** me only **tall** a little
'He is only a little bit taller than me.'

b. Ta **bi** wo jiu **gao** yi-diandian
He **than** me only **tall** a little
'He is only a little bit taller than me.'

(52) a. Ta **gao** wo **gao** bu liao dushao
He **tall** me **tall** not part. a little
'He is not much taller than me.'

b. Ta **bi** wo **gao** bu liao dushao
He **bi** me **tall** not part. a little
'He is not much taller than me.'

To summarize, the preliminary Chinese data presented in this section supports a DegP-shell structure, which has been argued for English data as well in Larson (1991) and Izvorski (1995). If this is on the right track, the degree argument is easily encoded in the lower DegP-shell position in the structure, and the surface word order is derived mostly through head movements.

## 6. Conclusion

In this paper, I show that the definiteness effect in attributive comparatives lends empirical support to the traditional view that comparatives involve quantification over a degree argument. Specifically, the definiteness effect emerges because the LF movement of the degree argument is modulated by the quantifier intervention effect. The syntactic structure of this degree argument is best characterized by the DegP-shell structure.

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