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A New Standard of Comparison

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1. Introduction

An intricate and well-known range of facts involving binding constraints, ellipsis, and scopal interactions indicate that the surface position of the standard constituent in English comparatives (the phrase headed by *than*) marks the scope of comparison (Gawron 1995, Bhatt and Pancheva 2004). For example, (1) is semantically ambiguous between the "sensible" reading in (1a), in which the modal verb *require* occurs within the scope of the comparison, and the "unlikely" reading in (1b), in which the comparison appears within the scope of the modal.

(1) California voters have been required to decide more ballot measures than Nevada voters.
   a. #(measures CA voters required to decide) > #(measures NV voters required to decide)
   b. it has been required: #(measures CA voters decide) > #(measures NV voters decide)

Under the "sensible" reading (1a), there is a certain number of measures that California voters must decide, and there is some other number of measures that Nevada voters must decide. Furthermore, the first number happens to exceed the second. Under the "unlikely" reading (1b), there is no specific number of measures that either group of voters must decide. Instead, what has been required is that California voters ultimately decide more of them than Nevada voters. A feature of this ambiguity is the way that it depends on the surface attachment site for the standard constituent *than Nevada voters*. The word order in (1) is consistent with both a matrix- and an embedded-level attachment site for the standard constituent. When the attachment ambiguity for the standard is ruled out, via the presence of an embedded VP adjunct, ellipsis resolution, or other means, the semantic ambiguity also disappears:

(2) a. California voters have been required to decide more measures than Nevada voters by a federal decree.
   b. California voters have been required to decide more measures by a federal decree than Nevada voters.

In (2a), the relative order of the standard constituent and the matrix adjunct *by a federal decree* (which we assume to be adjoined to the matrix VP) demands that the standard be attached at the embedded level. (2a) is also semantically unambiguous, and only possesses the "unlikely" reading. In (2b), the order of the standard and the adjunct is reversed, making the example consistent only with matrix-level attachment for the standard. And (2b) has only the "sensible" reading in (1a).

Based on facts like these, as well as other facts involving binding and ellipsis, Bhatt and Pancheva (2004, (39)) propose the following generalization concerning the relation between the surface position of the standard constituent and the scope of comparison.

(3) *The Extraposition-Scope Generalization (for degree expressions)*
   When a degree clause β extraposes from a degree head α, the scope of α is *exactly as high* as the merger site of β.

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(See (Gawron 1995, 342f) for two slightly different versions of this generalization.) Informally, the generalization in (3) states that the semantic scope of comparison corresponds exactly to the syntactic scope of the standard constituent. Bhatt and Pancheva account for this generalization by assuming that (i) the comparative morpheme *more*/*-er* must undergo Quantifier Raising for interpretability, and (ii) the standard constituent is merged countercyclically ("late merger") with *more*/*-er*, in the latter's post-QR position. Our first goal in this paper is to demonstrate that neither assumption is strictly necessary in order to account for the generalization in (3). In §2 and §3, we show that the same results can be derived under a much more direct mapping between the surface syntax and the semantic interpretation.

Crucial to our analysis is the hypothesis that both the comparative morpheme *more*/*-er* and the standard morpheme *than* contribute to the semantics of comparison. This represents a departure from the traditional wisdom about comparatives, which takes the semantics of comparison to be wholly introduced by the comparative morpheme, with the standard morpheme merely marking one of the terms of the comparison. Our second goal in this paper is to show that this hypothesis not only provides a viable alternative to Bhatt and Pancheva's late merger account of the Extraposition-Scope Generalization; it also provides a new way of understanding two observations about the expression of comparison across the world's languages. First, many languages (at least 32 out of 108 in Ultan's (1972) survey; see also Bobaljik 2012) lack any comparative morphology whatsoever. While it is possible that some of these languages include a phonologically null comparative morpheme (a counterpart to English *more*/*-er*), our analysis provides an alternative account of the facts: in these languages, the semantics of comparison is encoded by the standard morpheme alone. Second, in languages that morphologically mark the "phrasal vs. clausal comparison" distinction (Hankamer 1973), this marking is inevitably made in the language's standard morphology, and never in its comparative morphology. By encoding the semantics of comparison in the standard morphology, our analysis provides a basis for explaining why a difference in the standard's type is signaled in the form of the standard marker. In sections §4 and §5, we provide more details about how our proposal can shed light on these two cross-linguistic generalizations.

2. Two sources of comparative semantics

In this section, we spell out our basic assumptions regarding the semantic interpretation of English comparatives. There are different ways to implement our core analysis, depending on one's specific assumptions about the syntax of the adjectival projection and the lexical semantics of gradable adjectives. On the semantic side, we adopt the common view that gradable adjectives denote relations between degrees and individuals (Cresswell 1976, von Stechow 1984, Heim 1985, etc.). The adjectives *long, expensive*, and *happy* thus denote the relations in (4a-c), where the boldfaced expressions are functions that map individuals to degrees on the appropriate scales.

(4) a. $[\![\textit{long}]\!] = \lambda d \lambda x.\mathbf{long}(x) \geq d$
b. $[\![\textit{expensive}]\!] = \lambda d \lambda x.\mathbf{expensive}(x) \geq d$
c. $[\![\textit{happy}]\!] = \lambda d \lambda x.\mathbf{happy}(x) \geq d$

On the syntactic side, we will try to make as few theory- or construction-specific assumptions as possible, instead beginning with "naïve" assumptions based on superficial observations of word order and constituent structure, and departing from those only when we are forced to do so. In particular, we start from the assumption that the comparative morphology composes with the adjective and the standard marker composes with the standard, so that *long* and *-er* are a constituent in *longer than this*; *more* and *expensive* are a constituent in *more expensive than this*; and *than this* is a constituent in both.

Turning to our analysis, as stated above, our core semantic proposal is that both the comparative and the standard morpheme serve to encode the semantics of comparison. However, they do so in different ways: whereas the comparative morpheme simply combines with a gradable predicate to produce the corresponding comparative predicate, the standard morpheme instead combines with a degree property to produce a generalized degree quantifier. Our analysis thus unifies two different sorts of approaches to the comparative that one finds in the literature. On the one hand, comparative

semantics is invariably introduced by the comparative degree morphology, which has a purely local effect, turning the "basic" degree relation introduced by the lexical adjective into a comparative degree relation (von Stechow 1984, Kennedy 1999). At the same time, there is evidence (including facts like those discussed above) that the semantics of comparison (in English, at least) also involves a scopally active degree quantifier (see e.g., Heim 2000); our hypothesis is that the quantificational element of the comparative construction is just the expression whose superficial syntactic position correlates with scopal interpretation, namely the standard constituent.

Before presenting our proposed denotations for the comparative and standard morphemes, we first introduce a function that will play a role in both: the supremum function *sup* (= "least upper bound"). The *sup* function maps (the characteristic function of) a subset *D'* of some set *D* to the minimal *d* in *D* that is greater than or equal to every *d'* in *D'*. This function is mostly equivalent to the maximality function *max* familiar from much work on comparatives (see e.g., von Stechow 1984, Rullmann 1995), with the main difference being that the supremum of a set need not be an element of that set: the supremum of the set $\{n \in R \mid n < 1\}$ (the set of real numbers strictly less than 1), for example, is 1. This difference leads to the following equivalences, which will play an important role in our semantic analysis:

(5) $\forall \mathbf{m} \in D_{\langle e,d\rangle}, x \in D_e$:
  a. $sup(\lambda d.\mathbf{m}(x) \geq d) = \mathbf{m}(x)$
  b. $sup(\lambda d.\mathbf{m}(x) > d) = \mathbf{m}(x)$

Here, **m** is an arbitrary measure function, e.g., the one that maps an individual to its length (a component of the meaning of the adjective *long* in (4a) above), and *x* is an arbitrary individual, e.g., a particular rod. (5a) says that the supremum of the set of lengths that are less than or equal to the length of the rod is equal to the length of the rod. Here *sup* is equivalent to *max*, and the input to *sup* could be provided by the open sentence *the rod is d long*. (5b) says that the supremum of the set of lengths that are strictly less than the length of the rod, e.g., those lengths that satisfy the open sentence *the rod is longer than d,* is also the length of the rod. Here *sup* returns a value distinct from *max*.[1] For our purposes, what is important about the supremum function, as indicated in the equivalences in (5), is that it returns the same value regardless of whether a set of degrees is constructed from a "bare" gradable predicate (*long*) or its corresponding comparative form (*longer*). This will be crucial in the analysis that follows.

With this background in hand, let us now turn to our central proposal, which consists in the denotations for the comparative and standard morphemes in (6).[2]

(6) a. $[\![\text{COMP}]\!] = \lambda g_{\langle d,et\rangle}\lambda s_d\lambda x_e\,.\, sup(\lambda d.g(d)(x)) > s$
  b. $[\![\text{THAN}]\!] = \lambda S_{\langle d,t\rangle}\lambda T_{\langle d,t\rangle}\,.\, sup(T) > sup(S)$

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[1] Indeed, if measurement scales are dense (Fox and Hackl 2006), *max* will not even return a value given an input like the one provided to *sup* in (5b). In contrast, the equivalence in (5b) holds regardless of whether scales are dense or not.

[2] Because we have limited space in this paper, we ignore here the contribution of differential measure phrases such as *two inches* in *Rod A is two inches longer than Rod B is*. In short, the introduction of differentials requires modifying the denotations for COMP and THAN as shown in (i), and assuming existential closure over the differential argument *m* when it is not saturated by a measure phrase or other modifier, which makes (ia-b) equivalent to (6a-b), respectively.

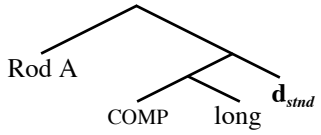
(i) a. $[\![\text{COMP}]\!] = \lambda g_{\langle d,et\rangle}\lambda s_d\lambda m_d\lambda x_e\,.\, sup(\lambda d.g(d)(x)) = s + m$
  b. $[\![\text{THAN}]\!] = \lambda S_{\langle d,t\rangle}\lambda T_{\langle d,t\rangle}\lambda m_d.\, sup(T) = sup(S) + m$

Compositionally, we also need to assume that differential phrases take scope above the standard constituent. We believe that these assumptions can all be derived without doing great violence to our overall assumptions about the syntax-semantics interface, but must leave a justification of this claim for an expanded version of this paper.

According to (6a), COMP maps a function of type <d,<e,t>> to another function of the same type, but changes the ordering relation from a partial to a total one. The difference between *long* and *longer*, then, is that the former holds of individual/degree pairs $\langle x,d\rangle$ such that the length of x is at least as great as d, while the latter holds of pairs such that the length of x is greater than d. According to (6b), the semantic function of THAN is quite different: it introduces a relation between functions of type <d,t> (the characteristic functions of sets of degrees) such that the supremum of its first argument (corresponding to the standard constituent) exceeds the supremum of its second argument (corresponding to the rest of the sentence, minus the standard). In other words, it combines with the standard constituent and derives a constituent of type <<d,t>,t>, a generalized quantifier over degrees.

To see how our analysis works, let us begin with the simple "intransitive" comparative in (7).

(7) Rod A is longer.



We assume that the standard degree argument to COMP in (7) is a definite implicit argument, which we represent for simplicity with the designated free variable $\mathbf{d}_{stnd}$ (subject to interpretation by an assignment function). This assumption, in combination with our proposed denotation for COMP, derives the following truth conditions for (7):

(8) a. $[\![long]\!] = \lambda d\lambda x.\mathbf{long}(x) \geq d$

b. $[\![longer]\!] = [\![\text{COMP}]\!]([\![long]\!])$
$= \lambda s\lambda x.sup(\lambda d.\mathbf{long}(x) \geq d) > s$
$= \lambda s\lambda x.\mathbf{long}(x) > s$ (by (5a))

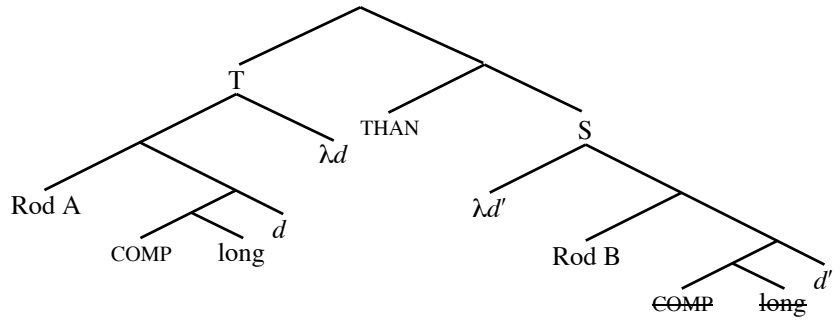
c. $[\![longer]\!](\mathbf{d}_{stnd})$
$= \lambda x.\mathbf{long}(x) > \mathbf{d}_{stnd}$

d. $[\![longer]\!](\mathbf{d}_{stnd})([\![Rod\ A]\!])$
$= 1$ iff $\mathbf{long}(\mathbf{Rod\_A}) > \mathbf{d}_{stnd}$

In (8b), COMP applies to the gradable predicate *long* to produce the two-place comparative predicate *longer*, which returns true if the length of its individual argument x exceeds its standard argument s. Note that the length of x comes to us via the supremum function *sup*, thanks to the equivalence in (5a). Successive instances of functional application yield the truth conditions in (8d), which require that the length of Rod A exceed whichever (contextually salient) length serves as the value for $\mathbf{d}_{stnd}$.

Things become more interesting when the standard argument is explicitly provided, as in (9).

(9) Rod A is longer than Rod B is.



Here we may assume either that the standard constituent extraposes from its base position, or that it is directly merged in its surface position, with a null operator or other λ-abstraction mechanism providing the necessary semantic dependency with the comparative predicate. (The latter assumption should straightforwardly derive the antireconstruction effects observed by Bhatt and Pancheva (2004)). Note that COMP appears twice in (9), once in the matrix clause T and again in the comparative clause S. Although this latter instance of COMP goes unpronounced, we assume that its presence is nonetheless required by the identity conditions governing comparative ellipsis. Given our previous

assumption that the standard morpheme THAN also encodes the semantics of comparison, it follows that comparative semantics is introduced in three separate positions in (9): twice by COMP, in the two occurrences of the comparative adjective *longer* (one in the matrix clause, and one in the comparative clause), and once by THAN. While this may appear problematic, we in fact derive the proper truth conditions, thanks to the equivalences in (5). To see why, consider the denotations that our analysis assigns to the matrix clause (T) and the comparative clause (S) in (9), shown in (10a-b).

(10) a. $[\![T]\!]$
$= \lambda d.[\![\text{COMP}]\!]([\![long]\!])(d)([\![Rod\ A]\!])$
$= \lambda d.\textbf{long}(\textbf{Rod\_A}) > d$

b. $[\![S]\!]$
$= \lambda d'.[\![\text{COMP}]\!]([\![long]\!])(d')([\![Rod\ B]\!])$
$= \lambda d'.\textbf{long}(\textbf{Rod\_B}) > d'$

For both clauses, the semantic interpretation is almost identical to that of our previous intransitive comparative in (7). The crucial difference lies in the binding of the standard degree argument to *longer*, which produces a set of degrees. In particular, the matrix clause T in (10a) denotes the set of lengths that are exceeded by the length of Rod A, while the comparative clause S in (10b) denotes the set of lengths that are exceeded by the length of Rod B. From the equivalence in (5b), the supremums for these two sets are the respective lengths of Rod A and Rod B. Since the denotation for THAN is also defined in terms of the supremum function *sup*, applying THAN to the comparative and the matrix clause yields the desired truth conditions in (11).

(11) $[\![\text{THAN}]\!]([\![S]\!])([\![T]\!])$
$= 1$ iff $sup(\lambda d.\textbf{long}(\textbf{Rod\_A}) > d) > sup(\lambda d'.\textbf{long}(\textbf{Rod\_B}) > d')$
$= 1$ iff $\textbf{long}(\textbf{Rod\_A}) > \textbf{long}(\textbf{Rod\_B})$ (by (5b))

What is crucial to observe about a comparative construction with an explicit standard constituent like (9), unlike our previous example (7) in which the standard was implicit, is that the sentence-level semantic force of comparison ultimately derives from the standard morpheme THAN, and not from the comparative morpheme COMP. This will generally be the case whenever there is an overt standard constituent, and is the source of the Extraposition-Scope Generalization, as we will see in the next section.

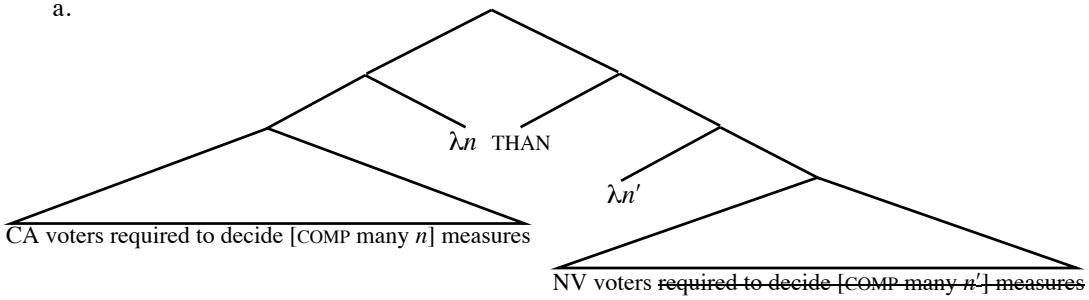
3. Deriving the Extraposition-Scope Generalization

Let us now see how our analysis accounts for the Extraposition-Scope Generalization in (3). We have just observed that the standard morpheme THAN will be responsible for introducing the sentence-level comparative semantics whenever an overt standard constituent is present. We have also claimed that the entire standard constituent headed by THAN will denote a generalized degree quantifier. It thus comes as no surprise that the semantic scope of the comparison is directly correlated with the syntactic scope of the standard constituent.

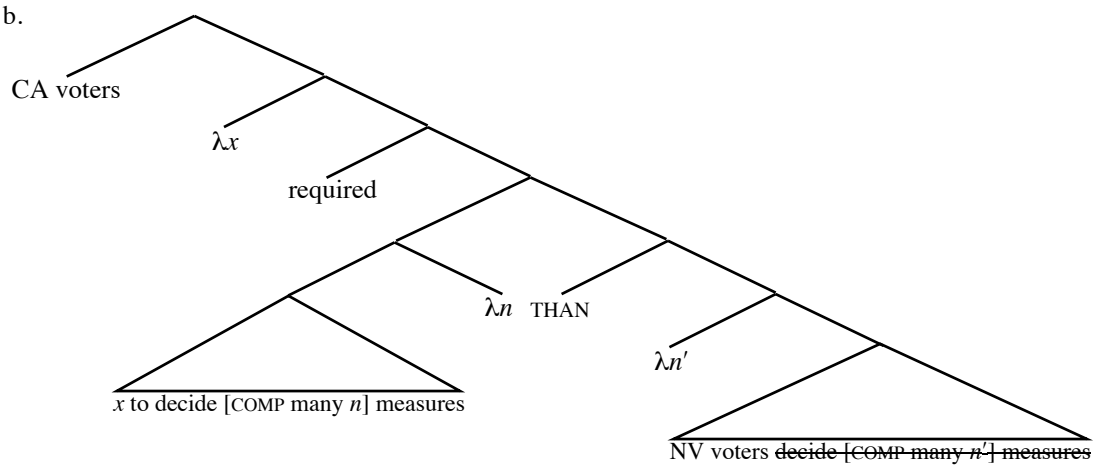
Recall that for our original example (1) (repeated below in (12)), there are two possible attachment sites for the standard.

(12) California voters have been required to decide more ballot measures than Nevada voters.

a.



b.



Attachment at the matrix level yields (12a), with the standard scoping over the modal, while attachment at the embedded level, as in (12b), produces the reverse scope relation. The truth conditions for the two possible structures are provided in (13).

(13) a. $sup(\lambda n.\forall w \in Acc : \exists x[\mathbf{decide}_w(x)(\mathbf{CA}) \,\&\, \mathbf{measure}_w(x) \,\&\, \#_w(x) > n]) >$
$sup(\lambda n'.\forall w' \in Acc : \exists y[\mathbf{decide}_{w'}(y)(\mathbf{NV}) \,\&\, \mathbf{measure}_{w'}(y) \,\&\, \#_{w'}(y) > n'])$

b. $\forall w \in Acc :\ sup(\lambda n.\exists x[\mathbf{decide}_w(x)(\mathbf{CA}) \,\&\, \mathbf{measure}_w(x) \,\&\, \#_w(x) > n]) >$
$sup(\lambda n'.\exists y[\mathbf{decide}_w(y)(\mathbf{NV}) \,\&\, \mathbf{measure}_w(y) \,\&\, \#_w(y) > n'])$

The high-attachment truth conditions in (13a) require the number of measures decided by California voters in those admissible worlds in which they decide the fewest to exceed the number of measures decided by Nevada voters in those admissible worlds in which they decide the fewest. Put more simply, (13a) states that the number of measures that Californians must decide exceeds the number of measures that Nevadans must decide. These truth conditions correspond to the "sensible" reading for (12). The low-attachment truth conditions in (13b) instead require every admissible world to be one in which the number of measures decided by California voters exceeds the number of measures decided by Nevada voters. In other words, (13b) states the existence of a requirement that Californians decide more measures than Nevadans. These truth conditions correspond to the "unlikely" reading for (12).

Given that the presence of these two readings hinges upon an attachment ambiguity for the standard constituent, we also predict that when no such structural ambiguity is present, the semantic ambiguity seen in (12) should disappear. This prediction is borne out by our earlier examples in (2) (repeated below in (14)).

(14) a. California voters have been required to decide more measures <u>than Nevada voters</u> <u>by a federal decree</u>.

b. California voters have been required to decide more measures <u>by a federal decree</u> <u>than Nevada voters</u>.

Because the matrix adjunct *by a federal decree* appears to the right of the standard in (14a), it follows that the standard must be attached at the embedded level. Hence, (14a) only possesses low-attachment, "unlikely" reading. In contrast, the word order in (14b) entails attachment of the standard at the matrix level, and so (14b) has only the "sensible" reading.

We see, then, that providing comparative semantics to both the comparative and the standard morpheme allows us to derive the Extraposition-Scope Generalization. Furthermore, we are able to do this while assuming a transparent mapping between the surface syntax and the semantic interpretation. In particular, there is no need to assume countercyclic merger of the standard constituent with a covertly scope-taking comparative morpheme. Instead, the scope-taking element is the constituent that

overtly occupies different positions in the representation, namely the standard marker, and its scope corresponds to the position that it occupies.

4. Comparatives with and without comparative morphology

A consequence of our analysis is that all of the configurations in (15) are predicted to be semantically equivalent, all other things being equal.

(15) a. X is [COMP A_1] [THAN Y is COMP A_2]
b. X is [COMP A_1] [THAN Y is A_2]
c. X is [A_1] [THAN Y is COMP A_2]
d. X is [A_1] [THAN Y is A_2]

According to the analysis in the previous section, (15a) is the structure of English comparative deletion constructions, with [COMP A_1] = [COMP A_2] and the latter deleted under identity with the former. (15b) is the structure of English "subcomparative" constructions like (16a), which our analysis assigns the correct truth conditions in (16b).

(16) a. The rod is longer than the hole is deep.
b. $sup(\lambda d.\mathbf{long}(\mathbf{the\_rod}) > d) > sup(\lambda d'.\mathbf{deep}(\mathbf{the\_hole}) \geq d')$
$= 1$ iff $\mathbf{long}(\mathbf{the\_rod}) > \mathbf{deep}(\mathbf{the\_hole})$ (by (5a) & (5b))

However, (15a) is ungrammatical when [COMP A_2] is not deleted or when [COMP A_1] ≠ [COMP A_2]; (15b) is ungrammatical when $A_1 = A_2$; and (15c) and (15d) are ungrammatical in English across the board, regardless of the identity relation between A_1 and A_2, or whether A_2 is deleted or not:

(17) a. *This rod is longer than that rod is longer.
a'. *This rod is longer than that hole is deeper.
b. *This rod is longer than that rod is long.
c. *This rod is long than that rod is (longer).
c'. *This rod is long than that hole is deeper.
d. *This rod is long than that hole is (long).
d'. *This rod is long than that hole is deep.

In other words, the generalizations about Standard English are as stated in (18):

(18) i. The matrix adjective must bear comparative morphology.
ii. The embedded adjective may not (overtly) bear comparative morpholology.
iii. If the embedded adjective is identical to the matrix adjective, it must be deleted.

Since our analysis assigns the same meanings to all of the constructions in (15) (modulo potential lexical differences in A_1 and A_2), it must be the case that the explanation for the observed pattern is a syntactic one.

Before providing our account of the English pattern, let us first observe that the fact of the equivalences in (15) is arguably a very positive result from a cross-linguistic perspective. This is because the structure in (15d), in which the gradable predicate does not bear comparative morphology at all, is a very common – possibly the most common – strategy for expressing comparison in the world's languages (Ultan 1972, Bobaljik 2012). For example, in Japanese comparatives the standard is marked by the postposition *yori* (which we gloss as THAN, but which is derived from a morpheme whose original meaning is 'from'; see Sawada to appear), but the gradable predicate is unmarked:

(19) a. Keiko-wa kasikoi desu.
Keiko-NOM smart is.
'Keiko is smart.'

b. Keiko-wa [Hanako-yori] kasikoi desu.
Keiko-NOM [Hanako-THAN] smart is.
'Keiko is smarter than Hanako.'

While it is possible that Japanese and other languages with superficially similar comparatives make use of a null comparative morpheme (see e.g., Beck, Oda, and Sugisaki 2004), and so have comparative constructions that are underlyingly identical to those in English, our analysis does not require such an assumption. Instead, we expect to find languages in which comparison is encoded entirely in the standard morphology, and there are (in effect) no comparative forms of gradable predicates. One indication that this may be the correct analysis of Japanese is that (19a) is unambigous: it has only a non-comparative meaning. In contrast, the corresponding form in Mandarin Chinese, which also lacks overt comparative morphology and instead indicates comparison by marking the standard with the morpheme *bi* (the categorial status of which is a subject of some debate; see Liu 1996, Xiang 2005), is ambiguous between a comparative and non-comparative interpretation:

(20) a. Zhangsan zhong.
Zhangsan heavy
'Zhangsan is heavy.' (!!except in matrix assertions; see Grano 2011)
'Zhangsan is heavier than some salient individual.'
b. Zhangsan bi Lisi zhong.
Zhangsan THAN Lisi heavy
'Zhangsan is heavier than Lisi.'

These facts can be naturally explained if we assume that Chinese has a null comparative morpheme, while Japanese lacks comparative morphology entirely.

Returning to English, our task is to derive the generalizations in (18). The explanation that we offer relies ultimately on a simple observation: there is a syntactic dependency between COMP and THAN. Traditionally, this has been taken to be a selection relation (Bresnan 1973), though we prefer to think of it as a form of agreement. Specifically, we hypothesize that English, like Chinese, requires a Deg head in the extended projection of the A, and that this head (COMP above) bears an inflectional feature [Deg:__] that is valued by an occurrence of a matching feature from a c-commanding phrasal XP, here the *than*P. The phrase headed by *than* naturally bears this feature by virtue of its projection from the head *than*, which we posit bears the categorial feature [Deg: COMP]. An application of Agree with *than*P as the controller of Agreement (the "goal") and Deg[Deg:__] as the target of Agreement (the "probe") will result in the value of this feature being represented on the Degree head, yielding Deg[Deg: COMP]; this feature specification is realized by vocabulary insertion either as *-er* or as *more*, depending on other factors (see Embick 2007). If this is right, then (18i) follows because the Degree head must receive a value (which *than* provides). (18ii) is a consequence of the fact that an embedded occurrence of Deg (COMP) cannot be licensed by the relevant feature specification on the *than*P, since the relation between the *than*P and the Deg does not satisfy the condition on Agree (since this Deg head is *contained* in the *than*P, and not c-commanded by it). We assume, however, that if the entire embedded comparative is deleted, which is possible just in case $A_1 = A_2$, the usual PF-crash triggered by an uninterpretable feature is avoided, and the structure is well-formed. This derives (18iii), and the otherwise puzzling obligation of deletion that we see in comparatives but not in deletion constructions generally (Kennedy 2002).[3]

Finally, it is important to note that the traditional account of the covariation in form between the comparative morpheme and the standard marker, namely that of local selection followed by movement (or its late merge variant), illustrated in (21) for predicative APs, has difficulty in accounting for the fact that while attributive comparison is perfectly licit, extraposition from attributive positions is impossible in English, as seen in the contrast in (22).

[3] Except, of course, in deletion structures that would be ungrammatical if deletion did not occur; see Merchant 2001.

(21) a. The belt was [more attractive t_1] after he stretched it [than it was before]$_1$.
b. Susan was [angry t_2] yesterday [at her mother]$_2$.
(22) a. Abby bought [a [more attractive t_1] belt] yesterday [than you did]$_1$.
b. *Ben met [an [angry t_2] woman] yesterday [at her mother]$_2$.

This distinction, we suppose, is due to the conditions on Agree which allow it to target elements internal to DPs (see Heim 2008 for application of this logic to DP-internal pronouns).

5. Phrasal vs. clausal comparatives

The denotation that we proposed above in (6b) for the standard morpheme presumes that THAN composes with a constituent that denotes a degree property. This semantic assumption reflects the well-established syntactic analysis of the standard constituent as a *wh*-structure (Chomsky 1977), in which an A-bar dependency is established to a degree position introduced by the correlate of the matrix comparative predicate in the clause. However, it is also well-established that in many languages the standard constituent need not be a clause, but instead can (or must) be of the same syntactic category and semantic type as the target of comparison, typically a DP (see Hankamer 1973 for English and several other languages; Xiang 2003 and Lin 2009 for Mandarin; Bhatt and Takahashi 2011 for Hindi; Merchant 2009, 2011 for Greek; Pancheva 2007 for Slavic). What is of interest to us is that whenever the phrasal/clausal distinction is morphologically marked in a language that allows both options, it is marked in the form of the standard morpheme, not in the form of the comparative morpheme. This is illustrated for Greek in (21), in which the phrasal comparative marker in (21a) is *apo*, and the clausal comparative marker in (21b) is *ap'oti*.

(21) a. Thelo na ime psilo-ter-os **apo** aftin.
want.I to be tall-COMP-3S.MASC THAN her.ACC
'I want to be taller than her.'
b. Thelo na ime psilo-ter-os **ap'oti** ine afti.
want.I to be tall-COMP-3S.MASC THAN is she.NOM
'I want to be taller than she is.'

The existence of the phrasal/clausal distinction has always been a bit of a puzzle for standard semantic analyses of comparatives, in which the comparative morpheme provides all of the semantic content, and the function of the standard morpheme is merely to introduce the standard. Such analyses (e.g. Merchant 2011) must assume a systematic ambiguity for the comparative morphology, never reflected in the superficial form of the morpheme itself, in order to accommodate the different semantic types of phrasal vs. clausal standards. In contrast, our analysis provides a straightforward account of the facts: since the standard morpheme both introduces the standard constituent and encodes the semantics of comparison (alongside the comparative morphology, if it exists), it is the constituent that lexicalizes semantic differences pertaining to standard type. The relevant difference between "clausal" THAN and "phrasal" THAN is specified in (22a-b).[4]

(22) a. $[\![\text{THAN}_{\text{CLAUSAL}}]\!] = \lambda S_{<d,t>}\lambda T_{<d,t>} . \mathit{sup}(T) > \mathit{sup}(S)$
b. $[\![\text{THAN}_{\text{PHRASAL}}]\!] = \lambda s_e\lambda g_{<d,et>}\lambda x_e . \mathit{sup}(\lambda d.g(d)(x)) > \mathit{sup}(\lambda d.g(d)(s))$

[4] Note that $\text{THAN}_{\text{PHRASAL}}$ can actually be derived from $\text{THAN}_{\text{CLAUSAL}}$, which explains why the phrasal/clausal distinction need not be marked overtly: (22b) is equivalent to (i) (Kennedy 2007).

(i) $\lambda s_e\lambda g_{<d,et>}\lambda x_e.[\![\text{THAN}_{\text{CLAUSAL}}]\!](\lambda d.g(d)(x))(\lambda d.g(d)(x))$

6. Concluding remarks

The interactions between the pieces of morphology that are present even in well-studied languages like English are by no means obvious. In this paper, we have shown that a range of intricate interpretational facts can be made sense of if the distribution of semantic labor in comparatives is not as it has traditionally been assumed, with the comparative morphology doing all of the work, and the marker of the standard contributing nothing. Instead, we have shown that the English interpretational facts find a straightforward and surface-based account if the semantic labor is divided among both the comparative morpheme(s) and the standard marker. Such an account, furthermore, makes sense of a range of cross-linguistic facts concerning the absence of comparative morphology where traditional accounts shed no light. It is important to remember, in evaluating the success and plausibility of the present account, which base-generates the standard in its surface position and relates it to the degree morphology by syntactic agreement, not by movement (selection + extraposition), that the observable facts merely indicate that there is *covariation in form* between the comparative morphology and the form of the standard marker. Such covariation does not wear its analysis on its sleeve, and we have argued here that it makes just as much sense—and provides the first possible account known to us of the predicative/attributive contrasts illustrated above—to think of this relation as a species of agreement. Finally, our analysis can make formal sense, for the first time, of the fact that phrasal/clausal distinctions are cross-linguistically always marked by changes in the marker of the standard of comparison, and not in the comparative itself.

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