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A WYSIWYG SYNTAX FOR COMPARATIVES
Syntax, Semantics, and Discourse: the Theory of the Interface, Utrecht University, July 5, 2008

Problem: the morpho-syntax of comparatives suggests a particular underlying structure, while their semantics argues for a different constituency.

Proposal: restate the lexical meaning of "comparative" morphemes in such a way that degree QR becomes compatible with their morpho-syntax

Contents: This is an argument for an existential view of comparatives (Seuren (1973), Larson (1988) as opposed to von Stechow (1984))

1.   INTRODUCTION: ELEMENTS OF COMPARISON

As is well-known, scalar predicates are treated via an additional argument slot, that of degree:

(1) $[\![tall]\!] = \lambda d \in D_d . \lambda x \in D_e .$ x is tall to the degree d

Scalar predicates are downward monotonic:

(2)   A function f of type $\langle d, \langle e, t \rangle \rangle$ is *downword monotonic* iff $\forall x \,\forall d \,\forall d' \, [f(d)(x) = 1 \,\&\, d' < d \rightarrow f(d')(x) = 1)$

Depending on who you ask, the comparative morpheme may occur with as many as three arguments (like a ditransitive verb): the **scalar predicate**, the **standard of comparison** and a **measure phrase** (differential or factor phrase – see von Stechow (1984)):

(3)   **Definitions**:
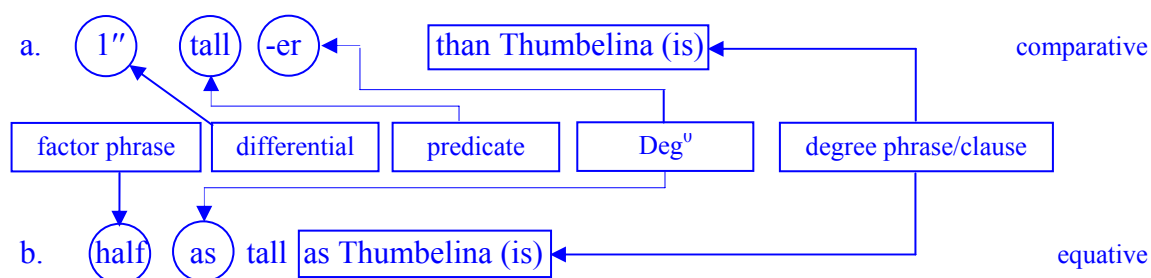
Selectional restrictions:
>   ➤   c-selection: certain degree morphemes combine only with adjectives
>   ➤   l-selection: the exact head of the degree clause/phrase is determined by the degree morpheme
>   ➤   s-selection: compatibility with measure phrases: some degree morphemes permit measure phrases (*more, less, as, too*), others don't

The degree clause/phrase is never found adjacent to the degree morpheme on the surface (Bhatt and Pancheva (2004))

2.   DEGREE QR

Bresnan (1973, (1975): comparatives involve PF-deletion

Chomsky (1977), Milner (1978): ***than*-clauses involve wh-movement of a null operator**

Pinkham (1982): ellipsis resolution in comparatives requires an interpretative approach

2.1. Evidence for operator movement

Comparatives obey constraints on movement:

2.1.1. Cross-over

Ross (1967), Postal (1971): movement cannot cross over a co-referring pronoun:

(4) a.   The students who $_i$ thought they $_i$ would flunk ___ $_i$ didn't flunk.
     b.   *The students who $_i$ thought ___ $_i$ would flunk they $_i$ didn't flunk.

(5) a.   More students $_i$ flunked than ___ $_i$ thought they $_i$ would (flunk).
     b.   *More students $_i$ flunked than they $_i$ thought ___ $_i$ would (flunk).

2.1.2. Islands

Ross (1967): certain configurations are islands for extraction (exx. from Bresnan (1975)):

(6) a.   *How hard did you believe the claim that these problems would be?   complex NP
     b.   *Wilt is taller than he knows a boy who is ___.

(7) a.   *How hard do you consider these problems ___ and onerous?   coordinate structure
     b.   *Wilt is taller than Bill is strong and ___.

(8) a.   *How hard is [that they will be ___] likely?   sentential subject
     b.   *Wilt is taller than [that he is ___] is generally believed.

Deletion rules are not subject to these constraints.

2.1.3. Interaction with ellipsis

Williams (1974), Heim (2000):

(9) a.   My father tells me to work harder than my boss does.
     b.   My father tells me to work harder than my boss does ~~work t hard~~.
     c.   My father tells me to work harder than my boss does ~~tell me to work t hard~~.

2.1.4. ACD

English quantified DPs may appear in apparent infinite regression structures:

(10) a.   Fred has bought every book that Ned has.
     b.   Dora will see no movie that Nora has.

To obtain the antecedent for VP-ellipsis in the relative clause, it is suggested that the quantified DP moves to its scope position (Sag (1976), Larson and May (1990), etc.):

(11) a.   [every book that Ned has ___] $_i$ Fred has bought t $_i$.   QR
     b.   [every book that Ned has ~~bought t$_i$~~] $_i$ Fred has bought t $_i$.   ellipsis resolution

Evidence that QR is involved: bare plural NPs cannot license ACD:

(12) a.   *Fred was climbing trees that Jill was.

However, bare plurals modified by a comparative can **license ACD**:

(13) a.   Fred was climbing more trees than Jill was.
     b.   Fred was climbing higher trees than Jill was.

Degree operators must license movement (Wold (1995) via Heim (2000)).

2.1.5. Inversion

Milner (1978): the movement of the null operator inside the degree clause is confirmed by the availability of stylistic inversion in French, which, furthermore, takes place cyclically:

(14) a. Pierre a plus de livres que n' en a Paul.
Pierre has CMPR of books CMPZR NEG PART.CL has Paul
Pierre has more books than Paul does.

b. Il est aussi triste que l' était Jeanne hier.
he is EQ sad CMPZR PRED.CL was Jeanne yesterday
He is as sad as Jeanne was yesterday.

Stylistic inversion indicates movement.
NB: Note that stylistic inversion only happens in the degree clause

2.2. Scope interactions with other quantifiers

Kennedy (1997/1999): if the degree operator moves, it should be able to take scope over other operators. Such readings are in fact not attested.

Heim (2000):

(15) John is 4 feet tall. Every girl is exactly 1 inch taller than that.
a. $\forall > $ -*er*: $\forall x \ [\text{girl}(x) \rightarrow \max \ \{d: \text{tall}(x,d)\} = 4' + 1']$
b. *-*er* $> \forall$: $\max \ \{d: \forall x \ [\text{girl}(x) \rightarrow \text{tall}(x,d)]\} = 4' + 1']$

The reading in (15b), where the shortest girl is one inch taller than John and the rest are taller, is not available

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(16) Kennedy's generalization (Heim (2000)):

If the scope of a quantificational DP contains the trace of a degree operator, it also contains that degree operator itself.

However, degree operators do interact with **intensional predicates** (Heim (2000)):

(17) This draft is 10 pages long. The paper is required to be exactly 5 pages longer than that.

a. required $>$ -er: required [[exactly 5 pages -er than that][the paper be d-long]]
$\forall w \in \text{Acc}: \max \ \{d: \text{long}_w \ (p, d)\} = 15 \text{ pages}$

b. -er $>$ required: [exactly 5 pages -er than that] [required [the paper be d-long]]
$\max \ \{d: \forall w \in \text{Acc}: \text{long}_w \ (p, d)\} = 15 \text{ pages}$

Degree operators can apparently take scope

Matushansky (2002), Bhatt and Pancheva (2004): Kennedy's generalization can be a special case of Beck's generalization (Beck (1996)).

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(18) Bhatt & Pancheva's reformulation of Kennedy's generalization:

*$\lambda d \ \dots \ QP \ \dots \ d$

The intervention effect obtains for quantification over individual variables (type $\langle e \rangle$) and certain others (temporal adjuncts (see below), but definitely not intensional verbs).
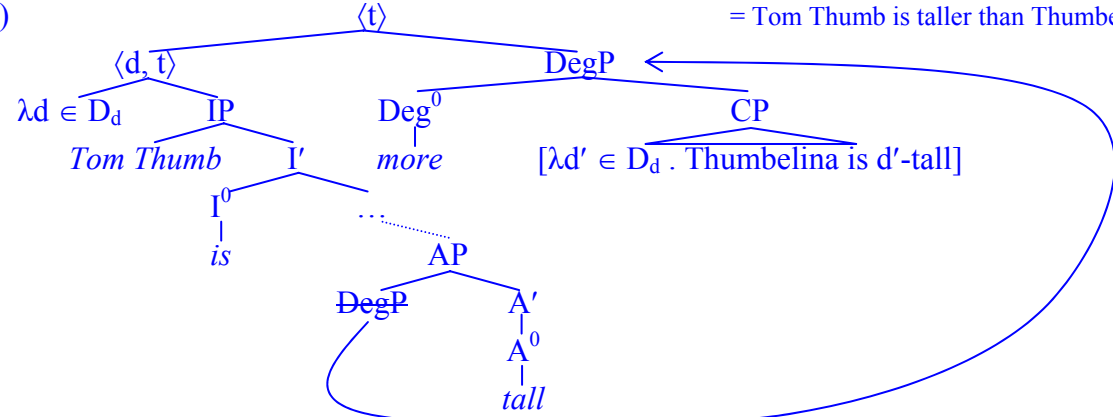
2.3. The syntax of degree quantification

Assuming that the comparative morpheme can QR and that the comparative clause denotes a degree predicate:

(19) $[\![$more than g$]\!]= \lambda f \in D_{\langle d, t \rangle}$. max (f) > max (g)
      where max (P) = $\iota d \in D_d$. P(d) = 1 and $\forall d' \in D_d$ [P(d') = 1 $\rightarrow$ d' $\leq$ d]

As a result, **the comparative morpheme** cannot be interpreted *in situ* and **must QR**:

(20)   TYPE CLASH
      less $_{\langle\langle d, t \rangle, t \rangle}$ *tall* $_{\langle d, \langle e, t \rangle\rangle}$

Disregarding all non-essential projections, we obtain the following structure:

(21)

= Tom Thumb is taller than Thumbelina

The comparative morpheme + comparative clause complex must raise **at least as high as the first $\langle$t$\rangle$-type node**, where λ-abstraction over degrees ensures its interpretability.

2.4. Extraposition and scope

Williams (1974:194-195), Guéron and May (1984), Fox and Nissenbaum (1999):

(22) **Williams's Generalization**
      When an adjunct β is extraposed from a "source DP" α, the scope of α is at least as high as the attachment site of β (the extraposition site).

Extraposition of the relative clause makes it impossible for the object DP to take scope below the surface position of the relative clause:

(23) I read every book that John had recommended before you did.
      a.   I read the entire set of books before you did.   before > every book
      b.   For each book, I read it before you did.   every book > before

(24) I read every book before you did that John had recommended.
      a.   *I read the entire set of books before you did.   before > every book
      b.   For each book, I read it before you did.   every book > before

Fox and Nissenbaum (1999), following Lebeaux (1988): adjuncts can be merged late, at the surface position of the DP

Bhatt and Pancheva (2004):

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

The scope of the degree operator depends on the surface position of the comparative clause:

(26) John is required [to publish fewer papers this year **[than that number]** in a major journal] [to get tenure].

    a. $\forall w \in \text{Acc}_{\text{required}} \max \{ d : \text{PRO to publish d-many papers} \} < n$ ✓
    b. $\max \{ d : \forall w \in \text{Acc}_{\text{required}} \text{PRO to publish d-many papers} \} < n$ ✗

(27) John is required [to publish fewer papers this year in a major journal] [to get tenure] **[than that number]**.

    a. $\forall w \in \text{Acc}_{\text{required}} \max \{ d : \text{PRO to publish d-many papers} \} < n$ ✗
    b. $\max \{ d : \forall w \in \text{Acc}_{\text{required}} \text{PRO to publish d-many papers} \} < n$ ✓

2.5. Summary
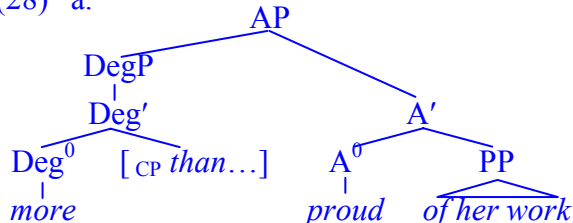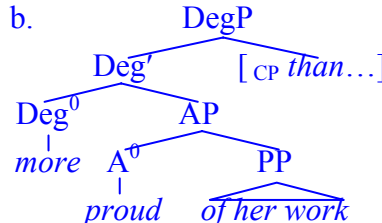
Evidence for degree QR:
- ➢ Constraints on movement
- ➢ Interaction with extraposition and ellipsis resolution
- ➢ Scope interactions with other quantifiers

3. PROBLEMS WITH THIS STORY

3.1. Morphosyntax

To permit the degree morpheme to move as high as it is supposed to, it is necessary to choose the structure in (28a) (Bowers (1975), Jackendoff (1977), etc.) over the structure in (28b) (Abney (1987), Bowers (1987), Corver (1990, 1991, 1997a, 1997b)):

(28) a.

However, there exist multiple morphosyntactic reasons to exclude (28a)

3.1.1. Constituency

The structure in (28a) does not fit the constituency observed on the surface:

- On the surface the degree clause/phrase and the degree morpheme are never adjacent (see Bhatt and Pancheva (2004) for a proposal explaining why degree clauses must be merged late and Grosu and Horvath (2006) for an explanation why it doesn't work).

- Milner (1978), Pinkham (1982): an overt pronoun may replace the adjective in the degree phrase:

(29) a.   Pierre a   plus   de   livres   que   n'   **en**   a   Paul.
        Pierre has CMPR of   books CMPZR NEG PART.CL has Paul
        Pierre has more books than Paul does.

    b.   Il   est   aussi triste que   **l'**   était Jeanne hier.
        he   is   EQ   sad   CMPZR PRED.CL was Jeanne yesterday
        He is as sad as Jeanne was yesterday.

A pronoun is generally taken to replace a maximal projection. The same argument can be drawn from *so*-pronominalization in English.

3.1.2. Morphology

The morphological processes that degree morphemes can be involved in suggest that the structure in (28b) is the correct one, since it is the correct syntactic configuration for head-movement..

- supplition: The combination of an adjective and a comparative morpheme can yield a suppleted form (*more + good → better*). By hypothesis, morphological processes can only target heads, which would necessitate the head-movement of A^0 to Deg^0.

- reduplication: the construction exemplified in (30) (Jackendoff (2000)) can be easily treated as the coordination of Deg^0 with its reduplicate. In (30a), reduplication was preceded by head-movement, while in (30b) the adjective is too heavy to be moved

(30)   a.   prettier and prettier
        b.   more and more beautiful

While suppletion can be treated non-syntactic combination of A^0 and Deg^0 (Embick and Noyer (2001)), such an analysis is not applicable to (30).

3.1.3. Movement

Measure phrases (differentials and factor phrases) are always found in the base position of the degree morpheme:

(31)   My father wants me to be **two inches** taller than my boss does.

If the degree morpheme alone moves to its scope position stranding the measure phrase, then:
        a.   the measure phrase becomes uninterpretable
        b.   such movement violates the head-movement constraint (Travis (1984))

3.1.4. Head-movement

If *-er*/*more* is treated as Deg^0 with an AP complement (resolving the morphological problems above), then its movement would violate the head-movement constraint (Travis (1984))

3.2. Other

When the degree QR story is extended to superlatives, the same issues arise: semantically it seems that the superlative morpheme moves, but morphosyntactically multiple problems arise (see Matushansky (2008b) for discussion).

There are also some arguments about available readings (see Grosu and Horvath (2006)) and their treatment (Heim (2000)), but they are tangential here

4. THE DUTCH SOLUTION

Seuren (1973) (following Ross (1969)): comparatives involve negation in the degree clause:

(32)   a.   John is more clever than Bill.
        b.   John is clever to an extent that Bill is not.

Adjusting slightly:

(33) $\exists d$ [John is $\geq$ d-clever & $\neg$ (Bill is $\geq$ d-clever)]

4.1. Evidence

- NPIs can occur in the degree clause, PPIs may not:

(34) a.　He would *(not) **lift a finger**.　　　　　　　　　　　　　　NPI
　　 b.　John's laziness was stronger than his willingness to **lift a finger**.
　　 c.　*John's willingness to **lift a finger** was stronger than his laziness.

(35) a.　I have(*n't) **already** eaten.
　　 b.　*He has got more support than you **already** have.
　　 c.　You have **already** got more support than he has.

von Stechow (1984): this is because it is a DE environment (Ladusaw (1979)); all alternative meanings of the comparative morpheme create such an environment

- Overt negation in French and Italian, negation copying in cockney English:

(36) a.　Jean　est　plus　grand　que　je ne　　pensais.
　　　　 Jean　is　　more　tall　　than　I NEG　thought
　　　　 Jean is taller than I thought.

　　 b.　Giovanni è　 più　alto　che　non　pensassi.
　　　　 Giovanni is more tall　than NEG　think-SBJ-1SG
　　　　 Giovanni is taller than I thought.

(37) a.　He has never been no good to no woman, not never.
　　 b.　She did a better job than what I never thought she would.

- The impossibility of other negative elements in standard English:

(38) a.　*He is taller than nobody here.
　　 b.　*Bill ran faster than I couldn't.

- Stassen (1984, pp. 138-141): There exist a lot of languages, where comparatives overtly involve negation:

(39) kaw- ohra naha Waraka,　kaw　naha Kaywerye.　　　Hixkaryana, Stassen (1984, p.35)
　　 tall　not　he.is Waraka　tall　he.is Kaywerye
　　 Kaywerye is taller than Waraka.

Joly (1967): The English *than* is historically derived from a neuter (singular) relative pronoun in the instrumental case (*þon*) and a negation element (*ne*).

Advantages:
　　➢　The degree clause doesn't form a constituent with the degree morpheme and the obligatory extraposition analysis becomes unnecessary
　　➢　A similar treatment can be constructed for *other* (cf. Matushansky (2008a))

4.2. Problems

von Stechow (1984): Seuren's semantics yields **incorrect entailments with quantification**:

(40) a.　Ede is fatter than Otto.
　　 b.　Ede is fatter than everyone.

(41) a.　$\exists d$ [Ede is $\geq$ d-fat & $\neg$ (Otto is $\geq$ d-fat)]
　　 b.　$\exists d$ [Ede is $\geq$ d-fat & $\neg$ (everyone is $\geq$ d-fat)]

NB: $\neg$ *(Otto is $\geq$ d-fat)* $\rightarrow$ $\neg$ *(everyone is $\geq$ d-fat)*

Larson (1988): The subject must outscope negation. In fact, other universally quantified arguments must also outscope this negation.

This is only possible if the negation is very low – incompatible with the analysis, where *than* contains negation (Joly (1967)), does not predict the behavior of NPIs
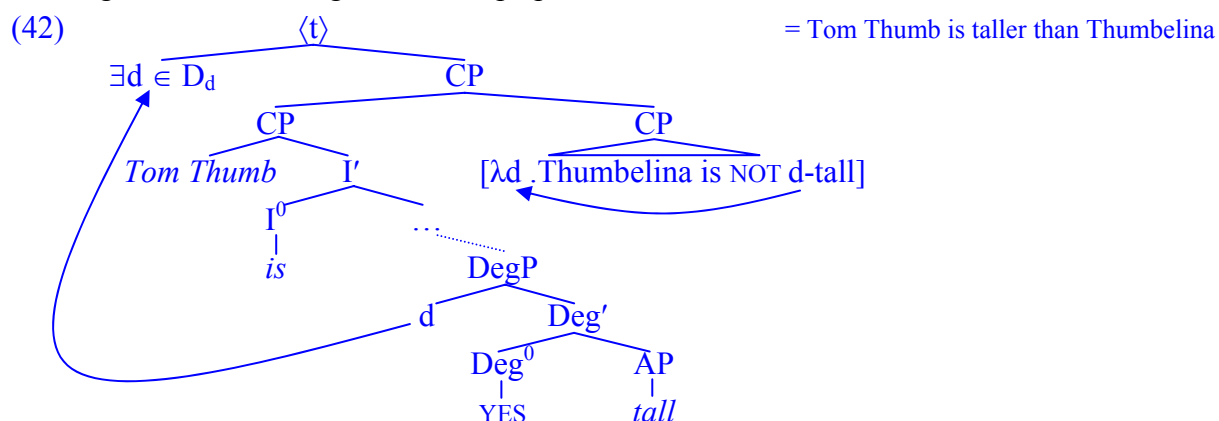
What is meaning of *-er*, if the negation is in the degree clause?

Seuren's hypothesis permits us to obtain the attested interpretations of the comparative, but not to rule out the unattested ones

5.   PROPOSAL

The "degree morpheme" *-er* is a **positive verum marker**, similar to *bien* in French or *wel* in Dutch. Its counterpart in the degree clause is the **null negative verum marker**.

The degree clause is merged in its scope position:

(42) ⟨t⟩   = Tom Thumb is taller than Thumbelina

$\exists d \in D_d$ CP

CP   CP

Tom Thumb   I′   [λd .Thumbelina is NOT d-tall]

I⁰   ⋯:

is   DegP

d   Deg′

Deg⁰   AP

YES   *tall*

5.1. Details

Since the "degree morphemes" are now viewed as independent of quantification, their head-movement is not required

The existential quantifier and the null operator are located in [Spec, DegP] and can be moved by phrasal movement

The Romance scope marker *ne/non* is a licenser for the null negative marker in the degree clause (see standard analysis of negative concord effects).

A parasitic scope analysis along the lines of Heim (1995/1999), Nissenbaum (1998a, 1998b, 2000), and Barker (to appear)) becomes necessary

Than either means the same as 'and' or semantically vacuous (and then the interpretation is achieved via Predicate Modification)

5.2. Advantages

Comparatives are different from positives, even though both are based on the ≥ relation (problem noted by Kennedy (1997/1999))

Since the existential quantification does not coincide with the "degree morpheme", **no head-movement violations occur**

The degree clause is no longer an argument of the degree morpheme, but the apparent c-selection of the complementizer can be explained by morpho-semantic means

There is no problem anymore explaining the **overt negation in the degree clause**

The **island effects** are triggered by the movement of the existential quantifier over degrees in the main clause and by the parallel movement of the null wh-operator in the degree clause. Both are originally located in [Spec, DegP] and are distinct from the degree morpheme

Movement reflexes in the degree clause are caused by wh-movement; QR of the existential quantifier in the main clause does not have such an effect (obviously)

The presence of negation permits us to consider scope-splitting for certain issues (cf. Heim (2000), Schwarzschild (2004), van Rooy (2008))

5.3. Cross-linguistic predictions

Stassen (1984, 1985): cross-linguistically, *than* is frequently a conjunction:

(43) a.   Enak   daging **karo** iwak   Javanese, Stassen (1984:48)
          is.good   meat   **than** fish
          Meat is better than fish.

     a.   Bapaq menjang ing- desa **karo** simboq menjang ing- desa uga.
          father go   to- field **and** mother   go   to- field too
          Father went to the field and mother went to the field too.

(44) a.   Chrēsthos ē   poneros   Classical Greek, Stassen (1984:49)
          good   **or** bad
          Good or bad.

     b.   Sofoteros ē   su
          wiser   **than** you
          wiser than you

(45) Thou knowst no less **but** all. (Shakespeare, Twelfth Night, 1, 4)   Stassen (1984:49)

(46) a.   Meitas   vecakas   **ne**   mate.   Latvian, Endzelin (1922) via Stassen (1984:50)
          daughters   older   than   mothers
          The daughters are older than the mothers.

     b.   Man nau   ne   tes   **ne**   mat.
          I   have nor father nor   mother
          I have neither father nor mother.

English: odd **determiners as measure phrases**:

(47) a.   Judith is **no** taller than Jess.
     b.   If the book is **any** less expensive than the journal, I will buy the book.
     c.   *The book is some **more** expensive.

If [Spec, DegP] in comparatives is an existential quantifier over degrees, the determiners are not unexpected, nor is their distribution

Unmarked or optionally marked comparatives in such languages as Hebrew and Japanese:

48 a.   tel aviv   gdola   mi- yafo
        Tel Aviv big-FSG from Jaffa

   b.   tel aviv   yoter   gdola   mi- yafo
        Tel Aviv CMP   big-FSG from Jaffa
        Tel-Aviv is larger than Jaffa.

49 a.   kinoo   -yori kyoo -ga   atui desu -yo
        yesterday THAN today -NOM hot COP -ASRT
        Today is hotter than yesterday.

b.   kinoo   -mo   atukatta   kedo kyoo -wa   motto atui desu -yo
     yesterday -TOO   hot-PAST but   today -TOP CMP   hot COP -ASRT
     Yesterday was hot, but today is (even) hotter.

The lack of comparative marking can be explained by **the language-specific choice not to mark the positive value of the verum Deg^0.**
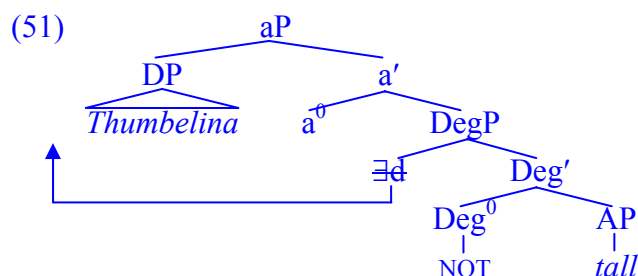
5.4.   Issues

5.4.1.   Negation

The tree in (42) does not exactly fit in with our intuitions regarding the **position of negation**:

(50) $\exists d$ [Tom Thumb is $\geq$ d-tall & $\neg$ (Thumbelina is $\geq$ d-tall)]

If the postulated verum markers are located in Deg^0, **negation is lower than the trace of the degree argument** and, presumably, lower than the subject:

(51)

Possibilities:
- The negation in the degree clause is an adjunct to aP
- There are no "negative degrees", contrary to Kennedy (1997/1999), with Sassoon (2008)

5.4.2.   Measure phrases

The existential analysis does not deal with **differentials** at all:
NB: The problem with measure phrases is not incorporating them into the semantics, but giving them the right syntax in both conjuncts. On the other hand, **factor phrases** (in English!) come out perfect!

(52) a.   The paper is allowed to be **exactly 5 pages** longer than that.
     b.   The paper is allowed to be longer than that **by exactly 5 pages**.

Proposal 1: Measure phrases are universal quantifiers:

(53) $\exists d \, \forall d' < 1''$ Tom Thumb is $\geq$ (d-d')-tall & $\neg$ [Thumbelina is $\geq$ (d-d')-tall)]

(53b) means that there exists a degree such that for every degree up to one inch smaller than that degree Tom Thumb is tall to that degree while Thumbelina is not.

Proposal 2: measure phrases are related to the precision of measurement:

(54) $\exists d$ [Tom Thumb is $\geq$ d-tall & $\neg$ (Thumbelina is $\geq$ d-tall)] and the precision of measurement permitting us to draw this conclusion is $1''$

In other words, the difference between Tom Thumb and Thumbelina is (at least) one inch.

5.4.3.   Scope issues

van Rooy (2008): Both views on the scope of negation or von Stechow's maximality analysis have problems with predicting the interpretation of quantifiers

We can no longer predict the behavior of NPIs, but we can consider different negation scopes

6.   SUMMARY

The interpretation of comparatives suggests that they involve quantification and, thus, QR.

Standard analyses: the quantified and moving element is the degree morpheme (-*er*/*more*). This leads to various morpho-syntactic problems that are generally disregarded

Proposed analysis: If -*er*/*more* is not quantified, we retain the advantages of the QR view of comparatives without violating any of the standardly assumed morpho-syntactic constraints.

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