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Severing the Degree Argument from the Adjective

1 Introduction

What is the right semantic analysis of gradable adjectives?

- Gradable adjectives denote relations between degrees and individuals (type $\langle d, \langle e, t \rangle \rangle$).

- Gradable adjectives denote functions from individuals to degrees (type $\langle e, d \rangle$).

According to the first view, all GAs introduce degree arguments, which must be saturated in order to derive a property of individuals. According to the second view, gradable adjectives must combine with some bit of functional (degree) morphology in order to derive a property of individuals. Degree arguments, if they exist, must be introduced by the functinal morphology.

What is responsible for the idiosyncratic and language-specific distribution of measure phrases?

(1)   *Norwegian*
        a. ei 200 kroners dyr   lampe
            a 200 crowns.s expensive lamp
            'a 20 dollar (*expensive) lamp'
        b. 20 grader varmt vann
            20 degrees warm water
            '20 degree (*warm) water'

(2)   *German*
        a. 100 Tonnen schwer
            100 tons   heavy
            '100 tons (*heavy)'
        b. 60 Stundentkilometer schnell
            60 hour.kilometers   fast
            '60 kilometers (*fast)'

(3)   *French*
        a. *grand de 1,27 meters
            big   of 1.27 meters
            '1.27 meters tall'
        b. *profond de 2 meters
            deep   of 2 meters
            '2 meters deep'

The plan for today is to develop some answers to these questions. The empirical starting point is degree questions in a dialect of Norwegian.

2 Null degree questions in Northern Norwegian

2.1 The facts

Degree questions (DQs) in Standard Norwegian have structures parallel to other *wh*-questions in the language: they involve overt movement of a gradable predicate headed by a question morpheme (*hvor*, used independently as 'where') to SpecCP, and movement of the main verb to C^0, resulting in V2 word order:

(4) a. Hvor langt er det til Nordkapp?
         where long is it   to North.cape
         'How far is it to the North Cape?'
     b. Hvor gammel er du?
         where old   are you
         'How old are you?'
     c. Hvor mye   koster en pils?
         where much costs   a   pilsner
         'How much does a beer cost?'
     d. Hvor mange kilo hvalkjøtt   vil du ha?
         where many   kilos whale.meat will you have
         'How many kilos of whale meat do you want?'

In northern dialects (henceforth NN), DQs like those in (4) are possible, but they are more typically verb-initial, with no overt *wh*-word. The structures are string-identical to Y/N questions, but the interpretations are distinguished prosodically (Midtgård 1995):

- With stress on the predicate, the following examples are yes/no questions.

- With stress on the initial verb, they are DQs.

(5) a. Er det langt til Nordkapp?
         is it   long to North.cape
         'How far is it to the North Cape?'   (stress on *er*)
         'Is it far to the North Cape?'   (stress on *langt*)
     b. Er du gammel?
         are you old
         'How old are you?'   (stress on *er*)
         'Are you old?'   (stress on *gammel*)
     c. Koster en pils   mye?
         costs   a   pilsner much
         'How much does a beer cost?'   (stress on *koster*)
         'Does a beer cost a lot?'   (stress on *mye*)
     d. Vil du ha   mange kilo hvalkjøtt?
         will you have many   kilos whale.meat
         'How many kilos of whale meat do you want?'   (stress on *mange*)
         'Will you have many kilos of whale meat?'   (stress on *hvalkjøtt*)

Y/N questions may sometimes elicit more information than a simple 'yes' or 'no':

(6) A: Did it cost much?
     B: Nearly fifty euros.
(7) A: Is she old?
     B: She's in her eighties.

However, NN null DQs can be distinguished from Y/N questions in their presuppositions. A Y/N question is felicitous only if the questioner is appropriately ignorant:

(8) B: It was expensive.
     A: #Did it cost much?
(9) B: She's really old.
     A: #Is she old?

NN null DQs are easily used in contexts where the answer to the corresponding Y/N question is obviously known to the questioner:

(10) A: Det var dyrt.
          it   was expensive
          'It was expensive'
      B: Kostet det mye?
          cost   it   much
          'Did it cost much?'
      A: Nesten fem hundre   kroner.
          nearly five hundred crowns
          'Nearly five hundred crowns'
(11) A: Ho er skikkelig gammel.
          she is properly old
          'She's really old'
      B: Er ho gammel?
          is she old
          'How old is she?'
      A: Mere enn   åtti.
          more than eighty
          'Over eighty'

Additional evidence that these are distinct interpretations comes from the fact that a modifier which requires a DQ meaning, such as *sånn cirka* 'approximately', is compatible only with DQ intonation (Midtgård 1995):

(12) a. EE'n tung, sånn cirka?
          IS-it heavy, approximately
          'How heavy is it, approximately?' (About how heavy is it?)
      b. *Ee'n TUNG, sånn cirka?
          is-it HEAVY, approximately
          'Is it heavy, approximately?' (*About is it heavy?)

2.2   The Salient Measure Restriction

DQ readings of V1 questions are not available with all gradable predicates:

(13) $[_{CP[+Q]}$ V $[_{IP}$ ... P ...]]:
      a. YN/DQ: P ∈ {far, expensive, old, tall, heavy, long, much beer/money, many beers/kilos of N, ...}
      b. YN/*DQ: P ∈ {near, cheap, young, short, light, little beer, few friends, ...}
      c. YN/*DQ: P ∈ {tired, clever, beautiful, exciting, successful, much anxiety, much success, ...}

The difference between the predicates in (13a) and those in (13b-c) is that only the former allow measure phrases in NN. Those in (13b) are 'negative' antonyms of those in (13a), and as such do not permit measure phrases:

(14)   a.   160 cm høy
                 160 cm long
          b.   *160 cm kort
                 160 cm short

(15)   a.   åtte måneder gammel
                 eight months old
          b.   *åtte måneder ung
                 eight months young

V1 questions with negative adjectives have only YN interpretations; DQs must have the 'standard' *wh*-XP + V2 structure seen in (4) (*kor* is the NN cognate to Standard Norwegian *hvor*):

(16)   a.   Er det kort?
                 is it   short
                 'Is it short?' (NOT: 'How short is it?')
          b.   Er ho ung?
                 is she young
                 'Is she young?' (NOT: 'How young is she?')

(17)   a.   Kor   kort er det?
                 where short is it
                 'How short is it?'
          b.   Kor   ung   er ho?
                 where young is she
                 'How young is she?'

The predicates in (13c) are not negative, but they denote properties for which measurement systems are not defined:

(18)   a.   *to   søvnløse døgn trøtt
                 two sleepless days tired
          b.   *syttifem   bekymringer engstelig
                 seventy-five worries   anxious

Again, V1 questions have only YN interpretations, and DQs must have *wh*+V2 structure:

(19)   a.   Er du trøtt?
                 are you tired
                 'Are you tired?' (NOT 'How tired are you?')
          b.   Er han engstelig?
                 is he   anxious
                 'Is he anxious?' (NOT 'How anxious is he?')

(20) a. Kor   trøtt er du?
          where tired are you
          'How tired are you?'
      b. Kor   engstelig er han?
          where anxious is he
          'How anxious is he?'

These facts lead to the empirical generalization stated in (21).

(21)   *The Salient Measure Restriction*
          Only gradable predicates that can be associated with a measurement system give
          rise to DQ interpretations in verb-initial questions.

Further illustration of this restriction comes from comparative constructions. Both positive and negative adjectives license measure phrases in the comparative form:

(22) a. Han Øystein er 10 cm høyere/lavere enn ho Mai.
          he Øystein is 10 cm higher/lower than her Mai
          'Øystein is 10 cm taller/shorter than Mai.'
      b. Tunfisk er 100 kroner dyrere/billigere   enn den var før.
          Tuna   is 100 kroner expensiver/cheaper than it   was been
          'Tuna is 100 kroner more expensive/cheaper than it used to be.'
      c. Han Julian er 8 måneder eldre/yngre   enn han Sam.
          he Julian is 8 months older/younger than him Sam
          'Julian is 8 months older/younger than Sam.'

DQ (as well as YN) interpretations of the corresponding V1 questions are also possible for both positive and negative comparatives (we address the role of *mye* 'much' below):

(23) a. Er han mye   høyere/lavere enn dæ?
          is he   much higher/lower than you
          'How much taller/shorter than you is he?'
      b. Er den mye   dyrere/billigere   enn den var før?
          is it   much expensiver/cheaper than it   was before
          'How much more expensive/cheaper than it was is it (now)?'
      c. Er han mye   eldre/yngre   enn dæ?
          is he   much older/younger than you
          'How much older/younger than you is he?'

Neither MPs nor DQ readings of V1 questions are possible in comparatives formed from predicates that express gradable properties without measurement systems, however:

(24) a. Æ er (*fem timer) trøttere enn dæ.
          I am five   hours tireder than you
          'I am (*five hours) more tired than you'
      b. Han Øystein er (*fem bekymringer) mere engstelig enn ho Mai.
          he Øystein is five   worries   more anxious than her Mai
          'Øystein is (*five worries) more anxious than Mai'

5

(25) a. Er han trøttere enn dæ?
          is he tireder than you
          'Is he more tired than you?' (NOT 'How much more tired is he than you?')
      b. Er han Øystein mere engstelig enn ho Mai?
          is he Øystein more anxious than her Mai
          'Is Øystein more anxious than Mai?' (NOT 'How much more anxious is Ø than M?')

But if the context is rich enough to coerce a measurement standard for these adjectives, then both MPs and DQ readings of V1 questions become (marginally) possible:

(26) CONTEXT: A competitive game of Limbo; the height of the bar is measured in centimeters, and contestants are trying to duck under successively lower heights.
      a. Gikk du lavt?
          went you low
          'How low did you go?'
      b. Æ gikk førti cm lavt.
          I went forty cm low
          'I went forty centimeters low'

(27) CONTEXT: A couple of experimenters with clipboards are administering IQ tests. They start discussing some particular subjects.
      a. Var han intelligent?
          was he   intelligent
          'How intelligent was he?'
      b. Ho var ti   poeng mer intelligent enn han.
          she was ten points more intelligent than him
          'She was ten points more intelligent than him'

(28) CONTEXT: A humorous discussion in a pub.
      a. Æ er to halvlitere fullere enn deg.
          I am two half.liters drunker than you
          'I am two pints drunker than you'
      b. ?Æ er fem halvlitere full.
          I am five half.liters drunk
          'I am five pints drunk'
      c. Er du mange halvlitere full?
          are you many half.liters drunk
          'How many pints drunk are you?'

The Salient Measure Restriction appears to be active not only in NN, but also in Icelandic, where the contrast is between 'pied-piped' vs. 'split' constructions:

(29) a. Hvad ertu   stór?
          what are.you big
          'How tall are you?'
      b. Hversu   stór ertu?
          how.much big are.you
          'How tall are you?'

(30) a. Hvad er bókin   dýr?
         what is the.book expensive
         'How expensive is the book?'
      b. Hversu   dýr   er bókin?
         how.much expensive is the.book
         'How expensive is the book?'

(31) a. Hvad er langt til Thingvalla?
         what is long to Thingvellir
         'How far is it to Thingvellir?'
      b. Hversu   langt er til Thingvalla?
         how.much long is to Thingvellir
         'How far is it to Thingvellir?'

(32) a. *Hvad er hann dugarlegur?
         what is he   clever
      b. Hversu   dugarlegur er hann?
         how.much clever   is he
         'How clever is he?'

(33) a. *Hvad er hann hávær?
         what is he   loud
      b. Hversu   hávær er hann?
         how.much loud is he
         'How loud is he?'

In what follows, we focus on the NN data, but we expect our analysis to carry over to the Icelandic split constructions as well.

3 A null degree operator in Northern Norwegian

For the basic syntax of null DQs, we propose that NN contains a phonologically null degree operator, parallel to Icelandic *hvad*, that binds a degree variable inside the gradable predicate.

(34) $[_{CP}$ Op$_1$ er$_2$ $[_{IP}$ det t_2 [t_1 langt til Nordkapp]]]
      $[_{CP}$ Op$_1$ is$_2$ $[_{IP}$ it t_2 [t_1 long to North.cape]]]
      'How far is it to the North Cape?'

The locality restrictions on this operator appear to be identical to the locality restrictions on overt wh-movement. For example, a complement clause boundary may be crossed:

(35) a. Sa du at   det var langt til Nordkapp?
         said you that it   was long to North.cape
         'How far did you say it was to the North Cape?'
      b. Kor langt sa du at   det var til Nordkapp?
         where long said you that it   was to North.cape
         'How far did you say it was to the North Cape?'

But an adjunct boundary may not be:

(36)   a.   Er det viktig   at   vi har fest   fordi   han er gammel?
            is it   important that we have party because he   is old
            'Is it important that we have a party because he is old?' (NOT: What age
            is it that his reaching makes it important that we have a party?')
       b. *Kor   gammel er det viktig   at   vi har fest   fordi   han er?
            where old   is it   important that we have party because he   is

The null operator analysis is also compatible with the fact that bare noun phrases, but
not noun phrases with possessors or determiners, are transparent.

(37)   a.   Trenger du langt tau?
            need   you long rope
            'How long a rope do you need?'
       b.   Kor   langt tau trenger du?
            where long rope need   you
            'How long a rope do you need?'
(38)   a.   Trenger du et langt tau?
            need   you a long rope
            'Do you need a long rope?' (NOT: 'How long a rope do you need?')
       b. *?Kor   langt et tau trenger du?
            where long a rope need   you

The null operator has a syntax distinct from that of overt *kor*; for example, *kor* never
strands its associated predicate.

(39)   a.   Kor   gammel er du?
            where old   are you
            'How old are you?'
       b. *Kor   er du gammel?
            where are you old
            (only # 'Where are you old?')
       c. *Kor   du er gammel?
            where you are old

The question that we now need to answer is why the NN null degree operator is possible
only with gradable predicates that are associated with measurement systems.

4   First try: The semantics of the operator

### 4.1   The relational analysis of gradable predicates

The standard analysis of gradable predicates is that they denote relations between degrees
and individuals (type $\langle d, \langle e, t \rangle \rangle$) with denotations as paraphrased in (40) (Cresswell 1977;
von Stechow 1984a; Heim 1985, 2000; Bierwisch 1989). Here **g** is shorthand for 'the degree
to which x is G.

(40)   For $G \in \{$gradable predicates$\}$: $[\![G]\!] = \lambda d \lambda x . \mathbf{g}(x) \succeq d$

(41)   a. $[\![old]\!] = \lambda d \lambda x . \mathbf{old}(x) \succeq d$
       b. $[\![young]\!] = \lambda d \lambda x . \mathbf{young}(x) \succeq d$
       c. $[\![successful]\!] = \lambda d \lambda x . \mathbf{successful}(x) \succeq d$

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The degree argument of a gradable predicate is typically assumed to occupy SpecAP, and to be expressed by a 'Degree Phrase' (Bresnan 1973; Jackendoff 1977; Heim 2000; Bhatt and Pancheva 2004):

(42)

```
        AP
       /  \
    DegP    A'
            |
            A
```
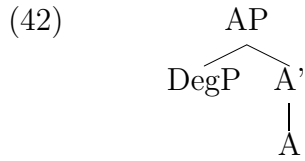
The DegP position can be filled by degree modifiers *very, quite*, etc., comparative constructions *more than ...*, and of particular importance to us: measure phrases.

The simplest analysis of measure phrases is that they just denote degrees (or properties of degrees, as in Schwarzschild and Wilkinson 2002; Schwarzschild to appear), and so directly saturate the degree argument of the adjective. However, whether or not a measure phrase is possible depends on two factors.

1. The adjective must express a gradable property for which a measurement system is defined.

FATIGUE does not come with a measurement system, so even though it is possible to make comparisons about how tired two objects are, it is not possible to use a measure phrase to express degree of tiredness.

2. The adjective must map its argument onto measurable degrees.

The second requirement underlines the difference between antonyms like *old* and *young*. The AGE scale comes with a measurement system, but (43b) is ruled out by independent assumptions about the representation of adjectival polarity.

(43) a. $[\![_{\text{AP}} \ \text{8 months old}]\!] = \lambda x.\textbf{old}(x) \succeq \textbf{8 months}$
      b. $[\![_{\text{AP}} \ \text{8 months young}]\!] = \lambda x.\textbf{young}(x) \succeq \textbf{8 months}$
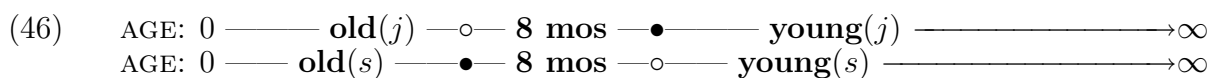
Antonyms map their arguments onto complementary regions of the same scale: 'positive' and 'negative' degrees, respectively (Seuren 1978; von Stechow 1984b; Kennedy 2001).

(44) AGE: 0 ————— **old**(x) ————•——— **young**(x) ——————————→∞
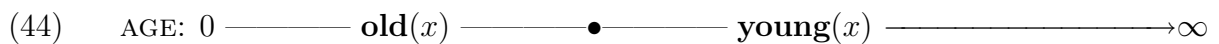
Only positive degrees correspond to measurable scalar intervals, so only positive degrees can be expressed by measure phrases (von Stechow 1984b).

In comparatives, what is being measured is not the positive/negative age of an object, but rather the difference in (positive/negative) age between two objects.

(45) a. Julian is 8 months older than Sam.
      b. Sam is 8 months younger than Julian.

(46) AGE: 0 ——— **old**(j) —○— **8 mos** —•——— **young**(j) ——————————→∞
      AGE: 0 ——— **old**(s) ———•— **8 mos** —○——— **young**(s) ——————————→∞

Such 'differential' degrees are always measurable (assuming a measurement system is defined; see Kennedy 2001; Schwarzschild and Wilkinson 2002; Schwarzschild to appear), and so can be expressed by a measure phrase.

4.2 The null operator as a type measure phrase

These assumptions suggest a straightforward explanatiopn of the Salient Measure Constraint: assume that the NN null degree operator is a (highly underspecified) measure phrase/quantifier over degrees with a denotation along the lines of (47).

(47) $[\![\text{Op}_{DegP}]\!] = \lambda D.$how many units is the maximal d such that $D(d)$?

This predicts that only adjectives that support measure phrases will have DQ interpretations: although all of (48a-c) are well-formed structures, only (48a) is interpretable.

(48) a. $[_{CP}$ Op$_1$ er$_2$ $[_{IP}$ du t_2 $[_{AP}$ t_1 gammel$]]]$ =
$[\![Op]\!](\lambda d.$the degree to which you are old $\succeq d$) =
how many units is the maximal d s.t. the degree to which you are old $\succeq d$?
b. $[_{CP}$ Op$_1$ er$_2$ $[_{IP}$ hun t_2 $[_{AP}$ t_1 ung$]]]$ =
$[\![Op]\!](\lambda d.$the degree to which she is young $\succeq d$) =
how many units is the maximal d s.t. the degree to which she is young $\succeq d$?
c. $[_{CP}$ Op$_1$ er$_2$ $[_{IP}$ du t_2 $[_{AP}$ t_1 trøtt$]]]$ =
$[\![Op]\!](\lambda d.$the degree to which you are tired $\succeq d$) =
how many units is the max. d s.t. the degree to which you are tired $\succeq d$?

(49b) is uninterpretable because negative degrees cannot be measured, and (49c) is uninterpretable because *tired* is not associated with a measurement system at all.

In contrast, the overt *wh*-DegP *kor* (as well as English *how*, etc.) must have a meaning like (49), where f is a degree modifier meaning (type $\langle\langle d, \langle e, t\rangle\rangle, \langle e, t\rangle\rangle$; this analysis assumes for simplicity that the adjective is not reconstructed).

(49) $[\![\text{kor/how}]\!] = \lambda G_{\langle d, \langle e,t\rangle\rangle}\lambda P_{\langle\langle e,t\rangle,t\rangle}.$what is the f such that $P(f(G))$?

(50) $[_{CP}$ $[_{AP}$ How young$]_1$ is$_2$ $[_{IP}$ Mai t_2 $t_1]]]$ =
$[\![\text{how young}]\!](\lambda Q.Q(\mathbf{mai}))$ =
$\lambda P_{\langle\langle e,t\rangle,t\rangle}.$what is the f such that $P(f([\![\text{young}]\!]))(\lambda Q.Q(\mathbf{mai}))$? =
what is the f such that $f([\![\text{young}]\!])(\mathbf{mai})$?

Possible answers to (50) are e.g. *very young, younger than you, too young to watch this movie*, etc., where f corresponds to the meaning of the degree modifier.

Among the set of such functions are also meanings like (51), which ensures that *how A* questions can also be answered by measure phrases (provided the adjective accepts them in the first place).

(51) $\lambda G_{\langle d, \langle e,t\rangle\rangle}\lambda x.G(\mathbf{8\ months})(x)$

(51) is basically just a type-shifted version of degree-denoting *8 months*.

4.3 Problems with presuppositions

The problem with this analysis is that the kind of meaning we need to assume for the null degree operator generates expecations about answers that are not in fact manifested by NN null operator DQs.

This is easiest to illustrate by looking at comparatives. The analysis assigns an interpretation to (52) that is semantically parallel to (53a), and distinct from (53b).

(52)   Er han mye   eldre enn   deg?
         is   he   much older than you
         'How much older than you is he?'

(53)   a.   How many months older than you is he?
         b.   How much older than you is he?

In (53a), we have explicit quantification over units of measurement, while (53b) just involves quantification over (unmeasured) degrees. The difference is made clear in the paraphrases in (54a-b).

(54)   a.   How many month units is the maximal degree d such that his age exceeds your age by d?
         b.   What is the maximal degree d such that his age exceeds your age by d?

This difference gives rise to a subtle constraint on appropriate answers to questions like (53a-b). While all of (55a-c) are possible answers to (53b), only (55a-b) are felicitous as answers to (53a).

(55)   a.   8 months older
         b.   many months older/a few months older/not as many months older as I thought
         c.   much older/a little bit older/not as much older as I thought

The responses in (55c) are odd, and prompt a questioner to say: Why are you avoiding my question!

This difference is not merely an issue of informativity: *many months older* is just as (un)informative an answer as *much older*. The only difference is that it explicitly frames the answer in terms of the information that was requested: month-units of measurement.

Turning back to the Norwegian example in (52), we see that all of (56a-c) are perfectly felicitous answers.

(56)   a.   8 måneder eldre
              8 months   older
         b.   mange måneder eldre/noen få   måneder eldre/ikke så mange måneder
              many   months   older/some few months   older/not   so many   months
              eldre som æ trodde
              older as   I   thought
         c.   mye   eldre/litt   eldre/ikke så mye   eldre som æ trodde
              much older/little older/not   so much older as   I   thought

We conclude that the NN null operator cannot quantify over units of measurement as proposed in (47), but rather must have a more general meaning along the lines of (57).

(57) $[\![\mathrm{Op}_{DegP}]\!] = \lambda D.$what is the maximal d such that $D(d)$?

If this is correct, we lose our account ouf the Salient Measure Restriction: since all gradable adjectives introduce degrees, the operator in (57) should be compatible with them, regardless of type.

In fact, this sort of quantification is exactly what is standardly assumed to be involved

in the interpretation of comparative clauses (see von Stechow 1984a; Heim 1985, 2000; Rullmann 1995 and many more), where there is clearly no restriction based on something like the Salient Measure Restriction:

(58)   a.   Tromsø is smaller than [$_{\text{CP}}$ Op$_1$ Rome is [$_{\text{AP}}$ ~~t_1 small~~]]
              $max\{d \mid \mathbf{small}(r) \succeq d\}$
        b.   Rome is more chaotic than [$_{\text{CP}}$ Op$_1$ Tromsø is [$_{\text{AP}}$ ~~t_1 chaotic~~]]
              $max\{d \mid \mathbf{chaotic}(t) \succeq d\}$

If we can't explain the Salient Measure Restriction in terms of the semantics of the operator, then we should try explaining it in terms of the semantics — and syntax — of the predicate. As we have just seen, the 'standard' analysis of gradable predicates makes the wrong predictions, so we need to consider an alternative.

5   Second try: Severing the degree argument from the adjective

5.1   The measure function analysis of gradable predicates

An alternative to the analysis of gradable predicates presented above is one in which gradable adjectives are expressions of type $\langle e, d \rangle$: they denote measure functions (Bartsch and Vennemann 1972; Kennedy 1999).

(59)   a. $[\![\text{old}]\!] = \lambda x.\mathbf{old}(x)$
        b. $[\![\text{young}]\!] = \lambda x.\mathbf{young}(x)$
        c. $[\![\text{successful}]\!] = \lambda x.\mathbf{successful}(x)$

Kennedy (1999) shows how this semantic analysis naturally supports a syntactic analysis in which degree morphology heads the extended functional projection of the lexical head (Abney 1987; Corver 1990; Grimshaw 1991):

(60)   DegP
           /   \
        Deg   AP
                 |
                 A
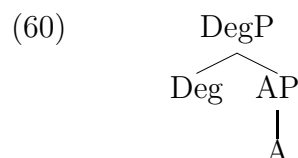
This analysis brings the adjectival projection in line with other lexical-functional projections (DP-NP, CP-IP-VP, etc.), clearly a desirable theoretical position.

The semantic function of degree morphology to convert a measure function into a property of individuals. For example, the unmarked 'positive' form of an adjectival predicate is derived by combining an adjective with a null Deg head *pos* which has the (oversimplified!) semantics in (61).

(61) $[\![_{\text{Deg}} \; pos]\!] = \lambda g \in D_{\langle e,d \rangle} \lambda x.g(x) \succ \mathbf{standard}(g)$

Here $\mathbf{standard}(g)$ represents the 'standard of comparison' for g in the context of utterance: the degree that is required to 'count as' having the property measured by g.

(62) $[\![_{\text{DegP}} \; pos \; [_{\text{AP}} \; \text{old}]]\!] = [\![pos]\!]([\![\text{old}]\!]) =$
        $\lambda g \in D_{\langle e,d \rangle} \lambda x.g(x) \succ \mathbf{standard}(g)([\![\text{old}]\!]) =$
        $\lambda x.[\![\text{old}]\!](x) \succ \mathbf{standard}([\![\text{old}]\!]) =$
        $\lambda x.\mathbf{old}(x) \succ \mathbf{standard}(\lambda y.\mathbf{old}(y))$
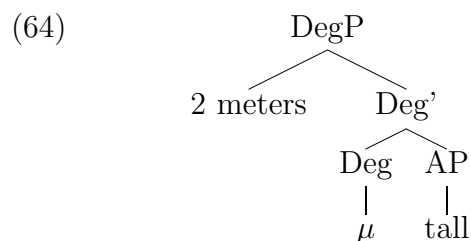
Kennedy 1999 shows how this approach extends to comparatives and other complex degree constructions; here we focus on the analysis of measure phrases.

5.2 Projecting the degree argument

If measure phrases denote (or quantify over) degrees, but gradable adjectives do not themselves have degree arguments, then some other element of the structure must provide this position for the measure phrases in examples like (63a-c) to saturate.

(63) a. 2 meters tall
b. 8 months old
c. 5 fathoms deep

We propose that the measure phrase argument is introduced by a Deg head which we will refer to as μ, so that an example like (63a) has the structure in (64).

(64)

```
            DegP
          /      \
    2 meters     Deg'
               /      \
             Deg       AP
              |         |
             μ        tall
```

We further claim that μ is restricted to combine only with adjectives that denote functions that map their arguments onto measurable degrees. This is implemented as a domain restriction in (65) (where **meas** abbreviates the relevant property), but we consider an alternative syntactic implementation/augmentation below.

(65) $[\![_{\mathrm{Deg}}\mu]\!] = \lambda g : \mathbf{meas}(g)\lambda d\lambda x.g(x) \succeq d$

In short, our claim is that the semantics that underlies explicit measurement of degrees has a direct effect on the syntax of the extended adjectival projection:

- Only those adjectives that have meanings that support measurement of degrees can combine with μ and project a syntactic degree argument.

If this is correct, the Salient Measure Restriction on NN null degree questions follows automatically:

- The NN null operator binds a degree variable.

- Only those adjectives that can combine with μ project a degree variable.

- Therefore, only those adjectives that support measurement permit V1 question strings to be parsed as DQ question structures.

(66)   a.   Er du gammel?
            are you old
            'Are you old?'/'How old are you?'
b.   [$_{\mathrm{CP}}$ er$_2$ [$_{\mathrm{IP}}$ du t_2 [$_{\mathrm{DegP}}$ *pos* [$_{\mathrm{AP}}$ gammel]]]]

    c.   [$_{CP}$ Op$_1$ er$_2$ [$_{IP}$ du t_2 [$_{DegP}$ t_1 μ [$_{AP}$ gammel]]]]] =
$[\![Op]\!]$(λd.the degree to which you are old $\succeq d$) =
what is the maximal d s.t. the degree to which you are old $\succeq d$?

(67)   a.   Er hun ung?
                is she young
                'Is she young?'/*'How young is she?'
    b.   [$_{CP}$ er$_2$ [$_{IP}$ hun t_2 [$_{DegP}$ *pos* [$_{AP}$ ung]]]]]
    c.   *[$_{CP}$ Op$_1$ er$_2$ [$_{IP}$ hun t_2 [$_{DegP}$ t_1 μ [$_{AP}$ ung]]]]]

(68)   a.   Er du trøtt?
                are you tired
                'Are you tired?'/*'How tired are you?'
    b.   [$_{CP}$ er$_2$ [$_{IP}$ du t_2 [$_{DegP}$ *pos* [$_{AP}$ trøtt]]]]]
    c.   *[$_{CP}$ Op$_1$ er$_2$ [$_{IP}$ du t_2 [$_{DegP}$ t_1 μ [$_{AP}$ trøtt]]]]]

Nothing special needs to be said about the semantics of the null operator, so we avoid
making the incorrect predictions about possible answers to null degree questions that we
saw with the 'how many units?' analysis.

5.3 How questions

How (and Norwegian *hvor*) are Deg heads, and have essentially the analysis sketched
above: they quantify over Deg meanings, as stated in (69).

(69) $[\![[_{Deg}\ how/hvor]]\!] = \lambda g \in D_{\langle e,d\rangle}\lambda P_{\langle\langle e,t\rangle,t\rangle}$. what is the $f \in D_{\langle\langle e,d\rangle,\langle e,t\rangle\rangle}$ such that
$P(f(g)) = 1$

The reason why *1.5 meters tall* is a possible answer to *how tall is Kim?* is because (70)
is an function of the appropriate type:

(70) $\lambda g \in D_{\langle e,d\rangle}\lambda x.g(x) \succeq \mathbf{1.5\ meters}$

This function doesn't correspond to any particular morpheme, but it can be derived by
abstracting over the adjective in (71).

(71)   [$_{DegP}$ 1.5 meters [$_{Deg'}$ μ [$_{AP}$ tall]]] =
$\lambda x.\mathbf{tall}(x) \succeq \mathbf{1.5\ meters}$

This will only be possible for adjectives that can appear in such structures in the first
place.

Finally, the fact that these are Deg heads explains why they cannot move on their own
(Corver 1990): this would violate the Head Movement Constraint.

5.4 Comparatives

As we saw earlier, comparative forms of negative adjectives permit measure phrases and
give rise to DQ readings even when the positive (unmarked) forms do not:

(72)   a.   *åtte måneder ung
                eight months   young

b. Er han ung?
'Is he young?'/*'How young is he?

(73) a. Julian er 8 måneder yngre enn Sam.
Julian is 8 months younger than Sam
'Julian is 8 months younger than Sam.'
b. Er han mye yngre enn deg?
is he much younger than you
'How much younger than you is he?'

One potential explanation of this fact is that the comparative degree morphology is like μ in that it introduces a degree argument, namely the 'differential degree' that measures the distance between the compared objects (Hellan 1981; von Stechow 1984a; Kennedy 2001; Schwarzschild and Wilkinson 2002; Schwarzschild to appear):

(74) a. $[\![\text{-er/more}]\!] = \lambda g_{\langle e,d \rangle} \lambda d \lambda y \lambda x.g(x) - d = g(y)$
b. $[\![[_{\text{DegP}} \text{ 2m longer than b}]]\!] = \lambda x.\textbf{long}(x) - d = \textbf{long}(b)$

But if our claims about the semantics of the NN null degree operator are correct, then this analysis can't be: it would wrongly predict DQ interpretations of examples like (75a).

(75) a. Er han mye trøttere enn deg?
is he much tireder than you
'Is he much more tired than you?'/*'How much more tired is he than you?'
b. Æ er (*fem timer) trøttere enn deg.
I am five hours tireder than you
'I am (*five hours) more tired than you'

In effect, we run into the same problem we had with the standard analysis of gradable adjectives, giving a predicate a degree argument when it shouldn't have one.

A second problem for this analysis comes from the fact that *mye* 'much' is required for a DQ interpetation of a comparative, regardless of polarity:

(76) Er han (mye) eldre/yngre enn deg?
is he (much) older/younger than you
'Is he (much) older/younger than you?'
'How much older/younger than you is he?' *(*mye*)

If comparative morphology introduced a degree argument, there would be no syntactic or semantic distinction between it and μ (in the relevant respects), and no obvious reason to require the presence of *mye* 'much' to get the DQ interpretation.

We can account for the distribution of DQ readings of comparatives if we adopt the analysis of comparatives proposed by Kennedy and McNally (in press, 2005b), in which comparatives are not true degree morphemes, but rather expressions that map adjective meanings to new adjective meanings (i.e., adjectival modifiers; see also Neeleman, Van de Koot, and Doetjes 2004). The basic idea is illustrated by (77)-(78):

(77) $[\![tall]\!]$ = the function h from individuals to:
HEIGHT: 0 ———————————————————————————→∞
such that $h(x) = x$'s height

(78) $[\![taller\ than\ Lee]\!]$ = the function h' from individuals to the $[\ —\ ]$ part of:
       HEIGHT: 0 - - - - Lee's height - - - - -$[\bullet \xrightarrow{\hspace{6cm}} \infty]$
       such that if x's height $\succ$ Lee's height, then $h'(x) = x$'s height, else $h'(x) = \bullet$

Since comparative predicates denote measure functions, not properties of individuals, they need to combine with *pos* (or some other degree morpheme) to derive a property of individuals; this claim has been made on independent syntactic grounds by Corver (1997a,b), who argues that comparative morphology fills a functional layer between the lexical head and DegP:

(79)
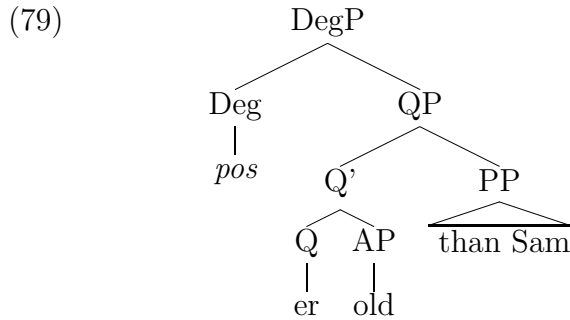
(80) $pos([\![taller\ than\ Lee]\!])(Kim) \Rightarrow$
       $[\![taller\ than\ Lee]\!](Kim) \succ \mathbf{stnd}([\![taller\ than\ Lee]\!])$

Assuming with Kennedy and McNally (2005a) that the standard of comparison assigned to predicates that use scales with minimal values is not context-dependent, but rather defaults to the minimum, (80) is equivalent to (81a), which is equivalent to (81b).

(81)   a. $[\![taller\ than\ Lee]\!](Kim) \succ min(\text{SCALE}([\![taller\ than\ Lee]\!]))$
       b. $[\![tall]\!](Kim) \succ [\![tall]\!](Lee)$

   • If you have a non-zero degree of taller-than-Lee-ness, then you are taller than Lee.

Comparatives should be able to further combine with degree morphology, such as intensifiers (*much taller than*), comparative morphology (*as much taller than*), and measure phrases.

In particular, measure phrases in differential comparatives can be analyzed in essentially the same way as measure phrases with the positive form. Specifically, we propose that differential comparatives involve combination with *meas*, as in (82).

(82)

16

Just as in the traditional analysis, the semantics of comparatives entails that both positive and negative comparatives map their arguments onto bounded measurable degrees, as illustrated in (83)-(84).

(83)   a.   [$_{\text{DegP}}$ 8 months older than Sam]
        b.   AGE: 0 - - - - Sam's oldness - - - - -[○ — **8 mos** —●—————————→∞]

(84)   a.   [$_{\text{DegP}}$ 8 months younger than Sam]
        b.   AGE: [0 ←————-●— **8 mos** —○]- - - - Sam's youngness - - - - - - - -→ ∞

As a result, both *older than Sam* and *younger than Sam* can combine with μ and introduce a degree argument for the NN null degree operator to bind.

In contrast, comparatives formed out of adjectives like *tired* still make use of scales without measurement systems. Combination with μ is therefore impossible, and no degree argument is projected.

This analysis also provides a basis for explaining the fact *mye* 'much' is required to obtain a DQ interpretation in NN, though the details still need to be worked out here. Here are a couple of variations on one plausible approach to the problem:

- ***mye*** $= \mu$:   *mye* is the pronunciation of μ, but that there is an obligatory deletion rule that eliminates it when it either selects for a lexical head or appears with an overt measure phrase (cf. Bresnan's (1973) rule of '*much*-deletion').

- ***mye*-support:** μ, unlike *pos*, requires phonological support, either by an overt measure phrase in SpecDegP, or via raising of a lexical head from its complement position. In comparatives, raising is blocked by the QP layer, so only an overt measure phrase will do. But in DQs, the measure phrase is null, so a dummy element *mye* is inserted in Deg^0 (cf. Corver's (1997a; 1997b) analysis of *much*-support).

- ***mye* as an adjective:**   The μ head, like the overt word *kor*, its English counterpart *how*, and modifiers like *very*, combines with AP, not QP (cf. **very taller, *how taller,* etc.). The word *mye* 'much' is a dummy A (cf. *very much, how much*).

The first two solutions draw on pre-Minimalist assumptions about syntax (deletion rule, overtness requirement) that have not yet been recast in Minimalist terms. The third is more original, but remains to be fully worked out; the crucial point is that our proposal makes a syntactic distinction between comparative and non-comparative forms that is not made in the standard analysis.

6   The distribution of measure phrases

6.1   Cross-linguistic variation

If our proposals are on the right track, then clearly an important question concerns the set of gradable adjectives that can actually combine with the *meas* head: which ones get to be in this set, and why?

In fact, it does not appear to be the case that having a scale associated with a measurement system is a sufficient condition for membership, though it is a necessary one. The set of adjectives that accept measure phrases is subject to language-specific and apparently idiosyncratic factors

For example, *expensive* and *warm* permit measure phrases in NN (at least in attributive position), but they don't in English:

(85)   a.   ei 200 kroners   dyr   lampe
              a 200 crowns.s expensive lamp
              'a 20 dollar (*expensive) lamp'
        b.   20 grader   varmt vann
              20 degrees warm water
              '20 degree (*warm) water'

In German, *heavy* and *fast* permit measure phrases, but they don't in English:

(86)   a.   100 Tonnen schwer
              100 tons   heavy
              '100 tons (*heavy)'
        b.   60 Stundentkilometer schnell
              60 hour.kilometers   fast
              '60 kilometers (*fast)'

In French, *tall* and *deep* do not allow measure phrases, but they do in English:

(87)   a.   *grand de 1,27 meters
              big   of 1.27 meters
              '1.27 meters tall'
        b.   *profond de 2 meters
              deep   of 2 meters
              '2 meters deep'

Neither NN nor English permit measure phrases with *rich*, though French does, but all allow them with the comparative form:

(88)   a.   *Bill Gates er 9 milliarder dollar   rik.
              Bill Gates is 9 billions   dollars rich
        b.   *Bill Gates is 9 billion dollars rich.
        c.   Bill Gates est riche de 9 billion.
              Bill Gates is   rich of 9 billion
              'Bill Gates is worth 9 billion.'

(89)   a.   Bill Gates er 9 mrd.   dollar   rikere enn   mæ.
              Bill Gates is 9 billion dollars richer than me
        b.   Bill Gates is 9 billion dollars richer than me.
        c.   Bill Gates est plus riche de moi de 9 billion.
              Bill Gates is   more rich of me of 9 billion

None of the predicates listed above allow measure phrases in Japanese or Russian in the positive form, but all of the predicates in all of the languages allow measure phrases when they are in the comparative form.

6.2 Schwarzschild's proposal

The relevant generalization is something like (90) (adapted from Schwarzschild to appear).

(90)   If a particular scale (height, depth, weight, etc.) is associated with a measurement system in language X, then comparative forms of adjectives that denote functions to that scale will accept measure phrases, but the set of positive forms that accept measure phrases is subject to arbitrary, language-specific factors.

Let us consider Schwarzschild's (to appear) explanation of the contrast between (91a) and (91b).

(91)   a. *Kim is 75 kilos heavy.
        b. Kim is 74 kilos heavier than this 1 kilo bag of potatoes.

Schwarzschild's semantics for comparatives assigns them a different semantic type from lexical adjectives: the former are relations between individuals and degrees; the latter denote differential degrees. Something like the following:

(92)   a. $\llbracket \text{heavy} \rrbracket = \lambda d \lambda x. \mathbf{heavy}(x) \succ d$
        b. $\llbracket \text{heavier than B} \rrbracket = \lambda P \lambda x. P(\mathbf{heavy}(x) - \mathbf{heavy}(B))$

Measure phrases are predicates of degrees. As a result, they can combine freely with comparatives (assuming they express the right kind of measurement for the scale), but not with lexical adjectives.

This means that (91a) is uninterpretable in Schwarzschild's analysis: according to him, this is the <u>basic case</u>. Languages like Japanese are the norm; English, which disallows (92a) but allows (93), is exceptional.

(93)   Kim is 2 m tall.

Schwarzschild explains (93) by proposing the type-shifting rule in (94) [slightly modified by CK], which is lexically specified as to the adjectives that it can apply to.

(94)   If A denotes a relation between individuals and degrees, then A has a secondary meaning A' relating individuals to predicates of degrees, such that:
        $\llbracket A' \rrbracket = \lambda P \lambda x. P(max\{d \mid \llbracket A \rrbracket(d)(x)\})$

This rule is lexically specified to apply to *tall* in English but not to *heavy*; Norwegian and German can apply it to *heavy* as well; Japanese doesn't allow it at all.

I think that Schwarzschild's core claims are exactly right:

- Measure phrases should not be able to freely combine with lexical adjectives, in constrast to comparative adjectives.

- There needs to be some way of specifying in a language-specific way which lexical adjectives can combine with MPs.

I think there is a fundamental problem with his implementation, however. If the types are as Schwarzschild suggests, then what rules out the possibility of type-shifting an MP to make it compatible with a lexical A?

If measure phrases are properties of degrees, then something along the lines of (95) seems like a good candidate for a measure phrase type-shifting rule (cf. Partee 1987).

(95)   If M denotes a property of degrees, then M has a secondary meaning M' as a description of a degree, such that: $[\![M']\!] = \iota d.[\![M]\!](d)$

If this were possible, there would be no way to restrict composition of e.g. *75 kilos* and *heavy*.

6.3   Our account

Our analysis of the projection of degree arguments captures the spirit of Schwarzschild's proposal but doesn't run into this problem. First I'll give an uninteresting but effective account of the data, then a more interesting but possibly more problematic one.

First, since μ is a lexical item, it is possible to lexically encode which adjectives it can combine with, so we can account for the contrast between e.g. (96a) and (96b) in terms of syntactic selection.

(96)   a.   DegP   b.*   DegP

                  2 meters   Deg'   75 kilos   Deg'

                          Deg   AP   Deg   AP
                           | | | |
                           μ tall μ heavy

(97)   a.   English
             $[_{\text{Deg}}\ \mu]$: $[\rule{1em}{0.4pt}\ \{AP_{[\text{HEAD}\in\{tall,deep,...\}]}\}]$
        b.   German
             $[_{\text{Deg}}\ \mu]$: $[\rule{1em}{0.4pt}\ \{AP_{[\text{HEAD}\in\{schwer,schnell,...\}]}\}]$
        c.   Norwegian
             $[_{\text{Deg}}\ \mu]$: $[\rule{1em}{0.4pt}\ \{AP_{[\text{HEAD}\in\{dyr,varmt,...\}]}\}]$

Turning to comparatives, recall that they are of the semantic type as lexical adjectives; as a result, they can combine with μ as long as they use appropriate scales.

The comparative constituent is still syntactically distinct from the lexical adjective, though. As noted above, Corver (1997a,b) has argued that comparatives have an extra level of functional morphology between A and Deg, as in (98a); alternatively, it might be the case that the adjective enters the syntax already marked as comparative, as in (98b).

(98)   a.   DegP   b.   DegP

              Deg   QP$_{[+\text{COMP}]}$ Deg   AP$_{[+\text{COMP}]}$
               | |
              pos   Q'$_{[+\text{COMP}]}$ PP   *pos*   A$_{[+\text{COMP}]}$ PP
                                                    than B | than B
                        Q$_{[+\text{COMP}]}$ AP   heavier
                            | |
                            er   heavy

In (98a-b) DegP is headed by *pos*, which derives the basic comparative truth conditions. But Deg could also be headed by μ, since the weight scale supports measurement. This licenses projection of a measure phrase:

(99)

```
            DegP
          /      \
    74 kilos     Deg'
               /      \
            Deg      AP_[+COMP]
             |       /      \
            μ    A_[+COMP]    PP
                   |          /\
                heavier    than B
```
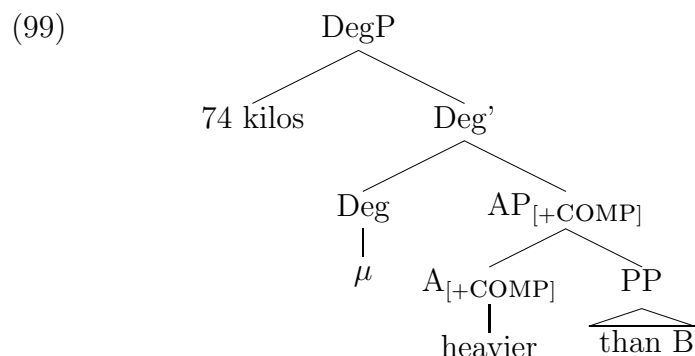
We then complete the picture by saying that cross-linguistically, μ selects for $AP_{[+COMP]}$, but it selects for non-comparative APs on a restricted, language specific basis. E.g.:

(100)   a.   English
            $[_{\text{Deg}}\ \mu]$: $[\underline{\quad} \{AP_{[+COMP]}, AP_{[\text{HEAD}\in\{\textit{tall,deep,...}\}]}\}]$
        b.   German
            $[_{\text{Deg}}\ \mu]$: $[\underline{\quad} \{AP_{[+COMP]}, AP_{[\text{HEAD}\in\{\textit{schwer,schnell,...}\}]}\}]$
        c.   Norwegian
            $[_{\text{Deg}}\ \mu]$: $[\underline{\quad} \{AP_{[+COMP]}, AP_{[\text{HEAD}\in\{\textit{dyr,varmt,...}\}]}\}]$
        d.   Japanese
            $[_{\text{Deg}}\ \mu]$: $[\underline{\quad} AP_{[+COMP]}]$

That's the effective version. The more interesting one explains why μ can always combine with a comparative in terms of the meaning of comparatives.
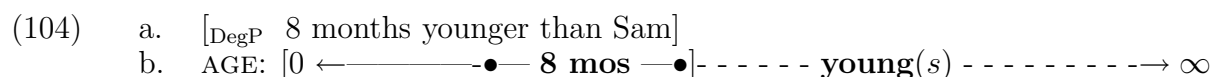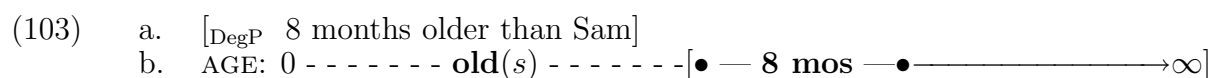
The central idea is that it is not a type distinction that differentiates comparatives and unmarked adjectives, but rather a scalar one: comparatives are special in always having scales with zero elements, regardless of the scale structure of the base adjective. The starting point is the contrast in (101).

(101)   a. $[_{\text{DegP}}\ 8\ \text{months}\ [_{\text{Deg}'}\ \mu\ [_{\text{AP}}\ \text{old}]]]$
        b. *$[_{\text{DegP}}\ 8\ \text{months}\ [_{\text{Deg}'}\ \mu\ [_{\text{AP}}\ \text{young}]]]$

What rules out (101b) if the age scale allows measurement? The answer is a scalar one: 'negative' adjectives map their arguments onto unmeasurable scalar intervals (Seuren 1978; von Stechow 1984b; Kennedy 2001):

(102)   AGE: 0 ———— **old**(x) ————•———— **young**(x) ——————→∞
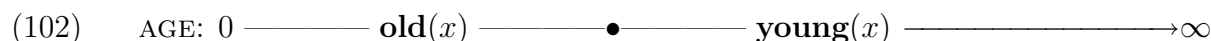
The semantics of comparatives always introduces a zero point, however, regardless of the polarity of the adjective. It therefore entails that both positive and negative comparatives map their arguments onto measurable degrees, as is illustrated in (103)-(104).

(103)   a. $[_{\text{DegP}}\ 8\ \text{months older than Sam}]$
        b.   AGE: 0 - - - - - - - **old**(s) - - - - - - -[• — **8 mos** —•————————→∞]

(104)   a. $[_{\text{DegP}}\ 8\ \text{months younger than Sam}]$
        b.   AGE: $[0$ ←————————•— **8 mos** —•]- - - - - - **young**(s) - - - - - - - - -→ ∞

So, one idea to consider is that the class of lexical adjectives that generally appear with measure phrases (Bierwisch's (1989) DIMENSIONAL ADJECTIVES) do not (contrary to appearance) have scales that are compatible with measure phrases.

Specifically, we could hypothesize that the ordering expressed by μ presupposes that both of its arguments (the measure phrase and the adjective/individual constituent) express degrees (intervals) that originate at the zero point of a scale.

And in fact, if we look at adjectives that allow measure phrases in English, we see that they do not use scales with zero points: compare (105)-(106) with (107) (see Kennedy and McNally in press for relevant discussion).

(105)   HEIGHT
      a. ??completely/absolutely/100% short
      b.   not tall $\not\Rightarrow$ doesn't have height
      c. $[\![$is tall$]\!]$ = has a height that exceeds a contextual standard/RELATIVE

(106)   DEPTH
      a. ??completely/absolutely/100% shallow
      b.   not deep $\not\Rightarrow$ doesn't have depth
      c. $[\![$is deep$]\!]$ = has a depth that exceeds a contextual standard/RELATIVE

(107)   BEND
      a.   completely/absolutely/100% straight
      b.   not bent $\Rightarrow$ doesn't have bend
      c. $[\![$is bent$]\!]$ = has a non-zero degree of bend/ABSOLUTE

So perhaps what is language-specific is a 'scale shifting principle' that allows μ to treat certain adjectives as having scales with zero points. The list of such adjectives must be specified lexically, and is subject to cross-linguistic variation.

Nothing special needs to be said about comparatives, because they always use scales with zero points, as described above.

This hypothesis predicts that any lexical adjective that uses a scale with a zero point should in principle allow measure phrases (i.e., if the scale has a measurement system). One set of adjectives that allow measure phrases cross-linguistically (in both the positive and negative forms!) are the following (Kennedy 2001; Schwarzschild to appear):

(108)   a.   10 minutes early/late
         b.   10 minutes fast/slow (of a watch)
         c.   10 Hz flat/sharp

What's special about these is that they measure in different directions from a (contextually defined) zero point: 'on time'.

7   Back to Northern Norwegian degree questions

If the previous proposals are correct (either the uninteresting but effective, or interesting but problematic proposal), we predict that there should be cases of lexical adjectives in Northern Norwegian that do not permit measure phrases or DQ interpretations of V1 questions, while their comparative forms do. One such example is *rich*:

(109) a. Er han Røkke rik?
           is   he   Røkke rich
           'Is Røkke rich?'/*'How rich is Røkke?'
       b. Er han Røkke mye   rikere enn   han Hegnar?
           is   he   Røkke much richer than he   Hegnar
           'Is Røkke richer than Hegnar?'/'How much richer than Hegnar is Røkke?'

However, there are also a few patterns like (110)-(111).

(110) a. Vinden   blåser (*10 m/s) hardt.
           the.wind blows (10   m/s)   hard
           'The wind is blowing (*10 m/s) hard.'
       b. Vinden   blåser 10m/s hardere enn   igår.
           the.wind blows 10   m/s   harder than yesterday
           'The wind is blowing 10 m/s harder than yesterday.'

(111) a. Blåser vinden   hardt?
           blows the.wind hard
           'Is the wind blowing hard?'/'How hard is the wind blowing?'
       b. Vinden   blåser mye   hardere enn   igår.
           the.wind blows much harder   than yesterday
           'Is the wind blowing harder than yesterday?'/'How much harder than yes-
           terday is the wind blowing?'

One possible explanation for these cases, based on the acceptability of (112), is that the
overt expression of a measure phrases triggers obligatory deletion of the adjective when
the scale is unambiguously determined by the measure phrase (Murphy 1997).

(112)   Vinden   blåser 10m/s
           the.wind blows ten.meters.per.second
           'The wind is blowing 10 meters per second.'

If this is the right explanation of these cases, then we should look to the possiblity of
DQ interpretations of V1 questions, rather than the acceptability of a measure phrase,
to determine whether a particular adjective can project a degree argument in NN.

8   Conclusions

- Gradable adjectives do not have degree arguments, but rather denote functions
  from individuals to degrees.

- The adjectival predicate is an extended projection structure: AP projects to (QP
  and) DegP.

- Degree arguments are introduced by functional morphology in the extended pro-
  jection of the adjective: the Deg head μ.

- Whether a degree argument can be projected or not depends on the semantic prop-
  erties of the lexical (adjectival) head (whether it uses a scale with a measurement
  system and maps its argument onto measurable degrees) and on possibly language-
  specific selectional restrictions (whether μ selects for the lexical head or not).

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