Modifiers like *approximately* appear to target degrees within quantifiers (Hackl, 2000; Nouwen, 2010). These are often degrees of cardinality, as in (1a), but can also be degrees in other domains, as in (1b).

(1)  
   a. Approximately 50 people attended the talk.  
   b. I eat an approximately gluten-free diet.

*Approximately* can also modify certain verbs, as in (2), raising the question of whether these verbs should likewise be treated as degrees, allowing for a unified account of *approximately*.

(2)  
   a. John’s income approximately doubled.  
   b. This approximately matches that.  
   c. Her winnings approximately equal the GDP of a small country.

I argue for a unified account of *approximately* (which can be extended to similar modifiers like *exactly, almost,* and *roughly*) as a ‘degree modifier’ (Hackl, 2000) such that it combines directly with a degree before composing with remaining material. This is sketched for (1a) in (3).

(3)  

\[
\left[ \left[ \text{approximately} \right] 50 \right] \left[ \text{people} \right] \quad \text{(approximately 50 people)}
\]

I extend this to (2) as in (4).

(4)  
   a. \( \left[ \left[ \text{approximately} \right] 2 \right] \left[ \text{-ple} \right] \) \quad \text{(approximately double)}  
   b. \( \left[ \left[ \text{approximately} \right] 0 \right] \left[ \text{difference} \right] \) \quad \text{(approximately equal/match)}

A Hackl-style treatment of the quantifier *approximately* is shown in (5), with the derivation of (1a) shown in (6), where *approximately* combines with a degree of cardinality, which in its base-generated position combines with the degree function MANY.

(5)  

\[
\text{[approximately]} = \lambda n_d. \lambda D_{\langle dt \rangle}. \exists m_d \in \{ y | n - \sigma \leq y \leq n + \sigma \} \ & D(m)
\]

takes a degree \( n \) and a partially-saturated parameterized determiner \( D \) and asserts that \( D \) holds of some degree \( m \) that is sufficiently close (as determined by a contextually supplied distance metric \( \sigma \)) to \( n \).  

(6)  

\[
[\text{Approximately 50 people attended the talk.}] =
\]

---

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∃m_d ∈ \{y|20 - \sigma \leq y \leq 20 + \sigma\} & \exists x people(x) = att(x) = 1 & x has m-many atomic parts in people

∃m_d ∈ \{y|50 - \sigma \leq y \leq 50 + \sigma\} & \exists x people(x) = att(x) = 1 & x has n-many atomic parts in people

∃m_d ∈ \{y|n - \sigma \leq y \leq n + \sigma\} & \exists x people(x) = att(x) = 1 & x has n-many atomic parts in people

This analysis can be extended to work beyond cardinalities.\(^1\) This ‘degree modifier’ composition requires verbs like those in (2) to contain a degree for the degree modifier to modify. I decompose multiplicative verbs like double into i) a degree of cardinality and ii) a multiplicative morpheme \([-le]\). The unmodified John’s income doubled is shown in (8).

(7) \([-le] = \lambda n_d. \lambda x_e. \lambda e_v. size(x)\) increases in e s.t. \(\frac{size(x) at e_1}{size(x) at e_0} = n\)

takes a degree argument \(n\), an individual, and an event, and it asserts that the individual increases by a factor of \(n\) by the conclusion of the event

(8) \([\text{John’s income doubled}] = \lambda e_v. size(i)\) increases in e

s.t. \(\frac{size(i) at e_1}{size(i) at e_0} = 2\)

The degree modifier approximately must here be of type \(\langle d\langle\langle d\langle dt\rangle\rangle\rangle\rangle\), as shown in (9), which I assume results from an eventive type shift. With this, the sentence in (2a) can be derived as in (10).

\(^1\)See Zaroukian (to appear) for a discussion a sentences like (1b).
(9)  [approximately] = \( \lambda n_d. \lambda D_{d(vt)} . \lambda e_v . \exists m_d \in \{ y | n - \sigma \leq y \leq n + \sigma \} \) & \( D(m)(e) \)

(10)  [John’s income approximately doubled] =

\[ \begin{align*}
\lambda e_v . \\
\exists m_d \in \{ y | 2 - \sigma \leq y \leq 2 + \sigma \} & \text{ & size}(i) \text{ increases in } e \text{ s.t. } \frac{\text{size}(i)}{\text{size}(i)} \text{ at } e_0 = m \\
\lambda D_{d(vt)} . \lambda e_v . \\
\exists m_d \in \{ y | 2 - \sigma \leq y \leq 2 + \sigma \} & \text{ s.t. } \frac{\text{size}(i)}{\text{size}(i)} \text{ at } e_0 = n \\
\lambda n . \lambda e_v . \text{size}(i) & \text{ increases in } e \\
\end{align*} \]

\[ \lambda n . \text{size}(i) \text{ increases in } e \text{ s.t. } \frac{\text{size}(i)}{\text{size}(i)} \text{ at } e_0 = n \]

Similarly, I decompose equatives verbs like equal and match into i) the degree of cardinality 0 and ii) a null difference morpheme [difference] (cf. Alrenga, 2007, who argues that expressions like same and different are comparatives, commenting on degree of similarity and not on (lack of) identity between two items (\( \lambda x_e . \lambda y_e . y = x \)).

(11)  [difference] = \( \lambda n_d . \lambda x_e . \lambda y_e . \text{DIFF}(x)(y) \leq n \) 

takes a degree \( n \) and two individuals and asserts that those individuals differ by no more than \( n \)

The unmodified This equals that is shown in (12), with the modified version in (13).

(12)  [This equals that] =

\[ \begin{align*}
\text{DIFF}(a)(b) & \leq 0 \\
\lambda y_e . \text{DIFF}(a)(y) & \leq 0 \\
\lambda x_e . \lambda y_e . \text{DIFF}(x)(y) & \leq 0 \text{ that} \\
\lambda n_d . \lambda x_e . \lambda y_e . \text{DIFF}(x)(y) & \leq n \\
\end{align*} \]
This analysis predicts that similar terms like \textit{redouble} (‘to increase greatly’) which lack a specific cardinality degree cannot be modified by \textit{approximately} (though with appropriate support a wide-scope \textit{approximately} may appear).

(14) John (?approximately) redoubled his efforts to win the election.

This analysis also suggests that predicates like \textit{same} and \textit{different} should be similarly decomposed to allow this unified degree-modifier \textit{approximately} across comparative predicate constructions and quantifiers alike (Alrenga, 2007; Huddleston and Pullum, 2002). Finally, it predicts that true predicates of identity should be infelicitous with \textit{approximately}, since they will not provide a degree argument. This is supported by the degradedness of \textit{approximately one and the same}, which may be a true identity predicate (though the phrase is not fully ungrammatical, likely due to our ability to coerce a scalar reading out of the term).

References


