Unified by degrees

Erin Zaroukian*

LSA Annual Meeting, Minneapolis, January 2–5, 2014

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) [[⟦**approximately**⟧ 50] ⟦**people**⟧] (approximately 50 people)

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

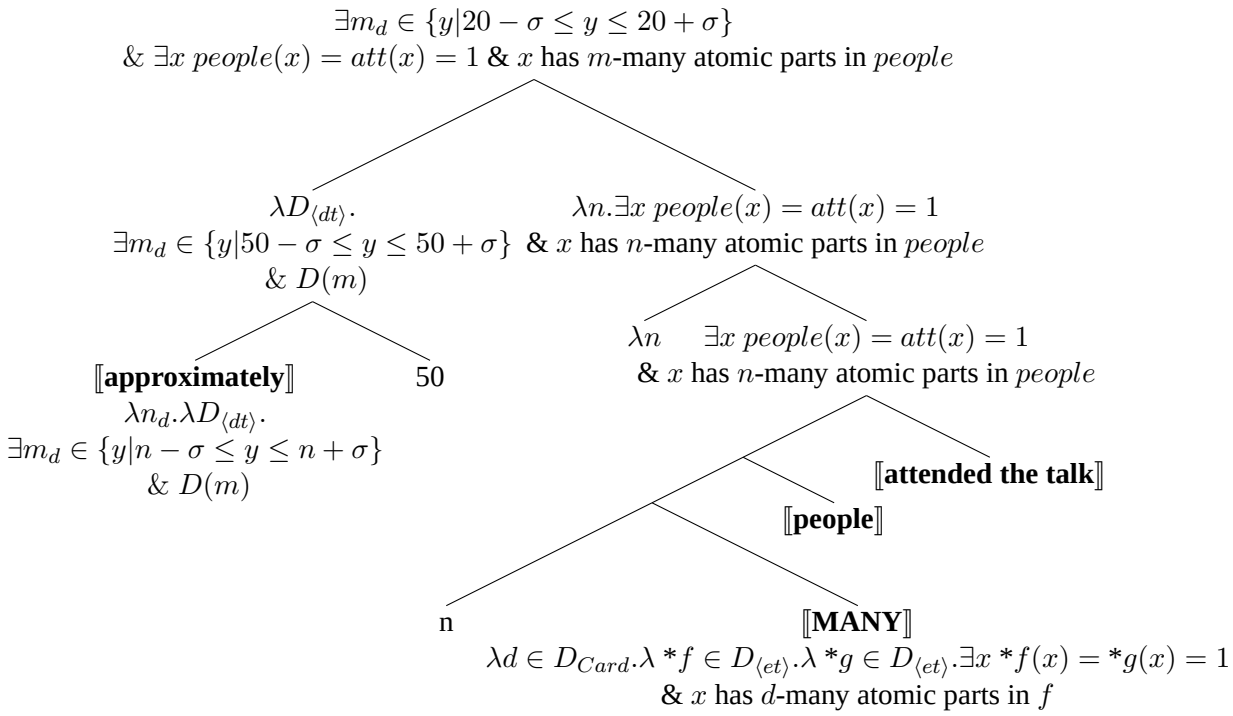
(4) a. [[⟦**approximately**⟧ 2] ⟦**-ple**⟧] (approximately double)
b. [[⟦**approximately**⟧ 0] ⟦**difference**⟧] (approximately equal/match)

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) ⟦**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 σ) to n (Zaroukian, 2013)

(6) ⟦**Approximately 50 people attended the talk.**⟧ =

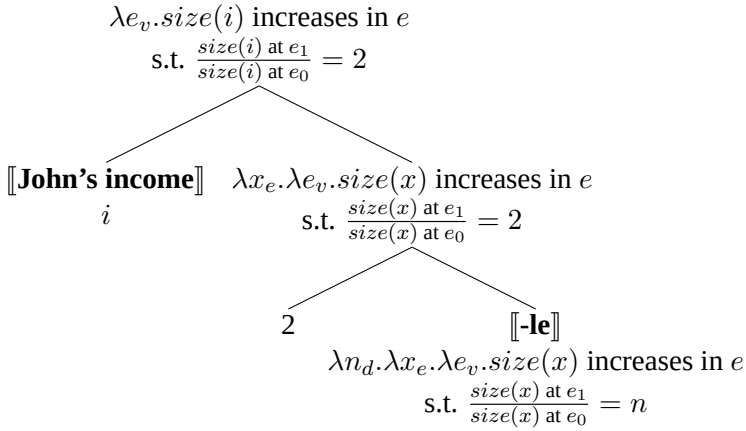
*This work was supported by grants ANR-10-LABX-0087 IEC and ANR-10-IDEX-0001-02 PSL. Additional thanks are owed to the Semantics Lab at Johns Hopkins University. Author: Erin Zaroukian, École Normale Supérieure/CNRS (egz@jhu.edu).



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. $\frac{size(x) \text{ at } e_1}{size(x) \text{ at } e_0} = n$
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) ⟦**John's income doubled**⟧ =

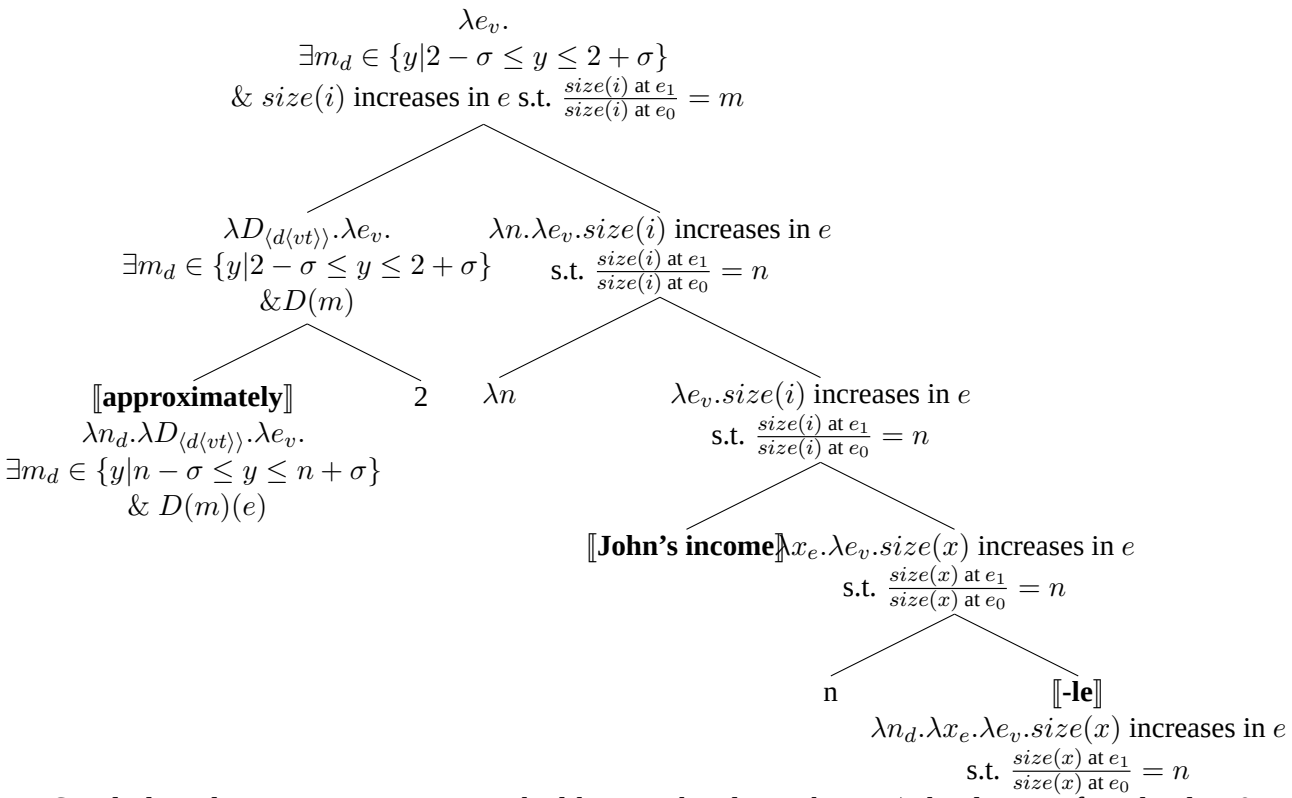


The degree modifier *approximately* must here be of type $\langle d\langle\langle d\langle vt\rangle\rangle\langle vt\rangle\rangle\rangle$, as shown in (9), which I assume results from an eventive type shift. With this, the sentence in (2a) can be derived as in (10).

[1] See Zaroukian (to appear) for a discussion a sentences like (1b).

(9) ⟦**approximately**⟧ = $\lambda n_d.\lambda D_{\langle d\langle vt\rangle\rangle}.\lambda e_v.\exists m_d \in \{y|n-\sigma \leq y \leq n+\sigma\}$ & $D(m)(e)$

(10) ⟦**John's income approximately doubled**⟧ =

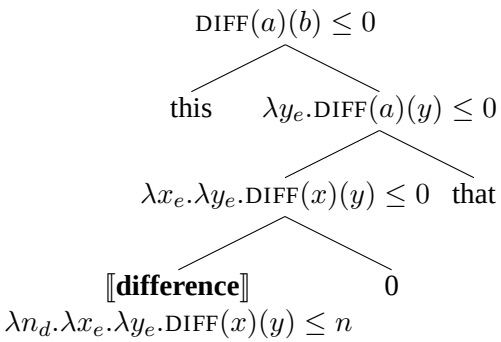


Similarly, I decompose equatives verbs like *equal* and *match* into i) the degree of cardinality 0 and ii) a null difference morpheme ⟦**difference**⟧ (cf. Alrenga, 2007, who argues that expressions like *same* and *different* are comparatives, commenting on degree of similarity and not on (lack of)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

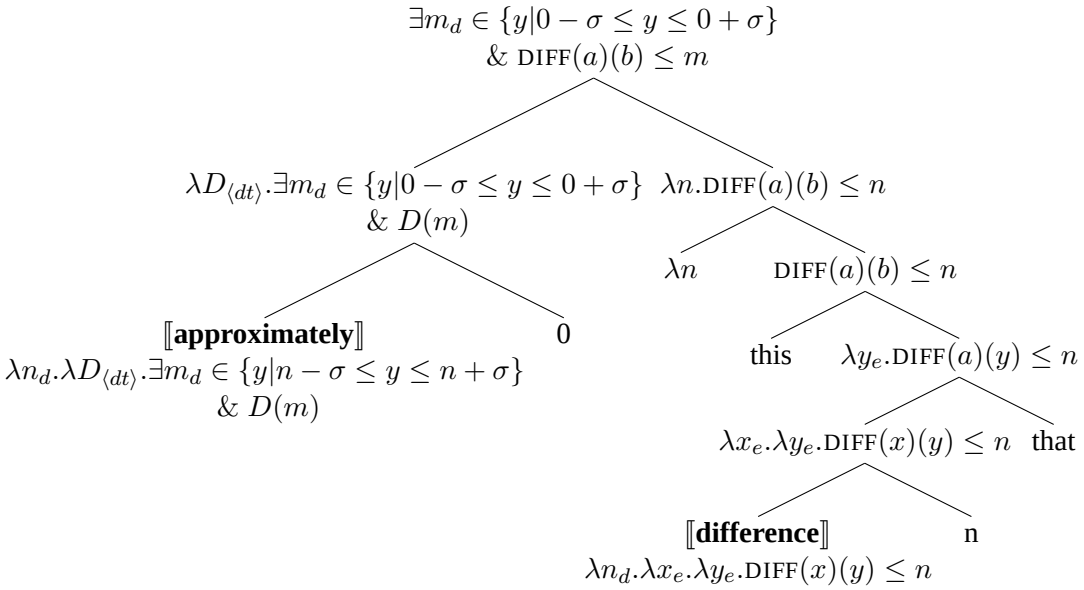
(11) ⟦**difference**⟧ = $\lambda n_d.\lambda x_e.\lambda y_e.\text{DIFF}(x)(y) \leq n$
takes a degree n and two individuals and asserts that those individuals differ by no more than n

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

(12) ⟦**This equals that**⟧ =



(13) ⟦**This approximately equals that**⟧ =



This analysis predicts that similar terms like *redouble* ('to increase greatly') which lack a specific cardinality degree cannot be modified by *approximately* (though with appropriate support a wide-scope *approximately* may appear).

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

This analysis also suggests that predicates like *same* and *different* should be similarly decomposed to allow this unified degree-modifier *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 *approximately*, since they will not provide a degree argument. This is supported by the degradedness of *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

Alrenga, Peter. 2007. Dimensions in the semantics of comparatives. Doctoral Dissertation, University of California Santa Cruz.

Hackl, Martin. 2000. Comparative quantifiers. Doctoral Dissertation, Massachusetts Institute of Technology.

Huddleston, Rodney, and Geoffrey K Pullum. 2002. *The Cambridge Grammar of the English Language*. Cambridge University Press.

Nouwen, Rick. 2010. Two kinds of modified numerals. *Semantics & Pragmatics* 3(3):1–41.

Zaroukian, Erin. 2013. Quantification and (un)certainty. Doctoral Dissertation, Johns Hopkins University.

Zaroukian, Erin. to appear. Gradable predicates and the distribution of approximators. In *Proceedings of the Western Conference on Linguistics*. California State University at Fresno.