Unified by degrees

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Abstract

- Modifiers like *approximately* appear to target degrees
- These modifiers can modify verbs as well
- I propose unified analysis of *approximately* and similar modifiers where certain verbs (e.g. *double*) decompose to contain a degree argument which is targeted by the modifier

Data

Approximately modifies degrees of cardinality, and beyond

(1) Approximately 50 people attended the talk.

(2) That towel is approximately dry.

(3) I eat an approximately gluten-free diet.

But it also modifies verbs

(4) Rhett approximately doubled his winnings.

(5) This one approximately matches that one.

(6) Her income approximately equals the GDP of a small country.

Previous work on Quantifiers

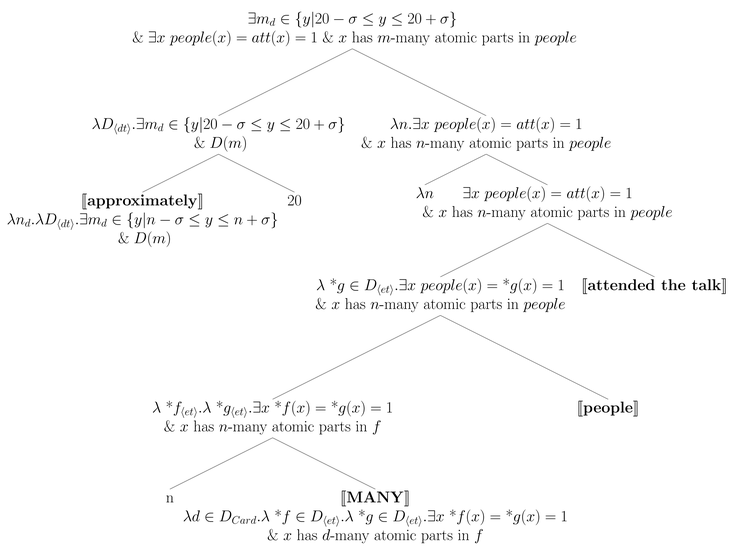
I argue for a unified account of *approximately* (which can be extended to similar modifiers like *exactly*, *almost*, and *roughly*) as a 'degree modifier' (Hackl, 2000) such that it combines directly with a degree before composing with remaining material.

Hackl-style treatment of quantifier *approximately*:

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

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)



We can extend this to work beyond cardinalities (Zaroukian, to appear)

With verbs →

Analysis

This 'degree modifier' composition requires verbs like those in (4)-(6) contain a degree for the degree modifier to modify

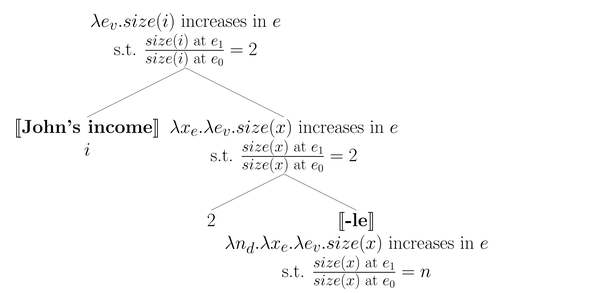
– double –

I decompose multiplicative verbs like *double* into

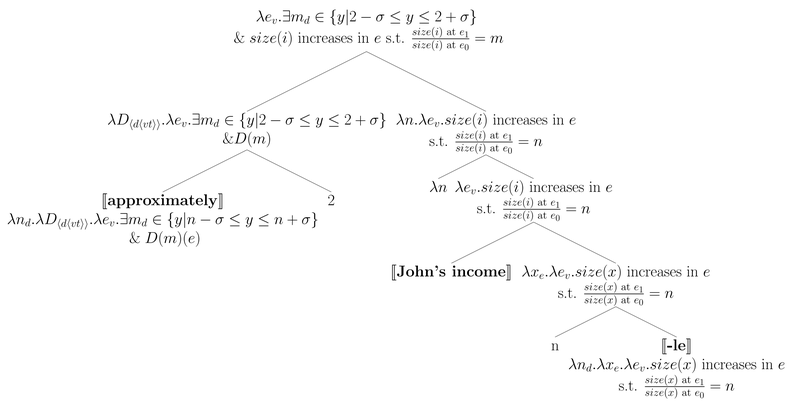
- a degree of cardinality
- a multiplicative morpheme $[\![\textbf{-le}]\!]$
  $[\![\textbf{-le}]\!] = \lambda n_d.\lambda x_e.\lambda e_v.size(x)$ increases in e s.t. $\frac{size(x) \text{ at } e_1}{size(x) \text{ at } e_0} = n$
  takes a degree argument n, an individual, and an event, and it asserts that the individual increases by a factor of n by the conclusion of the event

Degree modifier here type $\langle d\langle\langle d\langle vt\rangle\rangle\langle vt\rangle\rangle\rangle$
$[\![\textbf{approximately}]\!] = \lambda n_d.\lambda D_{\langle d\langle vt\rangle\rangle}.\lambda e_v.\exists m_d \in \{y | n-\sigma \leq y \leq n+\sigma\}$ & $D(m)(e)$

$[\![\textbf{John's income doubled}]\!] =$



$[\![\textbf{John's income approximately doubled}]\!] =$

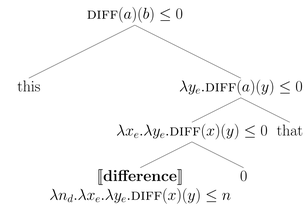


– equal –

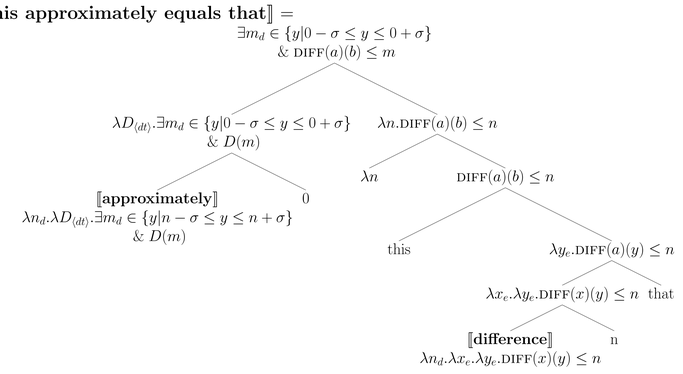
I decompose equatives verbs like *equal* and *match* into

- a degree of cardinality, 0
- a null difference morpheme $[\![\textbf{difference}]\!]$
  $[\![\textbf{difference}]\!] = \lambda n_d.\lambda x_e.\lambda y_e.\text{DIFF}(x)(y) \leq n$
  takes a degree n and two individuals and asserts that those individuals differ by no more than n, (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 (cf. $\lambda x_e.\lambda y_e.y = x$))

$[\![\textbf{This equals that}]\!] =$



$[\![\textbf{This approximately equals that}]\!] =$



Conclusions

Provided a unified analysis of *approximately* (which can be extended to *exactly*, *roughly*, etc.) as a degree modifier

Which argues that verbs like *double* should be decomposed to contain a degree argument

Degree modifier analysis (a la Hackl, 2000)

- Predicts only interpretations where *approximately* modifies the cardinality degree (it does not modify e.g. the 'increase' component in $[\![\textbf{-le}]\!]$).

Comparative analysis (a la Alrenga, 2007)

- 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)

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

- 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)
- 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 (the phrase is not fully ungrammatical, likely due to our ability to coerce a scalar reading out of the term)

References

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