

Approximation and the coercion of gradable predicates

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Abstract

- Goal: Identify and explain asymmetries in the distribution of *approximately* and *about* – (3), (4)
 - Distribution of *approximately* – direct result of composition and argument types
 - Distribution of *about* – result of inability to coerce scalar readings

Puzzle

- Approximated numerals can appear in constructions like (1) and (2)

- (1) John served {approximately/about} 50 sandwiches.
- (2) What John served was {approximately/about} 50 sandwiches.

- But – coerced scalar NPs (here, *beef stroganoff*) are more restricted
- And – the synonyms *approximately* and *about* pattern differently

- (3) John served {??approximately/??about} beef stroganoff.
- (4) What John served was {approximately/??about} beef stroganoff.

Q: Why do we find these asymmetries?

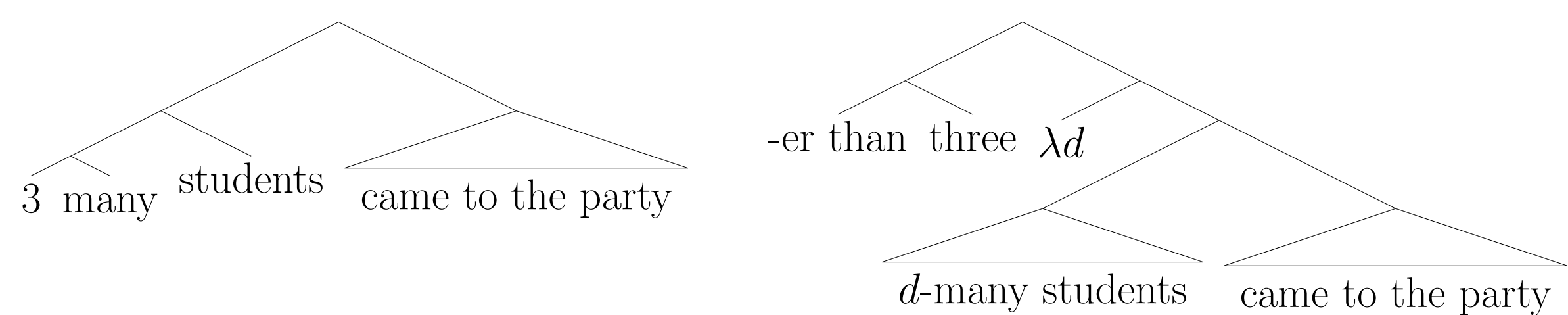
1. Why do coerced-scalar NPs pattern differently from numerals? – (1),(2) v. (3),(4)
A: Following Hackl (2000), degree modifier + scalar can only be used attributively
2. Why do *approximately* and *about* pattern differently with coerced-scalar NPs but not with numerals? – (3) v. (4)
A: *Approximately* and *about* have differing abilities to coerce scalars

Modified numerals

Hackl (2000)

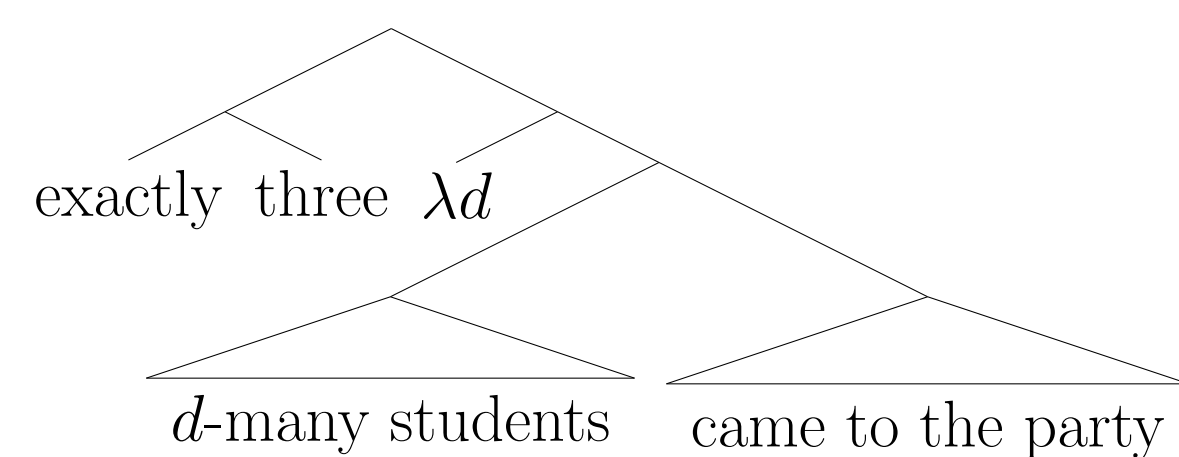
- Proposes that bare numerals combine with phonologically-null parameterized determiner *many*
- Numerals can also combine with degree modifiers (e.g. *-er than* + *n* + *many* = *more than n*)

- (5) $\llbracket \text{many} \rrbracket = \lambda d \in D_{Card}. \lambda *f \in D_{\langle et \rangle}. \lambda *g \in D_{\langle et \rangle}. \exists x *f(x) = *g(x) = 1 \ \& \ x \text{ has } d\text{-many atomic parts in } f$
- (6) $\llbracket \text{-er than } n \rrbracket = \lambda D_{\langle dt \rangle}. \max(\lambda d. D(d) = 1) > n$



- Suggests treating *exactly* as a degree modifier:

- (7) $\llbracket \text{exactly } n \rrbracket = \lambda D_{\langle dt \rangle}. D(n) = 1 \ \& \ \neg \exists d[d > n \ \& \ D(d) = 1]$



- *Many* can only be used attributively, i.e. cannot be type-shifted to behave predicatively like other degree functions (e.g. *tall*)
- Therefore, *many* cannot appear as complement of *look*, *consider*, which require predicative $\langle et \rangle$ (Partee 2008)

- (8) a. *The guests look many. (Hackl 2000, p. 97)
 b. *Mary considers the guests many.

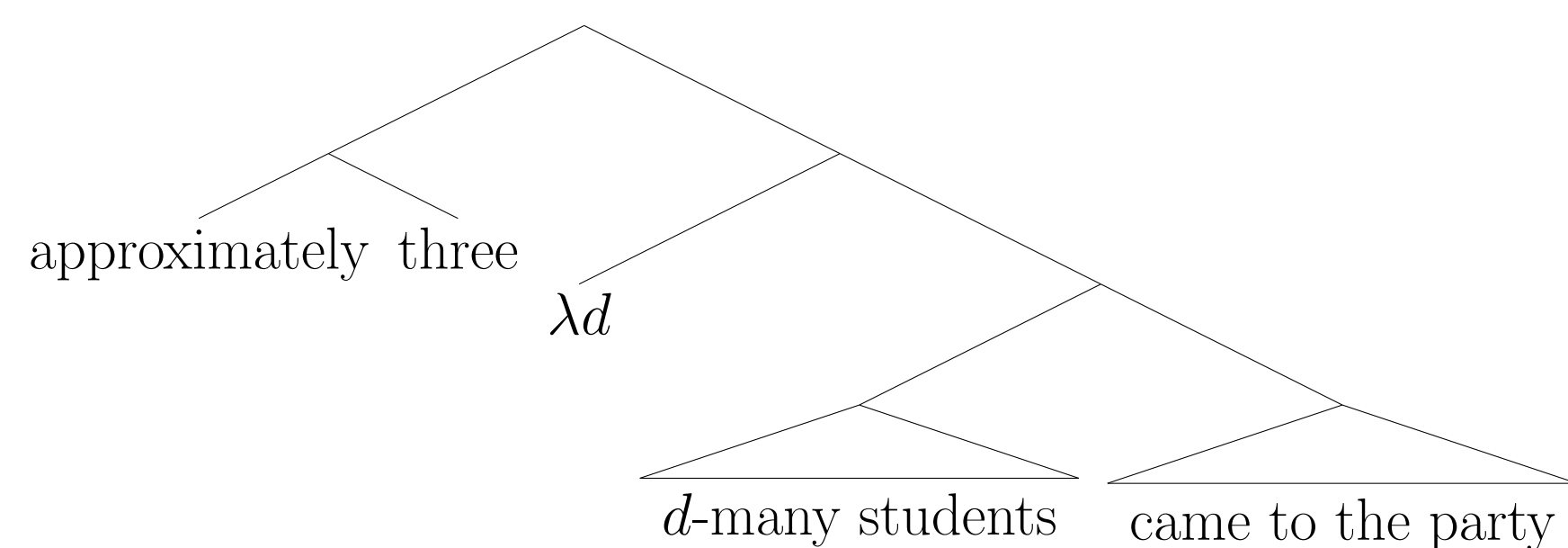
- Hackl notes that post-copulas position does not require type $\langle et \rangle$

- (9) The guests were many women. (Hackl 2000, pp. 97-8)

Analysis for *approximately*

- Treat *approximately* as a degree modifier (cf. *exactly*, (7)) which feeds *many* a degree that falls within some contextually-determined distance σ of n

- (10) $\llbracket \text{approximately } n \rrbracket = \lambda D_{\langle dt \rangle}. \exists x_d \in \{y | n + \sigma \geq y \geq n - \sigma\} : D(x)$

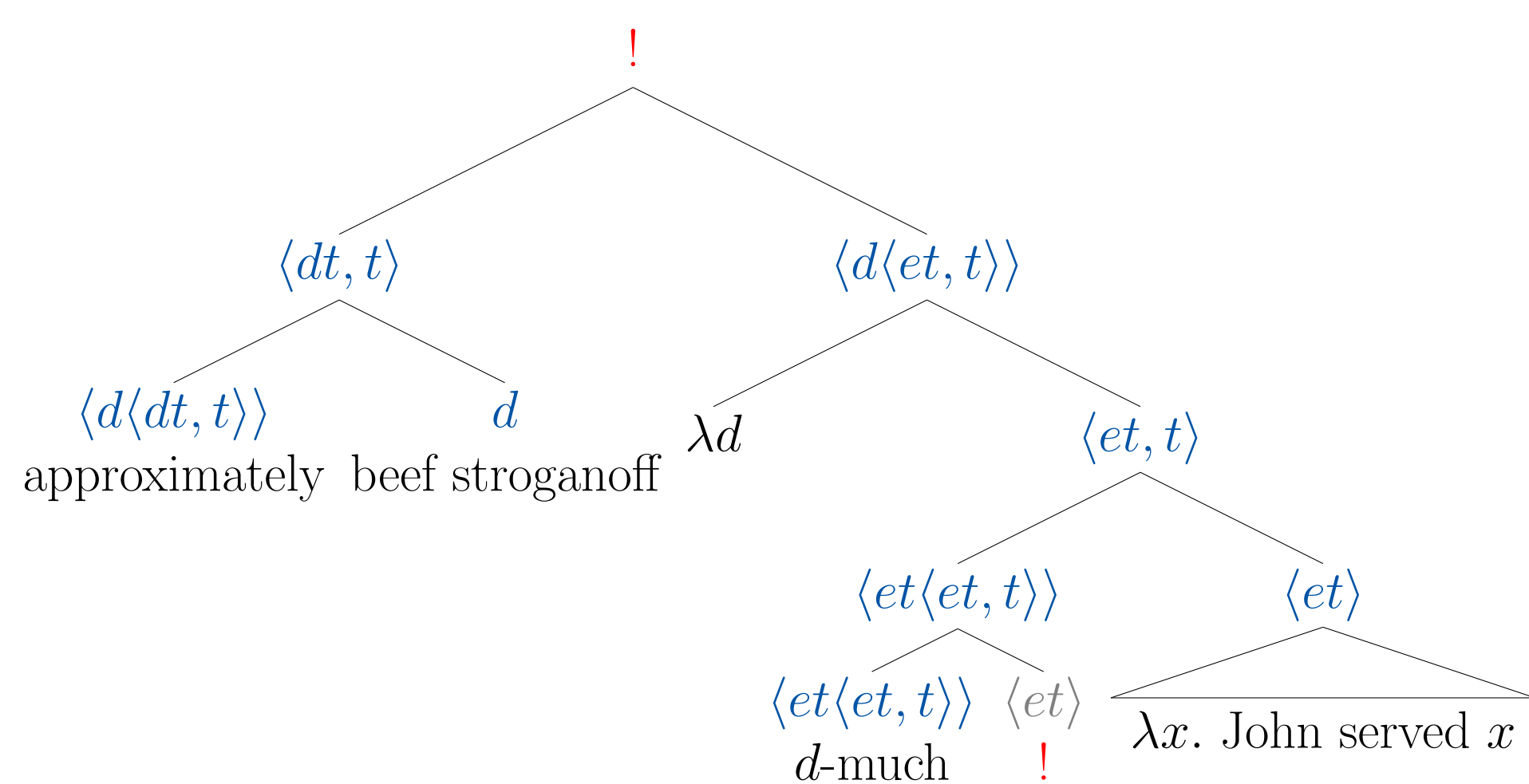


- Treat coerced scalars as degrees – here *beef stroganoff* = degree on some (set of) scale(s) representing beef stroganoff
- We cannot use *many* with these constructions (requires plural predicates and counting over atomic part), instead assume what here is called *much*

- (11) $\llbracket \text{much} \rrbracket = \lambda d \in D_d. \lambda f \in D_{\langle et \rangle}. \lambda g \in D_{\langle et \rangle}. \exists x f(x) = g(x) = 1 \ \& \ x \text{ falls at } d \text{ on the relevant scale in } f$

- In (3), *much* takes arguments *beef stroganoff* (type $d(\text{egree})$) and $[\lambda x. \text{John served } x]$ (type $\langle et \rangle$), but is still missing an argument of type $\langle et \rangle \rightarrow$ **unacceptable**

- (3) ??John served approximately beef stroganoff *much* __.



Additional support for missing $\langle et \rangle$ argument in (3): with coerced scalar AP, the sentence is acceptable when an additional NP argument ($\langle et \rangle$, e.g. *answer*) is present

- (12) John gave an approximately-correct answer.

- But then why is (4) fine? It too seems to be missing an argument of type $\langle et \rangle$

- (4) What John served was approximately beef stroganoff *much* __.

- Recall – Hackl does not consider post-copula position to be strictly $\langle et \rangle$
- Possible explanation: a copula-specific type shift (Partee 2008)
- But – this creates compositional problems - if *beef stroganoff many* + *what John served* ($\langle et, t \rangle$) is shifted to $\langle et \rangle$, it cannot combine with degree modifier, which requires argument of type $\langle dt \rangle$, not $\langle d\langle et, t \rangle \rangle$
- To retain this, we can change degree modifiers

- (13) $\llbracket \text{approximately } n \rrbracket = \lambda D_{\langle d\langle et\langle et, t \rangle \rangle \rangle}. \lambda f. \lambda g. \exists x_d \in \{y | n + \sigma \geq y \geq n - \sigma\} : D(f, g, x)$

Approximately with a coerced scalar is also unacceptable as the complement of *look*, *consider*, cf. (8)

- (14) *That dish looks approximately beef stroganoff.
- (15) *I consider that dish approximately beef stroganoff.

***Approximately* is a Hackl-style degree modifier – for attributive use only**

- Unacceptability of (3) due to missing argument of *many*
- Acceptability of (4) due to copula-specific type-shift such that *much* is no longer missing an argument

Alternative analysis for *Approximately*

- Verb-modifying *approximately* is just patterning like an adverb – occurs before lexical verb (cf. ??(3)) and after a copula (cf. (4))
- But intonation and paraphrases suggest different scope for *approximately* v. other adverbs

- (16) a. John [frequently [doubled his income]].
 'What John frequently did was double his income.'
 b. John [approximately [doubled]] his income.
 'What John did was approximately double his income.'

Approximately v. *about*

- Now we see why *approximately* is good in (4) but not (3). So why is *about* unacceptable in both examples?

- **Proposal:** unlike *approximately*, *about* does not coerce scalar readings, i.e. *about* cannot combine with non-inherently-scalar terms like *beef stroganoff* (see also prepositions *around*, *near*)

- According to Sauerland & Stateva (2007): *about* can only combine with numerals, temporal expressions
- But – *about* can occur with some gradable adjectives

- (17) about full/empty/straight/?dry/?certain/?closed/#wet/#visible/#invisible/#pure

- Maximum-standard adjectives (underlined) seem better, minimum-standard adjectives presumably result in a trivial meaning (similar pattern holds for *approximately*, *exactly*)
- But why aren't all maximum-standard adjectives acceptable with *about*?
- Do they have a conventionalized null *just* (cf. *almost*)?

- (18) a. about ten \nrightarrow not ten
 c. about full \rightarrow not full
 b. just about ten \rightarrow not ten
 d. just about full \rightarrow not full

- Why can't *about* coerce scalars? Perhaps related to the availability of non-scalar meanings:

- (19) a. It's about to rain.
 c. It's about time.
 b. Tom moved about the room
 d. John talked about Mary.

***About* is unacceptable in (3) and (4) because it cannot coerce scalars**

Conclusions

Summary

1. Coerced-scalar NPs pattern differently from numerals because *approximately* + (coerced) scalar can only appear attributively
2. *Approximately* and *about* pattern differently with coerced-scalar NPs but not with numerals because *approximately* can coerce scalar readings out of non scalars, but *about* cannot

This analysis

- provides new support for Hackl-style approach to quantification
 - Note that these contrasts would not be expected under a standard generalized quantifier theory
- extends Hackl's approach to other coerced scalars
- proposes copula-specific type shift that can apply to *many/much*

Q: Is there independent support for this?

Q: Is there independent support for degree modifiers of the form in (13)?