Notes on the Comparison Class

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Comparison Classes

- Sentences with vague predicates commonly analyzed as interpreted with reference to a comparison class that provides a frame of reference or standard of comparison (Bartsch & Vennemann 1972; Cresswell 1976; Klein 1980; von Stechow 1984; Fults 2006)

(1) a. Fred is tall

b. Sue's apartment is expensive

c. George doesn't have many friends

[[(1a)]] = 1 iff Fred's height is large in the context of some comparison class C of which Fred is a member

Comparison Classes

- In support of this view, the comparison class may be made overt with a *for* phrase:

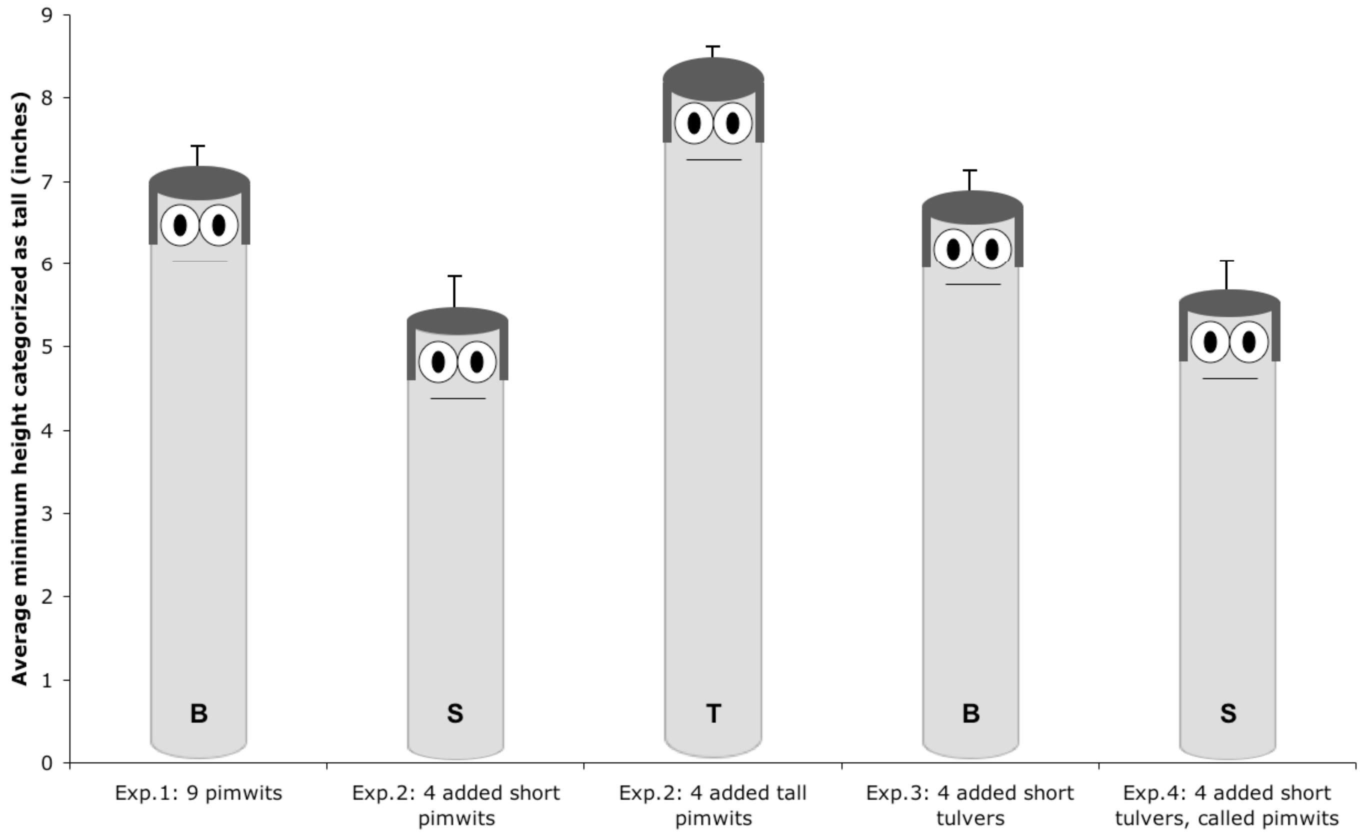
(2) a. Fred is <u>tall</u> for an **eight year old**

b. Sue's apartment is <u>expensive</u> **for an apartment on this street**

c. **For a politician**, George doesn't have <u>many</u> friends

Reality of Comparison Class

- Barner & Snedeker (2008): 4-year olds can use statistical properties of comparison class to determine standards for *tall* and *short*



Questions

- How is the standard of comparison set relative to the comparison class?
  - What information does the comparison class provide?
  - How is this information integrated compositionally?
- What sort of comparison classes are available?
- Is a comparison class essential to the interpretation of the positive form?

Degree-Based Framework

- I assume a degree-based framework:
  - Degrees as basic type (type *d*)
  - Gradable adjectives express relationships between individuals and degrees

    (3) $[[tall]] = \lambda d \lambda x.\mathrm{HEIGHT}(x) \geq d$

  - Positive forms involve (null) degree morpheme POS

    ➢ At the end of the talk: some comments on the need for degrees

Standard as Point

- Is the standard of comparison an average (mean or median) over the comparison class? (Bartsch & Vennemann 1972; Cresswell 1976; a.o.)

(4) ⟦Fred is tall⟧ = 1 iff HEIGHT(f) > mean $_{x \in C}$ HEIGHT(x)

(5) ⟦Fred is tall for an 8-year old⟧ = 1 iff
HEIGHT(f) > mean $_{x\text{:8-year-old}(x)}$ HEIGHT(x)

- But as pointed out by Kennedy (2007):

(6) Nadia's height is greater than the average height of gymnasts, but she still isn't tall for a gymnast

Standard as a Point

- A further issue with pairs of antonyms

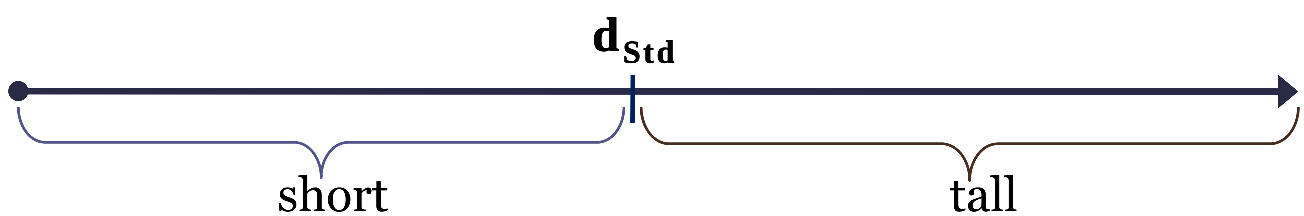
(7) a. Fred is tall (for an 8 year old)

b. Fred is short (for an 8 year old)

  - If standard is a single point (e.g. average) d_{Std} provided by comparison class, then positive/ negative antonyms defined as complementaries

(8) $[[7a]] = 1$ iff $\text{HEIGHT}(f) > d_{Std}$

$[[7b]] = 1$ iff $\text{HEIGHT}(f) < d_{Std}$



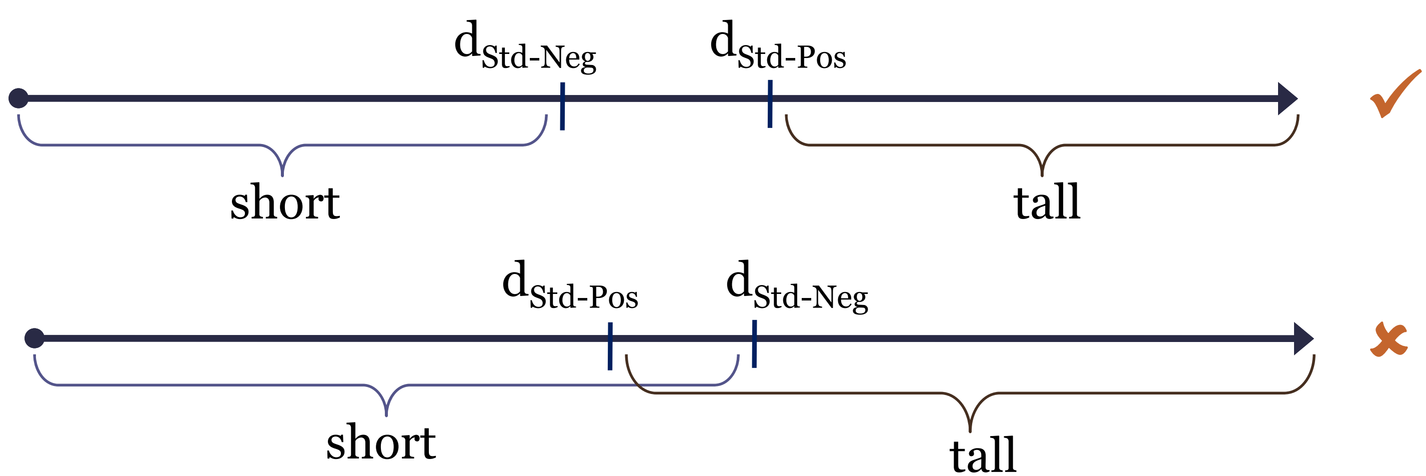
(9) Fred isn't tall (for a 8 year old), but he isn't short either ✓

Standard as a Point

- But if comparison class provides two separate standards $d_{Std\text{-}Pos}$ and $d_{Std\text{-}Neg}$, must stipulate that $d_{Std\text{-}Pos} > d_{Std\text{-}Neg}$

(10) [[7a]] = 1 iff HEIGHT(f) > $d_{\text{Std-Pos}}$

[[7b]] = 1 iff HEIGHT(f) < $d_{\text{Std-Neg}}$



(11) Fred is both tall and short (for a 8 year old) ✘

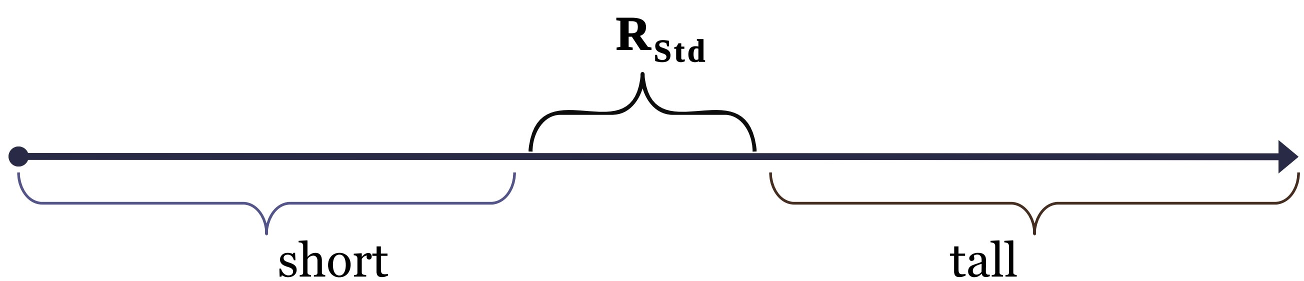
Standard as a Range

- These objections are overcome if the standard provided by the comparison class is taken to be a **range**, rather than a point

  (von Stechow 2006; Heim 2006)

(12) [[Fred is tall]] = 1 iff HEIGHT(f) > R_{Std}

[[Fred is short]] = 1 iff HEIGHT(f) < R_{Std}



- Relationship to comparison class?

Standard as a Range

- An example:

(13) a. Sue's apartment is <u>expensive</u> for an apartment on this street

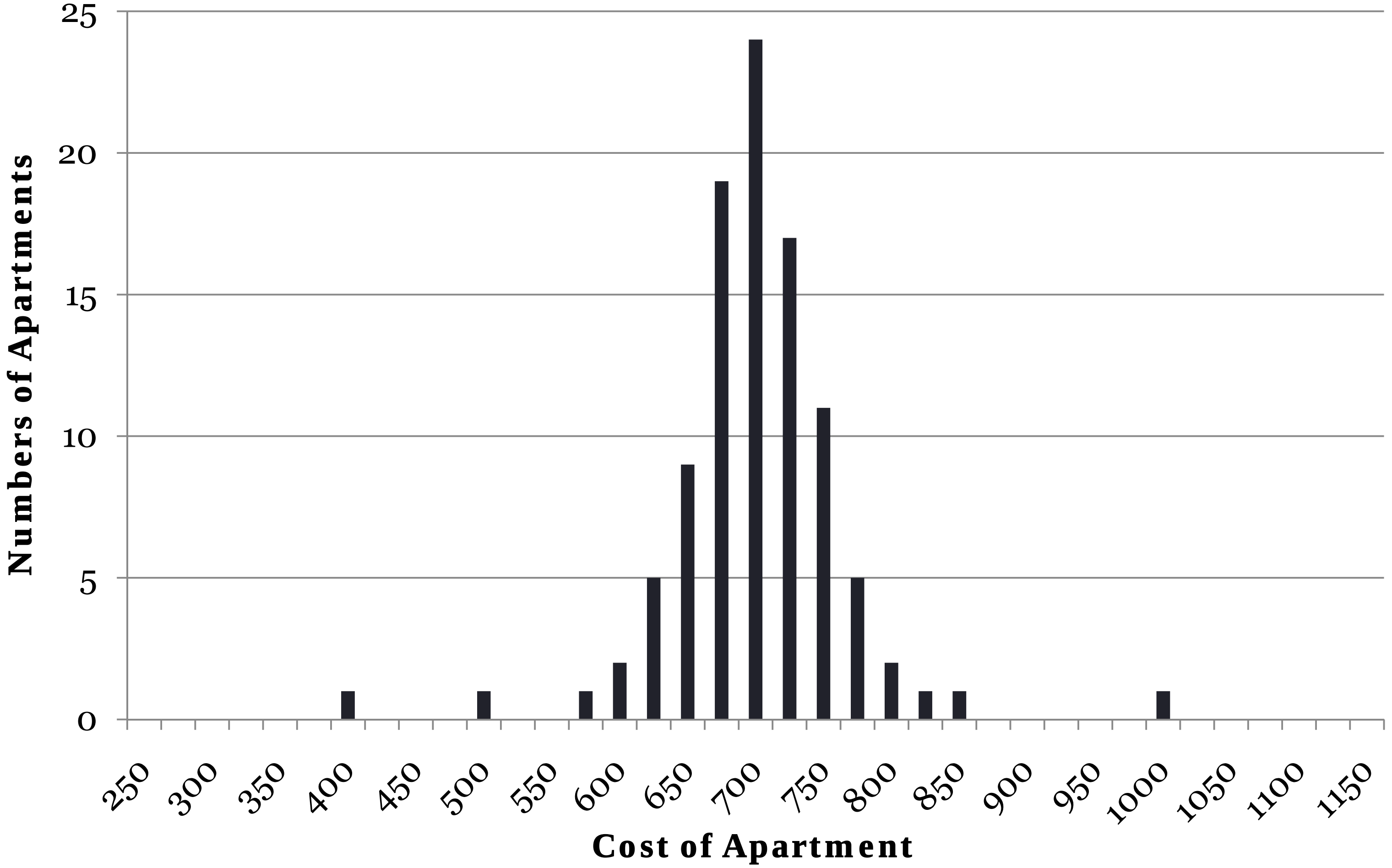
b. Paul's apartment is <u>inexpensive</u> for an apartment on this street

<u>The facts</u>

Sue's apartment:	$800
Paul's apartment	$600
Median on this street:	$700

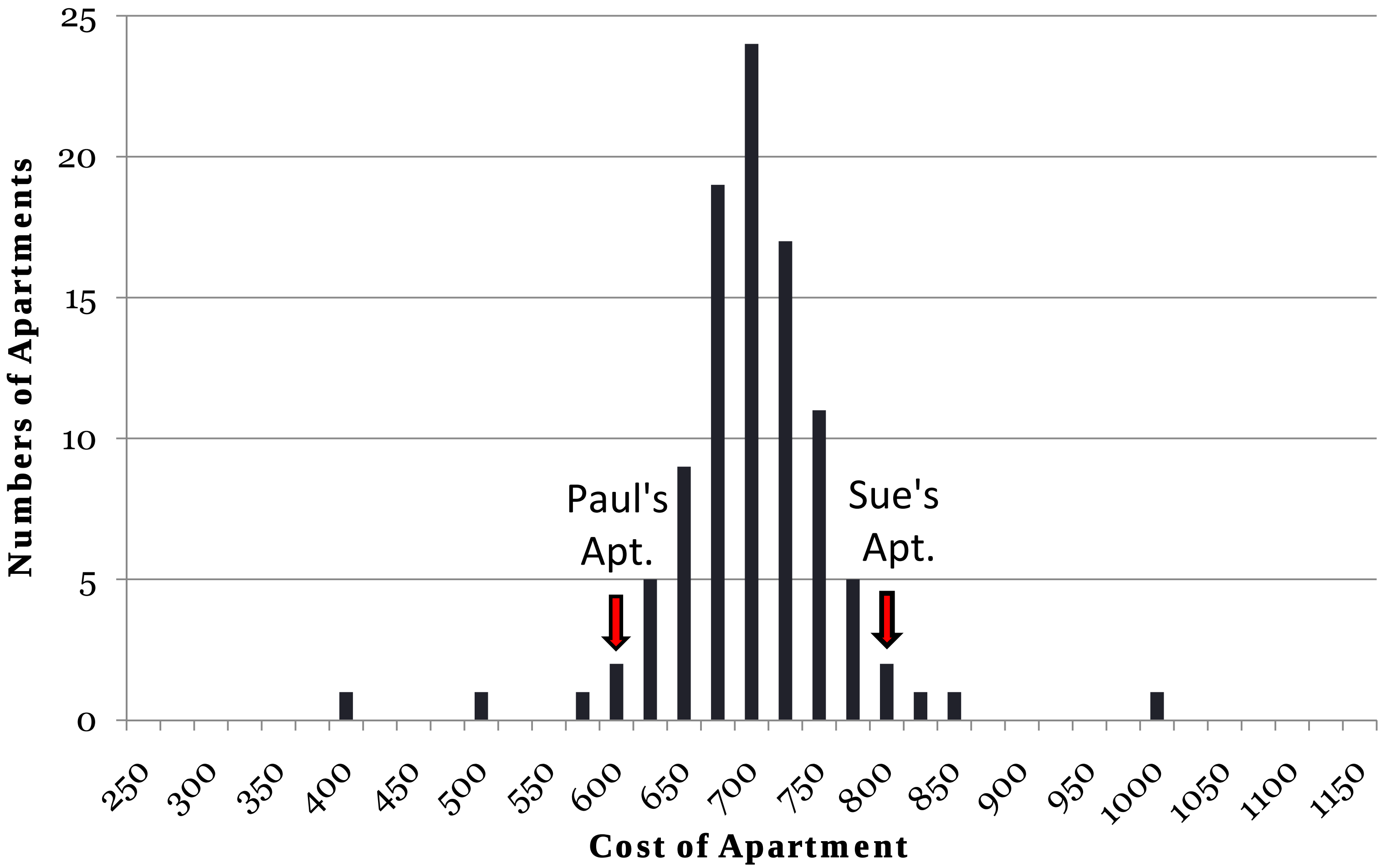
Standard as a Range

- (13a,b) true in this situation



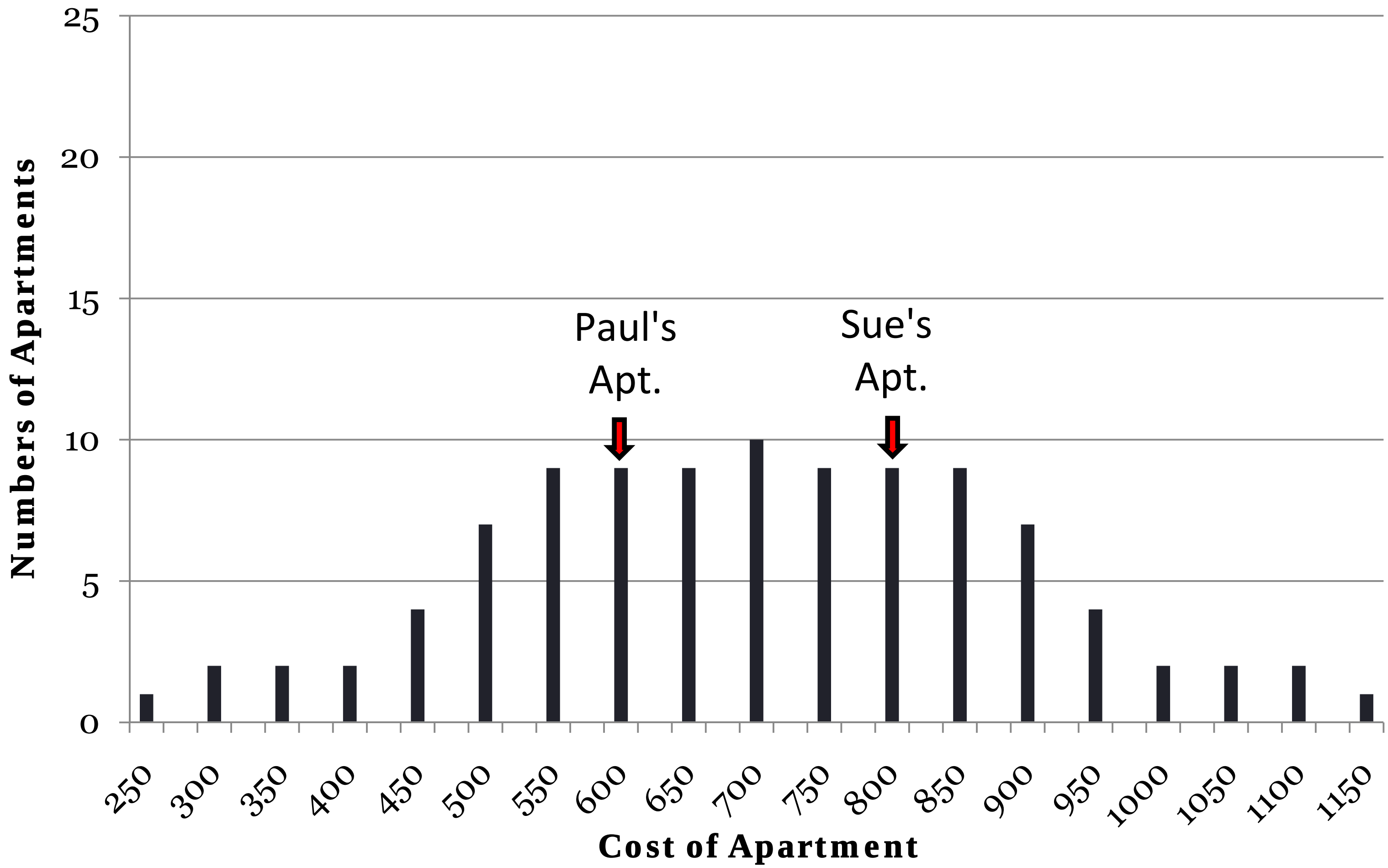
Standard as a Range

- (13a,b) true in this situation



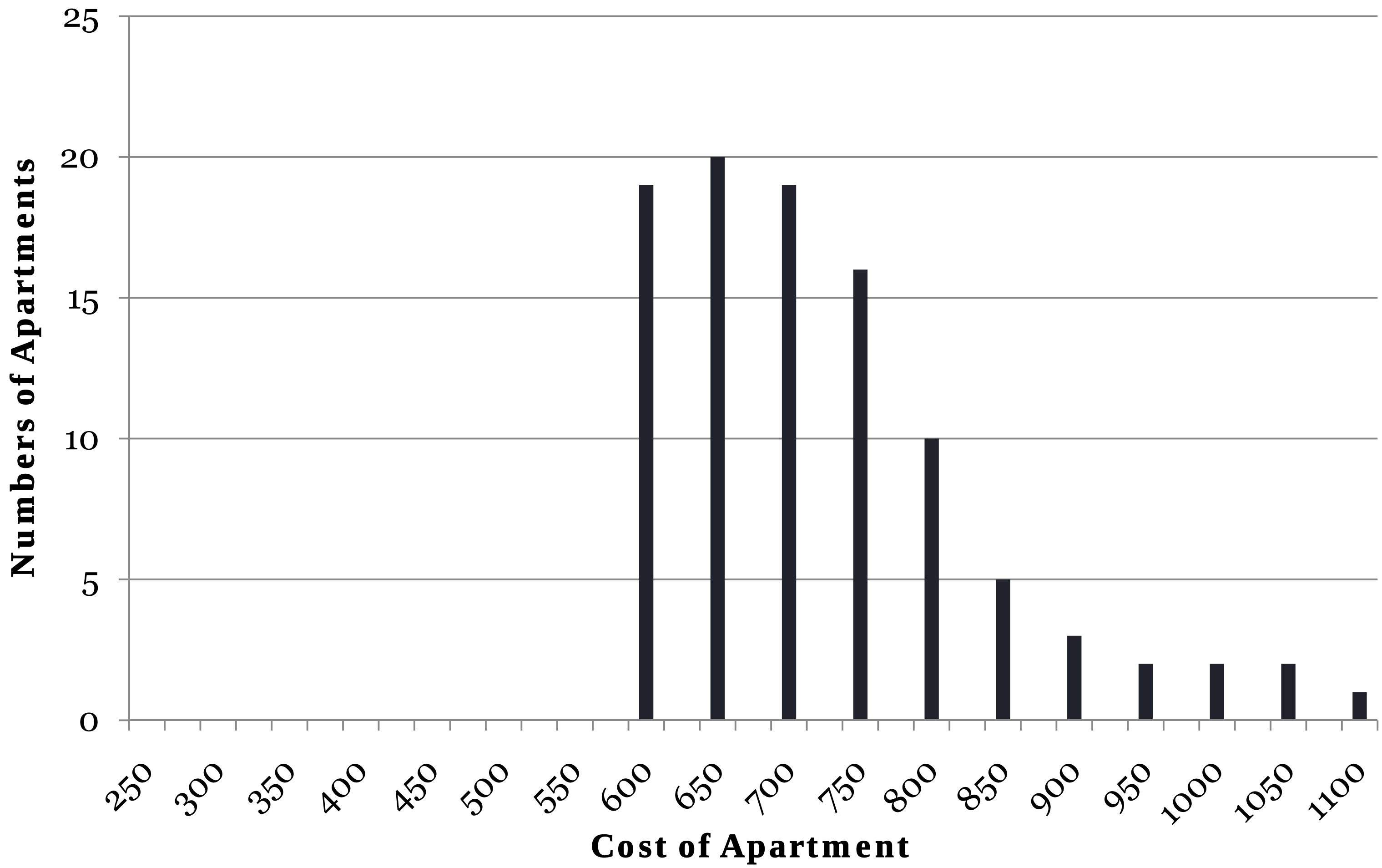
Standard as a Range

- But false in this situation



Standard as a Range

- Are there any inexpensive apartments?



Standard as a Range

- Standards for positive/negative antonyms sensitive to distribution of individuals in CC
  - R_{Std} defined in terms of deviation around a central value

- Can be captured with statistical analogy:
  - For (13a,b):

    (14) $R_{Std} = \text{median}_{x:x \text{ is an apartment on this street}} \text{COST}(x) \pm n \cdot \text{MAD}_{x:x \text{ is an apartment on this street}} \text{COST}(x)$

    where MAD is mean absolute deviation

  - The general case:

    (15) $R_{Std} = \text{median}_{x \in C} \text{MEAS}(x) \pm n \cdot \text{MAD}_{x \in C} \text{MEAS}(x)$

Standard as a Range

- Note that the following is not sufficient:

(16) $R_{Std} = \text{median}_{x \in C}\text{MEAS}(x) \pm n \cdot \text{median}_{x \in C}\text{MEAS}(x)$

  - Not enough to know the median – must know how *x*'s are distributed around that value

- Cf. analyses of positive form as requiring 'significant' difference from standard value (Fara 2000, Kennedy 2007)

Interim Summary

- Comparison class introduced by *for* phrase provides statistical information on the basis of which a standard of comparison is calculated
- How does *for* phrase (and thus the comparison class, and the statistical information it provides) compose semantically?
  - As an argument of the positive form?
  - As a modifier?
  - Something else?

Kennedy (2007)

- Presupposition of *for* phrase

(17) Fred is tall for an 8-year old

Presupposition: Fred is an 8-year-old

(18) Kyle's car is expensive for a Honda

Presupposition: Kyle's car is a Honda

(19) ?Kyle's BMW car is expensive for a Honda

\- Presupposition failure

Kennedy (2007)

- Analyzed as domain restriction

(20) $[[\text{tall}_{<ed>}]] = \lambda x.\text{TALL}(x)$

$[[\text{tall for an 8-year-old}_{<ed>}]] = \lambda x{:}\text{8-year-old}(x).\text{TALL}(x)$

$[[\text{POS tall for an 8-year-old}]] =$

$= \lambda y(\lambda x{:}\text{8-year-old}(x).\text{TALL}(x))(y) >$
$\mathbf{s}(\lambda x{:}\text{8-year-old}(x).\text{TALL}(x))$

where **s** is a function that picks out a degree that ensures that entities to which positive form applies 'stand out' relative to context

- Captures two roles of *for* phrase
- *For* phrase interpreted locally to gradable expression

Problematic Cases

- Subject of which presupposition holds not an argument of gradable expression:

(21) For a Fortune 500 executive, Bill is poor
… has a small salary
… is poorly paid
… doesn't earn much money

- All presuppose that Bill is a Fortune 500 executive

(22) Sarah reads difficult books for an 8-year-old

- Presupposes that Sarah is 8 years old

➢ Cannot be captured as domain restriction on gradable expression itself

Problematic Cases

- Domain restrictions over times

(24) a. The store is crowded for a Tuesday

b. For a Tuesday, there are a lot of cars here

<u>Presupposition</u>: Utterance time is Tuesday

(25) [[crowded for a Tuesday$_{<i,ed>}$]] =

$\lambda t{:}Tuesday(t)\lambda x.CROWDED(x)(t)$

- If POS applies at this stage, **s** must pick out standard independently of type *e* argument

$\mathbf{s}(\lambda t{:}Tuesday(t)\lambda x.CROWDED(x)(t))$?

Problematic Cases

- Extraposition of *for* phrase – sometimes obligatory:

(26) a. Fred is tall for an 8-year-old
b. For an 8-year-old, Fred is tall

(27) a. *This is a big for NYC apartment
b. This is a big apartment for NYC
c. For NYC, this is a big apartment

(28) a. *George has few for a politician friends
b. For a politician, George has few friends
c. George has few friends for a politician

Problematic Cases

- An issue for compositionality:

(29) ⟦big apartment for NYC⟧ =

= ⟦for NYC⟧ (⟦big⟧ ∩ ⟦apartment⟧) **?**

<e,d> <e,t>

= ⟦for NYC⟧(⟦big⟧) ∩ ⟦apartment⟧ **?**

  - Reason for extraposition?
  - Ellipsis resolution (for ~~an apartment in~~ NYC)

- Parallel to *than* phrase – taken to be argument of comparative morpheme (Heim 2000; Bhatt & Pancheva 2004; Kennedy 2007) :

(30) a. *This is a bigger than we need apartment

b. This is a bigger apartment than we need

Proposal

- The *for* phrase does not have a local effect, but rather composes remotely from the gradable expression
  - at its surface position (or one of them)
  - immediately prior to stage where subject of presupposition enters derivation
- Constrains the calculation of R_{Std}, while also linking subject to comparison class

(31) [[x is P for a C]] ≈ *x* has property *P* when considered in the context of *C*s

- Several potential compositional implementations

Implementation

- *For* as instantiation of degree morpheme POS (von Stechow 2006; Heim 2006; Bhatt & Pancheva 2004)

(32) $[\![\text{for}]\!] = \lambda C_{<et>}\lambda P_{<d,et>}\lambda x{:}x \in C.\text{max}(d)[P(d)(x)] > R_{Std}$

where $R_{Std} = \text{median}_{y \in C}[\text{max}(d)[P(d)(y)]] \pm n \cdot \text{MAD}_{y \in C}[\text{max}(d)[P(d)(y)]]$

(33) $[\![\text{for an 8-year-old}]\!] =$

$\lambda P_{<d,et>}\lambda x{:}\text{8-years-old}(x).\text{max}(d)[P(d)(x)] > R_{Std}$

where $R_{Std} = \text{median}_{y:\text{8-yr-old}(y)}[\text{max}(d)[P(d)(y)]] \pm n \cdot \text{MAD}_{y:\text{8-yr-old}(y)}[\text{max}(d)[P(d)(y)]]$

Implementation

(34) Sarah [[reads d_i difficult books][for an 8-yr-old]$_i$]

(35) [[reads d_i difficult books]] = λdλx.x reads d difficult books

(36) [[reads d_i difficult books [for an 8-year-old]$_i$]] =
λx:8-yrs-old(x).max(d).x reads d difficult books >
$\text{median}_{y:8\text{-yr-old}(y)}$[max(d).y reads d difficult books] ±
$n\cdot\text{MAD}_{y:8\text{-yr-old}(y)}$ [max(d).y reads d difficult books]

a predicate true of an 8-year-a old if the difficulty of the books he/she reads exceeds the mean + MAD over 8-year-olds of difficulty of books read

Extended to Times

- Replace individual argument of *for* with time argument

(37) $[\![\text{for}_{\text{time}}]\!] = \lambda C_{<it>} \lambda P_{<d,it>} \lambda t \in C.\max(d)[P(d)(t)] > R_{Std}$

$$\text{where } R_{Std} = \text{median}_{t \in C}[\max(d)[P(d)(t)]] \pm n \cdot \text{MAD}_{t \in C}[\max(d)[P(d)(t)]]$$

(38) $[\![\text{the store is } d_i \text{ crowded [for a Tuesday]}_i]\!] =$
$\lambda t{:}\text{Tues}(t).\max(d)[\text{the store is d crowded at t}] >$
$\text{median}_{t:\text{Tues}(t)}[\max(d)[\text{the store is } d_i \text{ crowded at t}]] \pm$
$n \cdot \text{MAD}_{t:\text{Tues}(t)}[\max(d)[\text{the store is } d_i \text{ crowded at t}]]$

a predicate true of a Tuesday *t* if the degree to which the store is crowded at *t* exceeds the median + MAD for the store on Tuesdays

No *for* Phrase

- Original examples:

(1) a. Fred is tall
b. Sue's apartment is expensive
c. George doesn't have many friends
  - Readily interpreted relative to (covert) comparison class of which subject is a member

- No comparison class?

(39) Wow, that's a lot of corn (Fara 2000)

Me: Wow, that's a lot of gazelles!
You: No, that's not a lot….

You: *That's* a lot of gazelles!

- Comparison class over cases (of seeing wild animals?)

Conclusions

- Comparison class introduced via *for* phrase provides statistical information by which a standard of comparison can be calculated for positive/negative adjectives
  - R_{Std} defined in terms of deviation around central value
- *For* phase composes remotely to gradable expression (instantiation of degree operator POS)
- Comparison classes may contain not just individuals, but also times (and perhaps other possibilities)
- Account extends to some cases without *for* phrases
  - **Tricky cases:** absolute relative adjectives (*full, flat*), *compared to* phrases, proportional readings of *many/few*

Comment on Degrees

- If we need a comparison class, do we still need degrees??

  Fred is tall for an 8-year-old

  - Fred’s height exceeds the median plus MAD (over 8-year olds) of height

    OR

  - If we rank 8-year-olds by height, Fred is in the top group

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