

Expensive, not expensive or cheap?

An experimental investigation of vague predicates

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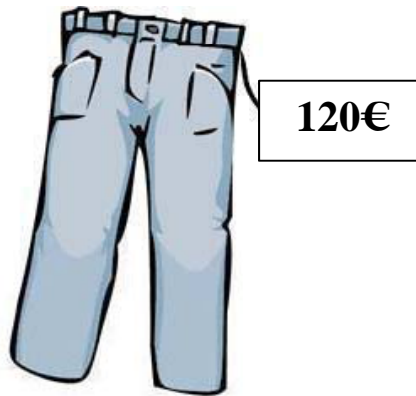
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Characteristics of vague predicates

❖ **Borderline cases**

These jeans are **expensive**



TRUE



??



FALSE

Characteristics of vague predicates

❖ **Sorites paradox**

Jeans that cost 100€ are expensive

Jeans that cost 0,10€ less than an expensive pair of jeans are expensive

Jeans that cost 5€ are expensive

Theories of vagueness

- ❖ Truth value gap/3-valued logic (Tye 1994)
- ❖ Truth value glut (Hyde 1997)
- ❖ Fuzzy logic (Goguen 1969)
- ❖ Supervaluationism (Fine 1975; Kamp 1975)
- ❖ Epistemicism (Williamson 1994)
- ❖ Contextualism (Raffman 1996, ms.; Fara 2000)

Theories of vagueness

These jeans are expensive



Truth value gap:

Neither true nor false

Truth value glut:

Both true and false

Fuzzy logic:

Partially true

- true to degree n for $0 < n < 1$

Supervaluationist:

Neither true nor false

- true in some completions of the model,
false in others

Epistemic:

Either true or false, but we don't (can't) know which

Contextualist:

It depends on which definition of *tall* we use

Experimental Approaches

Bonini et al. (1999)

Method

- Questionnaire based:

When is it true to say a man is tall? ...

...Please indicate smallest height that in your opinion makes it true to say that a man is 'tall'

... Please indicate the greatest height that in your opinion makes it false to say that a man is 'tall'.

Findings

- Gap between positive & negative extensions of gradable terms
- Parallel to gap around definite but unknown value
 - Taken to support epistemic view

Experimental Approaches

Raffman (ms.)

Method

- Judging of dynamic Sorites series of color chips
 - Blue, green or ??
- Multiple orders: blue→green, green→blue, random, 'reversal'

Findings

- Location of boundaries varied with order of exposure
- Hysteresis effects in 'reversal' condition
 - Taken to support contextualist position

Experimental Approaches

Issues

Methodological limitations

- Questionnaire-based approach
 - ‘Dangerous’ city [annual #violent crimes/‘000 inhabitants]
- Narrow focus: color words
 - Perceptual
 - P / Q versus P / \neg P

Missing link

- Relation of gradable adjective (*tall*) to antonym (*short*)
 - Typically regarded as contraries (Cruse 1986)
 - But some theories of vague predicates (e.g. Klein 1980) equate negation of positive adjective (*not tall*) to antonym (*short*)

Research Objectives

The objective of the present research is to strengthen the empirical base against which theories of vagueness can be assessed, by profiling speakers' interpretations of vague gradable adjectives.

Specifically:

- Do speakers allow **gap** between positive and negative extensions of vague gradable adjectives?
 - e.g. between *large* and *not large*
- Do they do so consciously?
- What is the relationship between the negation of a term and its antonym?
 - e.g. *not large* vs. *small*

Experiment 1 - Method

- Stimuli based on gradable adjectives (in German):
 - 3 adjectives:**
 - *groß*, *teuer* and *weit* (large, expensive, far)
 - their negations**
 - their antonyms**
- Adjectives were presented in a sentence context
- Sentences were paired with set of pictures (Sorites series)
- **Task:** Which pictures can be described by the sentence?
- Two conditions:
 - Condition 1:** adjective vs. negation (e.g. *teuer* vs. *nicht teuer*)
 - Condition 2:** adjective vs. antonym (e.g. *teuer* vs. *billig*)

Stimuli

Adjective

Sentence

Pictures

groß
(large)

Der Koffer ist groß
...nicht groß
...klein



Series of
27 pictures
(small to large
suitcase)

teuer
(expensive)

Die Jeans ist teuer
...nicht teuer
...billig



Series of
41 pictures
(20 - 100€;
2€ increments)

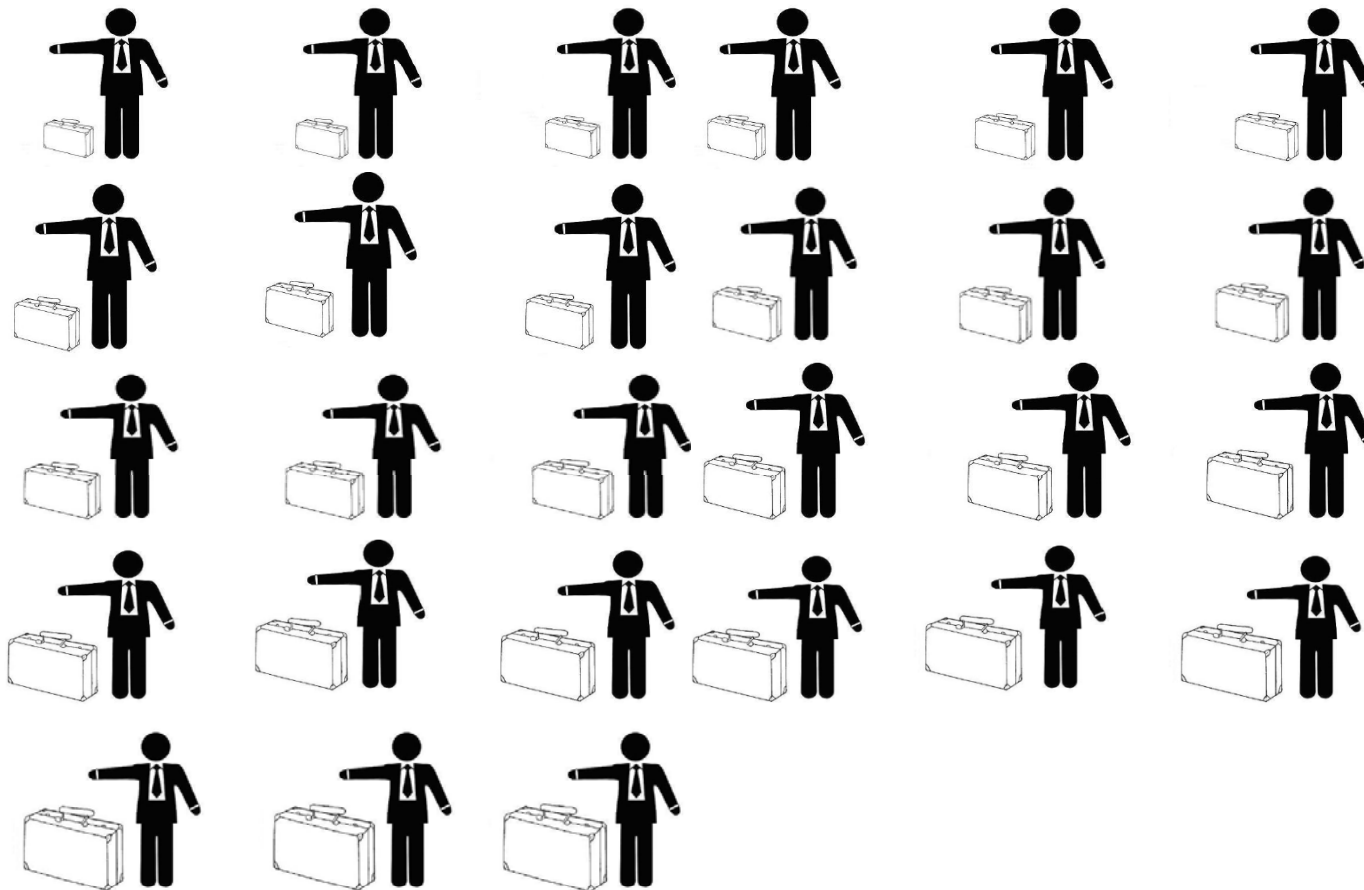
weit
(far)

Das Haus von Susis Mutter ist weit
weg von Berlin
...nicht weit weg von Berlin
...nahe Berlin



Series of
27 pictures
(varied distance
house to Berlin)

Der Koffer ist groß





Participants

Condition 1

14 Humboldt University students

All female

Studies: French/Spanish/Italian

21 years old on average

Condition 2

17 Humboldt University students

14 female, 3 male

Studies: French/Spanish/Italian

26 years old on average

Procedure

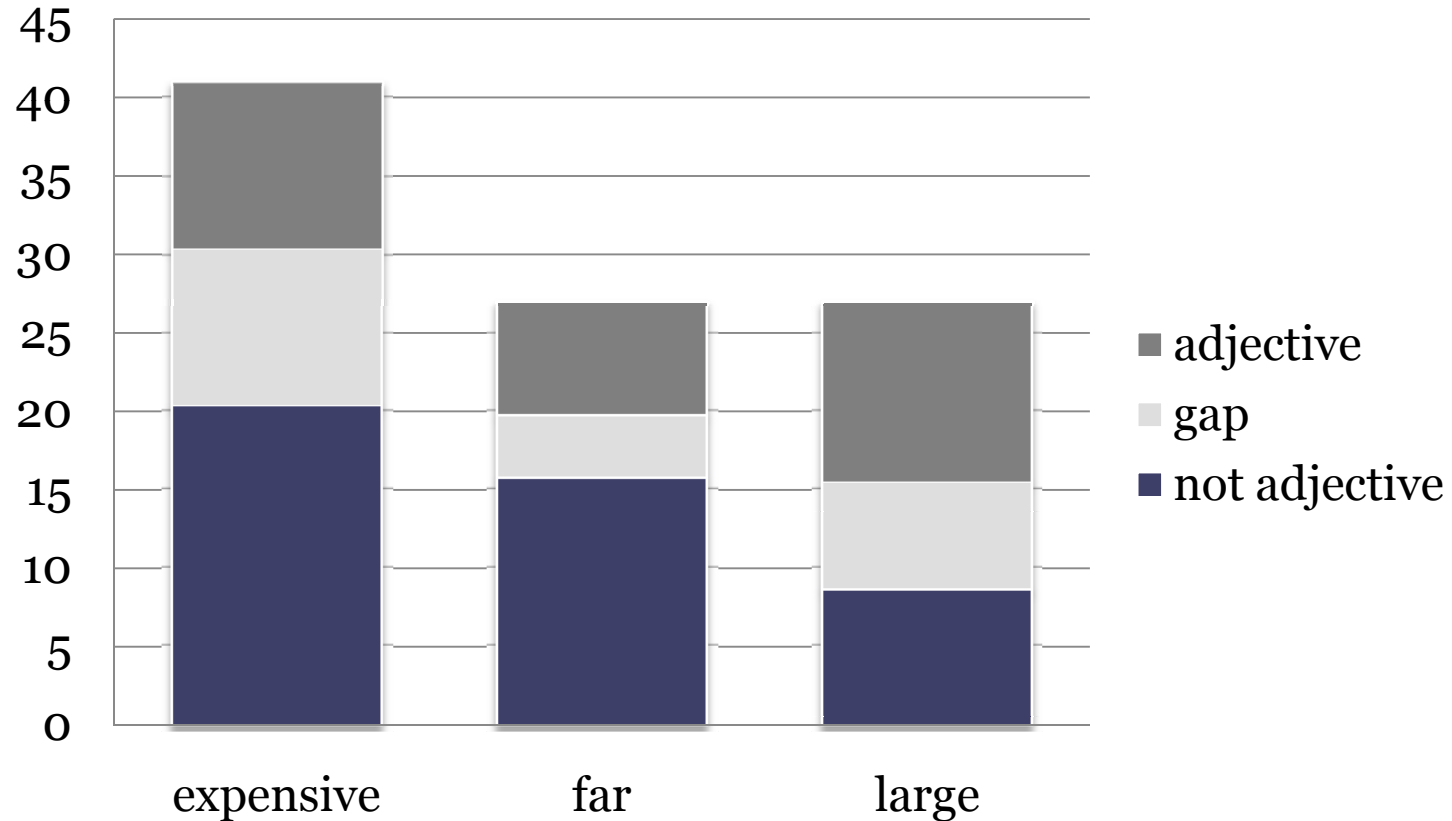
- Paper and pencil task, administered in groups
 - Sentence projected on screen
 - Respondent checks pictures on worksheet
- 8 trials (sentence + picture series):
 - 6 experimental items
 - 3 adjectives
 - 2 trials/adjective (adjective vs. antonym/negation)
 - 1 warm-up/1 distractor



Results - Condition 1:

of pictures classified as adjective, not adjective and neither (gap)

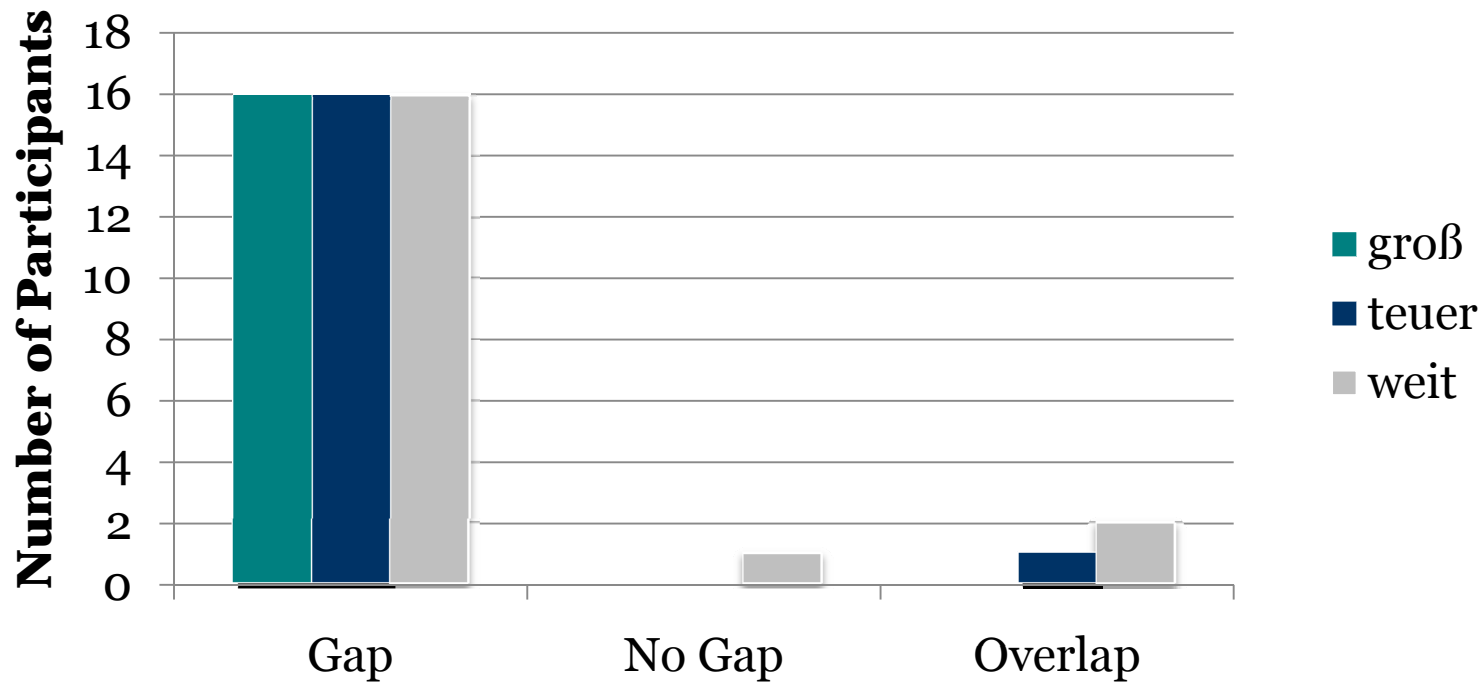
Group 1



Frequency Distribution

of participants who left a gap

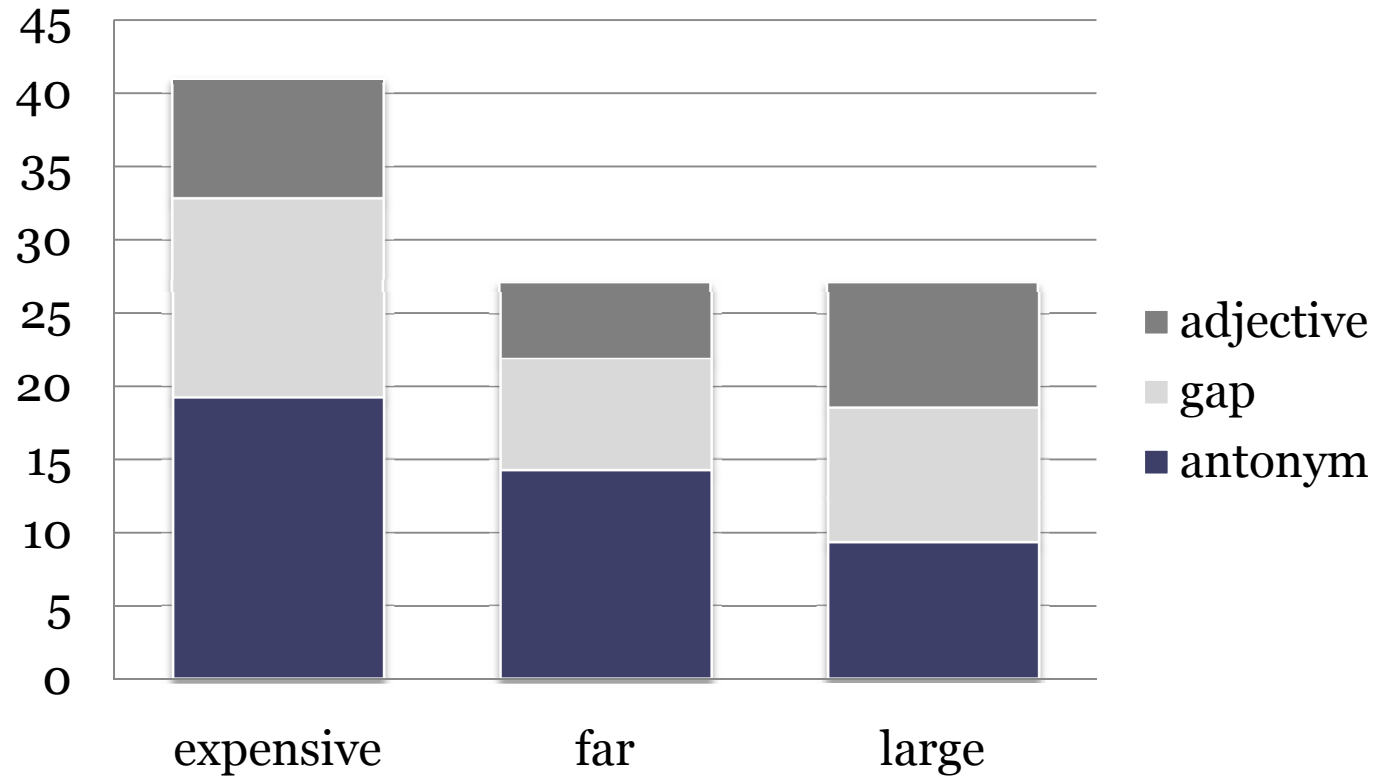
Frequency Distribution



Results - Condition 2

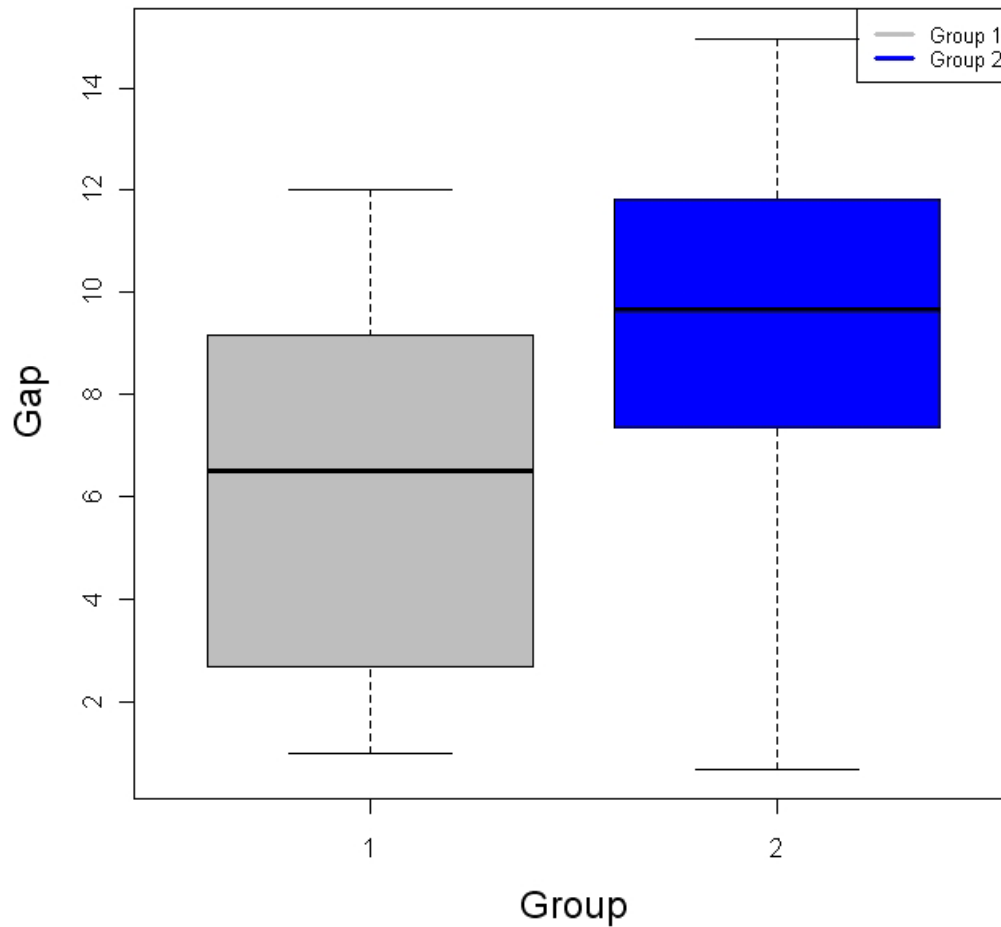
of pictures classified as adjective, antonym and neither (gap)

Group 2



Comparison of Conditions

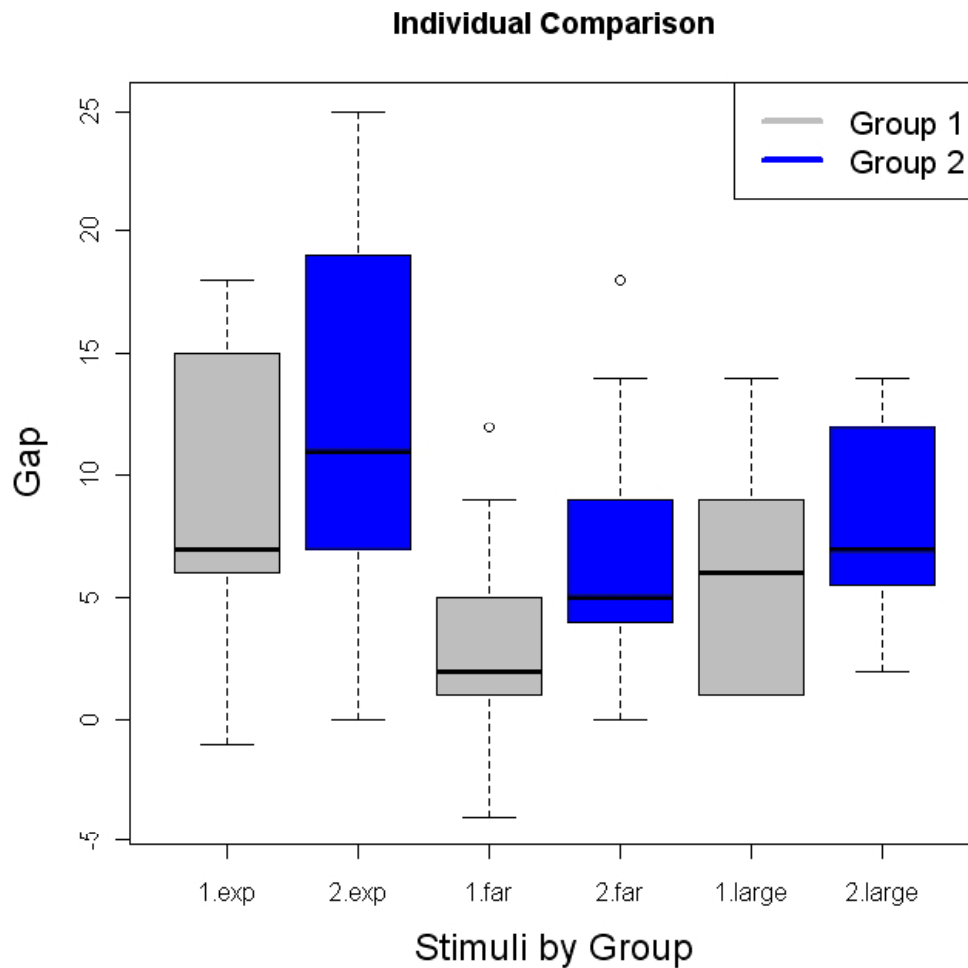
Gap on average



Size of Gap (on average)

	average
group 1 (adj/neg)	6,0
group 2 (adj/antonym)	9,6

Individual Comparison



Size of Gap (on average)

	expensive	far	large
group 1 (adj/neg)	9,1	3,0	5,9
group 2 (adj/ant)	12,6	6,6	8,2

Statistical Testing

One-way ANOVA: 2 conditions (3 stimuli)

- Difference between conditions (means): $F(1,85)=7.62$, **$p<0.01^*$**

Post-hoc Analysis (pairwise t-Tests)

- Large: **$p=0.18$**
- Expensive: **$p=0.16$**
- Far: **$p=0.03^*$**



Experiment 2 (preliminary)

- Do speakers acknowledge a gap...
 - when asked to judge positive and negative extensions at once?

Method

- Revised version of the first experiment
 - 4 adjectives:**
teuer, groß, weit, **heiß**
 - their negations**
- Participants judged positive and negative sentences on one set of pictures

Participants

6 Participants

3 female, 3 male

32 years old on average

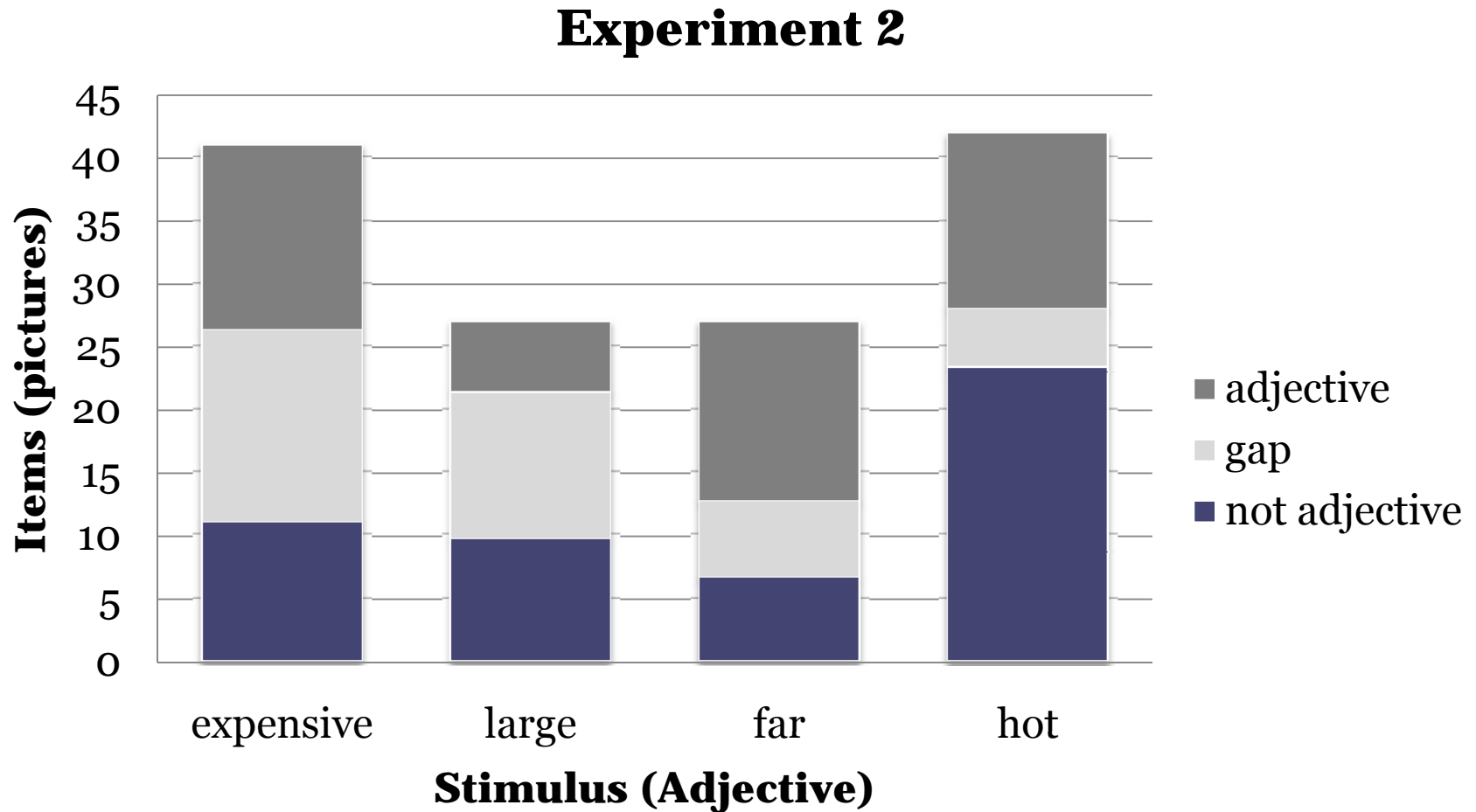
Procedure

- Paper and pencil task, conducted in person
- 6 trials (sentences + picture series):
 - 4 experimental items
 - 4 adjectives
 - 1 trial/adjective (adjective vs. negation)

Order



Results - Experiment 2



Summary of Findings

- Respondents leave a gap: neither adjective nor its negation are applied to borderline individuals
 - Participants acknowledge gap when judging adjective and its negation at once
- Gap between adjective and its antonym is significantly larger than that between adjective and its negation

Discussion

- Relative to theories of vagueness

For a vague predicate P...	TV Gap	TV Glut	Fuzzy Logic	Super-valuation	Epis-temic	Context-ualist
...speakers judge some entities as neither P nor \neg P	✓	✗	✓	✓	✓	✓
...speakers do so consciously (no evidence of commitment to bivalence/ excluded middle)	✓	✗	✓?	✓?	✓??	✓?

- What does task measure? Judgments of truth value?
Or something else?

Discussion

- Differential predictions?

For a vague predicate P...	TV Gap	Fuzzy Logic	Super-valuation	Epis-temic	Context-ualist
Complex sentences: for individual in 'gap', $P \vee \neg P$ accepted	?	?	✓	✓	?
Reaction time: borderline individuals take longer to judge	?	✓	✓	✓	✓
Dynamic approach: boundaries for P and $\neg P$ vary with order of exposure, etc.	??	?	??	?	✓
Other???					

Discussion

- Relationship of negation of adjective to antonym?
 - Not treated as equivalent by speakers
 - But difference smaller than might be expected
 - Most of 'gap' between adjective and antonym is already present between adjective and its negation
- How to characterize formally?



Thank You!



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