



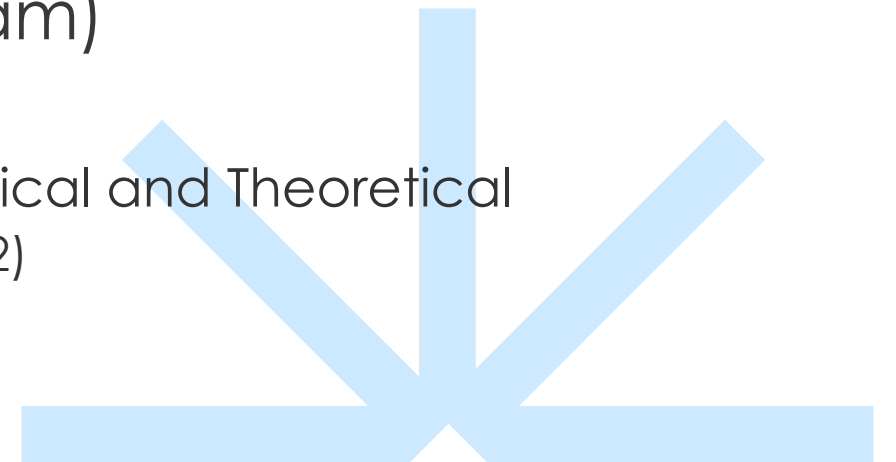
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Measurement scales and competition between alternatives

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Different types of inference



What size is your apartment?

(1) It is large \rightsquigarrow large but not gigantic

(2) It is not large \rightsquigarrow small

(3) It is not small \rightsquigarrow medium-size

Different types of inference



What size is your apartment?

(1) It is large \rightsquigarrow large but not gigantic (scalar/Q-based implicature)

(2) It is not large \rightsquigarrow small (negative strengthening, R-based implicature)

(3) It is not small \rightsquigarrow medium-size (middling, Q-/R-based implicature)

Horn (1989)

Different types of inference



- (2) It is not large \rightsquigarrow small (negative strengthening)
- (3) It is not small \rightsquigarrow medium-size (middling)
- } evaluative polarity asymmetry

Different types of adjectives



- Focus on relative adjectives (*large, small*)
- How about absolute adjectives (*clean, dirty*)?
- Different lexical semantics (Rotstein & Winter, 2004; Kennedy & McNally, 2005; Kennedy, 2007)
- Relative vs. Absolute distinction: Relevant to scalar implicature likelihood (Gotzner et al., 2018a;b) and interpretation in the *not very* construction (Leffel et al., 2018)

Research Questions



How do **evaluative polarity** and **adjective semantics** affect interpretation in the scope of **negation**?



Theoretical background

Semantic properties of gradable adjectives



Measurement scales (sets of totally ordered degrees, e.g., size) underly the meaning of gradable adjectives

(Bartsch & Venneman, 1973; Cresswell, 1977; Bierwisch, 1989; Kamp & Rossdeutscher, 1994; Kennedy & McNally, 2005; Kennedy, 2007; see Solt, 2015 for an overview)

Relative and absolute adjectives differ in:

- scale structure (open vs. closed scale)
- type of standard (context-dependent vs. fixed)
- entailment patterns

Different entailment patterns



Relative: contextual standard of comparison

(4) It is not large \Rightarrow it is small

middle ground

Absolute: fixed standard (minimum or maximum degree)

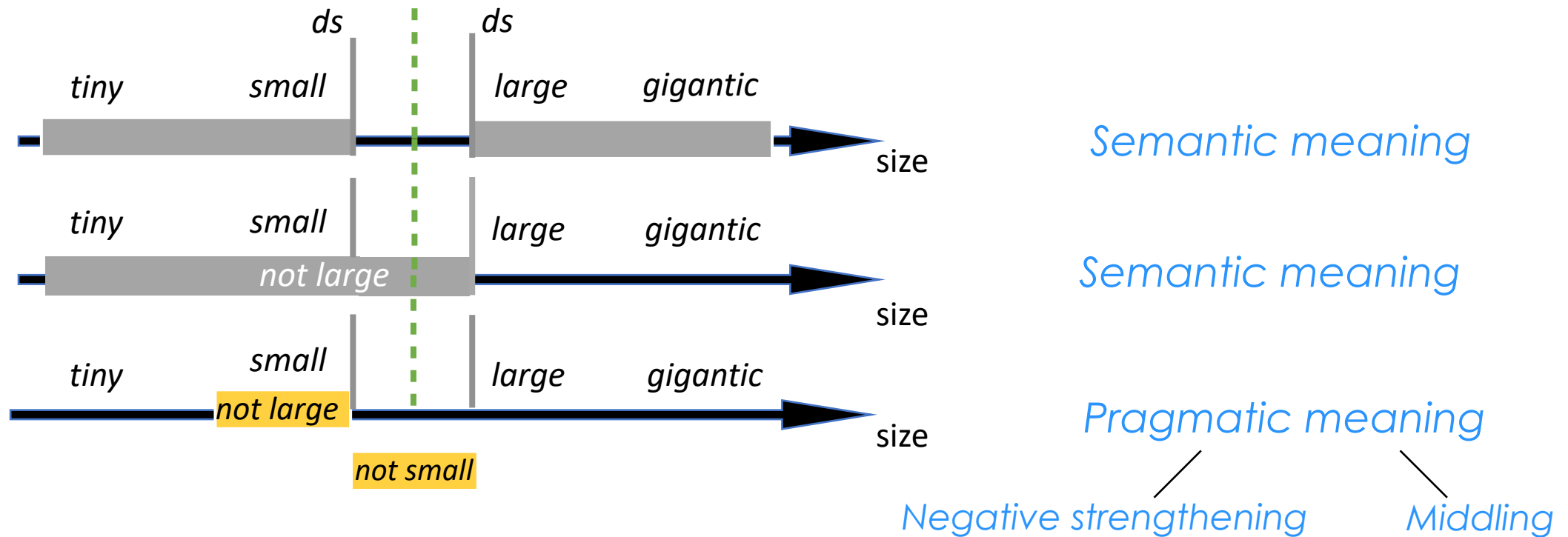
(5) It is not clean \Leftrightarrow it is dirty

no middle ground

(6) It is not very clean/spotless \Rightarrow it is dirty/filthy

middle ground

Semantic meaning and pragmatic interpretations under negation



Negative strengthening & Strong scalars



- (7) a. She's not happy \rightsquigarrow she's sad
b. She's not sad \nrightarrow she's happy } *polarity asymmetry*
c. She's not ecstatic \nrightarrow she's miserable

Contextual availability of alternatives & fine distinctions



- Availability of (stronger) scale-mates (*filthy* vs. *dirty*, *pristine* vs. *clean*) in context
 - ▶ Finer distinctions between alternatives & smaller amounts of dirt matter
 - ▶ Possible consideration of a fine-grained scale of dirt
 - ▶ Availability of a middle ground (neither clean nor dirty)
 - ▶ Complementarity between *clean* and *dirty* breaks
 - ▶ Absolutes may behave like relatives wrt pragmatic interpretation under negation

Rotstein & Winter (2004): “in some contexts a moist towel may be deemed neither wet nor dry”, see also Paradis & Willners (2006), Burnett (2014)



Experimental study

Goals



- Pragmatic interpretation **under negation**: the role of evaluative polarity, informational strength and of adjective semantics
 - Experiment 1: relative adjectives
 - Experiment 2: absolute adjectives
- How does contextual availability of **alternative expressions** (incl. strong scalars) affect interpretation under negation?
 - Experiment 3: relative adjectives
 - Experiment 4: absolute adjectives
 - 2 pilot experiments

Experiments 1 & 2: Methods



Methodology: Grading scenario with action-based task (extension of Gotzner & Benz, 2018; Tessler and Franke, 2018); run on PCIBex

▶ *Context makes distinctions between different terms relevant*

Design: 2 Polarity (positive, negative) x 2 Scalar Strength (weak, strong) x 2 Negation (non-negated, negated) -> 8 conditions

Items: 8 relative adjective quadruplets (Experiment 1, 64 trials), 8 absolute adjective quadruplets (Experiment 2, 64 trials)

Participants: N=56 (Experiment 1), N=55 (Experiment 2); English native speakers from Prolific

Example item: Experiment 1 (relative)



Context: A group of friends goes on vacation. One friend named Tim writes a review for each person's room on booking.com.

Please decide which rating each room receives in terms of its size based on Tim's statement.

1 = tiny, 5 = gigantic

Tim writes:

David's room was small.

1 2 3 4 5

Toby's room was tiny.

1 2 3 4 5

Anna's room was not tiny.

1 2 3 4 5

Predictions



Interpretation of **relative** and **absolute** adjectives under **negation** in line with their:

- **semantic properties & entailment patterns**
- **evaluative polarity**
- **informational strength**

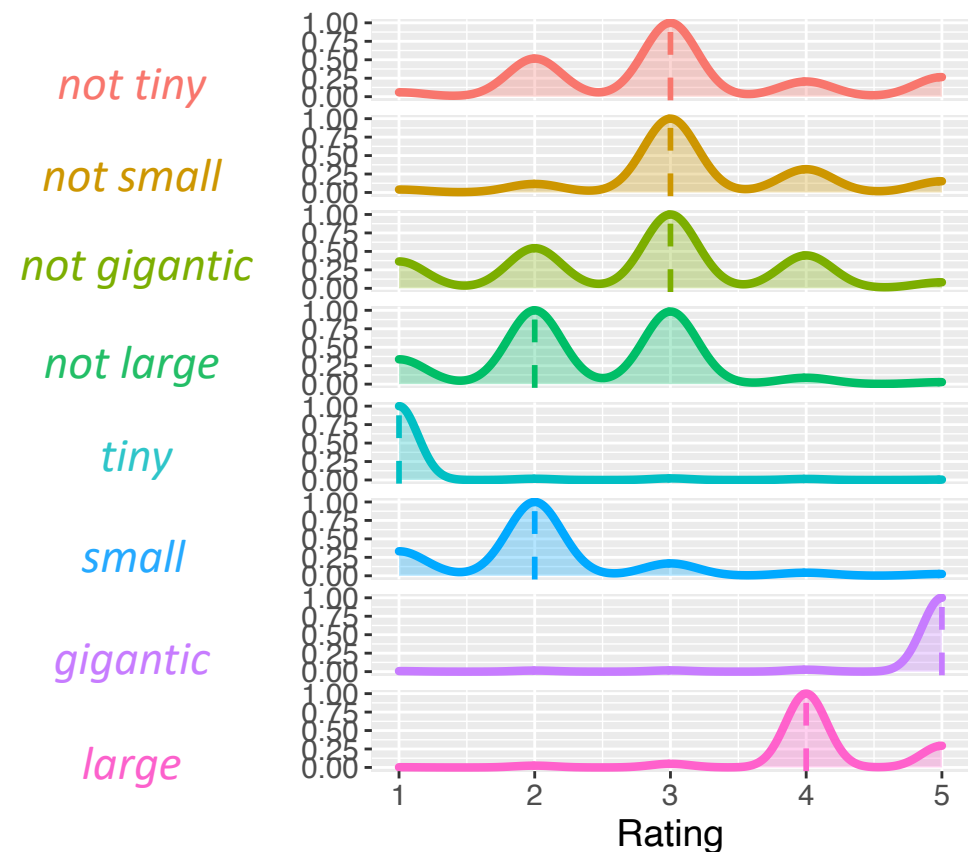
Possible effect of **presentational context** for absolutes

Predicted inferences under negation



	Relative adjectives (weak/strong)	Absolute adjectives (weak/strong)
	<p><i>The door is not large /</i> <i>The door is not gigantic</i></p>	<p><i>The door is not clean /</i> <i>The door is not pristine</i></p>
Entailment	<p>'The door is less than large' / 'The door is less than gigantic'</p>	<p>'The door is dirty' / 'The door is less than pristine'</p>
Negative strengthening	<p>'The door is (rather) small' / —</p>	<p>— / 'The door is (rather) dirty'</p>
Middling interpretation	<p>'The door is neither large nor small' / 'The door is neither large nor small'</p>	<p>'neither clean nor dirty' ?? / 'neither clean nor dirty' ??</p>

Experiment 1: Relative adjectives



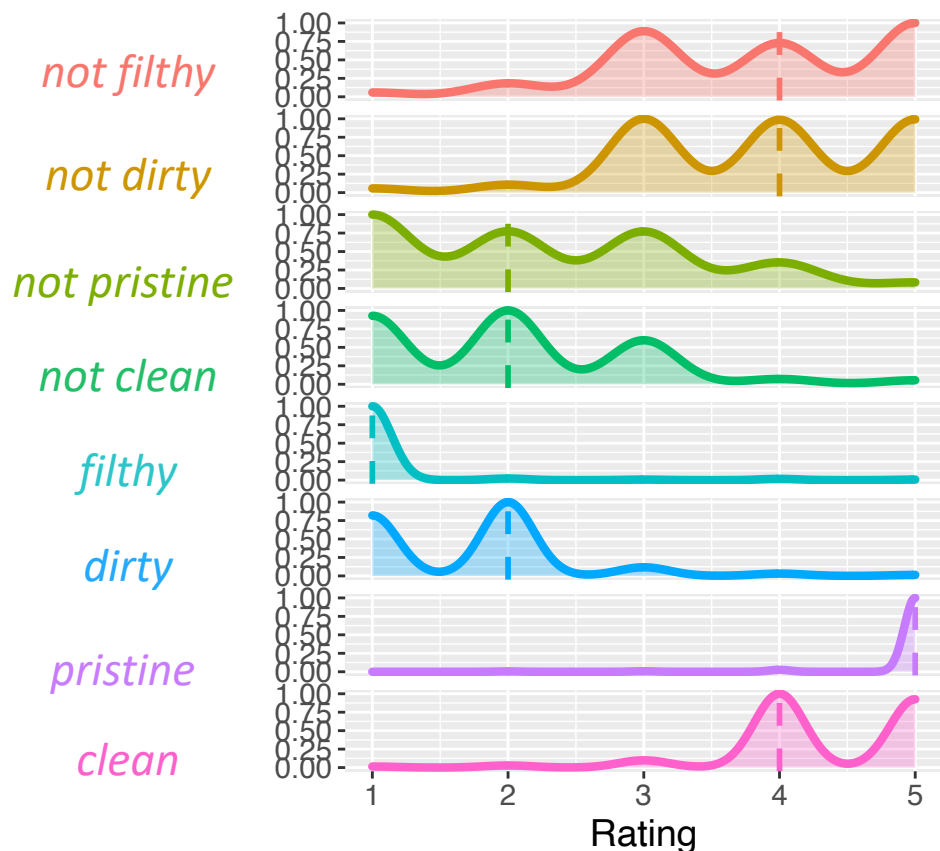
Condition

- Negated negative strong
- Negated negative weak
- Negated positive strong
- Negated positive weak
- Non-negated negative strong
- Non-negated negative weak
- Non-negated positive strong
- Non-negated positive weak

- Clear-cut distinctions in baseline non-negated environments
- Fewer distinctions in negated environments
- Polarity asymmetry for negated weak conditions
- Middling for negated strong and negative weak conditions

Clmm: 3-way significant interaction: $z=-15.720$, $p<.0001$
 subset analysis: Strength*Polarity significant interaction: $z=-9.16$, $p<.0001$

Experiment 2: Absolute adjectives



Condition

- Negated negative strong
- Negated negative weak
- Negated positive strong
- Negated positive weak
- Non-negated negative strong
- Non-negated negative weak
- Non-negated positive strong
- Non-negated positive weak

- Clear-cut distinctions in baseline non-negated environments
- Fewer distinctions and overlaps in negated environments
- Negated weak conditions receive both semantic and middling interpretations
- Negated strong conditions receive middling interpretations and inferences to the (weak) antonym
- Fewer middling interpretations compared to relative adjectives

Clmm: 3-way significant interaction: $z=-16.788$, $p<.0001$
subset analysis: No Strength*Polarity interaction, $p=0.53$

Conclusions



- **Sensitivity to informational strength for non-negated absolute and relative adjectives**
- **Under negation, fewer distinctions within adjective classes**
- **Differences between adjective classes due to semantic properties:**
 1. Negative strengthening -> Polarity asymmetry for weak relative adjectives (see also Gotzner & Mazzarella, 2021; Mazzarella & Gotzner, 2021)
 2. Middling interpretations for relative adjectives; to a lesser extent for absolute adjectives
 3. Weak absolute adjectives are interpreted semantically; additional interpretations due to presentation mode and/or fine granularity



What happens to **middling interpretations** when **distinctions** between different expressions are **less prominent** in a task where participants do not compare the alternative expressions directly?

Single presentation experiments 3 & 4



- Same stimuli, each **presented in isolation**
- 64 trials per participant, 8 per condition

Context 1

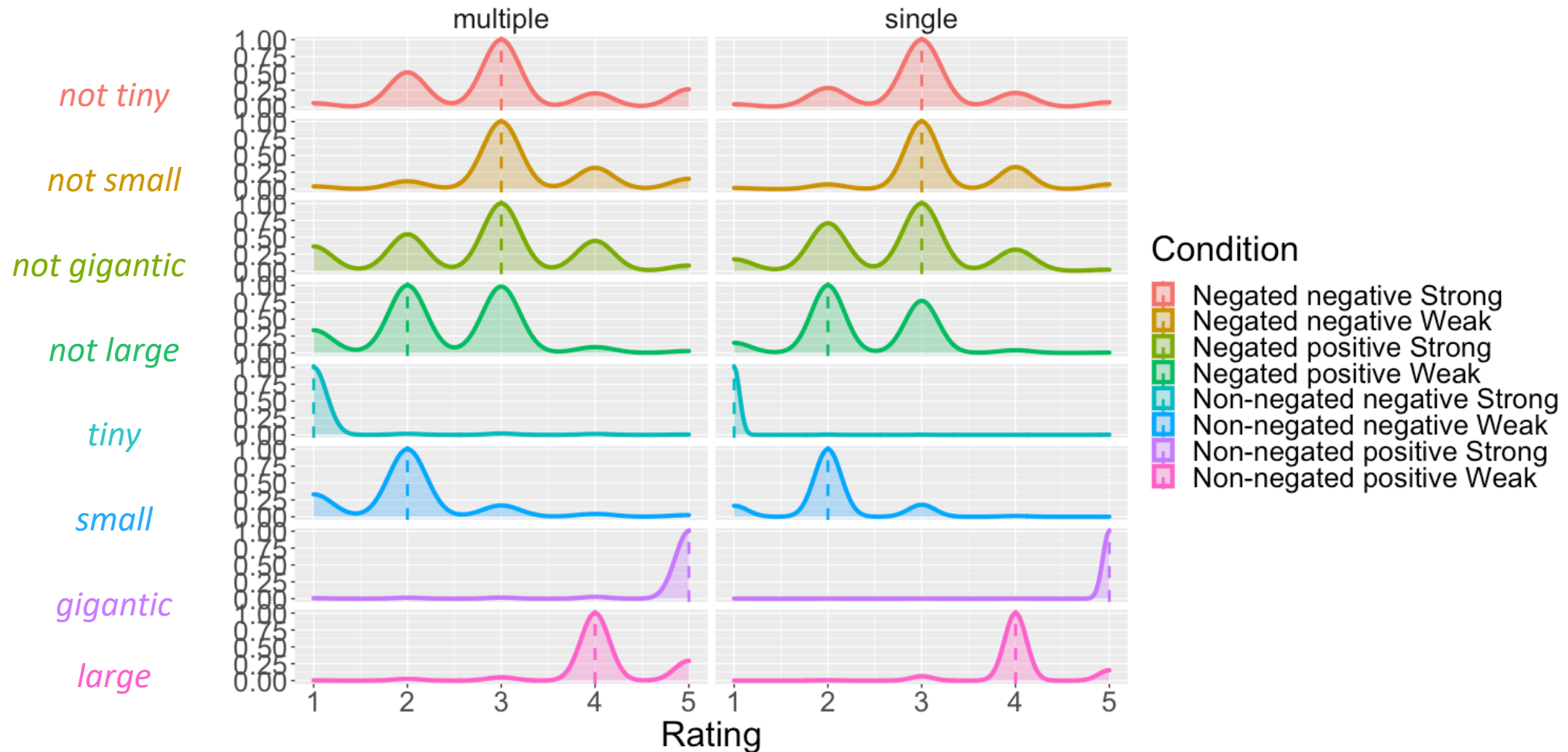
*David's room was
small.*

Context 2

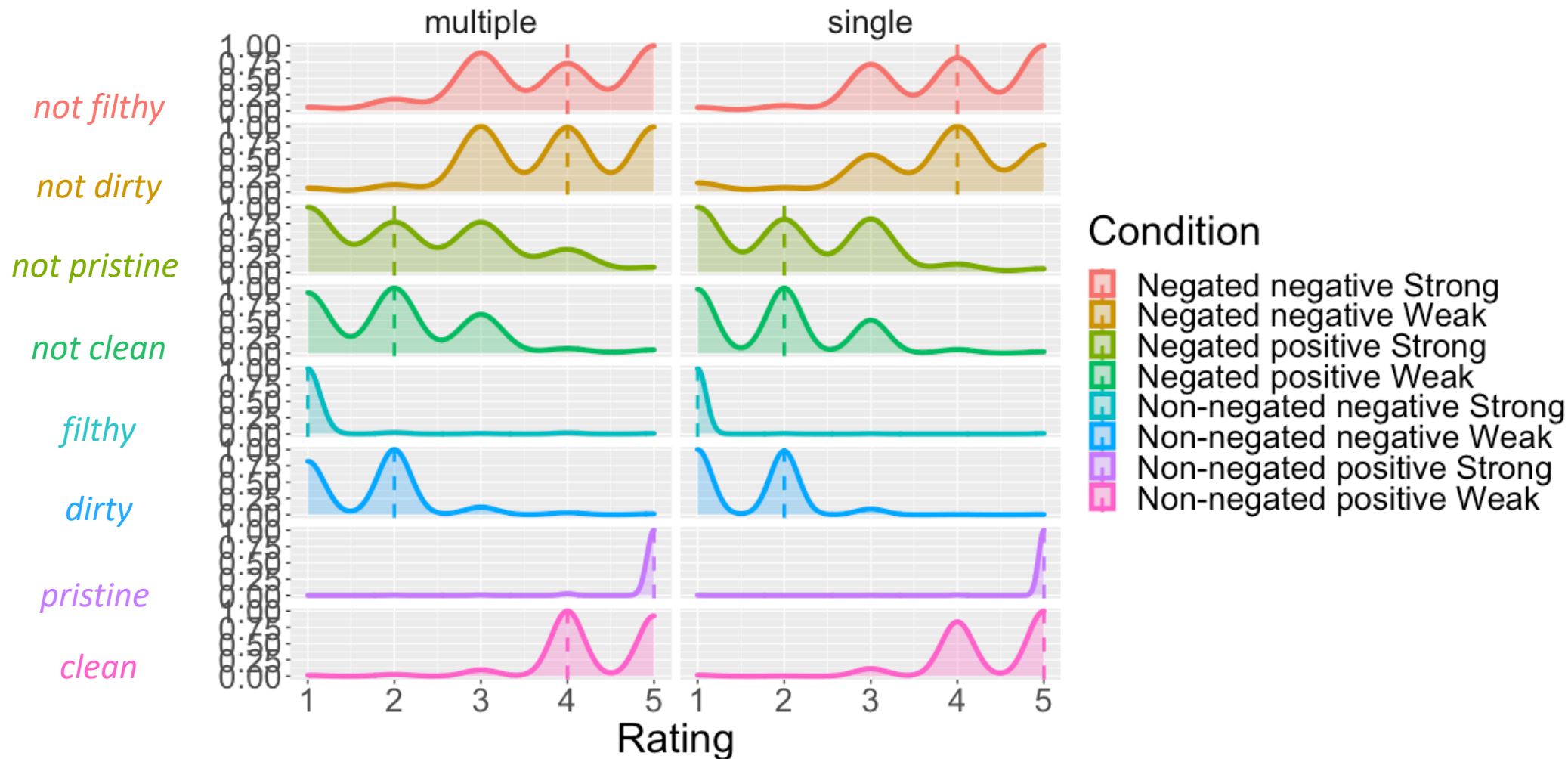
*Mary's picture was
gorgeous.*

... 64 statements

Experiment 3 (relative adjectives): Multiple vs. single presentation



Experiment 4 (absolute adjectives): Multiple vs. single presentation



Conclusion



Inferences of gradable adjectives do *not* depend on the presentation mode (multiple vs. single presentation)

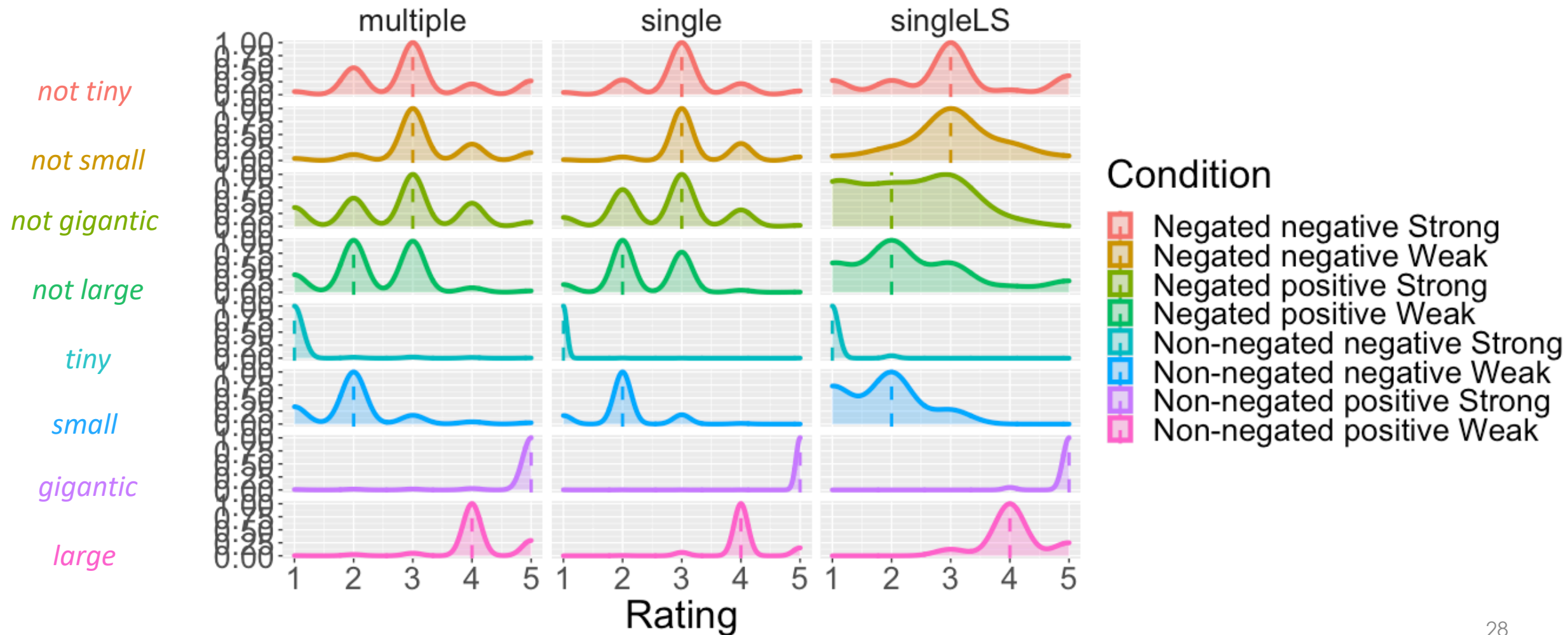
➔ Statement comparison within trials vs. between trials

Pilot experiments: 1 condition per item

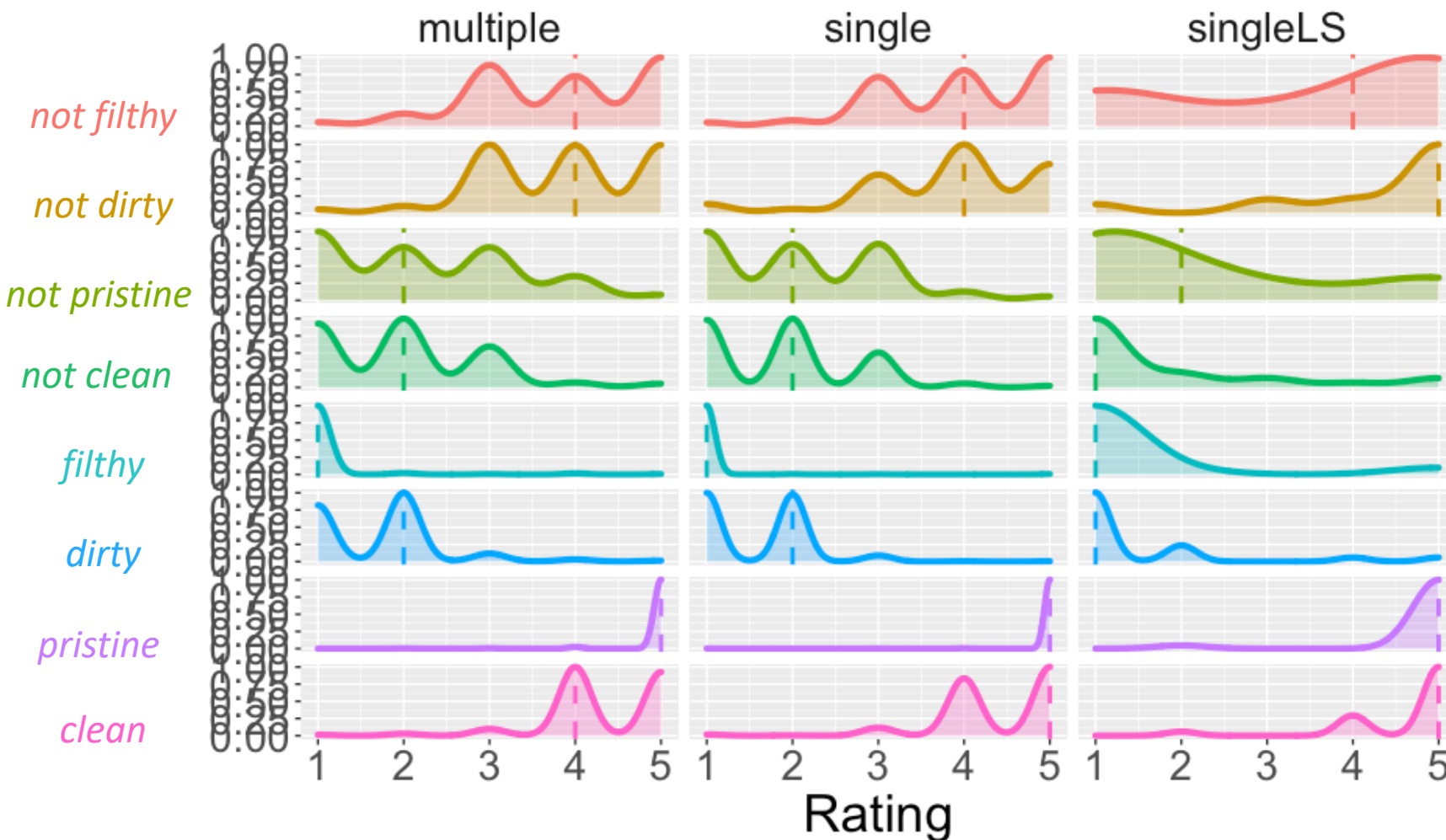


- Participants saw one statement at a time
- 8 trials per participant (cf. Tessler & Franke, 2018): 1 condition per item/context (latin square)
- 2 pilots: pilot 1 for relatives and pilot 2 for absolutes
- 24 participants per pilot

Pilot 1: relative adjectives



Pilot 2: absolute adjectives



Fewer middle ratings!

Condition

- Negated negative Strong
- Negated negative Weak
- Negated positive Strong
- Negated positive Weak
- Non-negated negative Strong
- Non-negated negative Weak
- Non-negated positive Strong
- Non-negated positive Weak

Tentative conclusion



Middling inferences of absolute, as opposed to relative, adjectives depend on the presentation mode

Middle ground induced via
context vs. semantics

Further issues



- Clarify further the role of presentation mode in adjective interpretation
- Resolve whether middling interpretations of absolute adjectives hinge on presentation mode *only* or *also* on the fine granularity level this may impose

General conclusions



- **Properties of measurement scales, evaluative polarity and context are crucial to adjective interpretation in the scope of negation**
- **Model of adjective meaning that integrates semantic, pragmatic, and contextual factors**