ON THE ROLE OF AGENCY AND CAUSATION IN THE SEMANTICS OF EMOTION VERBS

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OVERVIEW

1. Background
2. Experimental studies
3. Corpus study
4. Conclusion

BACKGROUND

USAGE-BASED PERSPECTIVE

- Linguistic meaning is a social construct that is dynamically negotiated within and across particular communication settings[1]
- How is the relation between objects and events in the external world and language users' subjective perspective on those events manifested in language structure and use?
- Similar syntactic behavior implies similar semantic structure

[1] Casasanto and Lupyan (2015); Geeraerts and Cuyckens (2007); Pütz (2014)

SEMANTICS OR WORLD KNOWLEDGE?

- People possess extensive knowledge about common events/situations in the world
  - who does what to whom? why? where? with what? for how long?
- Language explicitly encodes (some) aspects of situations
  - temporal properties, typical roles of participants
- Linguists seek to identify which aspects of our interpretation of an utterance are directly encoded in the linguistic system
  - What is the appropriate level of granularity for modeling the meaning of words?

Hare et al. (2009); McRae and Jones (2013); Metusalem et al. (2012)

GOALS

- Explore how lexical meaning and conceptual knowledge shape differences in speakers' interpretation and usage of semantically related verbs
- Focus on a special class of English psychological verbs (AMUSE, AMAZE, CAPTIVATE, CONCERN, DEPRESS, FRIGHTEN, etc.)
  1. Attribution of certain features, e.g. agentivity, is highly sensitive to local context and world knowledge, contra previous research
  2. Finer-grained aspects of semantic (conceptual) knowledge are active in offline intuitions and natural language usage

CASE STUDY: PSYCH-VERBS

Crosslinguistically, psychological verbs generally fall into two broad classes:

- Subject-Experiencer verbs (SEVs):
  fear, love, hate, adore, loathe, . . .
- Object-Experiencer verbs (OEVs):
  frighten, amuse, worry, irk, . . .

(1) a. Indiana Jones fears snakes.
EXPERIENCER STIMULUS

b. Snakes frighten Indiana Jones.
STIMULUS EXPERIENCER

PROPERTIES OF ENGLISH OEVS

- Typically describe a dynamic change of state caused by Stimulus, similar to other causative verbs (e.g. *break, kill*)
- Exhibit unusual syntactic behavior[2]

(2) a. That book about herself struck Mary as embarrassing.

b. *That book about herself struck Mary on the head.

(3) a. ??Which company does international unrest frighten the president of?

b. Which company does the international community fear the president of?

[2] Bouchard (1995); Baker (1997)

AGENTIVITY IN OEVS

Unusual behavior of OEVs applies only in non-agentive uses

(4) a. *Who did your behavior bother the sister of?

b. Who did you tease the sister of?

Some OEVs categorically disallow agentive uses[3]

(5) a. Mary deliberately AMUSED/FRIGHTENED/SURPRISED Sue.

b. *Mary deliberately AMAZED/DEPRESSED/FASCINATED Sue.

∴ (Non-)agentivity must be specified in the meaning of some OEVs

[3] DiDesidero (1999); Landau (2010)

THE QUESTION OF AGENTIVITY

Lexical meaning, context, and world knowledge together influence inferences about agentivity and causation in OEVs

➪ Most verbs are lexically underspecified for agentivity[4]

(6) a. *Jason cut the string around the package.*

b. *Jason cut his finger.*

- HYPOTHESIS: Inferences about agentivity in OEVs arise from pragmatic principles and knowledge about emotional situations they (tend to) describe
- COROLLARY: Emotion verbs typically associated with human causes are more open to agentive uses/interpretations

[4] Van Valin and Wilkins (1996)

SUGGESTIVE EVIDENCE

Usage facts don't align with claims in the literature

- 'NonAgentive' verbs[5]: AMAZE, ASTONISH, BORE, CONCERN, DEPRESS, FASCINATE, WORRY, ...

(7) a. Slick male foreigners talk funny to deliberately FASCINATE older women who don't know any better. (Google)

b. The politicians and health police deliberately DEPRESS us, so we'll pay the outrageous taxes on smoking products to cheer ourselves up. (Google)

c. we convinced him to AMAZE us with his "hand trick". (Google)

[5] e.g. Grimshaw (1990); Didesidero (1999)

EXPERIMENTAL STUDIES

EXPERIMENTAL EVIDENCE: JUDGMENT STUDY 1

- Do speakers reliably rate ‘NonAgentive’ Obj-Exp verbs lower in agentive contexts?
- How much variation exists among individual verbs?
- Is there a clear basis for classifying verbs into distinct subtypes based on agentive diagnostics?

STUDY 1: DESIGN

100 Amazon Mechanical Turk subjects rated sentences on 7-point rating scale: 1 = highly unnatural; 7 = highly natural

Four sentence conditions:[6]

- Agent-oriented adverbs
- Complement of *persuade*
- Imperative
- Present progressive

[6] Verhoeven (2010)

STUDY 1: DESIGN

Four verb class types:

- 10 Agentive OEVs (*amuse, annoy, frighten, surprise, . . .*)
- 10 NonAgentive OEVs (*amaze, fascinate, depress, horrify, . . .*)
- 10 Subject-Experiencer verbs (*love, hate, fear, admire, . . .*)
- 5 Non-psychological transitive verbs (*kick, hug, help, pinch, shove*)

5 verbs of each type in each condition

- 5×4 (verb class) $\times$ 4 (sentence type) = 80 test items per subject

STUDY 1: DESIGN

All sentences involved a human subject and human object:

(8) a. *The gymnast intentionally astonished the judges.*

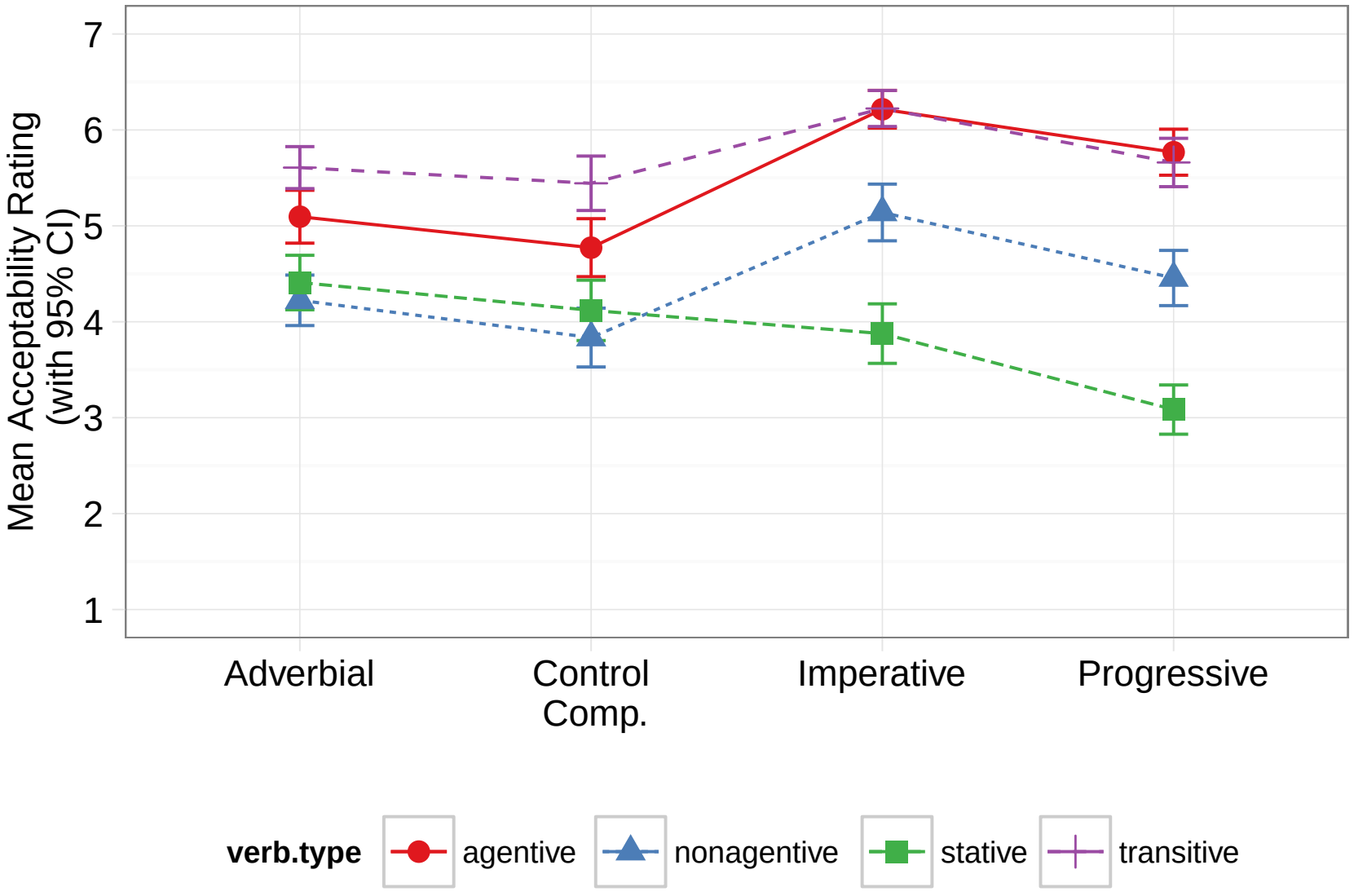
b. *The coach persuaded the gymnast to astonish the judges.*

c. *Astonish the judges!*

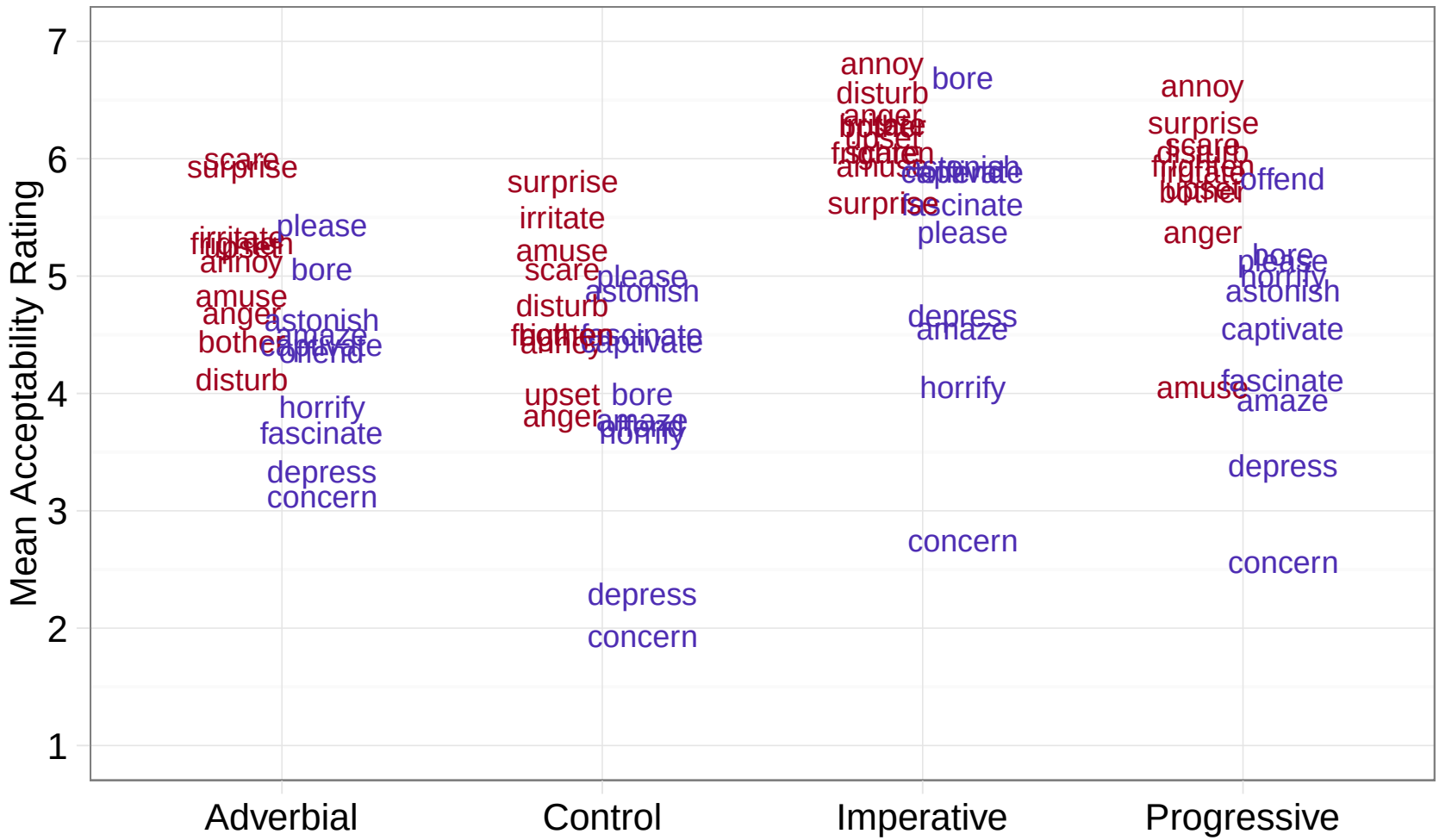
d. *The gymnast is astonishing the judges.*

H_1: Agentive Obj-Exp verbs, as a class, are more acceptable than NonAgentive Obj-Exp verbs in volitional contexts.

STUDY 1: RESULTS



STUDY 1: RESULTS



STUDY 1 RESULTS: SUMMARY

Agentive verbs rated significantly better than NonAgentive verbs (β = –0.87, *SE* = .32, $p < 0.01$)

- Effects largely driven by a few extreme cases (*concern*)

Judgments do not reveal a clear Agentive/NonAgentive class distinction

- Pattern is more compatible with a contextual/pragmatic approach to agentivity for most Obj-Exp verbs

MOTIVATION: JUDGMENT STUDY 2

Corpus examples are usually rich in additional detail, even within the same sentence

(9) a. . . . CAPTIVATE us with your story. . .

b. . . . we convinced him to AMAZE us with his “hand trick”.

c. I choose to ASTONISH my co-workers by staying happy.

d. Sandler To Intentionally HORRIFY Us With New Film.

Additional information makes explicit the means by which an agent purposefully brings about an event.

- WITH and BY phrases describe specifically HOW the subject is able to evoke the emotion in the experiencer

STUDY 2: DESIGN

100 AMT subjects rated sentences on same 7-point scale of naturalness

$2 \times 2 \times 2$ Design

- Agentive and NonAgentive verb types (same verbs as in Study 1)
- Sentence Condition
  - Adverb vs. *persuade* complement
- Prepositional phrase type
  - Modifier vs. Instrument

H1: The presence of Instrumental phrases will improve the acceptability of NonAgentive verbs.

STUDY 2: EXAMPLE STIMULI

Adverbial:

(10) a. The magician deliberately AMAZED the little girl with the bow in her hair.

b. The magician deliberately AMAZED the little girl with his disappearing trick.

Persuade complement:

(11) a. The parents persuaded the magician to AMAZE the little girl with the bow in her hair.

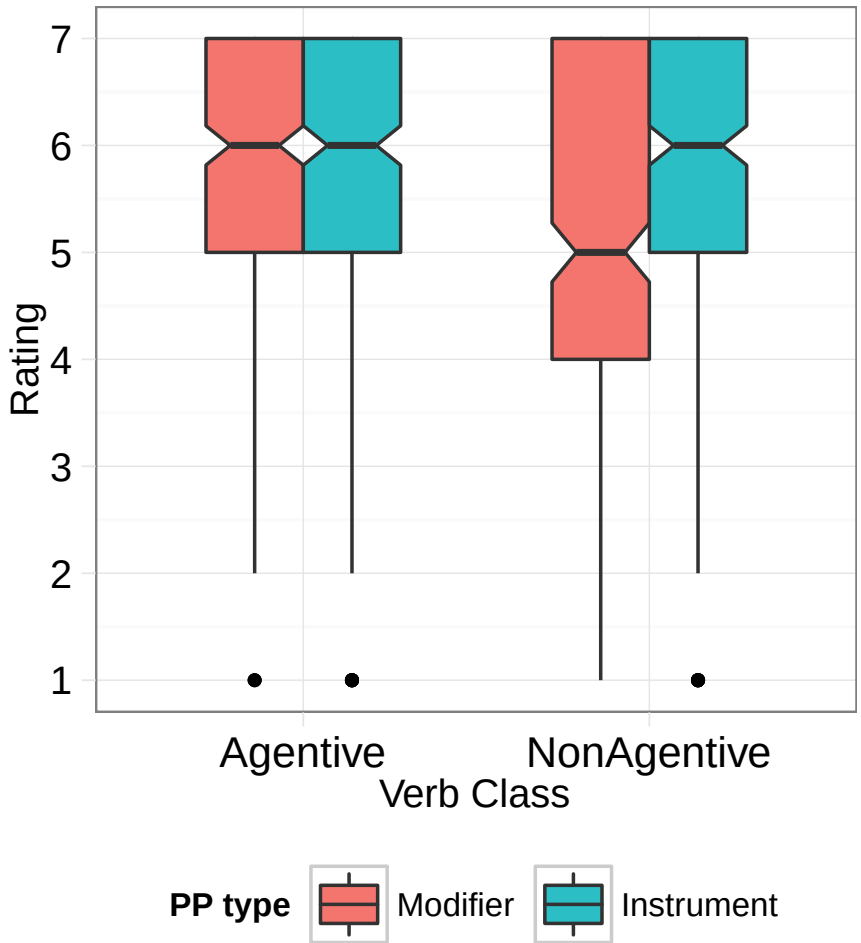
b. The parents persuaded the magician to AMAZE the little girl with his disappearing trick.

STUDY 2: RESULTS

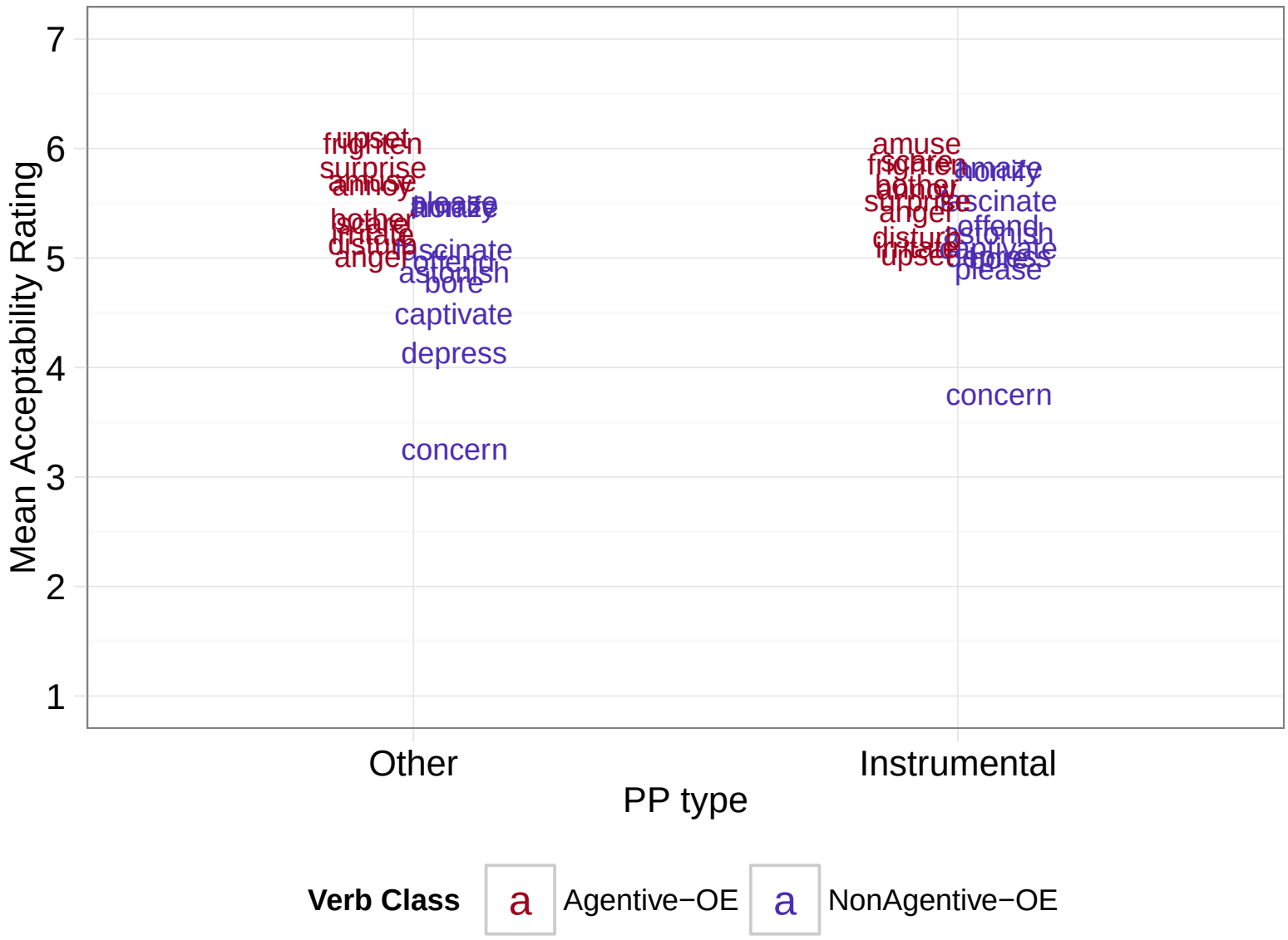
Significant interaction of Verb Class × PP Type ($\beta = 0.52$, $SE = .15$, $p < 0.001$)

No main effects of Verb Type ($\beta = -0.45$, $SE = .22$, $p = 0.07$), PP type ($\beta = 0.03$, $SE = .07$, $p = 0.65$), or Sentence Type ($\beta = -0.05$, $SE = .20$, $p = 0.82$).

No other interactions significant



STUDY 2: RESULTS



LIMITS OF LINGUISTIC DATA

Can these associations be independently verified?

- Investigate properties of emotion verbs (concepts) using other offline tasks
- Offline intuitions of emotions should align with findings from studies of linguistic data

EXPERIMENTAL EVIDENCE: SURVEY OF EMOTION PROPERTIES

100 AMT subjects rated emotion terms on 5-point scale according to various properties including:

- Intentionality
- Duration
- Suddenness
- Intensity
- Imageability
- Verifiability

Adapted from Geneva Appraisal Questionnaire[7]

[7] Geneva Emotion Research Group (2002)

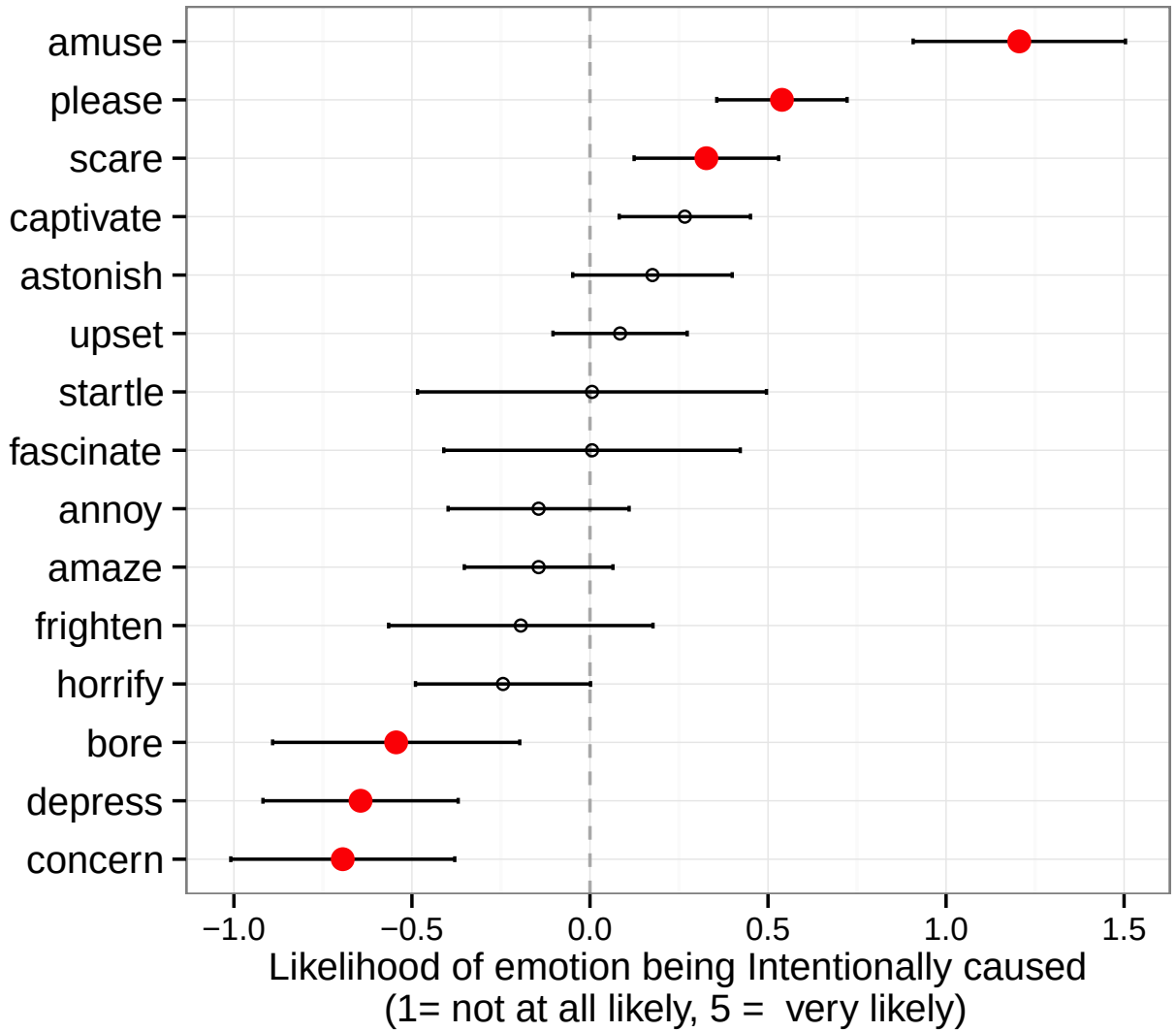
EMOTION SURVEY 1: DESIGN

Imagine a typical situation in which a person could be described as...

ASTONISHED

- At the time of experiencing the emotion, do you think that the emotion came on very *suddenly* and *abruptly*?
- At the time of experiencing the emotion, do you think that the emotion *lasted a long time*?
- If you think it was caused by one or more persons, how likely do you think it was that the person or persons caused the emotion event *intentionally*?
- . . .

EMOTION SURVEY: INTENTIONALITY RESULTS



CORPUS STUDY

STATISTICAL ASSOCIATIONS OF VERBS AND ARGUMENTS

Analyze large sample of OEVs from the Corpus of Contemporary American English (COCA)[8]

1. Annotate verb and discourse features, as well as properties of both Stimulus and Experiencer arguments
2. Explore associations between verbs and semantic properties of Stimulus arguments

[8] Davies (2008)

SAMPLE DETAILS

- 3200 randomly sampled active and passive observations of 16 Obj-Exp verbs ($\approx$ 200 per verb)
- Include only examples with both arguments present, and to exclude non-psychological uses
- Verbs: AMAZE, AMUSE, ANGER, ANNOY, CAPTIVATE, CONCERN, DEPRESS, FASCINATE, FRIGHTEN, HORRIFY, PLEASE, SCARE, STARTLE, SURPRISE, UPSET
- Verbs selected based on high overall frequency and prevalence of mention in the literature

SEMANTIC ANNOTATION

Classification of Stimulus types

HUMAN:	*Republicans, the former corporate lawyer*
ORGANIZATION:	*the police, the government*
OTHER ANIMATE:	*a bear, snakes*
CONCRETE OBJ:	*fake flowers, coconuts*
EVENT:	*The launch, the activity outside*
AESTHETIC OBJ:	*the story, the painting*
LOCATION:	*Paris, Kuwait*
SENSATION:	*the smell, the sounds*
ABSTRACT OBJ:	*male chauvinism, history*
ABSTRACT STATE OF AFFAIRS (SOA):	*that . . .*

CORRESPONDENCE ANALYSIS

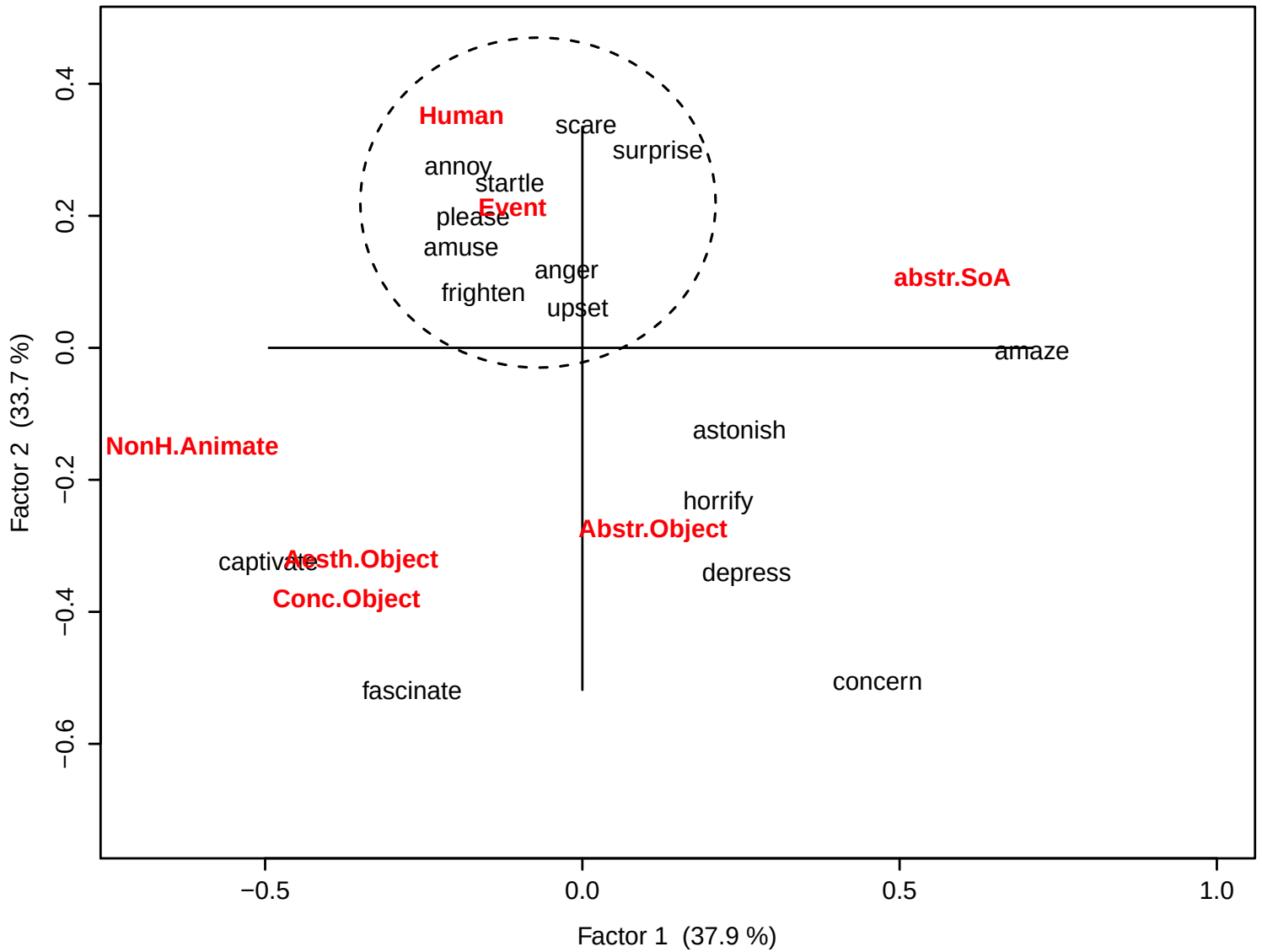
Visually represents frequency-based associations among groups or categories[9]

- Converts a contingency table to a 2D map in Euclidean space
- Proximity on the map reflects strength of association

Verb	HUMAN	EVENT	CONCRETE OBJECT	ABSTRACT OBJECT	ABSTRACT SOA	...
amaze	42	13	9	84	110	...
amuse	99	39	17	61	32	...
anger	61	34	1	62	26	...
annoy	140	62	26	81	36	...
astonish	31	15	12	55	41	...
⋮	⋮	⋮	⋮	⋮	⋮	⋱

[9] Glynn (2012); Grafmiller (2013)

CA OF VERBS AND STIMULUS TYPES



SUMMARY OF CA

- Some verbs tightly cluster around Stimulus args with high degree of causal force (humans or events)
  - STARTLE, ANGER, ANNOY, AMUSE, SCARE, PLEASE, SURPRISE
- Other verbs are more widely distributed and cluster closer to Abstract Stimulus args (abstract concepts or states-of affairs)
  - DEPRESS, CAPTIVATE, CONCERN, FASCINATE, HORRIFY

CONCLUSION

PSYCHOLOGY OF EMOTION CONCEPTS

Emotion concepts are relational structures that integrate multiple parts of an experienced situation.[10]

- As abstract concepts, emotions refer to entire situations representing settings, agents, events, introspections, etc.
- Lexicalized meaning represents the entrenchment of situated conceptualizations which “become so well established that [they become] active automatically and immediately when the situation arises”[11].
- Knowledge of a particular emotion is established by capturing context-specific memories of instances labeled with specific emotion terms[12]

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[10] Wilson-Mendenhall et al. (2011)

[11] Barsalou (2009:1284)

[12] Barrett (2006); **?**

PSYCHOLOGY OF EMOTION CONCEPTS

- The close relationship between patterns observed in corpus data and offline judgments naturally falls out of the way abstract concepts are continuously (re)constructed via social conventions, e.g. language
- Situated conceptualization theories provide a psychologically plausible mechanism by which detailed conceptual knowledge shapes, and is shaped by, the production and interpretation of language.

Thank you!

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