

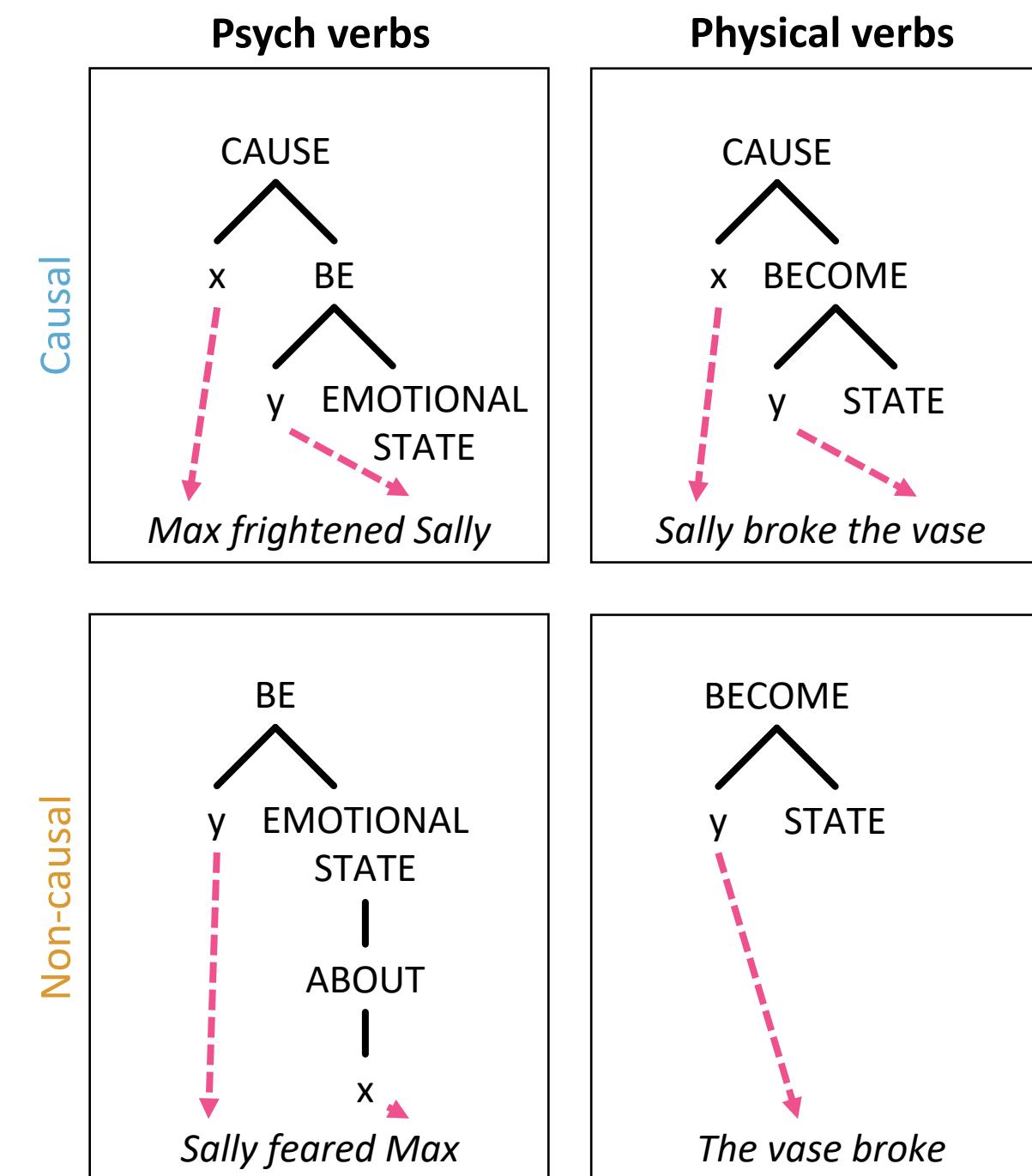
Evidence for shared conceptual structure for psychological & physical events

Jayden Ziegler^a (ziegler@g.harvard.edu), Annie Chai^b, Jesse Snedeker^a

^aHarvard Psychology, ^bUCSD Linguistics/Psychology

1. Introduction

- Natural language is characterized by systematic correspondences between meaning & form (e.g., causal agents=transitive subjects)
- Psych verbs** pose a challenge to this:
 1. Max_{STIMULUS} frightened Sally_{EXPERIENCER}
 2. Sally_{EXPERIENCER} feared Max_{STIMULUS}
- But only if we think **frighten** & **fear** actually mean the same thing...
- Turns out they don't: **language users perceive frighten verbs as more causal than fear verbs** (Hartshorne et al., 2016)
- We can capture these different **construals with hierarchically structured semantic event representations** that include a verbal root & one or more primitive predicates (Levin & Rappaport Hovav, 2005)
- The argument that is higher in the semantic tree becomes the subject of the sentence (which is the highest argument in the syntactic tree), while the argument that is lower in the semantic tree becomes the object (=preserve prominence)
- This approach provides a **straightforward solution to the linking problem posed by psych verbs**
- On this hypothesis, the **distinction between psych verbs is parallel to that between causal & non-causal physical verbs**



One CAUSE or many?

If participants learn a rule that applies to **frighten** (but not **fear**) verbs, will they extend it to causal (but not non-causal) physical verbs?

2. Methods

Training trials

1. Ball goes in while sentence plays
2. Ball emerges, frighten on left & fear on right* (*counterbalanced)
3. Subject clicks ball

Test trials

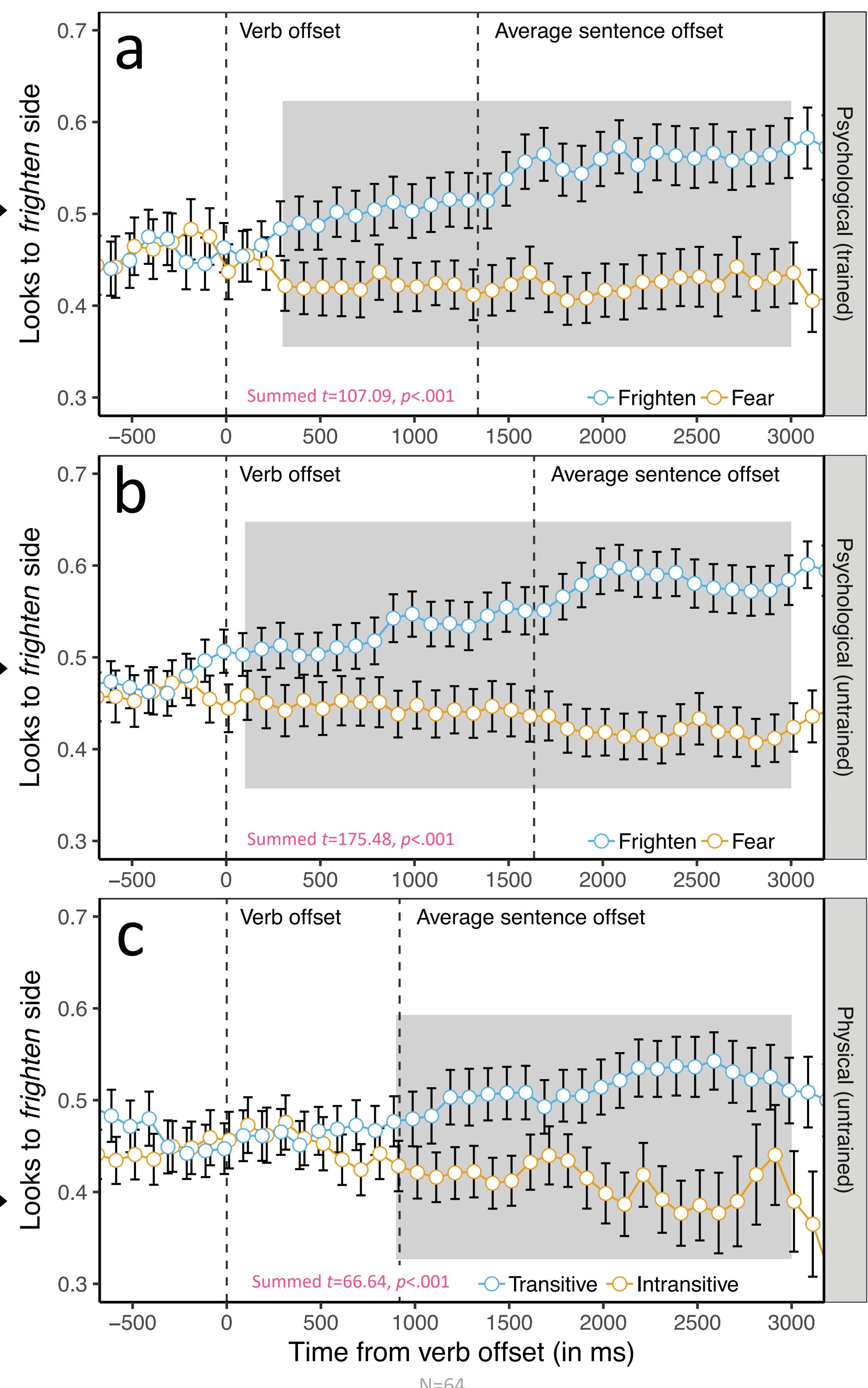
1. Ball goes in while sentence plays
2. Gray circles appear & subject clicks

Trial type	Description	Predictions
a	Psychological (trained)	Frighten ↑ Fear ↓
b	Psychological (untrained)	Frighten ↑ Fear ↓
c	Physical (untrained)	Causal ↑ Non-causal ↓

Analysis

1. Cluster-based permutation testing (Maris & Oostenveld, 2007)

3. Results



4. Discussion

- Participants learned to associate each side of the screen with the correct landing site for **trained psych verbs** & extended this rule to **untrained psych verbs & physical verbs**
 - ❖ I.e., when they heard a causal physical verb, participants looked more to the side of the screen associated with **frighten** verbs
- Our design allowed us to rule out a number of possible confounds: syntax, number of event participants, stativity, duration, animacy, valence, intentionality – ask me about them!
- These results provide evidence that **language relies on a representation of CAUSE that is broad enough to encompass both physical & psychological causation**
- This work **supports event decompositional approaches to semantic representation**: primitive predicates encode aspects of meaning that are *present in many different verbs*