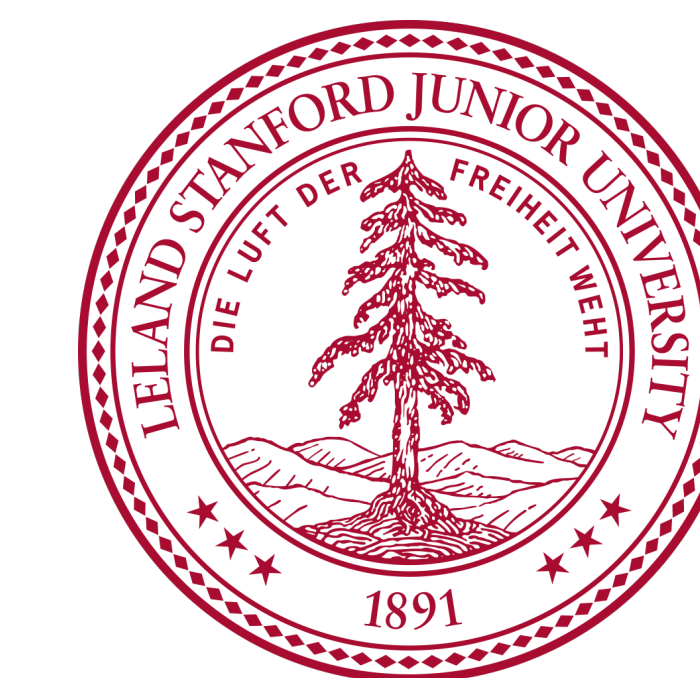


The Causative Alternation & Types of Causation

Phil Crone and Masoud Jasbi

Department of Linguistics, Stanford University



Introduction

English Causative Alternation:

- (1) The vase broke. (anticausative)
- (2) Phil broke the vase. (causative)

Types of Causation:

Two hypotheses about verbs' participation in the causative alternation:

- 1 *Internal vs. External* [1] (Hypothesis 1)
 - Verbs denoting internally caused eventualities do not lexicalize a notion of cause and lexicalize only one argument: patient.
 - Verbs denoting externally caused eventualities lexicalize a notion of cause and lexicalize two arguments: cause and patient.
 - Under certain conditions, it is possible to remove the cause through anticausativization. Both transitive and intransitive forms can be available.
 - No restriction on the type of causer.
- 2 *Direct vs. Indirect* [2], [3] (Hypothesis 2)
 - Alternating verbs lexicalize one argument: patient.
 - Transitive form is derived through causativization, which applies only if the cause is a direct cause.
 - Intransitive form is not available only when a change of state is properly contained within a causing act.

Question Does either Hypothesis 1 or Hypothesis 2 predict how the conceptualization of events will influence the argument structure of novel verbs?

Experiment 1

Design Participants ($n = 90$) watched 16 animations featuring a cell. In 8 animations a radioactive substance was also present. Participants were assigned to one of five experimental conditions, which differed with respect to the likelihood of the cell changing shape (“cheeming”) in isolation and when the external substance was present. Participants then indicated whether they thought the change was always internal to the cell, always caused by the radioactive substance, or internally caused with the substance making the change more likely.

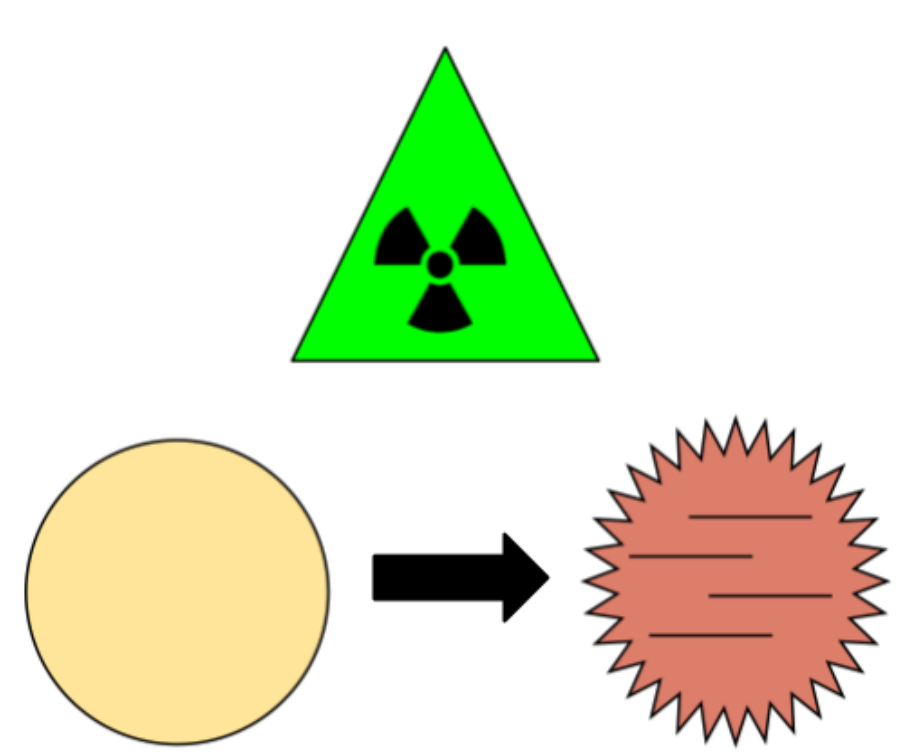


Figure 1: “Cheeming” with the radioactive substance present.

Participants rated 20 sentences for grammaticality on a 7-point scale. Each set of sentences featured intransitive, transitive, and periphrastic causative uses of “cheem.” For transitives and periphrastic causatives, variations with direct and indirect cause subjects were used.

Predictions

- 1 Participants who think the change is external will rate sentences with transitive “cheem” higher than those who do not.
- 2 Sentences with indirect cause subjects will receive lower ratings than those with direct cause subjects.

Results Responses were standardized for each participant. Wilcoxon signed-rank tests showed that ratings of sentences using transitive “cheem” did not differ based on participants' reported causal models (Internal: $M=0.538$, $Mdn=0.636$, Partially External: $M=0.534$, $Mdn=0.653$, External: $M=0.477$, $Mdn=0.596$, $p>0.10$ for all comparisons).

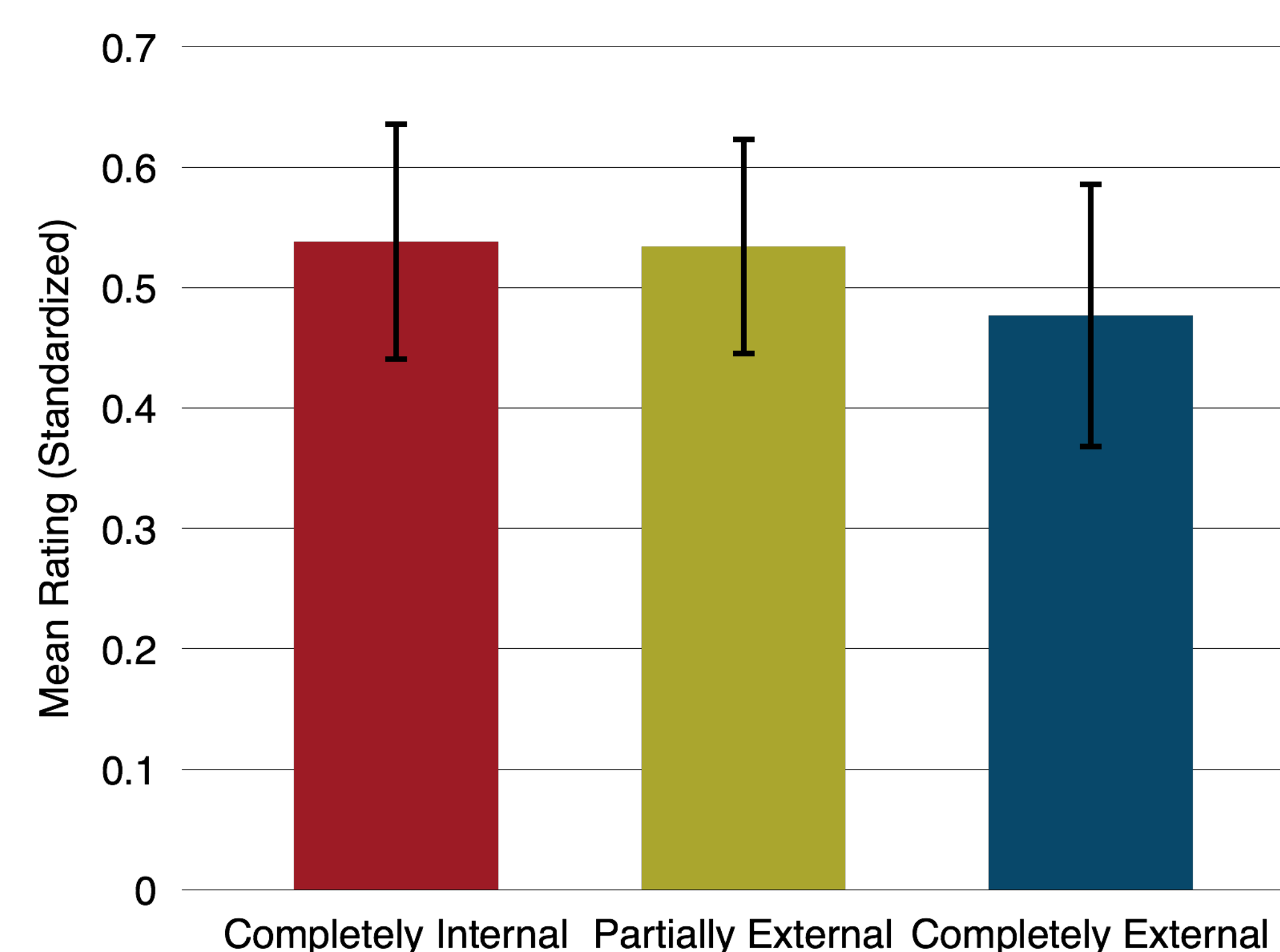


Figure 2: Mean ratings for sentences using transitive “cheem” by participants' reported causal models in Experiment 1.

Both transitive sentences with direct cause subjects ($M = 0.518$, $Mdn = 0.641$) and periphrastic causatives with indirect cause subjects ($M = 0.552$, $Mdn = 0.655$) differed significantly from grammatical controls ($M = 0.746$, $Mdn = 0.779$, $p < 0.001$ for both comparisons). Transitive sentences with indirect cause subjects ($M = 0.262$, $Mdn = 0.447$) differed significantly from transitives with direct cause subjects ($p < 0.001$) and periphrastic causatives with indirect cause subjects ($p < 0.001$).

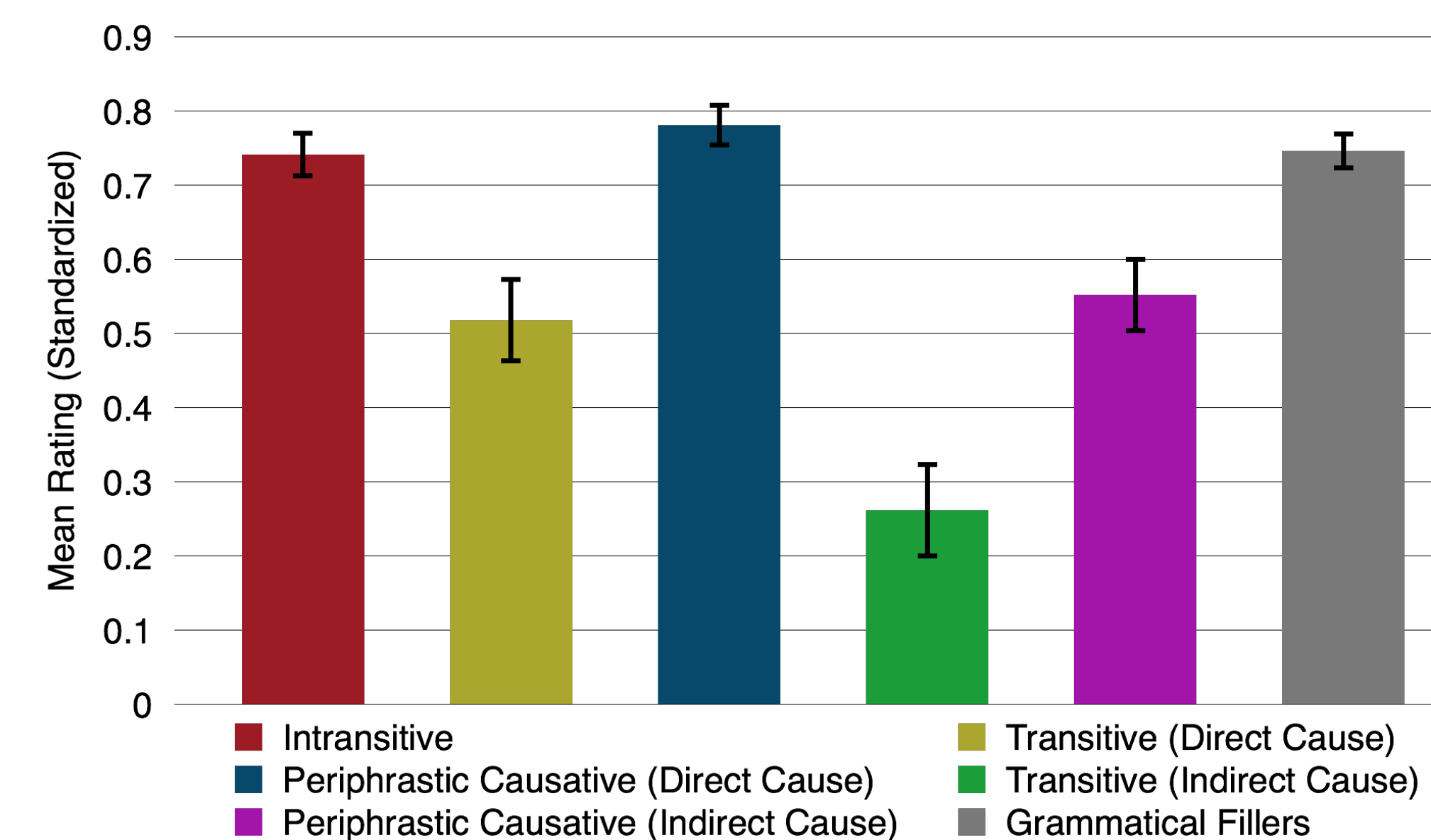


Figure 3: Mean ratings for different sentence types in Experiment 1, consistent with Hypothesis 2.

Experiment 2

Design Participants ($n = 150$) viewed 16 animations featuring three objects, one of which (Object 1) always transformed. In 8 animations, Object 1 transformed spontaneously (internal change). In 8 animations, a second object (Object 2) caused Object 1's transformation (external change). Participants judged how well a sentence described each animation using a 7-point scale. Each sentence used a different nonce verb to refer to Object 1's change; verbs were used intransitively, transitively, or in a periphrastic causative expression.

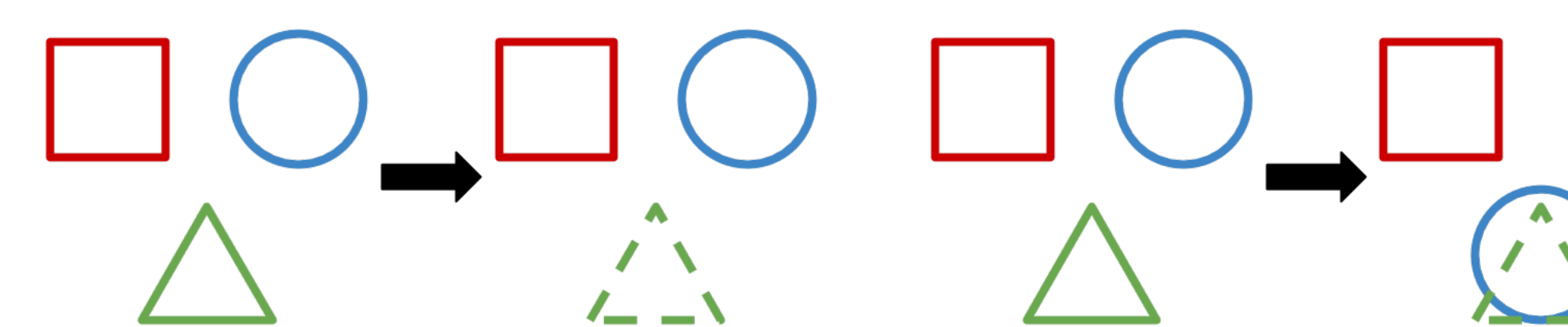


Figure 4: An example of internal change (left) and external change (right) animations in Experiment 2.

Prediction

- 1 Acceptability of a sentence with a transitive nonce verb will be greater when animation showed an external change rather than an internal change.

Results Ratings were standardized for each participant. Ratings of true transitive sentences for internal change animations ($M = 0.441$, $Mdn = 0.753$) were lower than those for external change animations ($M = 0.569$, $Mdn = 0.819$). Ratings of true periphrastic causatives were also lower for internal change animations ($M = 0.559$, $Mdn = 0.775$) than for external change animations ($M = 0.699$, $Mdn = 0.892$).

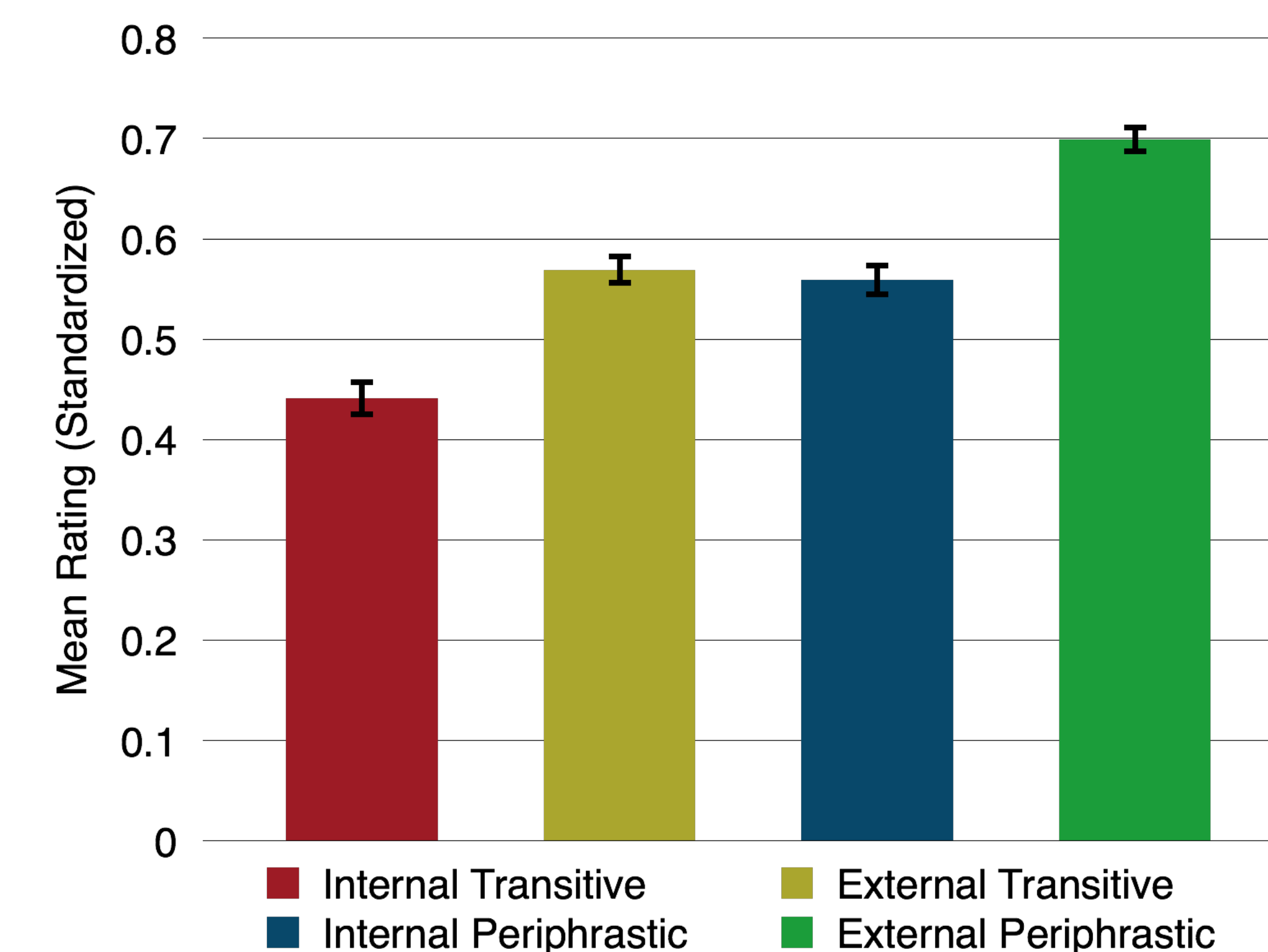


Figure 5: Mean ratings for sentence types given internal or external causation in accompanying animation.

Wilcoxon signed-rank tests showed that neither difference was significant ($p = 0.376$, $p = 0.243$).

Conclusion

Experiment 1 provided support for Hypothesis 2 (see Figure 3), but neither experiment provided support for Hypothesis 1. We do not draw a conclusion about Hypothesis 1 from these negative results, as there are factors associated with the internal/external cause distinction that were not tested in either experiment. We plan to investigate these factors more closely in future work.

References

- [1] Levin, B. and Rappaport-Hovav, M. (1995). *Unaccusativity*. MIT Press, Cambridge.
- [2] Wolff, P. (2003). Direct Causation in the Linguistic Encoding and Individuation of Causal Events. *Cognition*, 88(1):1–48.
- [3] Rappaport-Hovav, M. and Levin, B. (2012). Lexicon Uniformity and the Causative Alternation. In *The Theta System*, pp. 150-176. Oxford University Press, New York. See handout for additional references.

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Contact Information

- perone@stanford.edu
- masoudj@stanford.edu