

# Anticausatives are weak scalar expressions: Experimental evidence from Greek

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# **The semantic relation between causatives and anticausatives:**

**Q: How good are anticausative sentences in agentive scenarios?**

“The window broke.”

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Really?



# The semantic relation between causatives and anticausatives:

**Q: How good are anticausative sentences in agentive scenarios?**

“The boy shot a stone at the window and it broke.”



# The standard semantics of the causative alternation:

- (1) a. John opened the window.  
b. The window opened.
- On standard semantic analyses, **lexical causatives entail their anticausative counterparts** but not vice-versa (e.g., Parsons 1990, Levin & Rappaport 1995, Doron 2003, Reinhart & Siloni 2005, AAS 2006, Ramchand 2008):
  - This follows if the meaning of the anticausative is a subcomponent of the meaning of the causative:
- (2) a. [ [ x ACT ] CAUSE [ y BECOME < open > ] ] (Rappaport Hovav & Levin 1998)  
b. [y BECOME < open > ]
- (3) a.  $\lambda x \lambda y \lambda e \exists s. [\text{AGENT}(e, x) \ \& \ \text{CAUSE}(e, s) \ \& \ \text{OPEN}(s) \ \& \ \text{THEME}(y, s)]$   
b.  $\lambda y \lambda e \exists s. [\text{CAUSE}(e, s) \ \& \ \text{OPEN}(s) \ \& \ \text{THEME}(y, s)]$  (AAS 2015)

# Challenge for the standard semantics

- (1) a. John broke the window.  
b. The window broke.

## Predictions:

- > If the **causative (1a) is true**, the **anticausative (1b) is predicted to be true**, too.
- > If the **anticausative (1b) is false**, the **causative (1a) is predicted to be false**, too.

## Negation is downward entailing:

- > If a weaker expression is false, a stronger one is false, too.
- (4) #The soup is not warm and/but it is hot.

**Observation** (Koontz-Garboden 2009): Examples such as (5) are well-formed.

- (5) La ventana no se rompió, TU la rompiste! (Spanish)  
'The window didn't break, YOU broke it!'

<-The weaker **anticausative is negated (false)** and the stronger **causative is asserted (true)**!

# Rescuing the standard semantics

- Schäfer & Vivanco (2016): Negation in (5) is not used descriptively, but *metalinguistically*:

(6) The window didn't (just) break, (in fact) YOU broke it!

- When negation is used metalinguistically, the weaker expression can be negated and the stronger one asserted:

(8) The soup isn't (just) warm, (in fact) it is HOT!

- Informally, metalinguistic negation in (6/7/8) says that a weaker scalar expression does not suffice and should be replaced by a stronger alternative on the same scale:

< some, all >

< ..., warm, hot, ... >



## Rescuing the standard semantics:

- The causative alternation relates a *transitive* with an *intransitive* use of a root.
- Anticausatives (ACs) are weak **scalar expressions** forming scalar pairs with the causative counterparts:  $\langle \text{break}(y), \text{break}(x,y) \rangle$
- The AC-clause triggers (in certain contexts) the **scalar implicature (SI)** that the stronger causative alternative is not satisfied:

Assertion S: *The window broke.*

$\exists e \exists s. [\text{CAUSE}(e,s) \ \& \ \text{BROKEN}(s, \text{the window})]$

ALT(S):  $\exists e \exists x \exists s. [\text{AGENT}(e, x) \ \& \ \text{CAUSE}(e,s) \ \& \ \text{BROKEN}(s, \text{the window})]$

SI:  $\sim \neg \exists e \exists x \exists s. [\text{AGENT}(e, x) \ \& \ \text{CAUSE}(e,s) \ \& \ \text{BROKEN}(s, \text{the window})]$

Together with the assertion: *The window broke by itself.*

## Rescuing the standard semantics:

- (9) a. The window broke  
b. **SI:** NOT( $\exists x$ . x broke the window) (in certain contexts)

The metalinguistic negation targets the SI, preparing a correction:

- (10) a. The window didn't (just) break ...  
b. **NOT**(NOT( $\exists x$  broke the window))

- (11) ... YOU broke it!

# Scalar implicature: predictions and further assumptions

**Proposal** (Schäfer & Vivanco 2016):

Anticausatives trigger the **SI** that the stronger agentive causative alternative is not satisfied.

**Prediction:** Adults (and children) are expected to exhibit a similar behavior as they do with other scalar implicatures.

→ **Variability of judgments among adults**

→ Less computation of the SI with children than with adults.  
Children have been reported to show a non-adult-like behaviour with respect to SIs in certain contexts (Noveck 2001, Guasti et al. 2005, Foppolo et al. 2012, Katsos and Bishop 2011, Katsos et al. 2016 a.m.o.).

## Prediction: Variability of judgments among adults

Noveck (2001): two 'styles' of interpretation:

**Under 'logical' interpretations**, we judge the appropriateness of an utterance on the basis of its **truth-conditional content** only:

→ 'Logical' interpreters tend to accept *some giraffes have a long neck* (although it misleadingly triggers the SI *not all giraffes have a long neck*).

**Under 'pragmatic' interpretations**, we additionally require the defeasible inferences triggered by utterances in context to be fulfilled in order to classify an utterance as appropriate.

→ 'Pragmatic' interpreters tend to reject *some giraffes have a long neck* (although it is logically true).

## Prediction: variability of judgments among adults

- (9) a. The window broke  
b. SI: NOT( $\exists x$ . x broke the window) (in certain contexts)
- > 'pragmatic' interpreters should (tend to) accept the AC less often in a situation where the agentive causative mate is clearly satisfied than when it is not.
- > 'logical' interpreters should (tend to) accept the AC even in such a situation.

## Pilot experiment on Greek

Q: Is there evidence for the computation of a SI based on ACs in agentive context?

▪ We test the following conditions:

(I) a. **Unmarked anticausative – agentive scenario.** (implicature?)  
b. Unmarked anticausative – non-agentive scenario. (Control)

(II) a. Short passive causative – agentive scenario.  
b. Short passive causative – non-agentive scenario

- (IIa) controls that (Ia.) is not simply due to the absence of an overt agent NP.
- (IIb) checks whether short passives entail an agentive external argument.

## Pilot experiment on Greek: caveat

- In Greek, anticausatives can be unmarked or marked.
- Marked anticausatives are often ambiguous between an anticausative and passive interpretation.
- Thus, we tested unmarked anticausatives which also have an unambiguous passive form, e.g.

(12) a. i      valitsa      anikse.      *anticausative*

the suitcase opened.Past.3sg

b. i      valitsa      anix**tike**.      *passive*

the suitcase open.NAct.Past.3sg

## Pilot experiment on Greek: Design

- Truth value judgement task
- Material: pictures of playmobil scenes
- 2X2 design: 16 sentence-picture pairs (4 items per condition)

	No Agent Picture	Agent Picture
Unmarked anticausative	4	4
Passive	4	4

- Procedure:
  - Present picture (no agent/agent)
  - Present test sentence (anticausative or passive)(auditory)
  - Present Question: *Is [sentence] an appropriate description of [picture]?*
  - Push yes/no



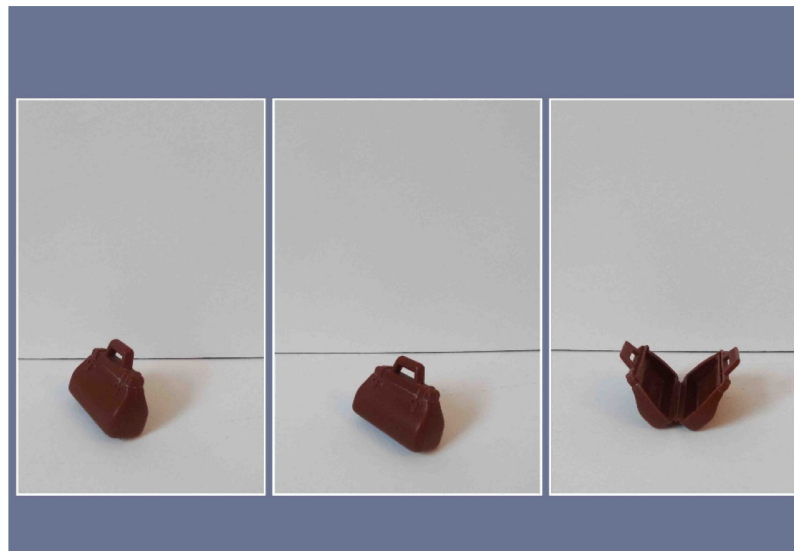
## Pilot experiment on Greek: Design

Unmarked AC	Passive	Interpretation
I valitsa anikse.	I valitsa anihtike.	The suitcase opened/was opened
To kuti eklise	To kuti klistike	The box closed/was closed
I kuvades adjasan	I kuvades adjastikan	The buckets emptied/were emptied
To trapezi katharise	To trapezi katharistike	The table cleaned/was cleaned

- *Within-subjects design*: The participants hear the same sentence both in the Agent condition and the No Agent condition.
- All participants heard the 8 sentences in both conditions (16 observations/participant).
- The items were pseudorandomized so that the same verb would appear only after several different items.
- 30 (after exclusion) participants recruited at the Aristotle University of Thessaloniki.
- 2nd version of E-Prime software (Schneider, Eschman, & Zuccolotto, 2002).

## Example: Anticausative – No Agent condition

*I valitsa anikse* 'The suitcase opened'



NO

YES

## Example: Anticausative – Agent condition

*I valitsa anikse* 'The suitcase opened'

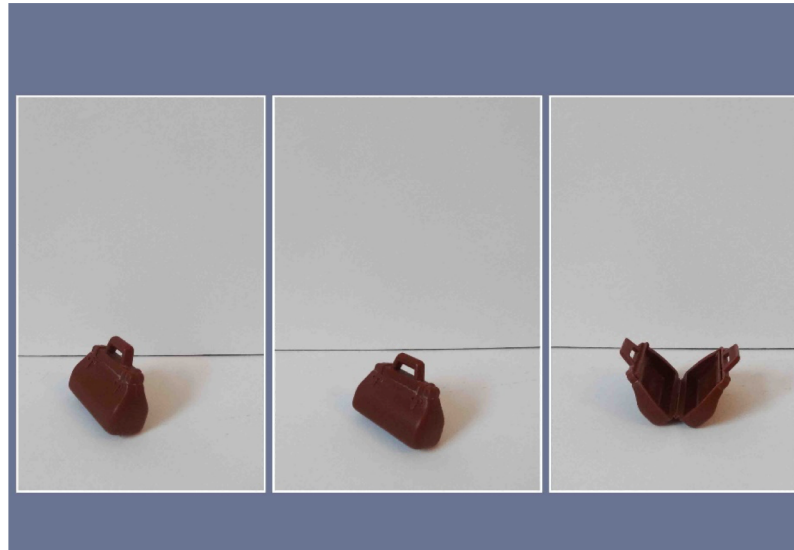


NO

YES

## Example: Passive – No Agent condition

*I valitsa anihtike* 'The suitcase was opened'



NO

YES

## Example: Passive – Agent condition






*I valitsa anihtike* ‘The suitcase was opened’



NO

YES

# Predictions

	No Agent scenario	Agent scenario
Unmarked AC		  Pragmatic vs. logical interpretation
Passive		

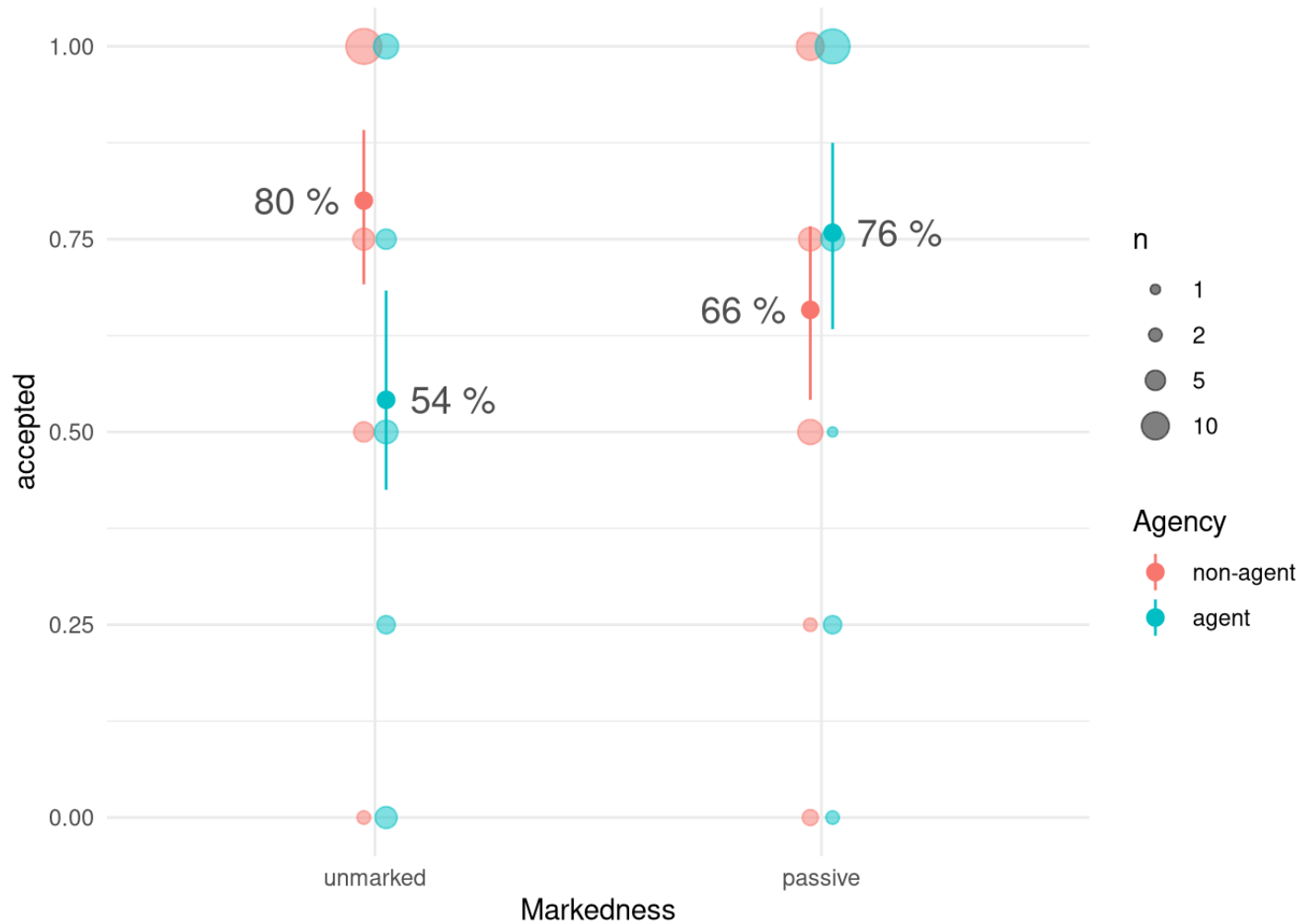
- **Unmarked AC:** We expect a difference in acceptability depending on the scenario.
  - **No Agent scenario:** Participants are expected to accept unmarked ACs
  - **Agent scenario:** a subset of speakers should reject unmarked ACs (Implicature)
- **Passive:** Given the interpretation of passive as involving an Agent we expect that
  - **Agent scenario:** participants will accept the passive
  - **No Agent scenario:** participants should in principle reject passive (BUT see below)

## Results: Overall comparison

- Our results confirm that Agency plays critical role in the acceptability.
- In the **Agent scenario**, the acceptability of unmarked ACs is significantly lower than in the **No Agent scenario**.
- By contrast, the effect of agency for the passive construction, although going in the expected direction, cannot be established with certainty.
- The relatively high acceptability of passives in the **No Agent condition** might be due to the particular experimental design with pictures:

The absence of an agent in the pictures does not exclude the possibility that participants still assume **a hidden agent**. Speakers tend to accommodate certain context in order to accept a sentence.

# Results



## Acceptability rate per condition

- The mean response of the participants is shown on the y axis
- The larger the blob, the higher is number of participants having this particular mean response
- The error bars are boot strapped confidence intervals as computed with the Hmisc R package (Harrell et al. 2019).



# Results

- We modeled the probability of acceptance with a generalized mixed model, as implemented in the glmer function within the R (R Core Team 2021) package lme4 (Bates et al. 2015).
- We excluded everyone who agreed more than half of the control false items and the participants who showed a very clear upward trend in their overall replies (total: 10/40 participants)
- The fixed part of the model takes both variables, Markedness and Agency into account, together with their interaction.
  - For Unmarked ACs the effect of Agency can be firmly established ( $p=0.0005$ ).  
In the No Agent condition, a lot of variability in the judgments, as expected.
  - For Passives, the difference between Agent – No Agent is not significant ( $p=0.06$ ).  
Here the evidence is clearly inconclusive, since we have a non-significant result with limited power.

## Discussion: Scalarity in unmarked ACs

- Our original hypothesis that unmarked ACs will be rejected by some speakers (pragmatic interpretation) in the agentive scenario is confirmed.
- In addition, there is large participant variation which is consistent with the hypothesis that adults vary as to whether they compute the implicature or not (see van Tiel et al. 2016).
- Importantly, a third of participants accepts unmarked ACs in the majority of cases in the agent condition. This is expected given that Unmarked ACs are *entailed* by their transitive counterparts.

## To do list

Q: Do speakers, languages and types of ACs differ?

In the long run, we would like to

- compare adults with children (cf. acquisition of SI and of passives).
- test French, German and Greek, because they show different aspects of Voice syncretism in the context of marked anticausatives

	German	Greek	French
Unmarked morphology	V: „Anticausative“	V: „Anticausative “	V: „Anticausative “
Marked morphology	V+SE: „Anticausative“ „Reflexive“	V-NACT: „Anticausative “ „Passive“ („reflexive“)	V+SE: „Anticausative “ “Passive“ „Reflexive“

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## Open issues: Implicature Computation & Alternatives

- The Passive/Active Causative counterparts of unmarked ACs are structurally more complex.
- Alternatives should not be more complex unless they are made contextually salient (see Fox & Katzir 2013).
- Speakers compute the implicature because the Causative/Passive is contextually explicit given the experimental design. Why?
  - In the same experiment, participants would also hear the passive counterpart.
  - Additionally a picture with a depicted agent may immediately activate the causative alternative.
- Follow-up study with in-between design (one group would only hear unmarked ACs and the other group only Causative or Passive).