Trivalence without Local Accommodation: Presupposition Projection from Attitudes

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Introduction and Key Points

> Presupposition projection out of quantified expressions has been problematic in terms of judgments: Heim (1983) assumes that presuppositions always project universally, but Chierchia (1995) and Chemla (2009) a.o. suggest that a more nuanced view is required.

> Fox (2013) (building on George 2010) maintains that a trivalent system based on a Strong Kleene logic, (2) and (3), makes correct predictions for presupposition projection out of quantifiers.

> We test presupposition triggers that occur in the scope of the attitude predicate *be certain*, considering the possibility that it is a universal quantifier over possible worlds: it is not a neg-raiser and it triggers an indirect scalar implicature under negation, (1).

> A quantificational approach predicts that *be certain* patterns with a generalized quantifier like *everyone*, (4a); instead, other approaches (such as the dynamic framework in Heim 1992) often assume universal projection for attitude predicates, (4b).

(1) Abigail isn't certain that Taro submitted late.
  ⇸ Abigail is certain that Taro didn't submit late.
  ⇝ Abigail considers it possible that Taro submitted late.

(2) Strong Kleene truth tables:

∧	T	F	#
T	T	F	#
F	F	F	F
#	#	F	#

∨	T	F	#
T	T	T	T
F	T	F	#
#	T	#	#

(3) **Projection out of a universal quantifier:**
The truth value of a formula $\forall x \in D\,[\phi(x)]$ is
  - T if $\phi(x)$ = T for all $x \in D$ (universal definedness projection for ϕ);
  - F if there is an $x \in D$ such that $\phi(x)$ = F (existential definedness projection for ϕ);
  - # otherwise (if there is an $x \in D$ such that $\phi(x)$ = # and no $x \in D$ such that $\phi(x)$ = F).

(4) Taro is certain that Aditi canoed again.
  a. Strong Kleene, after (3):
    - T if Taro is certain that Aditi canoed last time and this time.
    - F if Taro considers it possible that Aditi canoed last time and didn't this time.
    - # if Taro is either certain that Aditi didn't canoe last time, or that if she did canoe last time, she canoed this time, too.
  b. Universal Projection:
    - T if Taro is certain that Aditi canoed last time and this time.
    - F if Taro is certain that Aditi canoed last time and considers it possible that she didn't this time.
    - # if Taro considers it possible that Aditi didn't canoe last time.

The Experiment

This experiment aims at testing whether the participants' intuitions match the prediction of the Strong-Kleene-based system or rather a Heimian system for attitude predicates embedding a presupposition trigger where anything but universal satisfaction of the presupposition leads to presupposition failure (modulo local accommodation, cf. Heim 1983, Beaver & Krahmer 2001).

> Continuous trivalent truth-value judgment task   (cf. Križ & Chemla 2015)
> 2 × 4 design   (within-within; 48 items and participants)
  1. NEGATION: without vs. with matrix negation
  2. SCENARIO: true vs. false vs. undefined vs. critical
> The manipulation of the SCENARIO factor was encoded with a visual and a verbal component.
> Presupposition TRIGGER as a pseudo-factor: *stop* vs. *again* (between items, 24 each)

(completely false)   (neither completely true nor completely false)   (completely true)
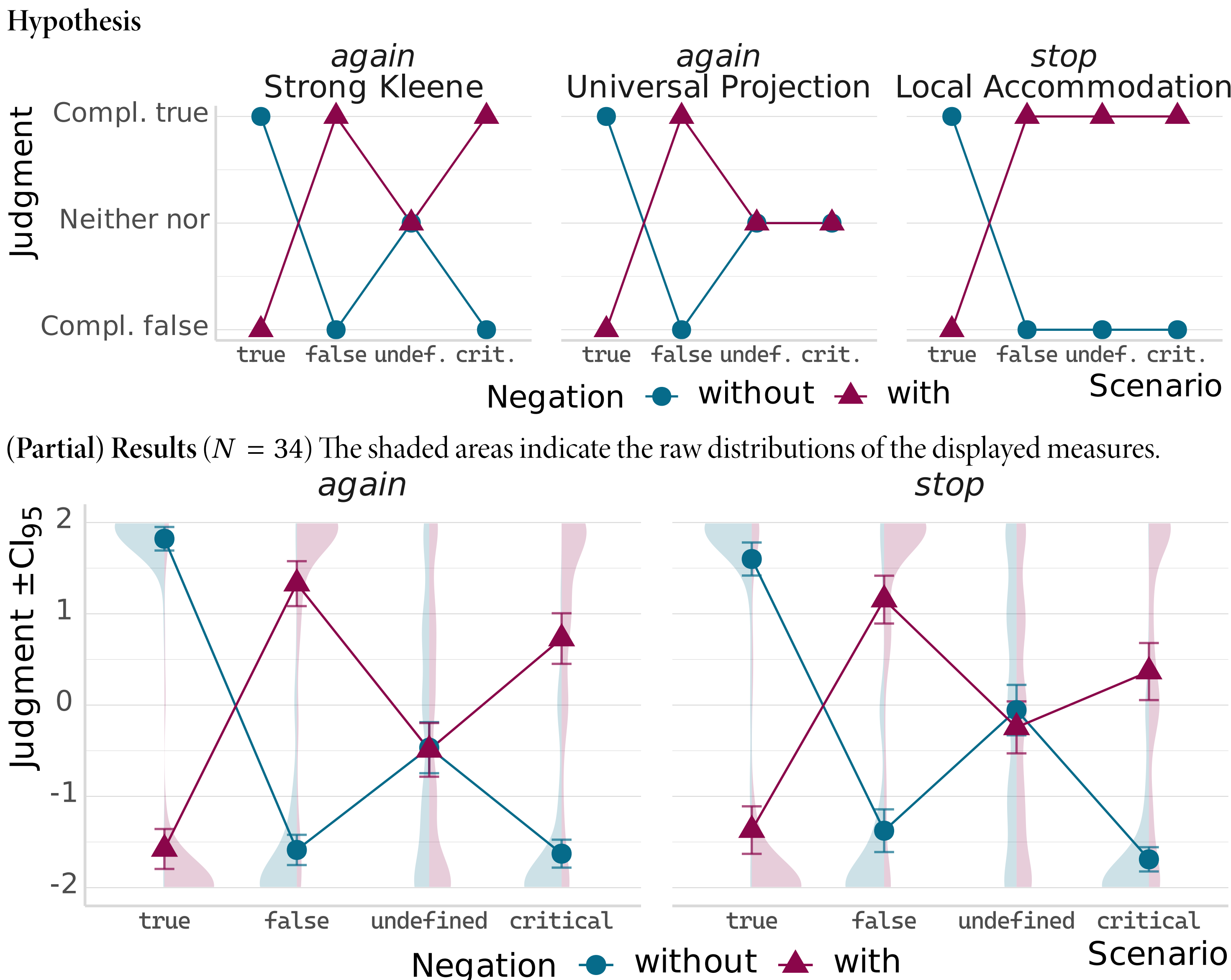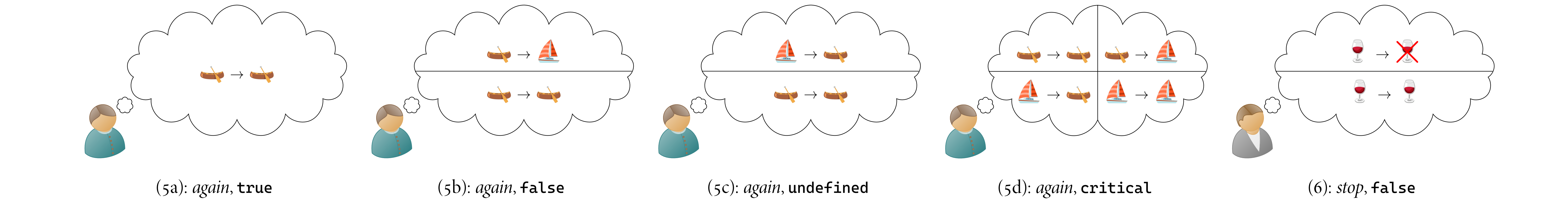(-2)   ▲   (2)

Materials (translated from German)

(5) NEGATION: without   TRIGGER: *stop*
  a. SCENARIO: true
    Peter: «I'm certain that Jan canoed last time, and I'm certain that Jan canoed this time.»
    Peter is certain that Jan canoed again.
  b. SCENARIO: false
    Peter: «I'm certain that Jan canoed last time, but I have no idea if this time, Jan canoed or not.»
    Peter is certain that Jan canoed again.
  c. SCENARIO: undefined
    Peter: «I have no idea if last time, Jan canoed or not, but I am certain that Jan canoed this time.»
    Peter is certain that Jan canoed again.
  d. SCENARIO: critical
    Peter: «I have no idea if last time, Jan canoed or not, and I have no idea if this time, Jan canoed or not.»
    Peter is certain that Jan canoed again.

(6) NEGATION: with   TRIGGER: *again*   SCENARIO: false
  Markus: «I'm certain that Sonja drank wine in the past, but I have no idea if now, Sonja drinks wine or not.»
  Markus is not certain that Sonja stopped drinking wine.

Hypothesis

Negation: without ● / with ▲

(Partial) Results

(*N* = 34) The shaded areas indicate the raw distributions of the displayed measures.

Negation: without ● / with ▲

To B or not to B?

> *Local accommodation* has been thought of as an operator that collapses Undefined and False:
$$[\![B]\!] = \lambda p_t \,.\, \text{T if } p = \text{T, F if } p \neq \text{T}$$

> It has been used to derive weaker projection patterns out of the scope of quantifiers (Fox 2013);

> *B* should be possible with soft triggers (*stop*), but not with hard triggers (*again*) (Abusch 2010);

> A parse with *B* for our undefined items would be pragmatically desirable because it would return True instead of Undefined in the presence of presupposition failure:
$$\text{NOT } (B) \text{ Markus certain } \lambda w\,.\,(B)[\text{Sonja stopped drinking wine in } w_{\text{Sonja drank wine in the past in } w}]$$

> Our results suggest that participants do not have access to such parses with *B*;

> Rather, they motivate a view where *local accommodation* is not an operator freely available to syntax, but a phenomenon restricted to certain semantically determined environments; such as the antecedent (restrictor), but not the consequent (scope) of a conditional;

> The predictions of Strong Kleene for presupposition projection seem to be correct for both soft and hard triggers (contra Charlow 2009).

Conclusions and Next Steps

> Our (preliminary) experimental results are better captured by a system where presuppositions project out of *be certain* as third values out of universal quantifiers in a Strong Kleene logic:
  > In the undefined scenario, the target sentences receive intermediate judgments for both factor levels of NEGATION;
  > Instead, in the critical scenario, NEGATION affects the judgment: without negation, sentences are judged as false; with negation, they receive a higher truth value;
  > The critical scenario patterns more like false than undefined, thus giving support to the prediction of Strong Kleene; instead, generalized universal projection does not explain the contrast between undefined and critical;
> Modals like *be certain* can be treated as quantifiers over possible worlds that behave like quantifiers over entities (cfr. Fox 2013) also in terms of presupposition projection.

> We plan on exploring related research questions using a similar methodology:
  > Can the presupposition projection pattern predicted by Fox (2013) be observed with the same design for quantifiers over entities? (true scenario not shown below)
  (7) All the men stopped drinking wine.

false   undefined   critical

◈ **Abusch**, D. 2010. Presupposition triggering from alternatives. *J. Semant.* 27(1). 37–80. ◈ **Beaver**, D. I. & **Krahmer**, E. 2001. A partial account of presupposition projection. *Journal of Logic, Language and Information* 10(2). 147–182. ◈ **Charlow**, S. 2009. "strong" predicative presuppositional objects *Proceedings of new directions in the theory of presupposition, esslli*. ◈ **Chemla**, E. 2009. Presuppositions of quantified sentences: experimental data. *Nat. Lang. Semant.* 17(4). 299–340. ◈ **Chierchia**, G. 1995. *Dynamics of meaning: Anaphora, presupposition, and the theory of grammar*. ◈ **Fox**, D. 2013. Presupposition projection from quantificational sentences: trivalence, local accommodation, and presupposition strengthening *From grammar to meaning*, 201–232. ◈ **George**, B. 2010. A new case for an old logic: reviving strong Kleene approaches to presupposition projection. Unpublished ms. UCLA. ◈ **Heim**, I. 1983. On the projection problem for presuppositions *WCCFL 2: Second Annual West Coast Conference on Formal Linguistics*, 114–125. ◈ **Heim**, I. 1992. Presupposition projection and the semantics of attitude verbs. *J. Semant.* (9). 183–221. ◈ **Križ**, M. & **Chemla**, E. 2015. Two methods to find truth-value gaps and their application to the projection problem of homogeneity. *Nat. Lang. Semant.* 23(3). 205–248.

(5a): *again*, true   (5b): *again*, false   (5c): *again*, undefined   (5d): *again*, critical   (6): *stop*, false