

A VERBAL ILLUSION WITHOUT THE VERB: DERAILED COMPOSITIONAL INTERPRETATION IN SENTENCE COMPLETIONS

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INTRODUCTION

- Wason & Reich (1979) observed that (1) is usually misinterpreted to mean *Treat all head injuries, no matter how trivial*:

(1) No head injury is too trivial to be ignored.

Compositional meaning:

*Ignore all head injuries, no matter how trivial**

* Compare: No missile is too small to be banned (→ ban all)

- Wason & Reich speculated that the illusion is due to **negation overload at the verb**:

<i>no</i> +	(global negation)
<i>too</i> +	(too x to y → ¬ y)
<i>trivial</i> +	(≈ ¬ serious)
<i>ignore</i>	(≈ ¬ treat)



- Paape & Vasishth (2017) found some eye tracking evidence consistent with the verb being the locus of the illusion
 - Effect found at final region of the sentence could be due to spillover/wrap-up
- O'Connor (2015) also observed the illusion in sentence completions when no verb was present
- The current experiment aims to find further evidence for an illusion effect in production, using two different coding schemes for cloze responses

THE EXPERIMENT

- Single factor design: Double negation (DEPTH CHARGE) versus single negation (CONTROL)

Global negation, Adjectival negation (DEPTH CHARGE)

Keine Kopfverletzung ist zu ungefährlich, um ...
No head injury is too un-dangerous to

No global negation, Adjectival negation (CONTROL)

Manch eine Kopfverletzung ist zu ungefährlich, um ...
Some a head injury is too un-dangerous to

- 32 items, 60 subjects
- Cloze response, preamble reading time, completion time recorded

Response coding

- Coders are blind to experimental manipulation as preamble is not shown to them
- Scheme A** (9 coders, 3 per list): Cloze response pasted into template with singular subject, e.g. *A head injury* → ignore it / treat it
Question: Is the subject considered to be of importance/consequence?
→ Matches intuition of Wason & Reich (1979), Kizach et al. (2015) that there is a class of verbs that create or signal the illusion
- Scheme B** (12 coders, 4 per list): Cloze response pasted into template without negation, quantification, e.g. *This head injury is too dangerous to* be ignored / # be treated
Question: Is the sentence sensible?
→ Matches intuition that the illusion meaning is pragmatically normalized, negations ignored

PREDICTIONS

- If the illusion appears in production: More unimportance-signaling / normalized completions in DEPTH CHARGE than in CONTROL condition
- If subjects are reliably led astray as opposed to merely being confused: Proportion of unimportance-signaling / normalized completions in DEPTH CHARGE condition > 0.5

RESULTS

- Inter-coder agreement higher for Scheme A (Fleiss' κ : 0.77, 'substantial agreement') than for Scheme B (Fleiss' κ : 0.49, 'moderate agreement')
- Completion types across coding schemes κ correlated at the observation level ($r = 0.52$, 95% interval: [0.51, 0.53])
- Illusion is relatively stable across items/subjects (but note exceptions):

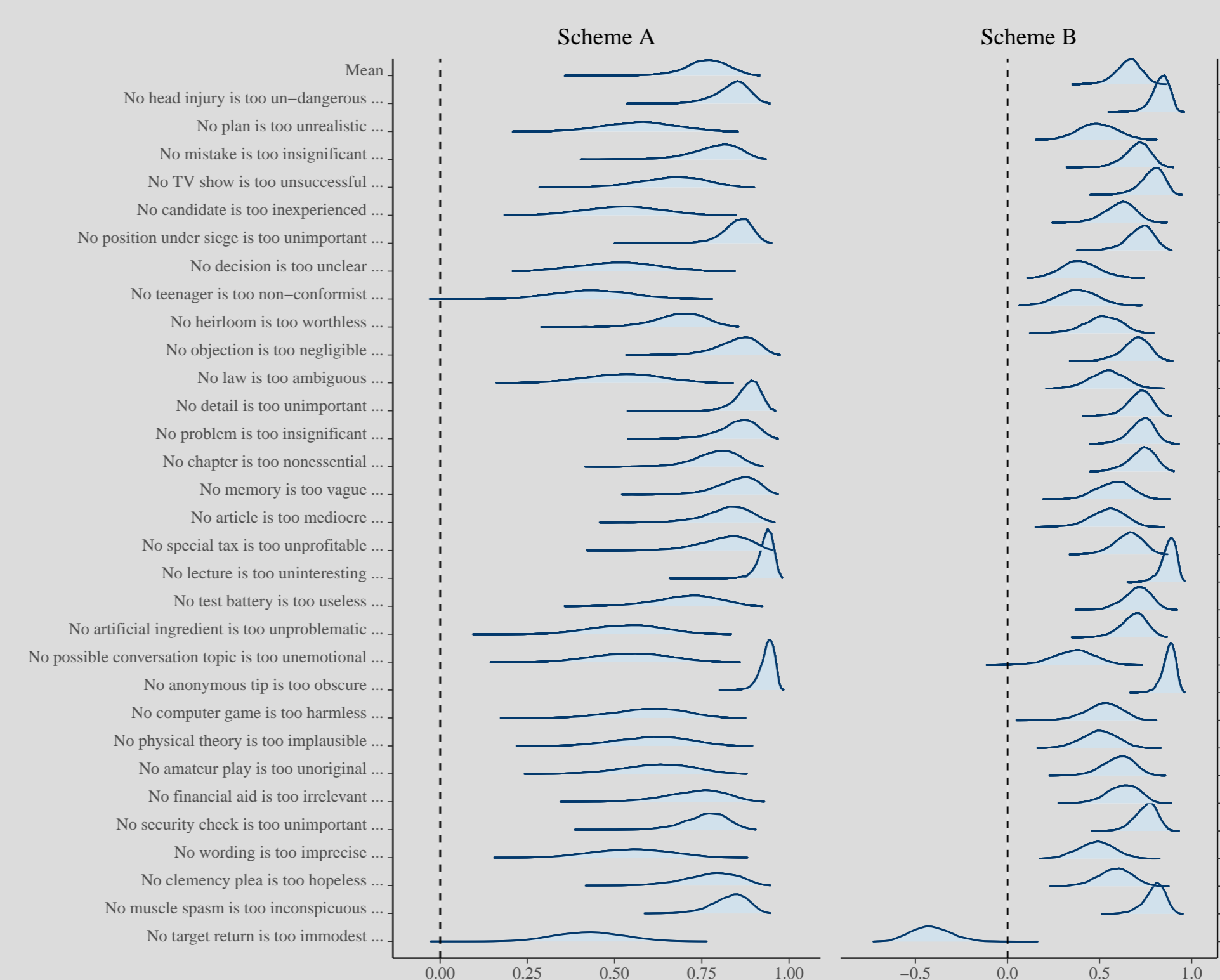


Figure 1: Difference in proportion of 'illusion' trials between conditions by item

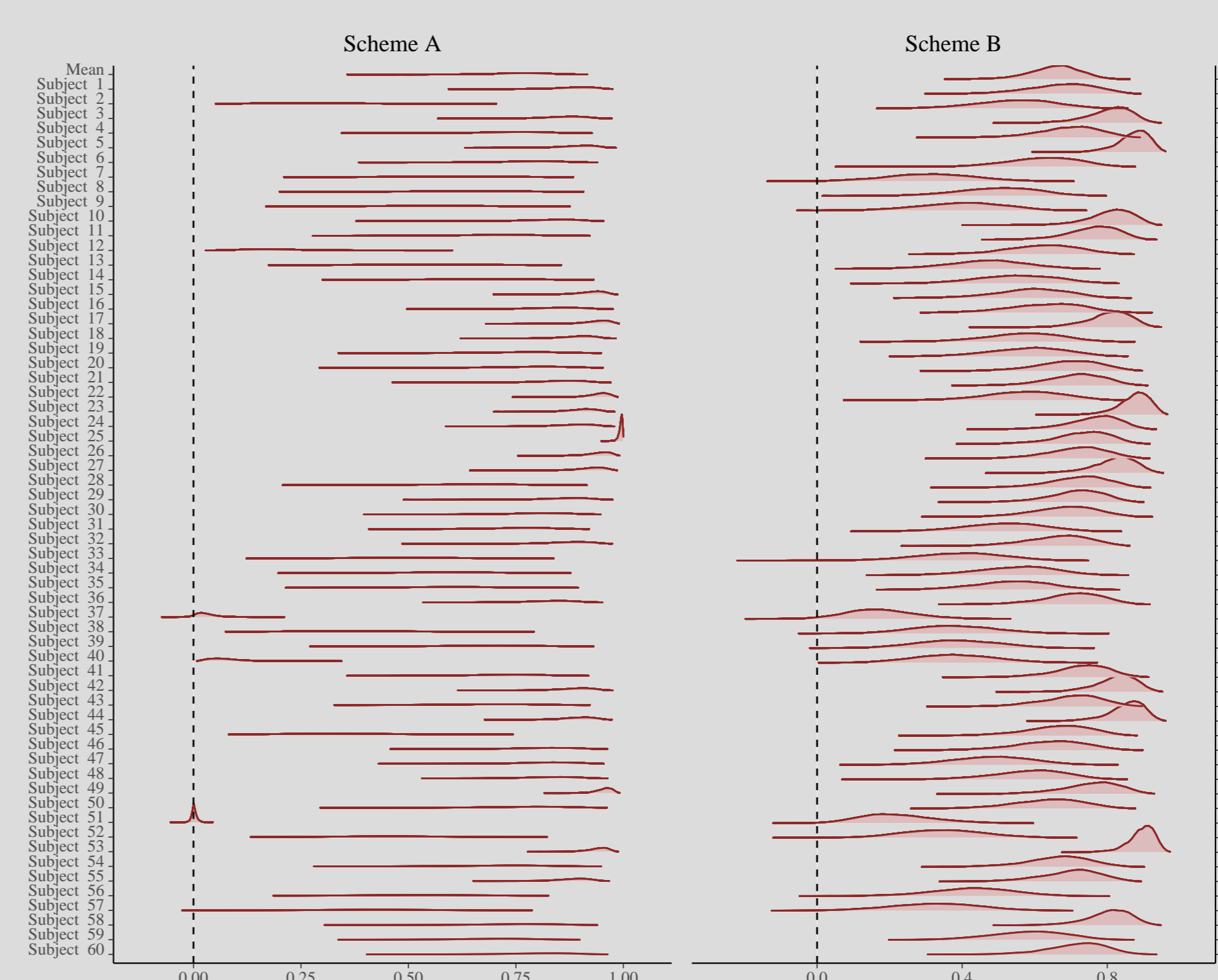


Figure 2: Difference in proportion of 'illusion' trials between conditions by subject

- Scheme A: Higher proportion of 'illusion' trials in DEPTH CHARGE versus CONTROL condition ($b = 0.77$, CrI: [0.65, 0.86], $\Pr(\beta > 0) \approx 1$)
- Scheme B: Higher proportion of 'illusion' trials in DEPTH CHARGE versus CONTROL condition ($b = 0.67$, CrI: [0.51, 0.78], $\Pr(\beta > 0) \approx 1$)
- Posterior means in DEPTH CHARGE condition:
 - Scheme A: **0.78** CrI: [0.66, 0.86]
 - Scheme B: **0.74** CrI: [0.62, 0.82]
- No evidence of condition affecting reading or completion times

DISCUSSION

- Results indicate that the depth charge illusion is triggered before the lexical verb appears
- Expectation for anomalous verb is reliably generated in depth charge sentences
- Mechanism still unclear:

Account A

Compositional processing fails at *too trivial*, normalized expectation is triggered as a result

→ Similar failures are expected for other cases of multiple negation

Account B

too embedded under *no* is inherently ambiguous between a 'negative' and a 'positive' reading (Cook & Stevenson, 2010; Fortuin, 2014)

→ Meaning reversal would not necessarily be expected to generalize