MEANING REVERSAL IN MULTIPLY NEGATED SENTENCES — NEW EVIDENCE FROM TWO TASKS

DARIO PAAPE, SHRavan VASiSHTH
University of Potsdam
paape@uni-potsdam.de

INTRODUCTION

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

\[
(1) \text{No head injury is too trivial to be ignored.}
\]

- Compositional meaning:
  Ignore all head injuries, no matter how trivial

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

\[
\begin{align*}
\text{no} & + \quad \text{(no + (global negation))} \\
\text{too} & + \quad \text{(too x to y \rightarrow \neg y)} \\
\text{trivial} & + \quad \text{(\neg serious)} \\
\text{ignore} & + \quad \text{(\neg treat)}
\end{align*}
\]

- Paape & Vasishth (2017) found some eye tracking evidence consistent with the verb being the locus of the illusion

O’Connor (2015) also observed the illusion in sentence completions when no verb was present — Experiment 1 aims to find further evidence for an illusion effect in production, using two different coding schemes for cloze responses

Fortuin (2014) argues that No X is too Y to Z is a conventionalized construction that licenses the inverted meaning – Experiment 2 also investigates closely related constructions

EXPERIMENT 1 – DESIGN

- 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

EXPERIMENT 1 – RESULTS

- Inter-coder agreement higher for Scheme A (Fleiss’ κ = 0.77, ‘substantial agreement’) than for Scheme B (Fleiss’ κ = 0.49, ‘moderate agreement’)

- Scheme A: Higher proportion of ‘illusion’ trials in DEPTH CHARGE versus CONTROL condition (b = 0.77, CrI: [0.65, 0.86])

- Scheme B: Higher proportion of ‘illusion’ trials in DEPTH CHARGE versus CONTROL condition (b = 0.67, CrI: [0.51, 0.78])

- Posterior means in DEPTH CHARGE condition:

  - Scheme A: 0.78, CrI: [0.66, 0.88] – Scheme B: 0.74, CrI: [0.62, 0.82]
  - No evidence of condition affecting reading or completion times

EXPERIMENT 2 – DESIGN

- 3 x 2 design: Construction (3 levels) x Negation (2 levels)

  Global negation, Adjectival negation (DEPTH CHARGE)

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

  No global negation, Adjectival negation (CONTROL)

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

- 30 items, 60 subjects
- Whole-sentence reading time, rating time, sensibleness rating (1-7 scale) recorded

EXPERIMENT 2 – RESULTS

- Reading times: Compared to too . . . to, increased for too . . . as that (b = 1144 ms, CrI: [1114, 1174 ms]) and so . . . that (b = 1144 ms, CrI: [1114, 1174 ms]); so . . . that x negation interaction (b = 969 ms, CrI: [956 ms, 1754 ms])

- Sensibleness ratings: Higher in DEPTH CHARGE condition for baseline too . . . to construction (b = 3.12, CrI: [2.54, 3.62]); compared to too . . . to, lower for too . . . as that (b = 0.36, CrI: [-0.69, -0.02]) and so . . . that (b = -1.44, CrI: [-1.78, -1.08]); so . . . that x negation interaction (b = -2.5, CrI: [-3.13, -1.82])

DISCUSSION

- Experiment 1 suggests that the verb is not the trigger of the depth charge illusion
- Experiment 2 suggests that the illusion generalizes to related constructions, as long as the particle too is present
- Proposal: Illusion may be due to interpreting either too many (too un-dangerous to not ignore) or too few (un-dangerous enough to ignore) negations in the presence of implicit negation (too X Y \rightarrow \neg Y

References:

Created with 8000 𝑡𝑜𝑜 . . . 𝑉𝑒𝑛𝑑 𝑡𝑜𝑜 . . . 𝑎𝑠 𝑡ℎ𝑎𝑡 𝑠𝑜 . . . 𝑡ℎ𝑎𝑡

Rating times