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Matter Orders: Structural cues affect readers' interpretations independently of word choice

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Extended Abstract

Communication often involves discussing caveats. Researchers must report both their main result and the limitations of their approach. Writing honestly about a complex world requires experts to navigate both good news and bad news. Much of our theory around discourse focuses on the words themselves. For example, the writer's judgments, opinions, and commitments — called *stance* — have been considered through the impact of specific words [1]. Likewise, the discussion of caveats in scientific research articles has been analyzed through hedging words, including modal verbs (*would, might*) and epistemic lexical verbs (*suggest, indicate*) [4]. Yet these models of stance and caveats as issues of word choice cannot account for sentences that contain identical words:

1. Although they aren't perfect, masks reduce the risk of COVID-19.
2. Although they reduce the risk of COVID-19, masks aren't perfect.

Although these sentences contain identical information, they may well be interpreted differently: (1) acknowledges a limitation before emphasizing a strength, while (2) admits a benefit, now relatively minor, before focusing on the real story of limitation. Placing information at the end of a sentence appears to add emphasis. In addition to varying *end placement*, these sentences also vary which information appears in the *main clause*. To control for this cue, we can separate the main clause and move it earlier:

3. Masks aren't perfect, although they reduce the risk of COVID-19.
4. Masks reduce the risk of COVID-19, although they aren't perfect.

Here too, the sentences differ from each other, and also from the previous two sentences, even though all four of them contain identical data and words. This effect has been considered theoretically [3], arguing that both versions now communicate *ambiguity*, as if the author is still weighing the evidence and figuring out what to recommend, or shifting the burden of decision-making to the reader. Although this is the effect readers may experience, perhaps it is not the author's intention. We can understand these interpretations by considering how (1) and (2) use main clause together with end placement to reinforce the same message, while (3) and (4) split the instructions. Figure 1 shows a visualization of this structural analysis.

Yet as several studies have demonstrated, assumptions about readers' behaviors are frequently contradicted [5], highlighting the need to test assumptions about readers' responses using populations of readers [2]. Here we investigate the impact of main clause and end placement empirically with a preregistered survey on Amazon Mechanical Turk ($N = 260$ after dropping responses that admitted to answering randomly). Participants reviewed statements with caveats about a character, and asked how they feel about him. Responses were constrained to a

thumbs-up or thumbs-down emoji, replicating [3]. These questions are repeated for both their own and the authors' perspectives, i.e., "what do *you* think about Fred," and "what does *the author* think about Fred." The design is fully counterbalanced with stimulus sampling across dimensions of **end placement** (good vs. bad news in the end of the statement), **main clause** (good vs. bad news in the main clause), **atrociousness** (character is rude vs. engages in animal cruelty [3]), **character names** (Mark vs. Fred), and **coordinating conjunction** (but vs. although). The experiment interface is shown in Figure 2.

Preliminary results (Figure 3) show that participants' own support for the character was agnostic to the main clause and end placement options examined, and can be attributed to the atrociousness of the bad news. However, participants' perception of the author's support was significantly impacted by main clause and end placement; structural adjustment did not change participants' minds about the character, but it *did* change their minds about the author. The raw effect of this is starkest in the high-atrociousness case, where the most concordant description of the character has close to 81% perceived author support, vs. the least concordant case, reaching only 20%. The low-atrociousness case sees a similar trend covering a smaller domain. These data suggest that structural choice made when presenting caveats is interpreted to say more about the author than the underlying data. Up to 61% points of difference are attributable to these two structural cues alone.

This work extends previous theoretical considerations of the influence of structure in a few ways. First, assumptions about readers are now empirically tested. Previously, readers were shown all four examples and allowed to compare them; here readers are shown only one example at random. Previously, readers were asked to *either* judge the subject of the sentence *or* consider the position of the author, which conflates persuasion with stance. We explicitly separate these tasks, and find a significant difference (Figure 3). Previous examples used the word "but", which confounds the effect of structure by introducing a new word and creating a coordinating conjunction. Here, we rewrote examples from [3] to isolate the effect of structure. The theoretical example is memorable in part because it is so appalling; we add an example with more balanced good news and bad news — being "honest" and being "rude" — in order to examine the effects of atrociousness.

These preliminary data suggest that readers perceive stance not only through words, but also through structure. Even within a single sentence, structural cues operate independently of word choice, functioning as a secondary channel of information. By attending to structure, writers can become more aware of how stance is embedded into text — sometimes unwittingly — and thereby signal support more intentionally.

References

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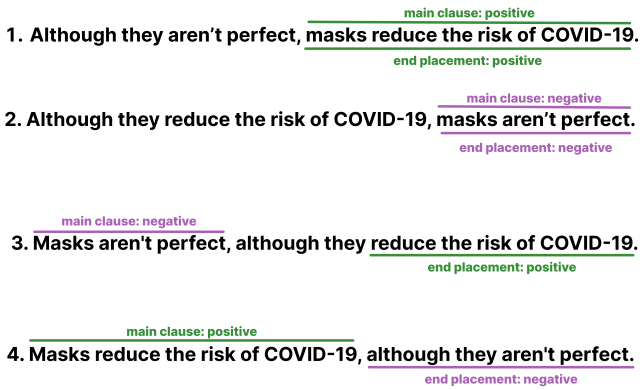

Figure 1: Sentences with identical words may communicate different messages by varying end placement and main clause.

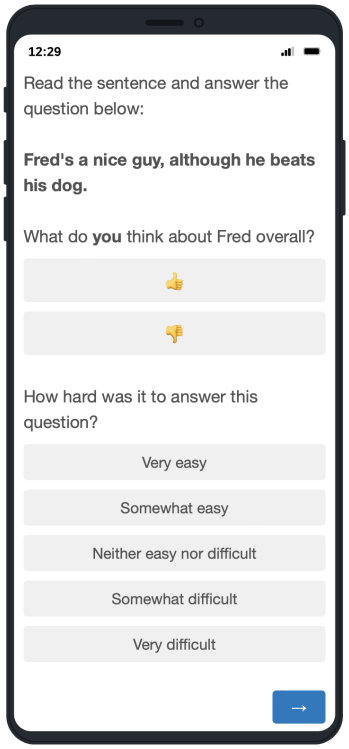

Figure 2: The survey experiment interface

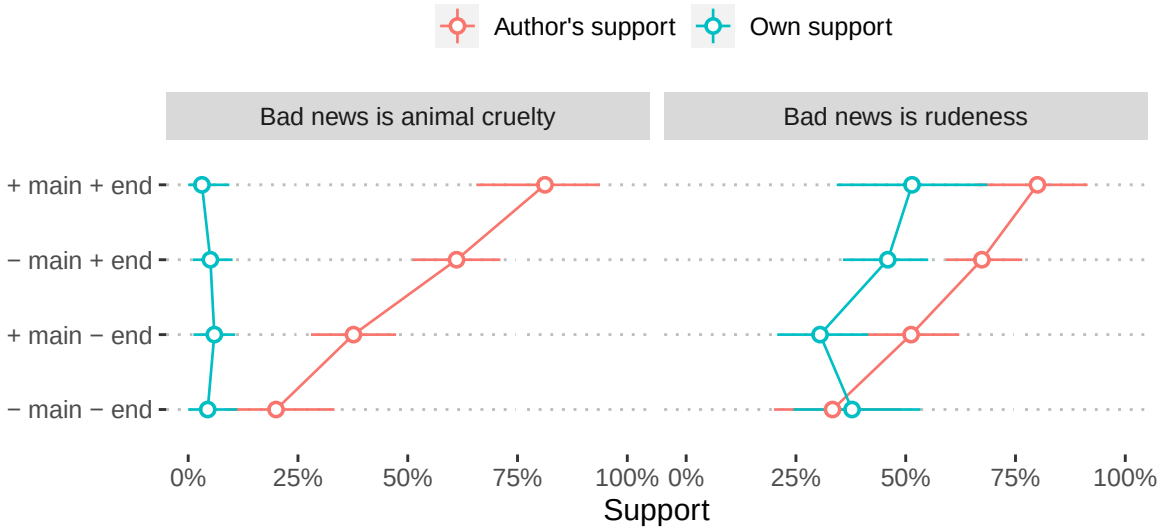

Figure 3: Participants' own support and perception of author's support for statements, indicating bootstrapped means and 95% compatibility intervals. **Animal cruelty** examples are variations of, "Although Fred's a nice guy, he beats his dog," modified from [3]. **Rudeness** examples are less atrocious: "Although Fred's an honest guy, he is often rude."