Polarity Illusions are Quantifier Illusions

Wesley Orth (Northwestern University), Masaya Yoshida (Northwestern University), Shayne Sloggett (University of York)
worth@u.northwestern.edu

Introduction: We report the results of a series of studies on the processing of polarity items (PIs). These results show that polarity illusions extend far beyond negative polarity items (NPIs), encompassing positive polarity items (PPIs) and polarity sensitive elements like tag questions. In addition, we show that illusions are selectively triggered by negative quantifiers, and other negative elements do not trigger illusions. We propose this pattern of results motivates a shift from models which do not behave uniformly across dependency types and towards models which build and edit syntactic structures online. We further propose that quantifier raising is a syntactic process uniquely suited to capture the distribution of polarity illusion.

Study 1: The first series of experiments looks at processing for NPIs. Negative polarity items (NPIs) are known to give rise to "illusions of grammaticality" [1-3]. NPIs are licensed when c-commanded by a negative element such as ***no*** [4] as illustrated in (1-2). However, sentences like (3), where the NPI is not c-commanded by the negative element, are rated as more acceptable and shows improved reading times compared to (2). Cue-based retrieval theories suggest that this illusion arises when comprehenders erroneously access a syntactically illicit negative element to license a given NPI [2].

1. ok/* **No** hunter who the fisherman respected will ever/still shoot a bear.
2. */ok The hunter who the fisherman respected will ever/still shoot a bear.
3. ?/? The hunter who **no** fisherman respected will ever/still shoot a bear.

In a series of speeded acceptability experiments we tested the negative elements: ***no***, ***not***, ***didn't***, ***never***, ***not a single***, and NPI licensing verbs. We find that only ***no*** and ***not a single***, trigger illusion and do so regardless of their depth in the relative clause (Figure 1).

Study 2: These experiments asked whether PPIs also give rise to polarity illusions. PPIs, like *still*, are ungrammatical when c-commanded by negation (1-2) [5-6]. As this is an anti-licensing condition, cue-based retrieval models predict no illusion effect, since retrieval cannot target the absence of a feature [7]. In an offline acceptability judgement study, we find that inaccessible negation decreases the acceptability of PPIs (Figure 2). In a followup eye-tracking study we also find evidence of an illusion of ungrammaticality for PPIs, which occurs contemporaneously with the illusion of grammaticality for NPIs (Figure 4). Finally, in a speeded acceptability judgement study we find that ***didn't*** does not give rise to PPI illusion (Figure 3). These findings suggest that both polarity-based licensing (NPI) and anti-licensing (PPI) dependencies are subject to illusions of (un)grammaticality, and that these illusions are selectively driven by negative quantifiers.

Study 3: The final study examines the behavior of tag questions in the same environment that gives rise to illusions for NPI and PPI. Tag questions are merely sensitive to polarity, but not strictly licensed or anti-licensed by it [8-10]. In a speeded acceptability experiment, we find an illusion such that positive sentences with a negative tags are rated significantly worse when ***no*** is present in the relative clause (Figure 5). In a follow up study we also find that ***didn't*** in the relative clause does not give rise to this illusion (Figure 6). These results underscore the previous findings.

Conclusion: Polarity illusions are ubiquitous across dependencies. Polar items which are licensed, anti-licensed, or not strictly licensed by c-commanding negative operators are nonetheless sensitive to structurally illicit negative elements. Illusions for PPI and tag questions are at odds with current cue-based implementations of polarity licensing. Moreover, we find that negative quantifiers are uniquely responsible for these illusions, suggesting a role for quantifier raising as a potential explanation that can apply across uniformly across polarity dependencies.

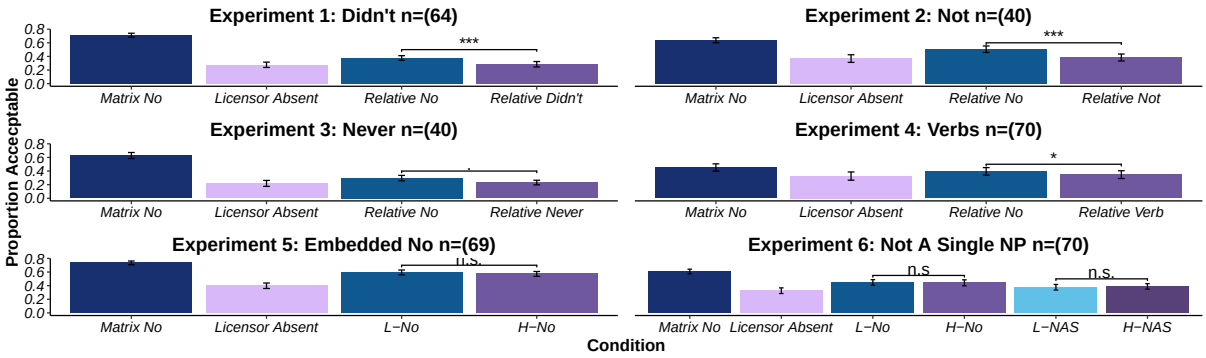

Figure 1: NPI illusion with negative licensors

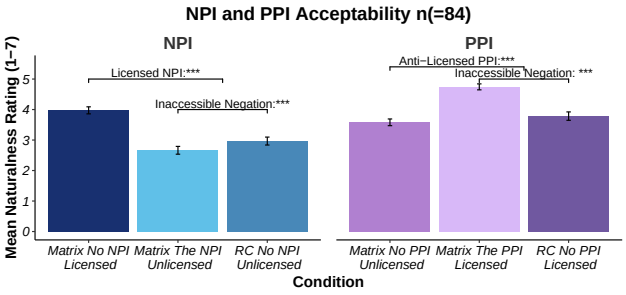

Figure 2: PPI illusion likert judgement

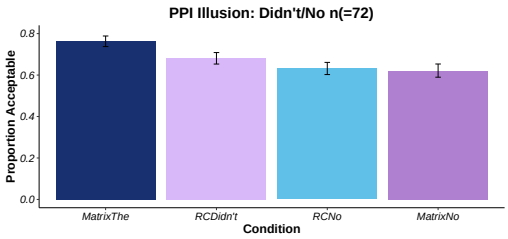

Figure 3: PPI illusion ***no*** vs. ***didn't***

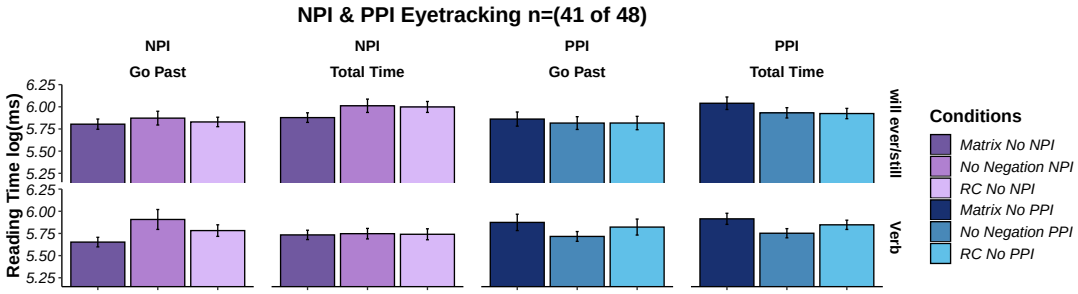

Figure 4: PPI illusion eye-tracking

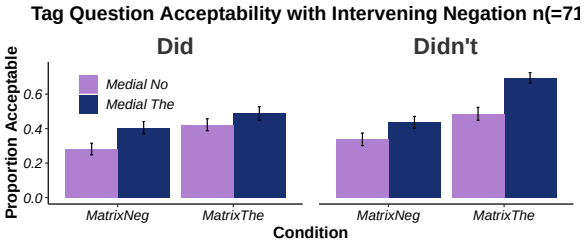

Figure 5: Tag Q illusions

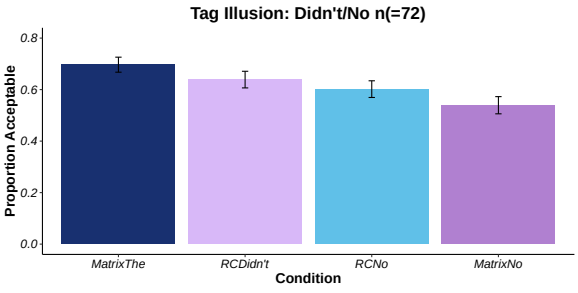

Figure 6: Tag Q illusion ***no*** vs. ***didn't***

References: [1] Drenhaus, H., Saddy, D., & Frisch, S. (2005), [2] Vasishth, S., Brüssow, S., Lewis, R. L., & Drenhaus, H. (2008), [3] Parker, D., & Phillips, C. (2016), [4] Ladusaw, W. A. (1980), [5] Szabolsci, A. (2004), [6] Homer, V. (2012), [7] Wagers, M. W., Lau, E. F., & Phillips, C. (2009). [8] Emonds, J. E. (2015)., [9] Tottie, G., & Hoffmann, S. (2006), [10] Quirk, R., Greenbaum, S., & Leech, G. (8). J. Svartvik (1985).