

### Spurious NPI licensing is covert licensing

**Introduction:** NPIs are expressions whose distribution is usually taken to be limited to Downward Entailing (DE) contexts (e.g. Ladusaw 1979). Neg-words create DE environments in their syntactic scope, thereby licensing NPIs that they c-command; compare the grammatical (1a) with the ungrammatical (1b). Psycholinguistic studies have shown, however, that speakers sometimes accept ungrammatical sentences like (1c), which involves a non-c-commanding Neg-word (Drenhaus, Saddy, & Frisch 2005, Xiang et al. 2006, Vasishth et al 2008).

- (1) a. **No** mountains [ that the Swedish hikers have climbed ] have **ever** been taller than 8000m.  
b. \*The mountains [ that the Swedish hikers have climbed ] have **ever** been taller than 8000m.  
c. The mountains [ that **no** Swedish hikers have climbed ] have **ever** been taller than 8000m.

The general questions that we seek to address are two: (i) What triggers the spurious licensing of NPIs by a non-c-commanding licensor? (ii) What is the actual interpretation of these illusory sentences? Most accounts take these spurious NPI licensing effects to be a *grammatical illusion*, a product of the vulnerability of the parser to interference when navigating complex linguistic representations in real time. For instance, the recognition of an NPI triggers a retrieval process that seeks a c-commanding [+neg] element, during which a partial match—a non-c-commanding Neg-word—is incorrectly treated as a licensor. The retrieval-plus-interference account has been criticized on the grounds that NPIs are licensed in a diverse set of environments and no extant linguistic theory of NPIs requires their licensor to be a Neg-word. In this paper, we present a novel set of arguments that suggest that the “grammatical illusion” account of spurious NPI licensing effects is incomplete at best, and at least some of the spurious licensing effects implicate the same underlying grammatical processes involved in successful NPI licensing. Our arguments come from the fact that spurious NPI licensing can sometimes obtain in the *absence of any visible Neg-word or DE-inducing environment*, so long as they license the insertion of a DE-inducing, albeit silent, operator, ExH.

**Proposal:** We hypothesize that at least in some environments, what looks on the surface like spurious licensing may in fact involve genuine licensing. More specifically, when a discourse requires that a sentence is parsed exhaustively, by means of an exhaustivity operator ExH (or a covert variant of *only*), a DE-environment is created despite there being no overt morphological reflexes of this environment. In such cases, we expect that an otherwise unlicensed NPI may now be licensed.

**Experiment:** To test this hypothesis, we conducted a speeded-acceptability judgment task. We manipulated two factors: (i) the presence of an NPI and (ii) the obligatoriness of exhaustive parsing. To manipulate the latter, we draw from the literature on complement anaphora (Moxey 2006) to create a set of stimuli where one of the critical conditions relies on a *shortfall* in the expectations about the size of the set that is being referenced. For example, the sentence in (2a) creates an expectation to continue to talk about *all* of the plants, an expectation that is not met in the second sentence. We crossed [+/-EVER] with [+/-SHORTFALL] in a 2×2 design, resulting in the conditions exemplified in (2).

- (2) a. Whenever the summer is really dry, Susy expects **all** of her plants to die. However, a small number of the plants have  $\{\emptyset/\text{ever}\}$  died. [+SHORTFALL; +/-EVER]  
 b. Whenever the summer is really rainy, Susy expects **none** of her plants to die. However, a small number of the plants have  $\{\emptyset/\text{ever}\}$  died. [-SHORTFALL; +/-EVER]

35 participants saw 24 such items in total. The participant read the first context sentence and then was presented the second target sentence in a rapid word-by-word display. They were then asked to judge the sentence as ‘natural’ or ‘unnatural’.

**Results:** The general results are summarized in Figure 1. We analyzed the results using a logistic mixed effects model with [SHORTFALL] and [EVER] as fixed effects and full random effects structure for subjects and items. The proportion of ‘natural’ responses was lower in the [+EVER] condition ( $z = -8.6, p < 0.05$ ), and there was no main effect of [SHORTFALL] ( $z = 0.7, p = 0.5$ ). There was furthermore an interaction between the two factors ( $z = 6.1, p < 0.05$ ). To investigate this interaction, we ran a second model that nested the factor shortfall under the levels of [EVER] and retained the full random effects structure of the original model. This model revealed a crossover interaction: in [-EVER], the presence of shortfall ([+SHORTFALL]) degraded a sentence ( $z = -3.1, p < 0.05$ ); in [+EVER], the presence of shortfall improved the sentence ( $z = 5.2, p < 0.05$ ).

**Discussion:** Our results contribute a new empirical generalization: licensing of NPIs is possible in the absence of overt DE-inducing operators. We created a contextual pressure to provide an exhaustive interpretation of a sentence by manipulating the expectations of what the reference set of a previously mentioned NP should be. In our contexts, an exhaustive parse of the second sentence is required; not doing so creates a faulty discourse, as illustrated by the follow-up in (3).

- (3) Whenever the summer is really dry, Susy expects all of her plants to die. This year, a small number of the plants have died. #In fact, all of them have.

The second sentence in (3) violates Quantity: after mentioning *all the plants*, making a further claim about them by referring only to a subset of them incurs in an irrecoverable violation of Quantity. We conclude that [+SHORTFALL] contexts always involve an exhaustive parse of the second sentence. For concreteness, this can be done by a covert variant of *only* that renders its scope a DE environment:  $\llbracket \text{EXH} \rrbracket (\text{Alt}(p))(p) = \lambda w : p(w). \forall q \in \text{Alt}(p)[q(w) \rightarrow p \subseteq q]$ . The consequence is that the so-called “illusory” licensing of NPIs, at least in cases like (2a), is not a genuine illusion; the NPIs are fully licensed by EXH. However, despite improving significantly, participants still rated [+EVER, +SHORTFALL] ‘natural’ only slightly above half of the time (53%). We can offer the following suggestion: numerically, [+SHORTFALL] was rated lower than [-SHORTFALL] also in the [-EVER] condition, suggesting that there might be independent reasons to disprefer [SHORTFALL]. If our reasoning is correct, cases of [-EVER, +SHORTFALL] also require parsing the sentence with EXH. To realize that EXH is required, one must reason counterfactually about the different propositions in the current discourse, which may incur an additional processing costs.

**Implications:** While we have shown that NPIs can be licensed with covert exhaustification, it is presently unclear how to extend this explanation to the paradigm cases in (1), but we are pursuing the hypothesis that EXH is responsible for all illusory NPI licensing in future work. These results line up with proposals about NPI interpretation in questions (Guerzoni & Sharvit 2007), which a priori predict that NPI licensing should be possible in declarative non-embedding contexts as well; our results lend preliminary support to this prediction.

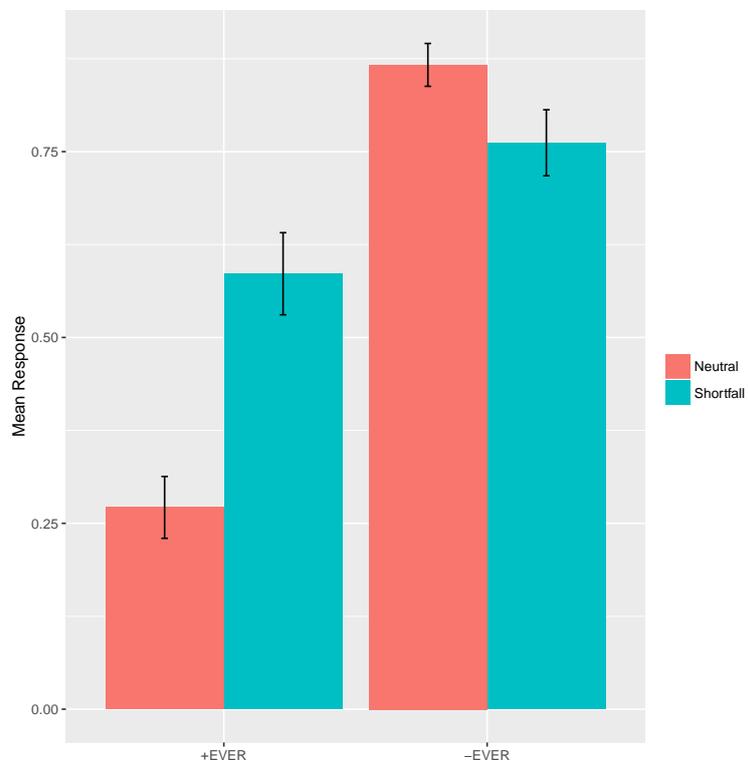


Figure 1: Proportion of 'natural' responses and standard errors by condition