Quantifiers, restrictors, and illusory NPI licensing

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To be grammatically acceptable, Negative Polarity Items (NPIs) like *ever* must be licensed by downward entailing operators (negation, *only*, etc.) occurring in structurally accessible configurations. Psycholinguistic research, however, has found that the presence of a licensor in a structurally inaccessible configuration can lead to an illusion of grammaticality (Parker & Phillips, 2016; Vasishth, et al., 2008). The source of this illusion has been the subject of recent debate. One hypothesis is that structurally inaccessible licensors are incorrectly retrieved as part of a noisy cue-based memory retrieval process. Alternatively, these illusions may reflect issues in the application of semantic/pragmatic processes (Xiang, Dillon, & Phillips, 2009; Xiang, Grove, Giannakidou, 2013).

NPI licensing by universal quantifiers like *every* offer an interesting but unexplored testing bed for these two hypotheses. An NPI that surfaces in the restrictor of a universal quantifier as in (1a) is licensed as this is a downward entailing environment (Ladusaw, 1980). The scope of a universal quantifier, however, is not downward entailing and therefore cannot license NPIs (1b). Thus licensing NPIs via universal quantifiers require the parser to pay close attention to the structural position of the NPI with respect to the restrictor and scope of a universal quantifier, a process that may be error prone given what we know about the delicacy of real-time NPI licensing in general.

We first examined whether illusory NPI licensing occurs with universal quantifiers when an NPI surfaces outside the quantifier's restrictor using speeded acceptability judgments (36 participants, 48 items per study). **Study 1**, (2a), found illusory licensing of *ever* outside of the restrictor of the universal quantifier *every*. **Study 2**, (2b) found no illusory effect for the existential quantifier *some*, suggesting that the illusory licensing in Study 1 was driven specifically by universal quantifiers, and not the presence of a quantifier more generally.

While the illusory licensing found in Study 1 is consistent with a faulty memory retrieval account, we hypothesized that this illusion results from difficulty in identifying the extent of the universal quantifier's restrictor. In out-of-the-blue contexts, quantifiers like *every* identify their restrictor sentence-internally. We hypothesized that the addition of modifiers to the quantified subject would allow the parser to rapidly identify the extent of the quantifier's restrictor prior to parsing the NPI by providing a suitable contrast set, thus reducing the illusory effect. However, if illusory NPI licensing is driven by faulty memory retrieval then we expect illusory licensing to persist regardless of manipulations affecting the identification of the quantifier's restrictor.

We conducted two further speeded acceptability studies to examine these hypotheses. **Study 3** introduced a pre-nominal modifier into the quantifier's restrictor, (3a), and **Study 4** introduced a post-nominal relative clause into the quantifier's restrictor, (3b). No illusory licensing effect was found in either study. These results suggest that the addition of a modifier allowed for rapid identification of the quantifier's restrictor. Having established the extent of the quantifier's restrictor, the parser was able to more easily reject the NPI as unlicensed.

Taken together, these results provide further evidence that illusory NPI licensing can be driven by semantic processes. When the extent of a universal quantifier's restrictor is uncertain, the parser may temporarily license a structurally unlicensed NPI. Interestingly, no illusory effect was found in offline acceptability judgments versions of Studies 1 and 2, suggesting that the illusion of grammatically driven by universal quantifiers is short lived. Further research is planned to investigate the timing of this temporary illusory effect using online methods.

(1) a. Every [RESTRICTOR student [who has **ever** come to class]] [SCOPE has received a good mark].
  b. Every [RESTRICTOR student [who has come to class]] [SCOPE has *****ever** received a good mark].

Example Stimuli (3 [No v. The v. Q] x 2 [No NPI v. NPI])
(2) a. **No/The/Every** journalist has (**ever**) been recognized for his online contributions.
  b. **No/The/Some** journalist has (**ever**) been recognized for his online contributions.
(3) a. **No/The/Every** <u>newspaper</u> journalist has (**ever**) been recognized for his online contributions.
  b. **No/The/Every** journalist <u>who was published on the website</u> has (**ever**) been recognized for his online contributions.

Table 1: Mean acceptability by condition

		No NPI			**NPI**		
		No	The	Q	No	The	Q
Study 1	Every	90.7%	92.1%	89.9%	91.8%	13.4%	21.1%
Study 2	Some	90.8%	94.1%	77.6%	95.0%	20.4%	19.8%
Study 3	Every + pre-mod	90.2%	88.7%	84.2%	86.2%	18.5%	23.4%
Study 4	Every + post-mod	68.9%	73.2%	72.3%	67.8%	21.3%	27.2%

Table 2: Summary of study results (significant effects in bold)

		NPI_Q – NPI_The	z	p
Study 1	Every	**7.66%**	**2.229**	**.026**
Study 2	Some	-0.65%	-0.161	.872
Study 3	Every + pre-mod	4.92%	1.231	.218
Study 4	Every + post-mod	5.94%	1.394	.163

Selected References. **Ladusaw, W. A. (1979)**. *Negative polarity items as inherent scope relations.* Ph.D. Dissertation, University of Texas at Austin. **Parker, D., & Phillips, C. (2016)**. Negative polarity illusions and the format of hierarchical encodings in memory. *Cognition*, 157:321-339. **Vasishth, S., Brüssow, S., Lewis, R. L., & Drenhaus, H. (2008)**. Processing Polarity: how the ungrammatical intrudes on the grammatical. *Cognitive Science,* 32, 685-712. **Xiang, L., Dillon, B., & Phillips, C. (2009).** Illusory licensing effects across dependency types: ERP evidence. *Brain and Language,* 108, 40-55. **Xiang, M., Grove, J., & Giannakidou, A. (2013).** Dependency dependent interference: NPI interference, agreement attraction, and global pragmatic inferences. *Frontiers in Psychology.*