

Licensing of minimizers in the restrictors of universal quantifiers

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Abstract

Minimizer NPIs (Negative Polarity Items) such as *lift a finger* and *sleep a wink* have subtle licensing behaviors that are difficult to generalize. Some have noted that these pattern like strong NPIs such as *in years*, in that they are infelicitous in mere DE (Downward Entailing) environments, and call for anti-additive environments. Others have noted that they are more akin to weak NPIs such as *any* and *ever*, in that they actually can be licensed in mere DE environments, albeit in a limited capacity. In this study, we probe experimentally the distribution and the licensing condition of minimizer NPIs and demonstrate their gradient yet systematic availability in DE environments. Inspired by our results and the account of Eckardt and Csipak (2013), we then propose a pragmatic account of minimizer NPIs that can adequately capture their gradient acceptability in these environments.

1 Introduction

Note: This project has a targeted scope, and aims to solve a specific empirical puzzle. For a fuller account of NPIs consistent with the results reported in this project, please refer to Jeong and Roelofsen (2023)¹.

- Negative polarity items (henceforth NPIs): expressions like *any* and *in years*; first approximation: can be used in negative statements but not in positive ones (1)–(2).
 - (1) a. I don't have *any* questions.
b. #I have *any* questions.
 - (2) a. I haven't been to Paris *in years*.
b. #I have been to Paris *in years*.
- Typology of NPIs (Zwarts, 1998):
 - **Weak NPIs**: e.g., *any*, *ever*; not only licensed in overtly negative environments, but also in antecedents of conditionals, restrictors of *every*, etc. → licensed in (Strawson) downward entailing environments (Ladusaw, 1979) (henceforth DE; more intuitively, implication reversal)
 - **Strong NPIs**: e.g., *in years*; only licensed in more overtly negative DE environments (3)–(4) – require an anti-additive environment (Zwarts, 1998)
- (3) Everyone who has *ever* been to Paris came to the convention.
- (4) #Everyone who has been to Paris *in years* came to the convention.

¹Open Access Link: <https://academic.oup.com/jos/article/40/1/1/7043136>

- **Minimizer NPIs?**: e.g., *lift a finger*, *sleep a wink*
- In some respects, minimizers seem to pattern like strong NPIs: They appear predominantly in anti-additive environments, and often sound infelicitous in non anti-additive DE environments (5)–(6). (Heim, 1984)
 - (5) From Heim (1984); originally from Linebarger (1980)
 - a. Every restaurant that charges so much as a dime for iceberg lettuce ought to be closed down.
 - b. ??Every restaurant that charges so much as a dime for iceberg lettuce actually has four stars in the handbook.
 - (6) From Eckardt and Csipak (2013)
 - a. If a restaurant charges so much as a red cent for tap water, it ought to be closed down.
 - b. ??If a restaurant charges so much as a red cent for tap water, its name starts with the letter ‘L’.
- Likewise, minimizers appear to be infelicitous in superlatives, another Strawson DE context that is non anti-additive.
 - (7) From Hoeksema (2013)
 - a. ?She was the most beautiful woman I have cared a pin about.
 - b. ?Fred is the smartest man who ever lifted a finger to help.
- Based on these types of data, work such as Eckardt and Csipak (2013) conclude that minimizers such as *lift a finger* should indeed be categorized as strong NPIs.
- However, in other instances, minimizers seem to pattern more like weak NPIs than strong ones. e.g., they are licensed in questions (9) whereas strong NPIs are not (10).
 - (8)
 - a. Do you have *any* questions?
 - b. Who has *any* questions?
 - (9)
 - a. Did she *lift a finger* to help?
 - b. Who *lifted a finger* to help?
 - (10)
 - a. #Have you been to Paris *in years*?
 - b. #Who has been to Paris *in years*?
- Furthermore, corpus data suggest that minimizers are actually *not* categorically ruled out in non anti-additive, Strawson DE environments.²
 - (11) From the COCA (Corpus of Contemporary American English) corpus
 - a. If anyone will lift a finger to help me, it will be Prue.
 - b. Too weak to lift a finger, Nikolayev lay in a listless rage, feeling the cat eyeing him from the stove. (from COCA)
 - c. The only one to lift a finger was a photographer who sold the New York Post horrifying photos of the [...]. (from COCA)
 - d. This is the first project she has cared a pin about.
 - e. Fred Sullivan was the last CEO of the company who cared a pin about his employees.

²Hoeksema (2013) acknowledges that minimizers can appear in the restrictor of *the only* and provides an example from his corpus.

- (12) a. Everyone who slept a wink was excluded from the test phase.
 b. At the end of the party, Susan thanked everyone who had lifted a finger to help.

- Aim of this paper:
 - Present a pilot experimental study that can help clarify the distribution and the licensing condition of minimizer NPIs, and reconcile the apparently conflicting observations summarized above
 - Develop a pragmatic account of the gradient acceptability of minimizer NPIs in Strawson DE environments. → Inspired by that of Eckardt and Csipak (2013), but transfers much of what they posit as conventional/semantic component into pragmatic inferences and world knowledge.
- The emerging discussion enables us to categorize minimizers as a subtype of weak NPIs, and highlights the importance of identifying factors other than semantic/logical ones when analyzing the licensing patterns of NPIs.

2 Hypothesis and predictions

2.1 Eckardt and Csipak (2013)

- Eckardt and Csipak (2013) argue that the infelicity of minimizers in weak DE environments stems from the clash between the existential presupposition that characterizes these environments and a particular lexical semantic property of minimizers.
- Weak (Strawson) DE environments such as restrictors of *every* and superlatives give rise to the following existential presuppositions, as long as they obtain non law-like interpretations.

- (13) a. Every student who helped was thanked.
 Presupposes: There exists a student x who helped.
 b. She was the smartest person who helped.
 Presupposes: There exist at least two persons x and y who helped.

- These existential presuppositions tend to target **exhaustified/strengthened** interpretations, as exemplified below.

- (14) a. Every student who took syntax or semantics last semester is taking pragmatics this semester.
 Presupposes: There exists a student x who only took syntax. / There exists a student y who only took semantics.
 b. Every student who ate some cookies was excluded from the analysis.
 Presupposes: There exists a student x who (only) ate some but not all cookies.

- By extension, minimizers in these environments, namely, restrictors of *every* and superlatives, are predicted to give rise to the presuppositions in (15).

- (15) a. ?Every student who lifted a finger to help was thanked.
 Presupposes: There exists a student x who *only* lifted a finger to help.
 b. ?She was the smartest person who slept a wink.
 Presupposes: There exist at least two persons x and y who *only* slept a wink.

- According to Eckardt and Csipak (2013), by virtue of their lexical semantics, minimizers ‘denote properties which can *never* obtain in isolation’; e.g., in the actual world, it is

impossible for someone to only lift a finger to help and stop there (i.e., do absolutely nothing more beyond this).

- The existential presuppositions in (15) which involve exhausted interpretations thus cannot be accommodated, resulting in judgments of infelicity.
- Promising intuitions, but as noted in the introduction, and contra Eckardt and Csipak (2013), the acceptability of minimizers in these environments seems quite variable. → variability can be flexibly captured by positing a weaker version of this account.

2.2 Our hypothesis

- We hypothesize that language users generally assume that minimizers are very *unlikely* to be satisfied without their neutral counterparts being satisfied as well. That is:

- (16) a. *lift a finger*
By default, it is generally assumed that the following is very unlikely to be true in the actual world:
 $\exists x(\text{only}(\text{lift a finger}(x)))$
- b. *sleep a wink*
By default, it is generally assumed that the following is very unlikely to be true in the actual world:
 $\exists x(\text{only}(\text{sleep a wink}(x)))$

- In most contexts, the (exhaustified) existential presuppositions triggered by non law-like interpretations of these weak DE environments are difficult to accommodate, given the default assumptions in (16).
- A testable prediction: In cases where the relevant existential presuppositions of weak DE environments are explicitly supported by the context, (thus overriding the default assumptions in (16)) minimizer NPIs are felicitous.
- The experiment outlined below tests and confirms this main prediction, focusing on one of the relevant environments, namely, the restrictor of universal quantifiers.
- Context manipulation (varying crucially as to whether the contextual information supports or denies the existential presupposition) emerges as a significant predictor of the naturalness ratings for minimizers in weak DE environments.
- What is the nature and status of the default assumptions in (16), if it exists?
 - Possibility 1: they just derive from the interlocutors’ world knowledge, interacting with the lexical meaning of minimizers (i.e., there’s nothing special about them)
 - Possibility 2: minimizers conventionally encode these unlikelihood assumptions, which would be another way in which they differ from their neutral counterparts (more in the spirit of Eckardt and Csipak (2013))

3 Methods

Participants 400 native speakers of American English were recruited through Amazon Mechanical Turk.

Stimuli Exemplified in (17); involved sentences with minimizers in restrictors of *every*, evaluated in various contexts. The contexts varied crucially as to whether they explicitly supported the existential presupposition associated with the exhausted interpretation of the predicate in the restrictor of *every*.

- (17) My friend Susan organised a party and asked everyone to help out by bringing some food.

- a. **Neutral:** ...
- b. **Supported:** One person brought some nuts, and one person brought a small bottle of wine, but nobody brought anything substantial. Still, ...
- c. **Inconsistent I:** Everyone brought something really delicious. ...
- d. **Inconsistent II:** But nobody remembered to bring anything. ...

At the end of the party, Susan thanked everyone/anyone who had lifted a finger to help.

To probe the nature/status of unlikelihood assumptions, also included stimuli involving sentences without minimizers but with contextual contrasts parallel to those in (17), varying in how easily the existential presuppositions associated with them could be accommodated given world knowledge.

- (18) Our school recently did a survey on teacher-student relationships.
- a. **Neutral:** ...
 - b. **Supported:** I live in a very violent suburb of Detroit, where many kids are involved in serious crime. ...
 - c. **Inconsistent:** I live in a very safe neighborhood in San Francisco, where all kids are well-behaved. ...

Everyone in my class who has been to prison is treated badly by the teachers.

- (19) The local government is trying to reduce car traffic.
- a. **Neutral:** ...
 - b. **Supported:** In our neighborhood, many kids have a bike. ...
 - c. **Inconsistent:** In our neighborhood, there are no kids who own a bike. ...

Everyone who biked to school today got a free snack.

UNLIKELY and NOT UNLIKELY cases, standing for restrictors without minimizers describing *a priori* unlikely scenarios and those describing *a priori* not unlikely scenarios.

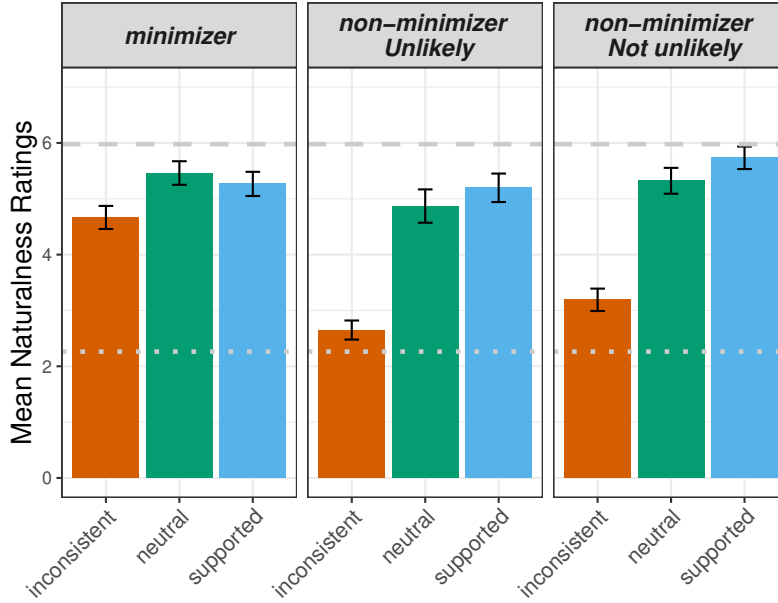
Procedure The experiment included 6 target sentences: 2 involving minimizers *lift a finger* and *sleep a wink* (henceforth MINIMIZER condition), 2 involving sentences with unlikely existential presuppositions (e.g., (18); henceforth UNLIKELY condition), and 2 involving sentences with likely existential presuppositions (e.g., (19); henceforth NOT UNLIKELY condition). It also included 4 control items involving established instances of presupposition failure or satisfaction.³ The target sentences were paired with one of 3 contexts: neutral, inconsistent (over/under), and supported. The pairings between context-type and target sentence were counterbalanced, and across target trials, every participant encountered 2 neutral contexts, 2 inconsistent contexts, and 2 supported contexts. In each trial, the participants were asked to rate the naturalness of the target or control sentence on a likert scale from 1 to 7. A complete list of stimuli is provided in Section 6.

A series of ordinal regression models were fitted to the data, using the `clmm` package in R, with naturalness ratings as the main dependent variable and context-type as the independent variables. Separate models were fitted to each sentence type: ones involving minimizers and ones without minimizers (likely, not unlikely).

4 Results

- Figure 1 displays the main results.
- Across all three panels including the case involving minimizers (the leftmost panel), the target sentences are judged to be less natural when the preceding context provides in-

³For instance, the stimuli for a sample trial involving a presupposition satisfaction/failure would be: We have a physics teacher and a chemistry teacher, but no math teacher at school. *The physics/math teacher is very bright.*



■: Inconsistent; ■: Neutral; ■: Supported; dashed: felicitous controls; dotted: infelicitous controls

Figure 1: Naturalness of NPI and non-NPI statements (Means & 95% CIs)

formation that are inconsistent with the existence presupposition, than when it provides information that are consistent or are neutral (Table. 1)

- Conversely, target sentences, including those containing minimizers, are judged to be significantly more acceptable when the relevant presuppositions are validated by the preceding context, i.e., in supported contexts.
- Across all three context conditions, the naturalness ratings of the MINIMIZER sentences are *not* lower than those without minimizers, namely, NOT UNLIKELY and UNLIKELY sentences.⁴
- This suggests that the implication of unlikelihood in (16) which contributes to the judgment of infelicity of certain *every* sentences need not be stipulated separately for minimizers, but rather emerges contextually.
- While not as directly relevant to the point at hand, it is also worth noting that the UNLIKELY sentences (where the presupposition is a priori unlikely) elicit significantly lower naturalness ratings than NOT UNLIKELY sentences (where the presupposition is a priori not unlikely) across all 3 contextual conditions (reflected in shifting of the baselines of all 3 bars in the third panel compared to the second panel).

5 Discussion & Conclusion

- The experimental results confirm that when contexts are of the right type, minimizer NPIs are judged to be felicitous in restrictors of *every*, even when they obtain non-lawlike interpretations.

⁴In fact, they are even significantly higher than UNLIKELY cases, which is surprising. This may be due to the fact that one of the target minimizer items, namely, the one involving *sleep a wink*, failed to completely rule out law-like interpretations. But even if we restrict the data to just the ones involving *lift a finger*, which does seem to successfully rule out such interpretations, the acceptability ratings of MINIMIZER are still not significantly lower than UNLIKELY cases.

- Furthermore, they suggest that the context-dependent judgements of infelicity regarding minimizers in restrictors of *every* stem at least partly from the difficulty in accommodating the existential presupposition of *every*.
- We suspect that the gradient infelicity of minimizers in other DE environments such as superlatives can also be at least partly captured by the same explanation. As was shown in (15), these also give rise to existential presuppositions involving exhaustified interpretations of the minimizers, which in usual contexts are difficult to accommodate.
- This line of explanation also provides a natural answer to why minimizers in restrictors of *every* are judged to be felicitous (somewhat irrespective of the specifics of the context) when they obtain lawlike interpretations: these interpretations do not give rise to existential presuppositions.
- Based on these results, we conclude that fundamentally, minimizers have a similar distribution as weak NPIs in statements, and are licensed in a variety of DE environments.

6 List of stimuli

6.1 Minimizers

1. My friend Susan organised a party and asked everyone to help out by bringing some food.
 - (a) One person brought some nuts, and one person brought a small bottle of wine, but nobody brought anything substantial.
 - (b) Everyone brought something really delicious.
 - (c) But nobody remembered to bring anything.
 (Still,) At the end of the party, Susan thanked anyone/everyone who had lifted a finger to help.
2. The participants of the medical study were not allowed to sleep the night before.
 - (a) Nobody fell asleep, though a few people dozed off for split seconds.
 - (b) All of them followed the instructions and stayed awake through the night.
 - (c) However, all of them forgot about it and went to bed.
 Anyone/Everyone who slept a wink was excluded from the test phase.

6.2 Non-minimizers: unlikely (nonmin-UL)

1. Our school recently did a survey on teacher-student relationships.
 - (a) I live in a very safe neighborhood in San Francisco, where all kids are well-behaved.
 - (b) I live in a very violent suburb of Detroit, where many kids are involved in serious crime.
 Anyone/Everyone in my class who has been to prison is treated badly by the teachers.
2. Unicef organised a fundraising campaign.
 - (a) The most generous contribution came from someone who donated two thousand dollars.
 - (b) The most generous contribution came from someone who donated twenty million dollars.
 Anyone/Everyone who donated more than ten million dollars got a special gift.

6.3 Non-minimizers: Not unlikely (nonmin-NU)

1. I took a class on biology.
 - (a) Most students managed to complete the final assignment.
 - (b) All students studied hard but no one managed to complete the final assignment.
 Anyone/Everyone who turned in the assignment passed the class.
2. The local government is trying to reduce car traffic.
 - (a) In our neighborhood, many kids have a bike.
 - (b) In our neighborhood, there are no kids who own a bike.
 Anyone/Everyone who biked to school today got a free snack.

6.4 Controls (Felicitous, infelicitous)

1. Susan called the library yesterday but it was closed.
 - (a) She was surprised that it was closed.
 - (b) She was surprised that it was open.
2. In my town, there is a recreation center and an art gallery, but no theater.
 - (a) The mayor wants to convert the theater into a museum.
 - (b) The mayor wants to convert the art gallery into a museum.
3. We have a physics teacher and a chemistry teacher, but no math teacher at school.
 - (a) The physics teacher is very bright.
 - (b) The math teacher is very bright.
4. The company offered Sally a job but she turned it down.
 - (a) Two weeks later, she regretted having accepted the offer.
 - (b) Two weeks later, she regretted not having accepted the offer.

7 Summary of ordinal regression models

	Estimate	SE	z-value	<i>p</i>
Supported	0.49	0.15	3.23	<.01
Neutral	0.70	0.16	4.50	<.001

Table 1: Minimizers (Inconsistent context set as reference level)

	Estimate	SE	z-value	<i>p</i>
Supported	2.44	0.17	14.17	<.001
Neutral	2.01	0.17	11.94	<.001

Table 2: Non minimizer: Unlikely (Inconsistent context set as reference level)

	Estimate	SE	z-value	<i>p</i>
Supported	2.27	0.17	13.19	<.001
Neutral	2.07	0.17	11.95	<.001

Table 3: Non minimizer: Not unlikely (Inconsistent context set as reference level)

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