[PL]: One morpheme, many understandings

Roumyana Pancheva & Luismi Toquero-Pérez
pancheva@ucsc.edu, ltoqueroperez@fullerton.edu

NASSLI 2025
06/25, 2025

1 The basic pattern

Unmarked singular nouns refer to just one individual. But plural-marked nouns may be understood in two different ways: (e.g. Krifka 1989; Sauerland 2003; Sauerland et al. 2005; Spector 2007)

(1) a. Lina harvested **tomatoes**.
b. Lina didn't harvest **tomatoes**.

For (1a) to be true, Lina must have harvested 2 or more tomatoes. The plural-marked noun is understood **exclusively**: $\{ab, ac, bc, abc\}$.

For (1b) to be true, Lina must not have harvested any tomatoes (i.e. one or more). The plural-marked noun is understood **inclusively**: $\{a, b, c, ab, ac, bc, abc\}$.

The difference in clusivity may or may not be found cross-linguistically:

(2) Spanish (✓clusivity contrast)
a. A la fiesta asistieron profesore-**s**
to the party attended professor-PL
'The party was attended by (2 or more) professors'
b. A la fiesta no asistieron profesore-**s**
to the party NEG attended professor-PL
'The party was not attended by any professors' (Martí 2008)

(3) Turkish (*clusivity contrast)
a. Azar çocuk-**lar** bak-iyor
Azar child-PL care-IMPF.3SG
'Azar takes care of (2 or more) children'
b. Azar çocuk-**lar** bak-mi-iyor
Azar child-PL care-NEG-IMPF.3SG
'Azar does not take care of (2 or more) children' (Dali and Mathieu 2021)

The questions raised:

- In what environments do the exclusive/inclusive contrasts arise?
- What is the meaning of the [PL] morpheme?

We will see that the inclusive understanding is generally restricted to downward entailing contexts and negative polarity environments.

The analytic approaches vary:

- the basic meaning of [PL] is always inclusive and the exclusive is derived from it.
- [PL] is lexically ambiguous and pragmatic competition determines which one is chosen.
- the basic meaning of [PL] is always exclusive, and the inclusive is derived from it.

2 The distribution of inclusive and exclusive plurals

2.1 negation

We have seen that inclusive understandings arise under sentential negation, e.g. (1b).

They also arise under the scope of negative indefinite *no*:

(4) a. Messi scored (some) goals last night.
Exclusive, #inclusive
b. Messi scored **no** goals last night.
#Exclusive, inclusive

2.2 conditionals

Inclusive understandings are also found in the antecedent of conditionals (e.g. the *if*-clause):

(5) a. [**After** I got tenure], I wrote **books**.
Exclusive, #inclusive
b. [**If** I write **books**], I will get tenure.
#Exclusive, inclusive

2.3 Questions

Inclusive understandings are also found in questions:

(6) a. Messi scored goals last night.
Exclusive, #inclusive
b. Did Messi score goals last night?
#Exclusive, inclusive

2.4 Restrictor of universal quantifier

Inclusive understandings are also found when the NP is in the restrictor of *every*.

(7) a. [The [house with **windows** overlooking the ocean]] is overpriced.
Exclusive, #inclusive
b. [**Every** [house with **windows** overlooking the ocean]] is overpriced.
#Exclusive, inclusive

2.5 Under the scope of some modals

It seems like under certain modals like *should* (or *will*), the inclusive interpretation also arises.

(8) a. Sherlock Holmes should question **local residents** to find the thief. (Zweig 2009, ex.33)
b. If I get tenure, I will write **books**.

3 Different analyses

3.1 Sauerland (2003): the inclusive-only view

A presupposed consequence: there is a markedness asymmetry between morphology and semantics, i.e. Anti-Horn's pattern:[1] (See also Bale et al. 2011)

(9) Morphologically marked forms must be semantically unmarked, but morphologically unmarked forms are semantically marked.

A note on markedness (Bale et al. 2011)

(10) Marked features are the only features that can be referenced by grammatical rules. Grammatical rules are vocabulary insertion rules, agreement, etc.

Since semantic interpretation rules are grammatical rules, unmarked features cannot affect interpretation.

(11) $[\![\text{X} + m\text{F}]\!] \subseteq [\![\text{X} + u\text{F}]\!]$
The denotation of X with a marked F is a subset of the denotation of X with an unmarked F.

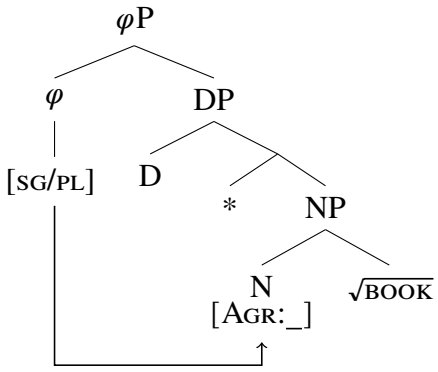
(12) $[\![lion]\!] = [\![\sqrt{\text{LION}}\ \text{MAS}]\!] = \{x\text{: } x \text{ is a lion or lioness}\} = \{x_m, y_m, z_m, a_f, b_f, c_f\}$

(13) $[\![lioness]\!] = [\![\sqrt{\text{LION}}\ \text{FEM}]\!] = \{x\text{: } x \text{ is a lioness}\} = \{a_f, b_f, c_f\}$

In other words, a feature is semantically marked if it has a more restrictive denotation.

[1] There are many variations of the inclusive-only approach that rely on competition or alternatives. See for example e.g Spector (2007); Zweig (2009); Bylinina and Podobryaev (2020). But the idea is pretty much the same: if the weaker alternative is uttered, that must be because the stronger alternative cannot be uttered. Therefore, the utterance of the weaker alternative must mean that the speaker is in no position to utter the stronger alternative; thus, assuming the speaker knows the truth of the stronger alternative, it must be false.

(14)



(15) a. $[\![^*\text{NP}]\!] = \lambda x.{}^*\mathsf{N}(x)$ $\{a, b, c, ab, ac, bc, abc\}$

b. $[\![\text{SG}]\!] = \lambda P\colon \forall x[P(x) \rightarrow \text{atom}(x)].P$

c. $[\![\text{PL}]\!] = \lambda P.P$

(16) a. $[\![book]\!] = [\![\text{SG}]\!]([\![^*\text{NP}]\!]) = \{a, b, c\}$

b. $[\![books]\!] = [\![\text{PL}]\!]([\![^*\text{NP}]\!]) = \{a, b, c, ab, ac, bc, abc\}$

Number-marking on nouns is the result of agreement: $\mathsf{Agree}(\varphi, \text{N})$.

Only [SG] is semantically marked: it encodes the presupposition that the extension of its argument has only atoms.

The distribution of [PL] is not constrained by an inherent presupposition. But it is constrained by the general maxim Maximize Presupposition. (Heim 1991)

(17) when choosing between two different morphological forms, the one with stronger presuppositions must be chosen, as long as no presupposition violation will result.

When a singular referent is intended, singular morphology surfaces on the noun used to reference it. Otherwise, [PL] and its concomitant plural morphology appear.

The clusivity asymmetry

Sauerland's proposal gets the inclusive understanding of the plural by default.

(18) $[\![\text{PL } {}^*\text{NP}]\!] = [\![^*\text{NP}]\!] = \lambda x.{}^*\mathsf{N}(x)$ $\{a, b, c, ab, ac, bc, abc\}$

Exclusive interpretations can be explained by appealing to pragmatic competition between (16b) and (16a) mediated by Maximize Presupposition.

(19) $[\![$*Lina harvested tomatoes*$]\!]$ = 'Lina harvested one or more tomatoes'.

(20) $[\![$*Lina harvested a tomato*$]\!]$ = 'Lina harvested exactly one tomato'

- The proposition in (19) is entailed by the proposition that results from the use of the singular form in (20).
- Competition: since the speaker did not choose the more informative proposition, e.g. (20), the speaker does not believe that Lina harvested one or more than one tomato.
- The result is an exclusive interpretation of *tomatoes*.

Some concerns

A. Cancellation of implicatures: the classic test for implicatures is the possibility of cancelling the implicature:

(21) a. Some of the professors left $\Rightarrow_{impl}$ Not all professors left.
b. Some professors left. In fact, all of them did!

If these number inferences are also the result of a pragmatic implicature, it should be possible to cancel said implicatures.

The reported judgments for English seem to be conflicted:
For some, inclusive plural inferences are harder to cancel than regular scalar implicatures. For others, inclusive plural inferences are easily cancelable, just like regular implicatures.

(22) Mary bought books. #In fact, she bought exactly one. (Dali and Mathieu 2021)

(23) [FBI investigator] (Zweig 2009)
a. All the suspects live in big cities$\Rightarrow_{impl}$ All the suspects do not live in one big city.
b. ...perhaps even the same city!

B. Cross-linguistic variation: The meaning of the plural is by default atoms and sums, as opposed to sums of atoms. But...[2]

1. there are no (attested) languages that have an inclusive-only understanding, while
2. there are languages that have an exclusive-only understanding.

3.2 Farkas and de Swart (2010): lexical ambiguity

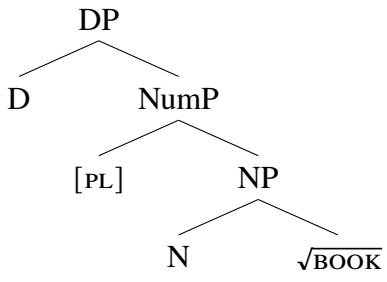
Their point of departure is the opposite of (9), i.e. the Horn (2001) pattern in (24).

(24) Morphologically marked forms are semantically marked, but morphologically unmarked forms are semantically unmarked.

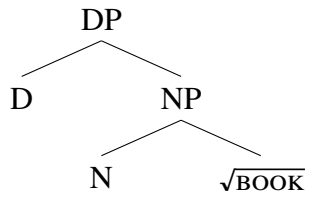
Privative view of markedness: [F] ~ Ø. (Noyer 1992; Harley and Ritter 2002; Cowper 2005)

Semantically, [F] is characterized by the presence of some property *P*, Ø entails nothing about the presence or absence of *P* but is used chiefly (although not exclusively) to indicate the absence of *P*.

(25) *books*



(26) *(a) book*



[2] Martí (2020) argues based on the distribution and interpretation of duals that [PL] must be interpretable.

The interpretation of [PL] is ambiguous.

(27) a. $[\![\text{PL}]\!] = \lambda x.\lambda^* P[x \in \text{sum} \cup \text{atom} \wedge^* P(x)]$
b. $[\![\text{PL}]\!] = \lambda x.\lambda^* P[x \in \text{sum} \wedge^* P(x)]$

(28) $[\![\textit{Lina harvested tomatoes}]\!] = \exists x\text{: } [x \in \text{sum} \wedge^* \text{tomato}(x)][\text{harvest}(L, x)]$

(29) $[\![\textit{Lina didn't harvest tomatoes}]\!] = \exists x\text{: } [x \in \text{sum} \cup \text{atom} \wedge^* \text{tomato}(x)][\neg\text{harvest}(L, x)]$

Singular nominals have no explicit number feature and are restricted to atomic reference only as a result of the competition with the plural form.

(30) $[\![\textit{Lina harvest a tomato}]\!] = \exists x\text{: } [x \in \text{atom} \wedge^* \text{tomato}(x)][\text{harvest}(L, x)]$

The choice between (27a) and (27b) is determined by a pragmatic mechanism:

(31) *The Strongest Meaning Hypothesis*
When an expression is assigned a set of interpretations ordered by entailment, choose the strongest element of this set that is compatible with the context.

In upward entailing environments: if it is true that exclusive, then it is necessarily true that inclusive. But the opposite does not follow.

(32) If Lina harvested two or more tomatoes, it must be the case that she harvested one or more.

In downward entailing environments the entailments are reversed: if it is true that inclusive, then it is necessarily true that exclusive.

(33) If Lina didn't harvest one or more tomatoes, it must be the case that she didn't harvest two or more either.

The concerns raised by the inclusive-only approaches are dealt away by assuming that [PL] is ambiguous.

The account also has some welcome consequences.

The Strongest Meaning Hypothesis predicts that there are contexts in which the entailing proposition might not be chosen – as long as the entailed proposition is the strongest in that particular context.

This is confirmed in English with examples such as (34): *children/mice* are in an upward-entailing environment but interpreted inclusively.

(34) a. [Speaker walks into unknown house, and notices toys littering the floor]
There are **children** in this house.
b. [Speaker walks into basement, and notices mouse droppings]
Ah! We have mice!

The opposite situation also exists: exclusive interpretations of plurals in downward entialing environments.

(35) John may have read *one* book, but I don't think he has read books.

Concern
A. [SG] ≠ the absence of plural: We have seen evidence that singular-marking cannot be reduced to the absence of [PL] or the lack of NumP.

3.3 Toquero-Pérez (2024, 2025): Exclusive-only + allosemy

There are also accounts that analyze [PL] as having an exclusive meaning, and the inclusive is derived given certain structural conditions.

Singular and plural are independently required by the syntax: [SG] or [PL] may head NumP.

Plural-marked NPs interpreted inclusively in §2 are in parallel distribution to plural marked NPs with NPI *any*. (Harbour 2016, ch.6: p.149-150), and Ackema and Neeleman (2018, ch.3: p.81-83)

Compare the pairs of sentences:

(36) a. I didn't see children.
b. I didn't see **any** children.

(37) a. I saw children.
b. ?? I saw **any** children.

(38) A: {Did you see children in the park? / Did you see **any** children in the park?}
B: {Yes, I saw one / # No, I saw one}

(39) a. If you have children, you are welcome to board now.
b. If you have **any** children, you are welcome to board now.

(40) a. [Every [house with **windows** overlooking the ocean]] is overpriced.
b. [Every [house with **any** windows overlooking the ocean]] is overpriced.

Hypothesis: there is a (c)overt NPI that occurs with plurals in downward entailng contexts.

Whenever this (overt or covert) NPI is appropriately licensed, it will be responsible for triggering the inclusive interpretation of the plural.

General rule for the interpretation of plural-marked nouns

(41) A plural-marked noun is interpreted inclusively …
a. if it is directly c-commanded by a negative determiner (e.g. *no*) or a properly licensed NPI (e.g. *any*) at LF.
b. Otherwise, it will be interpreted exclusively.
c. Structural description: D[{NEG/ NPI}] > PL > N $\sqrt{\text{ROOT}}$

Assumption: just like morphemes are mapped to a vocabulary item via a series of rules at PF, that take into account the morpho-syntactic contexts and are mediated by the Subset Principle, so is the denotation of morphemes. (Arad 2003; Marantz 2001, 2013; Harley 2014; Wood 2016, 2023)

(42) Vocabulary Insertion rule format
a. α[F] $\Leftrightarrow$ $X / \_\_ \beta$ 'Map F on α to vocabulary item X in the context of β'

b. α[F] $\Leftrightarrow$ *Y* 'Map F on α to vocabulary item Y elsewhere'

(43) Meaning Insertion rule format

a. α[F] $\leftrightarrow$ $\lambda\sigma$ ... /__β 'Interpret α[F] as the λ-expression in the context of β'

b. α[F] $\leftrightarrow$ $\lambda\sigma.\lambda\tau$ ... 'Interpret α[F] as the λ-expression elsewhere'

The [PL] morpheme has the two allosemes in (44).

(44) Allosemy rules for [PL]

a. Num[PL] $\leftrightarrow$ $\lambda P.P$/__ D[{NPI/ NEG}]

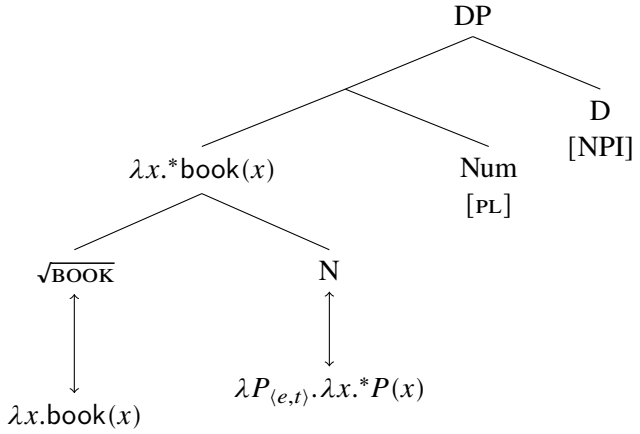
b. Num[PL] $\leftrightarrow$ $\lambda P.\lambda x.P(x) \wedge \mathsf{sum}(x)$

The two allosemes which compete for insertion at LF.

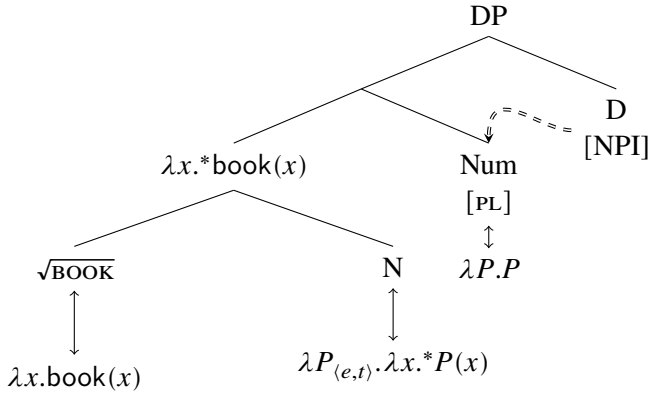
- The elsewhere case in (44b) is the 'basic' or 'elsewhere' denotation.
- The elsewhere rule will be blocked in favor of the more specific rule in (44a). According to this rule, the denotation of [-atomic] will be that of an identity function.

(45) Semantic derivation of plurals in a downward entailing context

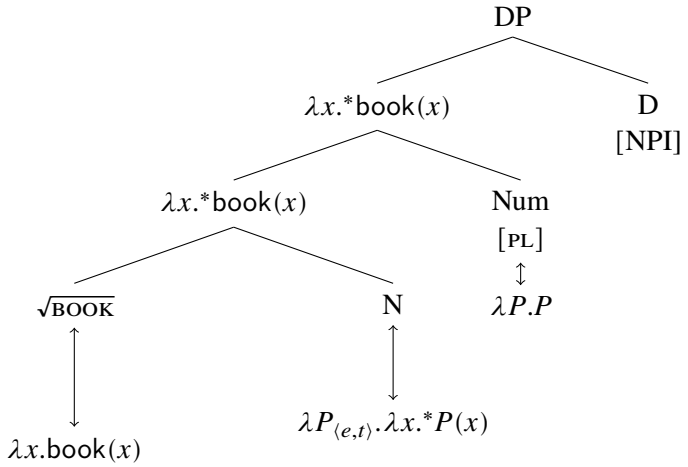
a. $[\![\text{N}]\!]([\![\sqrt{\text{BOOK}}]\!])$



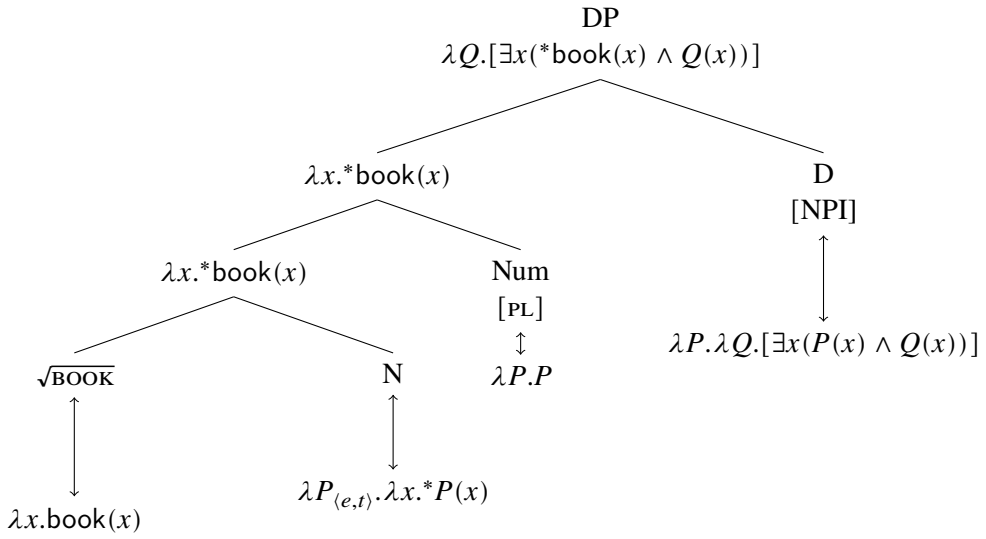
b. D[NPI] triggers allosemy of (44a) on Num[PL]



c. $[\![\text{Num}]\!]([\![\text{NP}]\!])$



d. ⟦D⟧(⟦NumP⟧)



The account predicts that inclusive interpretations of plurals correlate with NPI licensing.

Potential concerns There are at least two places where the interpretation of (covert/overt) *any* and inclusive plurals seems to diverge.[3]
A. The scope of *only*: The scope of *only* is an NPI licensing context. We would expect a plural-marked NP to receive an inclusive interpretation, but that is arguably incorrect:

(46) Only John has (any) iPhones.
Exclusive: 'Only John has 2 or more iPhones'

(46) is wrongly predicted to not imply that 'John has multiple iPhones'.

B. The nuclear scope of *every/each*: the nuclear scope of universal quantifiers is not an NPI-lincesing environment.

Plurals in the scope of *every/each* allow a 'mixed readings', not exclusive. (Farkas and de Swart 2010)

(47) Every applicant submitted journal articles as part of their job application.

[3]Thanks to Y. Sudo (p.c.) for pointing them out.

#Exclusive: Every applicant submited two or more journal articles.

Mixed: Not every applicant submitted 2 or more journal articles, but at least some applicants did.

4 Where do we stand?

Languages may or may not have a clusivity asymmetry in the understanding of plural nouns.

Within and across languages, the inclusive understanding is usually limited to downward entailing contexts and questions while the exclsuive one is found elsewhere. However, we have seen that there are important excecptions to this generalization.

Explaining the asymmetry is not trivial, and regardless of the view one adopts, there seem to be challenges (both empirical and/or conceptual) that need addressing.

Any theory that attempts to explain the asymmetry must not only take into account the inclusive/exclusive distinction, but it must be consistent with the morphological and syntactic facts about number-marking more generally.

References

Ackema, P. and Neeleman, A. (2018). *Features of Person: From the Inventory of Persons to their Morphological Realization*. MIT Press.

Arad, M. (2003). Locality constraints on the interpretation of roots: The case of Hebrew denominal verbs. *Natural Language and Linguistic Theory*, 21:737–778.

Bale, A., Ganon, M., and Khanjian, H. (2011). On the relationship between morphological and semantic markedness: The case of plural morphology. *Morphology*, 21:197–221.

Bylinina, L. and Podobryaev, A. (2020). Plurality in Buriat and structurally constrained alternatives. *Journal of Semantics*, 37:117–128.

Cowper, E. (2005). A note on Number. *Linguistic Inquiry*, 36:441–445.

Dali, M. and Mathieu, E. (2021). The semantics of distributed number. In Kiss, T., Pelletier, J., and Husić, H., editors, *Things and Stuff: The Semantics of the Mass-Count Distinction*, pages 261–278. Cambridge University Press, Cambridge.

Farkas, D. and de Swart, H. (2010). The semantics and pragmatics of plurals. *Semantics and Pragmatics*, 3:1–54.

Harbour, D. (2016). *Impossible Persons*. MIT Press.

Harley, H. (2014). On the identity of roots. *Theoretical Linguistics*, 40:225–276.

Harley, H. and Ritter, E. (2002). Person and number in pronouns: A feature geometric analysis. *Language*, 78:482–526.

Heim, I. (1991). Artikel und definitheit. In von Stechow, A. and Wunderlich, D., editors, *Ein Internationales Handbuch der Zeitgenössischen Forschung*, pages 487–535. de Gruyter, Berlin.

Horn, L. (2001). *A Natural History of Negation*. CSLI Publications, Stanford, CA.

Krifka, M. (1989). Nominal reference, temporal constitution and quantification in event semantics. In Bartsch, R., van Benthem, J., and van EmbdeBoas, P., editors, *Semantics and Contextual Expression*, pages 75–115. CSLI Publications, Standord, CA.

Marantz, A. (2001). Words and things. Handout of talk given at MIT.

Marantz, A. (2013). Locality domains for contextual allomorphy across the interfaces. In Matushansky, O. and Marantz, A., editors, *Distributed Morphology Today: Morphemes for Morris Halle*, pages 95–115. MIT Press.

Martí, L. (2008). The semantics of plural indefinites in Spanish and Portuguese. *Natural Language Semantics*, 16:1–37.

Martí, L. (2020). Inclusive plurals and the theory of number. *Linguistic Inquiry*, 51:37–74.

Noyer, R. (1992). *Features, Positions, and Affixes in Autonomous Morphological Structure.* PhD thesis, MIT.

Sauerland, U. (2003). A new semantics for number. In Young, R. and Zhou, Y., editors, *Proceedings of Semantics and Linguistic Theory (SALT) 13*, pages 258–275. CSLI Publications.

Sauerland, U., Anderssen, J., and Yatsuhiro, K. (2005). The plural is semantically unmarked. In Kepser, S. and Reis, M., editors, *Linguistic Evidence: Empirical, Theoretical and Computational perspectives*, Studies in Generative Grammar, pages 413–434. De Gruyter.

Spector, B. (2007). Aspects of the pragmatics of plural morphology: On higher-order implicatures. In Sauerland, U. and Stateva, P., editors, *Presupposition and Implicature in Compositional Semantics*, pages 243–281. Palgrave Macmillan UK, London.

Toquero-Pérez, L. M. (2024). *The Grammar of Individuation, Number and Measurement*. PhD thesis, University of Southern California.

Toquero-Pérez, L. M. (2025). Accommodating number neutrality in Alasha Mongolian: Markedness and semantic interpretation. To appear in *Journal of Semantics*.

Wood, J. (2016). How roots do and don't constrain the interpretation of Voice. *Working Papers in Scandinavian Syntax*, 96:1–25.

Wood, J. (2023). *Icelandic Nominalizations and Allosemy*. Oxford University Press (to appear).

Zweig, E. (2009). Number-neutral bare plurals and the multiplicity implicature. *Linguistics and Philosophy*, 32:353–407.