On quantificational force in conjoined and non-conjoined summative predicates, and its consequences for underspecification theories of homogeneity

Mathieu Paillé, University of Calgary

Introduction. Some work on homogeneity suggests that the paradigm involves underspecification between existential and universal quantificational force, with some mechanism determining which is actually intuited in a given sentence. This abstract suggests that such an approach cannot capture all of the data touching on (at least) subatomic homogeneity. In particular, conjoined summative predicates are predicted by these theories to behave in the same way as non-conjoined co-predicated summative predicates. This is not the case: the former are weak and consistent, while the latter are strong and inconsistent.

Background: underspecification theories of homogeneity. Pluralities are generally interpreted universally in positive sentences, and existentially in negative ones; this is a 'homogeneity' effect.

(1) a. Adam saw the kids.

b. Adam didn't see the kids.

 \approx he saw **all** of the kids

 \approx he didn't see all of the kids

 $\not\approx$ he saw at least some of the kids

 \approx he saw **none** of the kids

Why is this? One theory builds on the simple intuition that each sentence in (1) has the quantificational force that provides the strongest meaning. Indeed, Krifka (1996), Lasersohn (1999), Winter (2001), and Malamud (2012) propose that the grammar does not fix whether a predicate is interpreted universally or existentially when it takes a plurality as an argument. Rather, the Strongest Meaning Hypothesis (SMH) of Dalrymple et al. (1994) ensures that speakers prefer whichever interpretation results in the strongest meaning.

Križ & Spector (2021) also provide an underspecification theory, but not based in the SMH. They point out that the SMH cannot capture the meaning of pluralities in non-monotonic contexts:

(2) Exactly one student read the books.

(Križ & Spector 2021:1135)

Instead, Križ & Spector (2021) suggest that the possible meanings of plurals arise from the *conjunction* of candidate interpretations (CIs). The meaning of (2) is predicted if the two CIs in (3) are conjoined: exactly one student read all of the books, and the other students read none of them.

- (3) a. Exactly one student read some of the books.
 - b. Exactly one student read all of the books.

Call this the 'co-assertion' account of homogeneity.

In addition to plural homogeneity, the homogeneity paradigm also exists within atoms (e.g., Löbner 2000, Spector 2013, Križ 2015, 2019):

(4) a. The flag is green.

 \approx all of the flag is green

≉ at least some of the flag is green

b. The flag isn't green.

≉ not all of the flag is green

 \approx **none** of the flag is green

At first glance, there is no reason not to carry over underspecification theories of homogeneity to the subatomic case. On this view, *green* is lexically ambiguous (5) (at first approximation):

(5) [green] =

a. $\lambda x. \exists y [y \sqsubseteq x \land green(y)].$

b. $\lambda x. \forall y [y \sqsubseteq x \rightarrow green(y)].$

The positive (4a) is intuited as universal due to co-asserting that the flag has a green part and that all parts of the flag are green, while the negative (4b) is intuited as a negated existential due to co-asserting that the flag is not entirely green and is not green at all.

Co-predications as a challenge for underspecification accounts of subatomic homogeneity. In this section, I take in turn the two underspecification accounts of homogeneity (the SMH and the co-assertion accounts), and show that they fail to capture all datapoints involving the predication of two same-class (colour, material, etc.) summatives predicates of a single individual ('co-predications'). The theories predict consistency where inconsistency is observed, or vice-versa.

UNDERSPECIFICATION ACCOUNT #1: THE SMH. On the SMH account of homogeneity, computing the strength of predicates should never lead to inconsistency. After all, on this approach, the quantificational strength of predicates results from a pragmatic preference for strong meanings over weaker ones; this preference would be overridden if the strongest meaning was inconsistent.

Prima facie, this might appear to be borne out. In conjunctions, predicates whose co-predication as universals would result in inconsistency are interpreted as less than universal:

- (6) a. The children are 5 years old and 6 years old. \approx some of the children are 5 years old and the rest are 6 years old
 - b. The flag is white and green. \approx some parts of the flag are white and the rest are green

While it is possible to understand the sentences in (6) through a non-Boolean lexical meaning for *and* (Krifka 1990), they can also be understood simply as involving the strongest predicate meanings that are available while remaining consistent. (But see below on the *and* in (6b).)

However, in the domain of subatomic homogeneity, the SMH theory of homogeneity runs into a problem when same-class summative predicates are co-predicated *without* a conjunction:

(7) a. #This is a white green flag. b. #Some white flags are green. Intuitively, the examples in (7) are inconsistent due to the quantificational force of the colour terms; each is universal. This clearly counters the prediction of the SMH account, according to which speakers would choose to interpret the colour terms as consistent. The pragmatics would not create inconsistency out of (potentially) consistent lexical material.

UNDERSPECIFICATION ACCOUNT #2: CO-ASSERTION. To see how Križ & Spector's (2021) approach could deal with co-predication, we must better understand which CIs actually end up being conjoined (co-asserted). Križ & Spector (2021) claim that only 'strongly relevant' CIs (SRCIs) are co-asserted. SRCIs are CIs that correspond exactly to a cell in a partition of worlds, according to some QUD. Moreover, all CIs are obtained through (informally speaking) the disjunction of (one or more) sentences making a claim about an individual (atomic or plural) and all sentences making a claim about sums containing that same individual. Hence, if there are two students, A and B, the CIs for (8a) are in (8b) (Križ & Spector 2021:1160) (these are the SRCIs if the QUD is 'Who sang?,' so that each possible sum of singers is strongly relevant).

(8) a. The students sang.

b.
$$CI = \left\{ egin{array}{ll} a \ {\rm sang} \ \lor b \ {\rm sang} \ \lor a \oplus b \ {\rm sang}, \\ a \ {\rm sang} \ \lor a \oplus b \ {\rm sang}, \\ b \ {\rm sang} \ \lor a \oplus b \ {\rm sang}, \\ a \oplus b \ {\rm sang} \end{array} \right\}$$

Can this theory capture the paradigm in (9), repeated from (6b) and (7a), where colour terms are consistent when co-predicated through conjunction but not when stacked on a noun?

- (9) a. The flag is white and green.
 - b. #This is a white green flag.

Let's focus on (9b), which is inconsistent. There is no world in which a flag is both entirely white and entirely green. Thus, on Križ & Spector's (2021) theory, the inconsistency of (9b) cannot result directly from a SRCI, since there is no SRCI that has an inconsistent meaning (SRCIs must correspond to a cell in a partition of worlds). On the other hand, it would be possible to obtain (9b) by having internally consistent SRCIs which, when conjoined, result in inconsistency. We would need candidates of the following nature, where a and b are subatomic pieces of the flag and 'white' and 'green' are universal (as emphasized through a subscript \forall):

(10) SRCIs for (9b) =
$$\begin{cases} (a \text{ is white}_{\forall} \lor a \oplus b \text{ is white}_{\forall}) \land (b \text{ is green}_{\forall} \lor a \oplus b \text{ is green}_{\forall}), \\ (b \text{ is white}_{\forall} \lor a \oplus b \text{ is white}_{\forall}) \land (a \text{ is green}_{\forall} \lor a \oplus b \text{ is green}_{\forall}), \\ \dots \end{cases}$$

Since it is impossible for $a \oplus b$ to be both white \forall and green \forall , (10) is equivalent to:

(11) SRCIs for (9b) =
$$\begin{cases} a \text{ is white}_{\forall} \land b \text{ is green}_{\forall}, \\ b \text{ is white}_{\forall} \land b \text{ is green}_{\forall}, \\ ... \end{cases}$$
Consequence SRCIs results in inconsistency obtaining (0b). Creating these SRCIs results in inconsistency obtaining (0b). Creating the second of the s

Co-asserting these SRCIs results in inconsistency, obtaining (9b). Crucially, for this to occur, the mechanism whereby SRCIs are co-asserted must be blind to the creation of inconsistency. There is no equivalent of Bar-Lev & Fox's (2017) 'Innocent Inclusion' in co-assertion.

This is how the co-assertion theory might obtain (9b). The problem is that this wrongly predicts (9a) to be inconsistent, too—specifically, because the conjunction and in (9a) is intersective. A non-intersective and would involve existential quantification breaking up the flag into pieces, of which white and green would be predicated universally (Krifka 1990). If so, (9a) would be predicted to behave differently from (9b). But such a non-intersective and is not available in this particular example (presumably due to the atomicity of the subject; Winter 2001); if it was, it would be possible to modify each colour term with completely, contrary to fact:

(12) #The flag is completely white and completely green.

Given that *and* in (9a) is intersective, the SRCIs for (9a) look exactly as in (11), and inconsistency is predicted just as for (9b). For (9a) to be consistent, the co-assertion mechanism must be 'intelligent' enough to not knowingly create a contradiction. But this brings back the puzzle of (9b).

Conclusion. The quantificational force of summative predicates is not aligned with the predictions of underspecification theories of homogeneity, at least in the domain of subatomic homogeneity. The SMH predicts all co-predicated summative predicates to be weak, contrary to fact; the co-assertion approach predicts all co-predicated predicates to pattern together (as consistent or inconsistent, depending on assumptions about co-assertion), rather than making the cut between conjoined and non-conjoined co-predicated predicates.

The upshot is that homogeneity must be computed *locally* in cases like (9b). (9a) might be understood in terms of the conjunction creating a syntax where both summative predicts can fall in the same locality horizon. See (citation removed) for work along these lines.

Finally, this abstract has focused only on summative predication, leaving for future research whether similar points hold for plural homogeneity. The data would look like (13).

- (13) a. The kids are singing and talking.
 - b. #The talking kids are singing.

References

- Bar-Lev, Moshe E., & Danny Fox. 2017. Universal Free Choice and Innocent Inclusion. In *Proceedings of SALT 27*, ed. Dan Burgdorf, Jacob Collard, Sireemas Maspong, & Brynhildur Stefánsdóttir, 95–115.
- Dalrymple, Mary, Makoto Kanazawa, Sam Mchombo, & Stanley Peters. 1994. What do reciprocals mean? In *Proceedings of SALT 4*, ed. Mandy Harvey & Lynn Santelmann, 61–78. Ithaca, NY: Cornell University.
- Krifka, Manfred. 1990. Boolean and non-Boolean 'and'. In *Papers from the Second Symposium on Logic and Language*, ed. László Kálmán & László Pólos, 161–188. Budapest: Akadémiai Kiadó.
- Krifka, Manfred. 1996. Pragmatic strengthening in plural predications and donkey sentences. In *Proceedings of SALT 6*, ed. Teresa Galloway & Justin Spence, 136–153. Ithaca, NY: Cornell University.
- Križ, Manuel. 2015. Aspects of homogeneity in the semantics of natural language. Doctoral dissertation, University of Vienna, Vienna.
- Križ, Manuel. 2019. Homogeneity effects in natural language semantics. *Language and Linguistics Compass* 13:1–17.
- Križ, Manuel, & Benjamin Spector. 2021. Interpreting plural prediction: homogeneity and non-maximality. *Linguistics and Philosophy* 44:1131–1178.
- Lasersohn, Peter. 1999. Pragmatic halos. Language 75:522–551.
- Löbner, Sebastian. 2000. Polarity in natural language: predication, quantification and negation in particular and characterizing sentences. *Linguistics and Philosophy* 23:213–308.
- Malamud, Sophia A. 2012. The meaning of plural definites: A decision-theoretic approach. *Semantics & Pragmatics* 5:1–58.
- Spector, Benjamin. 2013. Homogeneity and plurals: From the Strongest Meaning Hypothesis to supervaluations. Sinn und Bedeutung 18: University of the Basque Country, Vitoria-Gasteiz. Available at: https://ehutb.ehu.es/uploads/material/Video/3289/Sinn18_01.pdf.
- Winter, Yoad. 2001. Flexibility principles in Boolean semantics. Cambridge, MA: MIT Press.