Musings on Homogeneity and Non-Maximality

MANUEL KRIŽ
University of Vienna · Harvard University

NYU, 3/28/2014

Overview

1. **Background**

   Homogeneity, non-maximality, and why they are linked.

2. **A Theory for Plurals**

   Deriving non-maximality from homogeneity + pragmatics (for plurals).

3. **Further Consequences**

   A few things fall into place nicely.

4. **More on Homogeneity**

   Collective predicates are homogeneous, too, and what that even means. Resulting predictions of the theory.

5. **Outlook**

1 Background

1.1 Homogeneity

Plural predication is *homogeneous* or *polar* (Fodor 1970, Schwarzschild 1994, Löbner 2000 a. m. o.):

(1) Mary read the books.
true ~ iff Mary read all the books.
false ~ iff Mary read none of the books.
neither ~ otherwise.

(2) a. Mary read all (of) the books.
b. Mary didn't read all (of) the books.

1.2 Non-Maximality

It is well-known that predications with definite plurals allow exceptions. (Link 1983, Dowty 1987, Brisson 1998 a. o.)

(3) a. *Concerning the audience's reaction to a job talk:*
The professors smiled.
(Allows some neutral faces.)
b. *Activities at a summer camp:*
The boys built a raft.
(Allows some slackers that didn't contribute.)

1.3 The Link Between the Two

Desideratum: A theory that derives either one from the other, or both from the same source.

1.3.1 *All*

The addition of *all* removes **both** homogeneity and non-maximality.

(4) Mary read all the books.
true iff Mary read all the books.
false iff there is a book Mary didn't read.
neither never

(5) a. (All) the professors (all) smiled.
$\rightsquigarrow$ No neutral faces.
b. (All) the boys (all) built a raft.
$\rightsquigarrow$ All the boys participated.

1.3.2 Conditionals

Conditionals are homogeneous (*conditional excluded middle*; Stalnaker 1981, von Fintel 1999).

(6) If Mary comes, Peter will be happy.
true ~ iff in all worlds where Mary comes, Peter is happy.
false ~ iff in no world where Mary comes, Peter is happy.
neither ~ iff Peter is happy in some and unhappy in other worlds where Mary comes.

They are also known for allowing exceptions.

(7) If Mary comes, Peter will be happy. (Of course, if Sue also comes, Peter will be unhappy because Mary and Sue always quarrel. But that's not very likely. . .).

This has been explained by the alleged non-monotonicity of conditionals (Lewis 1973) or domain-shifting mechanisms (von Fintel 2001, Gillies 2007), but this doesn't change the fact that they are exactly parallel to plurals.

(8) The professors smiled. (Of course, Smith didn't, but you know, he never does, so that doesn't mean anything. . .)

Homogeneity and exception-tolerance both disappear with *necessarily* (Schlenker 2004):

(9) A: If Mary comes, Peter will necessarily be happy.
B: No, not necessarily. Sue might come too. . .

1.3.3 Generics

Homogeneity of generics is also a noted fact (Cohen 2004, in a way also Magri 2012):

(10) Birds can fly.
true ~ iff all birds can fly.
false ~ iff no bird can fly.
neither ~ some birds can fly and other can't.

Of course, they are even more famous for allowing exceptions! This has prompted treatments with non-monotonic logic which, again, concealed the parallel with plurals.

Homogeneity and exception-tolerance are removed by *all* or *always*:

(11) All birds can fly.
true iff all birds can fly.
false iff there is a (species of?) bird that can't fly.

2 A Theory for Plurals

2.1 Basic Idea

- Homogeneity is a semantic phenomenon.
- *All* somehow removes this.
- Non-maximal uses arise from semantic homogeneity and certain pragmatic principles.
- Once *all* removes homogeneity, the basis for non-maximal uses is lost.

2.2 Recipe

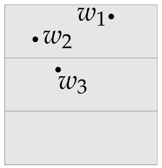
- Assume that homogeneity is a semantic property of predicates (though not a presupposition), and that *all* removes it in virtue of its semantics.

(12) $[\![\text{The professors smiled.}]\!]^{+} = \{w \mid \text{all the professors smiled in } w\}$
$[\![\text{The professors smiled.}]\!]^{-} = \{w \mid \text{no professor smiled in } w\}$

(13) $[\![\text{All the professors smiled.}]\!]^{+} = \{w \mid \text{all the professors smiled in } w\}$
$[\![\text{All the professors smiled.}]\!]^{-} = \{w \mid \text{not all the professors smiled in } w\}$

- Speakers posit an issue to be resolved, modelled as a partition of the set of possible worlds. We also refer to this question as *current purposes* or *current issue*. (similar notion in Malamud 2012)

  Simplistic example: we're concerned with the reception of a talk.



q_1: positive reception

q_2: mixed reception

q_3: negative reception

(14) The professors smiled.

- **Central Idea:** Non-maximal uses are possible if the exceptions are irrelevant for current purposes, i.e. if the actual world is in the same cell a world where there are no exceptions.
- Still, sentences can never be used when literally *false*, hence only sentences with extension gaps have non-maximal uses.

2.3 The Maxim of Quality

The maxim of quality is in fact weaker than usually assumed. It does not require that one should only say true things.

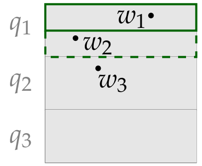
(15) **(Weakened) Maxim of Quality**
Don't say anything that excludes a cell of the current issue that you couldn't exclude on the basis of your total knowledge.

Quality Implicature: A sentence S conveys not its literal truth-conditions, but rather the union of all question cells that are compatible with S. This may include worlds where S is not true.

Example: The communicated content of (14) is "Something is the case which, for current purposes, is equivalent to all professors smiling."

In our example, this is simply all of q_1.

$[\![$*The professors smiled.*$]\!]^+$



w_1: all smiled

w_2: Smith neutral, rest smiled

w_3: only half smiled

(15) can be used non-maximally to describe w_2, but not w_3.

Predicts maximal readings if all exceptions would be relevant, e.g. Lasersohn's (1999) sleep study scenario.

(16) *The sleep study can only begin when all subjects are asleep.*
The subjects are asleep.

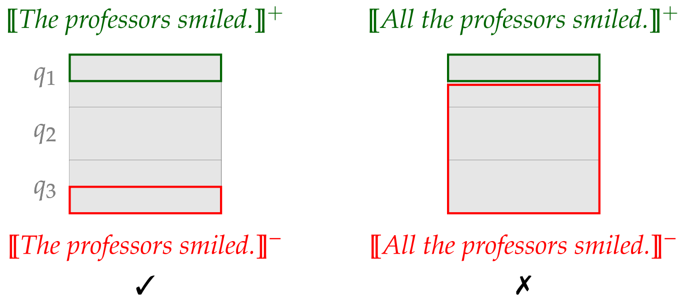
Necessary Restriction: One cannot say something that is literally *false*. Therefore...

2.4 Addressing and Issue

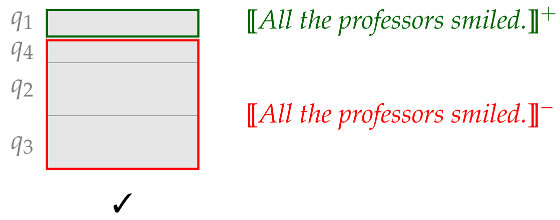
We require a certain kind of alignment between a sentence and an issue it is used to address:

(17) **Addressing an Issue**
A sentence S may be used to address an issue Q only if there is no cell $q \in Q$ such that q overlaps with both the positive and the negative extension of S, i.e. S is true in some worlds in q and false in others.

This condition may be seen as a way of extending Lewis's (1988) notion of *aboutness* to sentences with extension gaps.



The *all*-sentence cannot be used to address the issue in our example. It can only be used if the issue is different, i. e. if we care whether really all professors, even Smith, smiled.



Consequences

- No sentence can be used when it is literally false.

  Assume the actual world w_0 is in cell q and S is false in w_0; then either S is not true anywhere in q and violates the maxim of quality (because it's incompatible with q), or S is true in some worlds in q and false in others, then it violates (17).

- Sentences without the homogeneity property can only be used when literally true.

  Follows immediately from the above, because such sentences are literally true whenever they are not literally false.

All removes the extension gap, so the resulting sentence can only be used to address a current issue where every exception matters. Hence, it can only be used when literally true.

3 Further Consequences

3.1 What Exceptions Do

Important Prediction: It can matter what exceptions do, not only who they are!

(18) The professors smiled.

- . . . is fine if Smith actually had a neutral look.
- . . . is **not** fine if Smith looked enraged, jumped up, and hit his fist on the table.

We compare worlds, not (sub-)pluralities! Neutral-Smith-worlds may be in the same cell as all-smiling-worlds, but angry-Smith-worlds are in a different cell.

3.2 Unmentionability of Exceptions

Although plural predication allows exceptions, those cannot easily be mentioned (Kroch 1974, cited in Lasersohn 1999).

(19) a. #Although the professors are smiling, one of them is not.
b. The professors are more or less all smiling, one of them is not.

The same effect can be observed with *but* (*pace* Brisson 1998).

(20) a. #The professors are smiling, but one of them isn't.
b. More or less all the professors are smiling, but one of them isn't.

Implemented! For non-maximal readings: *all*-worlds and exception-worlds in the same cell. The exception-mentioning sentence is true in the latter, but false in the first, hence true and false in the same cell. That's forbidden!

4 More on Homogeneity

Traditionally, homogeneity was considered only for distributive predicates: $P(x)$ is true if P holds of all parts of x, and false if it holds of no part of x. But certain collective predicates have a similar property. (Büring & Križ 2013 and, independently, Benjamin Spector, p. c.) What does homogeneity for collective predicates mean, exactly?

(21) The girls are forming a circle.

- What if half of the girls are forming a circle? Then (21) seems to be neither true nor false.

  (22) **Downward Homogeneity**
  If P is false of x, then P is not true of any mereological part of x. (Equivalently, if P is true of x, it is not false of any plurality that contains x.)

  Corresponding Non-Maximality: (21) can be judged true even if there are a few girls standing by the side and not participating in the circle-forming.

- But if only the girls together with the boys are forming a circle, (21) *also* seems neither true nor false.

  (23) **Upward Homogeneity**
  If P is true of x, then P is not false of any mereological part of x.

  Corresponding Non-Maximality: Irrelevant additional participants can be ignored. This seems correct: Small children frequently do not perform complicated manual tasks unaided, and so (24) could easily be considered true even when some of the actual glueing was done by a parent.

  (24) Johnny and Lissy built a model plane.

- What if half of the girls together with the boys are forming a circle? Then, too, (21) seems neither true nor false. It seems that in order for a predicate P to be false of an individual, there has to be — in some intuitive sense — no P-ness in any way about any part of that individual at all.

  (25) **General Homogeneity**
  If P is true of x, P is not false of any plurality that overlaps with x.

  Corresponding Non-Maximality: If the boys built a raft assisted by an adult, some of them not actually participating, (26) could also plausibly be used to describe this situation (in broad strokes, as it were).

  (26) The boys built a raft.

Note: For distributive predicates (P holds of x iff P holds of all parts of x), these constraints are equivalent.

5 Conclusion

5.1 Summary

- Non-maximality is a pragmatic phenomenon: a sentence can be used as long as (i) it is not literally false and (ii) it is true up to equivalence for current purposes. Consequently, only sentences with an extension gap can ever be used non-maximally.
- *All* removes the semantic homogeneity; with the extension gap gone, the sentence can no longer be used non-maximally. The “slack-regulating” effect of all is thus an epiphenomenon of its semantics.
- Once we look at collectives, homogeneity turns out to be a bit broader than usually thought. The corresponding kinds of non-maximality that our theory predicts seem to exist.

5.2 Outlook

- Extend the picture to conditionals and generics:
  - How to formalise the notion of addressing a question with a conditional?
  - What is the structure relative to which generics are homogeneous? Subkinds, members of the kind, both?
- Actually... *all* can be used non-maximally:

  (27) All the people at the party were very happy.
  $\rightsquigarrow$ Well, there may have been a couple of people who were only mildly happy...

  Maybe solvable if the connection between homogeneity and vagueness is suitably illuminated.
- Develop a compositional theory of homogeneity and its removal by *all*. (ongoing work with Benjamin Spector)

References

Brisson, Christine. 1998. *Distributivity, Maximality, and Floating Quantifiers*: Rutgers dissertation.

Büring, Daniel & Manuel Križ. 2013. It's that and that's it! Exhaustivity and homogeneity presuppositions in clefts (and definites). *Semantics & Pragmatics* 6.

Cohen, Ariel. 2004. Generics and mental representations. *Linguistics and Philosophy* 27. 529–556.

Dowty, David. 1987. A note on collective predicates, distributive predicates and *all*. In *Proceedings of escol 86*, 97–115.

von Fintel, Kai. 1999. NPI licensing, strawson entailment, and context dependency. *Journal of Semantics* 16(2). 97–148.

von Fintel, Kai. 2001. Counterfactuals in a dynamic context. In M. Kenstowicz (ed.), *Ken Hale: A life in language*, Cambridge: MIT Press.

Fodor, Janet Dean. 1970. *The linguistic description of opaque contexts*. Cambridge, Mass.: MIT dissertation.

Gillies, Anthony. 2007. Counterfactual scorekeeping. *Linguistics and Philosophy* 30. 329–360.

Kroch, Anthony. 1974. *The semantics of scope in English*. Cambride, MA: MIT dissertation.

Lasersohn, Peter. 1999. Pragmatic halos. *Language* 3(75). 522–551.

Lewis, David. 1973. *Counterfactuals*. Oxford: Blackwell.

Lewis, David. 1988. Vague identity: Evans misunderstood. *Analysis* 48. 128–130.

Link, Godehard. 1983. The logical analysis of plurals and mass terms: A lattice-theoretical approach. In R. Baeuerle, C. Schwarze & Arnim von Stechow (eds.), *Meaning, use and interpretation of language*, de Gruyter.

Löbner, Sebastian. 2000. Polarity in natural language: predication, quantification and negation in particular and characterizing sentences. *Linguistics and Philosophy* 23. 213–308.

Magri, Giorgio. 2012. No need for a dedicated theory of the distribution of readings of English bare plurals. In Anca Chereches (ed.), *Proceedings of Semantics and Linguistic Theory (SALT) 22*, 383–402.

Malamud, Sophia. 2012. The meaning of plural definites: A decision-theoretic approach. *Semantics & Pragmatics* 5. 1–58.

Schlenker, Philippe. 2004. Conditionals as definite descriptions (a referential analysis). *Research on Language and Computation* 2(3). 417–462.

Schwarzschild, Roger. 1994. Plurals, presuppositions and the sources of distributivity. *Natural Language Semantics* 2(3). 201–248.

Stalnaker, Robert. 1981. A defense of conditional excluded middle. In Robert Stalnaker, William Harper & Glenn Pearce (eds.), *Ifs: Conditionals, belief, decision, chance and time*, 87–104. Dordrecht: Reidel.