Effects of Domain Complexity on Verification Procedures for *Most* and *More Than Half*

Recent studies ([1], [3]) have proposed competing analyses of the determiner *most*, using results of verification studies as key evidence. [1] argues that *most* is a superlative construction and that verifying *most* statements effectively involves the comparison of $|A \cap B|$ and $|A - B|$, schematized in (1). [3] proposes an alternative, (2), based on the observation that under extremely short presentations of dot arrays, the complexity of $A - B$ does not affect the verification of corresponding *most* statements. (2) accounts for this insensitivity by not directly referring to $A - B$, its cardinality rather being computed from $|A|$ and $|A \cap B|$. This study provides new experimental evidence in favor of an analysis of *most* as a superlative, in the form of a hitherto unnoticed latent superlative reading of sentences with *most* in subject position.

We conducted an experiment that compared the verification of quantified statements containing *most* and *more than half*. The two competing representations for *most* are compared to *more than half*, the semantics of which we assume to explicitly reference A and $A \cap B$, but not $A - B$, (3). If the correct representation of *most* is as in (2) then the same entities are involved in the verification of both determiners, and we expect them to be similarly affected by manipulating the complexity of $A - B$. If the correct representation of *most* is as in (1), we expect the manipulation to affect each determiner differently.

We used the Self-Paced Counting method of [1]: 51 participants verified statements such as (4a,b) relative to dot arrays of varying sizes displayed on a computer screen. The dots were uncovered in groups of 2 or 3 as participants pressed the spacebar. Dependent measures are the RTs for each press of the spacebar and the accuracy rate of the answers. To test whether the complexity of $A - B$ affects verification, we followed [3] in varying the number of colors in the arrays, for a 2- and a 3-Color condition.

We observe that: **1.** The accuracy rates for the *true* items of both of the proportional determiners are surprisingly low. **2.** Participants answered *True* more often in the 3-Color condition than in the 2-Color condition for *most*, but the accuracy rates for *more than half* remain the same across both Color conditions. That is, we observe a *Truth×#Colors* interaction for *most* ($p<0.05$, contrast-coded Mixed Logit Model with random subject and item effects) but not for *more than half*.

The sensitivity of *most*, in contrast to *more than half*, to the number of colors supports (1) over (2). Furthermore, we propose that the pattern of accuracy indicates that some participants respond *True* when $|A \cap B|$ is greater than the cardinality of all contextually salient subsets of $A - B$. This superlative reading of *most*, straightforwardly captured under the extension of [1] in (5), is supported by i) a post-hoc analysis of the RT data of the participants who used the superlative reading of *most*, (5b), vs. those who used its proportional reading, (5a): the former speakers have significantly longer RTs throughout the verification process; ii) results of an offline study using Amazon's Mechanical Turk.

(1) $[\![\text{most}]\!](A)(B) = 1 \quad \text{iff} \quad |A \cap B| > |A - B|$ [1]

(2) $[\![\text{most}]\!](A)(B) = 1 \quad \text{iff} \quad |A \cap B| > |A| - |A \cap B|$ [3]

(3) $[\![\text{more than half}]\!](A)(B) = 1 \quad \text{iff} \quad |A \cap B| > ½\,|A|$ [1]

(4) a. Are most of the dots blue?
b. Are more than half of the dots blue?

(5) $\exists X\, [{*A}(X) \wedge {*B}(X) \wedge \forall Y\, [Y \in C \wedge Y \neq X \rightarrow |X| > |Y|\,]]$ *X,Y pluralities*

Presupposition on C: C contains at least two non-overlapping elements.

a. $C = {*A}$ (A closed under i_sum-formation) *proportional reading*

b. $C = \{X: X \in {*A} \wedge (X \in {*D_1} \vee X \in {*D_2} \vee \ldots)\}$ *superlative reading*

(where $D_1, D_2, \ldots$ = subsets in a salient partitioning of A)

References

[1] Hackl, M. (2009). On the grammar and processing of proportional quantifiers: *most* versus *more than half*. *Natural Language Semantics*, 17, 63-98.

[2] Halberda, J., Sires, S.F. & Feigenson, L. (2006). Multiple spatially overlapping sets can be enumerated in parallel. *Psychological Science*, 17, 572-576.

[3] Lidz, J., P. Pietroski, T. Hunter & J. Halberda. (in press). Interface Transparency and the Psychosemantics of *most*. Natural Language Semantics.