Exhaustivity in Questions - The German particles *so* and *alles*

Based on the results of three off-line and one on-line study on the question particles "so" and "alles" in German we argue that 1) unembedded questions always require exhaustive answers, 2) that "alles" is a maximality marker, whereas "so" is marking restriction of the question domain and 3) that partial/mention-some answers must explicitly marked as such and are harder to process.

There is a persistent claim in the literature that the German question particle "alles" is a marker of (weak) exhaustivity (Reis 1992, Beck 1996, Beck and Rullmann 1999, Zimmerman 2007), recently it has also been claimed to be a marker of distributivity (Xiang 2016) and to scopally interact with modals to yield both mention-all (MA) and mention-some (MS) readings. Moreover, the question particle "so" is often analyzed as the counterpart of "alles", and as introducing a non-exhaustive interpretation of the question.

We tested the prediction of these theories in three different off-line studies, where people judged the appropriateness of MS/MA answers to questions containing different discourse particles in different contexts. All data were collected using the free software OnExp (Onea 2011), all results analyzed using the R programming language.

For the first study, we created test sentences that provide only one true answer for questions with no particles or one of the particles "so" ("among others"), "alles" ("all") and "beispielsweise" ("for example") in contexts where it is clear that there are other true answers. A simplified example is given in (1).

(1)   **Context:** Wer arbeitet denn so/alles/beispielsweise/ in dem Projekt? Anna, die wei, dass Polina und Sonja in dem Projekt arbeiten, sagt:
       ***Context:** Who works so/alles/beispielsweise/ in the project? Anna who knows that Sonja and Polina work in the project replies:*
       Target: Polina und Sonja arbeitet/n in dem Projekt.
       ***Target:** Polina and Sonja work(s) in the project*

The analysis revealed a main effect of the type of answer (MA/MS): non-exhaustive answers were always worse than exhaustive answers ($p < .001$). However, no main effect for particle was found and no significant interaction between type of answer and particle. A pairwise comparison of the particles revealed an interaction only between "beispielsweise" and "so", "beispielsweise" versus no particle, and "beispielsweise" versus "alles". In sum, the expected effect of "so" and "alles" was not yielded. The only particle that had the expected effect is "beispielsweise": its presence improved the judgment for non-exhaustive answers (see figure 1). In a second off-line study, we tested another claim in the literature that existential modals in a question indicate that MS answers are sufficient (Xiang 2016). The idea behind a second rating study was to use modals to mark mention-some questions. To indicate that exhaustive answers were required the particle "alles" was added to the question in a second context condition. A sample item is given below in (2).
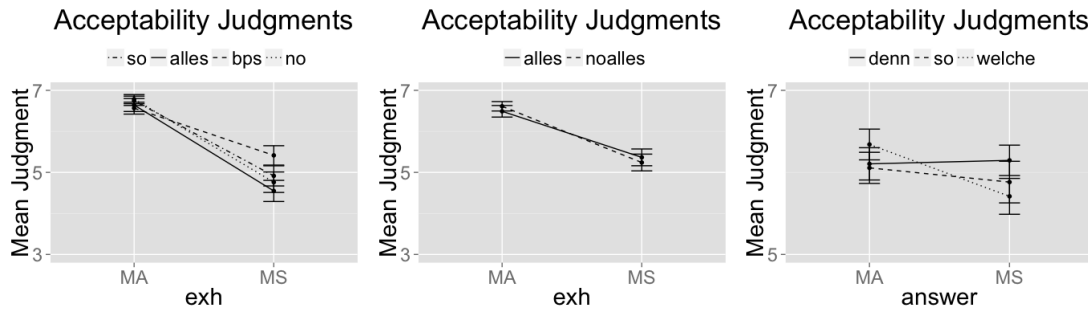
Figure 1: Study 1   Figure 2: Study 2   Figure 3: Study 3

(2) **Context:** Wer am Lehrstuhl kann alles meine Arbeit korrigieren?
      Context: *Who can alles grade my thesis?*
      Target: Ulrike, die wei, dass Frau Dr. Gruen und Frau Dr. Klein die Arbeit korrigieren knnen, sagt: Frau Dr. Gruen und Frau Dr. Klein kann/knnen deine Arbeit korrigieren.
      Target: *Ulrike, who knows that Dr. Gruen and Dr. Klein can grade the thesis, replies: Dr. Gruen and Dr. Klein can grade your thesis.*

As for the study before, there was no main effect of the particle and no interaction between the presence of the particle and the type of answer. Again, there was a significant main effect of answer type, however ($p<.01$). Even though the acceptability of mention-some answers was slightly higher than in the previous experiment (M=5,3 vs. M=4,875), the study revealed that exhaustive answers are generally preferred also when questions contain a modal (see figure 2). In the third experiment, both the context and the question were manipulated to push an MS-reading. Contexts favoring an MA-interpretation were paired with "which" questions, contexts favoring an MS interpretation were paired with either the particle "so" or "denn". This time a significant interaction between context (MA/MS) and answer type was found ($p<.01$): whereas the acceptability of MS answers decreased in an MA context, MS answers were equally acceptable as MA readings in an MS context (see figure 3).

We conclude that the particles "alles" and "so" do not play a role for the appropriateness of MS/MA- answers. The results speak in favor of an analysis where giving exhaustive answers to matrix questions is semantically encoded and cases involving MS/partial answers either require strong contextual pressure or explicit marking (by using "for example") (Groenendijk and Stokhof 1984). A fourth study, using the self-paced reading paradigm, revealed that these questions are associated with more processing costs than MA readings. The data suggest that "alles" is neither an exhaustivity nor distributivity marker, but merely a maximality marker. This explains the data just presented, as well as the fact that it can co-occur with "so" (which narrows the domain but does not license MS), and its scopal interaction with negation.

References

Beck, Sigrid (1996). "Quantified Structures as Barriers for LF Movement." In: *Natural Language Semantics* 4.1, pp. 1–56.

Beck, Sigrid and Hotze Rullmann (1999). "A Flexible Approach to Exhaustivity in Questions." In: *Natural Language Semantics* 7.3, pp. 249–298.

Groenendijk, Jeroen and Martin Stokhof (1984). "Studies on the Semantics of Questions and the Pragmatics of Answers." PhD thesis. Amsterdam: University of Amsterdam.

Reis, M. (1992). "The category of invariant alles in wh-clauses: on syntactic quantifiers vs. quantifying particles in German." In: *Who climbs the grammar tree*. Ed. by R. Tracy. Niemeyer, pp. 465–492.

Xiang, Y. (2016). "Interpreting Questions with non-exhaustive Answers." PhD thesis. Harvard University.

Zimmerman, Malte (2007). "Quantifying Question Particles in German : Syntactic Effects on Interpretation." In: *Proceedings of Sinn und Bedeutung 11*. Ed. by E. Puig-Waldmüller. Barcelona, Universitat Pompeu Fabra, pp. 627–641.