Scalar implicature processing in high-functioning autism

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The project aims at comparing typical and autistic participants with respect to their processing of the scalar implicature *not all* associated with the weak quantifier *some*. High-functioning autists often show atypical performance with respect to pragmatic aspects of language processing, including difficulties with the processing of defeasible reasoning, pragmatic inferences and linguistic information in context (Pijnacker, Guerts, et al., 2009; Pijnacker, Hagoort, et al., 2009; Pijnacker et al., 2010). Yet, little is known about the calculation of the scalar implicature in autism. In addition, different processing profiles have been observed across typical participants and there have been attempts to attribute these individual differences to the participants' pragmatic language ability. For instance, Nieuwland et al. (2010) showed that the ERP responses for the scalar implicature violation case were dependent on the individual's AQ communication subscale. However, this result could not be replicated in the study by Spychalska et al. (2014), where the processing of underinformative statements with *some* was only dependent on the truth-value evaluation of these statements. In our project we want to determine whether the HFA group differs from typical individuals in their processing of scalar inferences in contexts in which no world-knowledge can be assumed to play a role in sentence evaluation.

We will first present the results of the ERP experiment by Spychalska et al. (2014) that used a sentence-picture verification paradigm to investigate the processing of the scalar implicature and was conducted on a group of healthy individuals. The authors showed that critical words in underinformative sentences with *some* elicited larger N400s and late positivities than critical words in true and informative sentences with *some* only for so-called pragmatic responders, i.e. those who evaluated underinformative sentences as false in their truth-value judgment. In contrast, the difference in the N400 and the late positivity evoked by critical words in false and underinformative sentences was larger for the logical responders. These effects were shown to be dependent only on the truth-value evaluation of the underinformative sentences and independent of the subjects' Autistic Spectrum Quotients or the lexico-semantic relationship between the critical words and the main noun phrases in the tested sentences. We plain to reuse this study to test a group of high-functioning autistic patients, aiming at comparing the ERP profiles of healthy and autistic subjects. Next, we will briefly describe a design of a second study in which we include the epistemic reasoning step in the process of implicature generation. In the initial study by Spychalska et al. (2014) the scenarios contained all the relevant information needed to evaluate the truth-value of sentences with *all* or *some*. However, scalar inferences are often argued to occur as results of global reasoning processes based on assumptions regarding the speakers intentions and information states. Therefore, *not all* is inferred from *some* based on the reasoning that no informationally stronger utterance (i.e. with *all*) is available for the speaker. This could be the case if such a stronger sentence with

all is known to be false, or if the speaker does not know, whether a stronger statement is true. If the speaker is known to have only partial access to the model, we need to include the information regarding her epistemic state to evaluate whether the use of a statement with *some* or *all* is justified. By manipulating the epistemic context of a presumed virtual agent in the experimental scenario (by means of avatar-based communication) we can investigate whether our participants perform this sort of epistemic reasoning. We expect that typical and autistic participants should differ with respect to their processing of those cases in which the epistemic step is required, since HFA participants are known to show a general impairment in reasoning in context or reasoning based on the theory of mind.

References

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