Do speakers adapt object descriptions to listeners under load?

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For successful communication, it is important that speaker and listener have established a common ground (Clark, 1996). For example, a speaker saying 'please give me the green chair' needs to have made sure, among other things, that there is an object near the listener that can be uniquely identified by the referring expression 'the green chair'. If the listener sees only one chair, mentioning 'green' is redundant; if the listener sees more than one green chair, the expression may be underspecified. There is a hot debate as to whether speakers consider the perspective of the listener when making linguistic choices. It is generally accepted that speakers adapt their language to addressees at least at a crude level (e.g. Galati & Brennan, 2010), but it is less clear which cues trigger speakers to explicitly consider the listener's needs.

In this study, we investigated whether speakers adapt descriptions of objects to addressees who are under an increased cognitive load. According to the Uniform Information Density hypothesis (UID; Levy & Jaeger, 2007), speakers strive to produce utterances that minimize peaks in information density, which may lead to processing difficulty for the listener. If speakers are sensitive to the processing capacity of their addressees, they should adjust the overall information density of their utterances to a level that they expect the addressee to be able to process. Hence, we hypothesized that, when the addressee is involved in a difficult task that is noticeably reducing their cognitive capacity, speakers will introduce more redundancy in their descriptions, thereby distributing information over more linguistic units.

To test this hypothesis, we conducted a referential communication experiment with pairs of speakers and listeners in a driving simulator. The speaker was in the passenger's seat and described pieces of furniture (cf. the TUNA corpus; Gatt, et al., 2007) for the listener, who was performing a driving task. Speakers were instructed to describe each object in such a way that the listener could identify it from a set of furniture objects appearing on the driving simulator screen. The objects could be identified by mentioning a particular set of properties (a minimal description) concerning its color, size and/or orientation. Any mentioned property that was not necessary to uniquely identify the referent was considered redundant (cf. Koolen et al., 2013).

We manipulated the listener's cognitive load by varying the difficulty of the driving task in two blocks. In the easy driving block, listeners had to drive down a straight road, while in the difficult driving block, they had to perform a challenging tracking task that has previously been shown to increase cognitive load (Demberg, et al., 2013). The order of the blocks was counterbalanced across participants. After completing the two blocks, speaker and listener switched roles and repeated the experiment with a new set of items. In this way, half of the participants had first-hand experience with the driving task before taking the speaker role.

We predicted that speakers would lower the information density of their descriptions, using more redundant attributes and/or producing longer descriptions, when listeners perform a difficult as compared to an easy driving task. In addition, we predicted that adaptation effects would be stronger when speakers had already experienced the driving task before describing.

The results showed that in the first block, speakers used more redundant attributes (but not otherwise longer descriptions) when it was a difficult driving block than when it was an easy driving block, but only when the speaker had already been the driver in the first half of the experiment (cumulative link mixed model analysis, $\beta = 0.9368$; $SE = 0.4497$; $p < .05$). This finding is in line with the view that speakers only take the listener's perspective into account when there are strong cues that adaptation is necessary (e.g. Pickering & Garrod, 2004). In addition, speakers did not seem to adjust their level of redundancy between the first and the second block, even though the second block had the other driving condition (see Figure 1). This suggests that speakers adapt to their first assessment of listeners' cognitive load, but not when cognitive load changes halfway through the task.

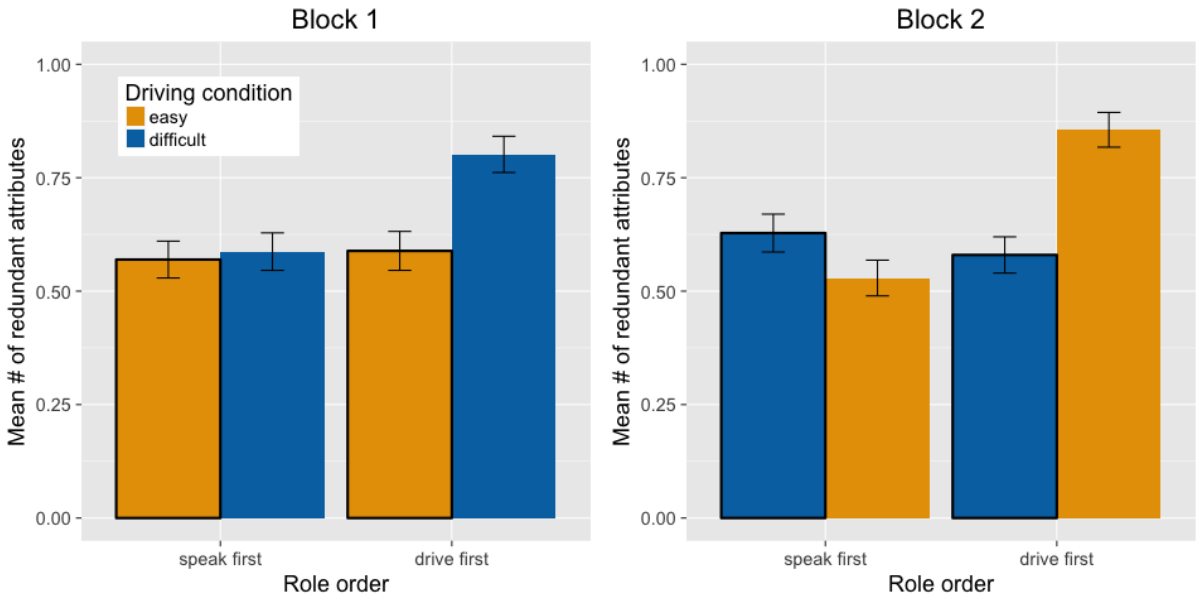

Figure 1. Mean number of redundant attributes by Driving condition and Role order in Block 1 (left) and Block 2 (right). For an individual participant pair, if Block 1 had the easy driving condition, Block 2 had the difficult driving condition (black borders) and vice versa (no borders).

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