Why do we overspecify in dialogue? An experiment on L2 lexical acquisition

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Abstract

We describe an experimental study designed to evaluate the effect of overspecification on L2 language acquisition. Our hypothesis is that overspecification helps establish alignment, which facilitates the acquisition of lexemes. Our results show that subjects receiving overspecified references during the exercise phase are slower at resolving the exercises, but have better lexeme acquisition rates. This supports the claim that overspecification is a useful mechanism for communication.

1 Introduction

The study of the generation and interpretation of *referring expressions* (REs) has been an active area of research for many years, due to its importance for communication. In particular, the role of *overspecification* in reference has received much attention – studies have shown that, although it makes interpretation more costly, redundant information is frequently used in the referring expressions produced by speakers and that while subjects take longer to resolve overspecified references, they do not rate them them any worse than minimal ones (Maes et al., 2004; Engelhardt et al., 2006). There are two main competing explanations that have been proposed for the overspecification phenomenon. One explanation holds that (1) overspecification is a result of speakers' cognitive limitations and impairs the comprehension of the REs (Engelhardt et al., 2011). The second claims that (2) overspecification is a useful part of communication because it gives the listener more chances to align with the speaker, compensates for perceptual difficulties, and makes future communication more effective (Nadig and Sedivy, 2002).

In this paper, we aim to support explanation (2) by empirically evaluating the effect of overspecification on lexical acquisition in second language (L2) learning. Our hypothesis is that overspecification helps establish *alignment* (Brennan and Clark, 1996) between the speaker and the listener, which in turn facilitates lexical acquisition.

2 The Experiment

To test our hypothesis, we created an instruction-giving system that produces minimal and overspecified REs of objects located in the context of a 3D virtual world, designed using the GIVE platform (Koller et al., 2008).

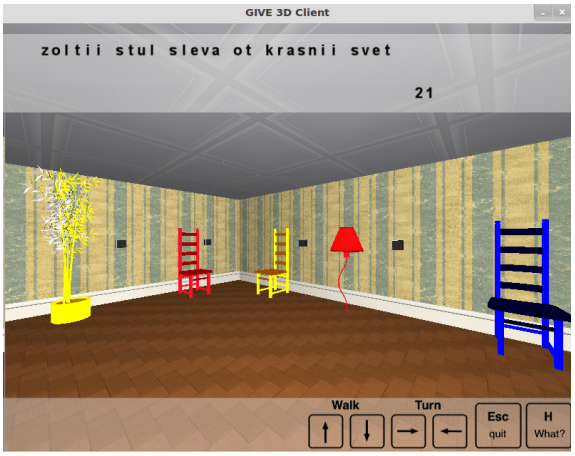

Figure 1: Exercise Phase: Referring expression received by a subject in the OR condition *zoltii stul sleva ot krasnii svet* means 'yellow chair on the left of the red light'.

We recruited fifty subjects and made two equal groups: the MR (Minimal Reference) group received minimal REs regarding objects in the Exercise Room, whereas the OR (Overspecified Reference) group received overspecified REs. Figure 1 shows a RE as received by a subject in the OR condition — REs were overspecified with a relation to a neighbouring object since there are case studies that show that this is the preferred property that is most frequently overspecified in corpora (Viethen and Dale, 2008).

3 Results

In order to test our hypothesis, we extracted information on *whether* and *how much* the number of errors decreased between the First Test Phase and the Second Test Phase of the experiment. In Table 1, we can see that 33% more OR subjects decreased their errors compared to MR subjects, which is represented by the *lexeme acquisition rate*, and that a bigger percentage of errors was overcome in the OR condition (43%) than in the MR condition (29%) (the *error overcoming rate*). We can also see that the *average resolution speed* with which the subjects in each condition resolved the referring expressions in the exercise phase is two times slower for the OR condition than the MR condition. Finally, in a post-experiment questionnaire, we found that OR subjects did not rate the received expressions worse and evaluated that the Exercise Phase as more useful to acquire the lexemes than the subjects in the MR condition.

Metric	MR	OR
Lexeme acquisition rate (%)	56	89
Error overcoming (%)	29	43
Resolution speed (cm/s)[a]	101.1	49.88

[a]The metric unit used for speed is an interpretation of perceived size in the virtual world.

Table 1: Objective metrics gathered during the experiment for the two group of subjects.

Our hypothesis was confirmed by our results: the overall OR lexeme acquisition rate was significantly higher than that of the MR condition and subjects perceived the training exercises as more effective when overspecified REs were used. These results are coherent with previous work that reports that it takes more time to resolve overspecified referring expressions and that overspecified REs are evaluated as equal to minimal ones (Engelhardt et al., 2006).

4 Conclusion

In this paper, we have shown that subjects learning Russian words via a virtual-world task had better success rates when they were provided with overspecified training exercises, and evaluated the exercises as more useful. This has applications in dialogue system development — if overspecification is useful for establishing alignment, then algorithms should produce overspecified references to facilitate communication.

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