Tailoring Object Orientation Descriptions to the Dialogue Context

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1 Introduction

Research on the verbal description of object placement has primarily focused on *where* objects are (e.g., Plumert et al., 1995), disregarding how they are *oriented*. In the present study, we describe when dialogue partners *exchange* object orientation information in a referential communication task, or rather rely on *inferences*.

In dialogue, speaker and addressee try to keep an idea about common ground to guarantee understanding (Clark, 1996). According to the 'Principle of least collaborative effort', both dialogue partners try to minimize the conversational effort for themselves and for their partner at the same time (Clark and Wilkes-Gibbs, 1986), and expect their dialogue partner to draw inferences from common ground (Spenader, 2002). Levinson (2000, 32) suggests that inferences from cultural knowledge are licensed by the *I-heuristic*, namely: "What is simply described is stereotypically exemplified". A contribution should therefore not be more informative than is required in a particular conversational situation (see also Grice, 1975), because minimal descriptions (of object orientation) may already license stereotypical interpretations of the situation.

2 Empirical Study

Our empirical study (first reported in Tenbrink et al., 2008) was a referential communication task. In the study, the *director* described for the *matcher* how to furnish an empty dolls' house. The director's dolls' house was pre-furnished either in a functional array (*f*), in which the rooms could be identified as kitchen, living-room, bedroom, and bathroom, or in a non-functional array (*nf*), in which the rooms could not be associated with a specific function (see Figure 1). The participants were separated by a screen, so that they could not see each other or the interior of their partner's dolls' house. The present analysis comprises the data of sixteen randomly selected dyads (eight dyads per condition).

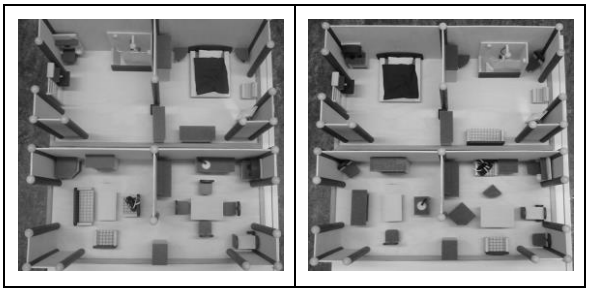


Figure 1. The model houses (left: *f*, right: *nf*).

2.1 Coding of Orientation Errors

For the present analysis, orienting objects correctly provided a measure for evaluating communication success. Objects were considered as oriented incorrectly when their orientation differed from the model by more than 45°. Error scores were coded by two independent raters who agreed in 96.19% of cases. Coding disagreement was resolved by a third coder.

2.2 Annotating Orientation Information

Referring to an object's orientation may involve its geometric properties, such as axes, which are projected onto objects analogous to the human body's axes (Landau and Jackendoff, 1993). Descriptions were considered *complete* when they included explicit references to one of the locatum's (directed) axes or features, a spatial term, a reference object to describe orientation if required by the spatial term (e.g., *towards the bed*), and (if required) reference to diagonal orientation. Based on this annotation, orientation descriptions were

evaluated as being *complete*, *incomplete*, *depending*, or *missing* for each object individually.

Example (1) shows a *complete* description of a shelf, and (2) exemplifies an *incomplete* description. A few descriptions such as (3) *depended* on the orientation of an object described earlier; this could lead to placement errors if the previous object was placed incorrectly.

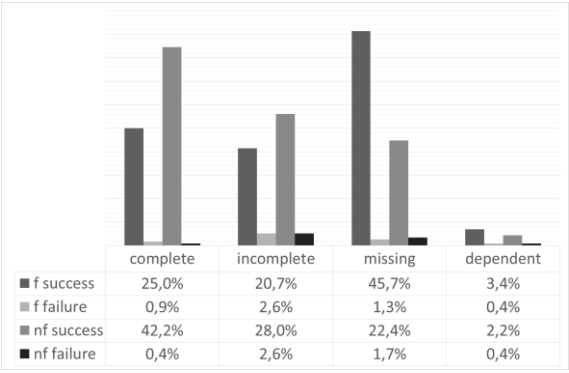
(1) *director*: ein großes Regal (…) mit den blauen Türen zum Bett rüber
[a big shelf (…) with the blue doors towards the bed]

(2) *director*: in die Ecke ist schraeg ein Stuhl reingestellt
[there is a chair placed diagonally into the corner]

(3) *director*: äh die Toilette is äh parallel zur Dusche praktisch an die Hinterwand gestellt.
[uh the toilet is uh parallel to the shower practically placed at the back wall.]

3 Results

In each of the conditions (*f* and *nf*), there were only 12 orientation errors out of 232 objects to be placed. Figure 2 shows our four categories for orientation information (*complete*, *incomplete*, *missing*, *dependent*) according to condition (*f* vs. *nf*), and further distinguishes between success and failure to orient the object in focus correctly. The results presented in the following focus on the discrepancy between the two conditions regarding orientation success based on *complete* orientation information and *missing* references.



	complete	incomplete	missing	dependent
f success	25,0%	20,7%	45,7%	3,4%
f failure	0,9%	2,6%	1,3%	0,4%
nf success	42,2%	28,0%	22,4%	2,2%
nf failure	0,4%	2,6%	1,7%	0,4%

Figure 2. Extent of orientation information (per object).

While *complete* orientation information was given for 58 objects (25.0%) that were then successfully placed in the functional condition, this applied to 98 objects (42.2%) in the non-functional condition. Conversely, orientation information was *missing* for 106 objects (45.7%) that were successfully placed in the functional condition, but for only 52 objects (22.4%) in the non-functional condition. The overall pattern was highly significant ($\chi^2 = 29.50$, df = 3, $p<.001$).

4 Discussion

Our data demonstrate that both director and matcher were sensitive to the availability of cultural knowledge of functional relations between objects. Directors and matchers adjusted their descriptions of orientation information to context-specific conditions, and matchers regularly made correct inferences from missing orientation information, using their cultural knowledge to fill in the gaps. While dialogue partners tended to explicitly negotiate orientation information for atypical spatial arrangements, in the case of typical object arrangements they relied on inferences drawn from cultural knowledge far more often. Based on this adaptation to the availability of cultural knowledge, errors occurred seldom and to the same extent in both conditions – irrespective of the typicality of the spatial situation. Clearly, functional arrangements supported and simplified communication, adding to previous findings on effects of functional relationships (e.g., Coventry and Garrod, 2004).

These findings comply with Clark and Brennan's (1991) suggestion that information is communicated when perceived as necessary. They also provide an exemplification of the I-heuristics (Levinson, 2000). In our data, director and matcher mostly relied on the I-heuristic for individual objects when the spatial array was stereotypical. However, they tended to rely on verbal information exchange when the spatial arrangement was atypical. This was the case even though the objects in our study were, in fact, all set in a typical orientation; no object was oriented towards the wall or put upside down. In this way, use of the I-heuristic appeared to be mediated by the typicality of the object arrangement. With a non-typical arrangement, speakers apparently felt that object orientation could not be left out, leading to less 'simple' descriptions (in Levinson's terms) and, accordingly, less stereotypical interpretations. Still, even in atypical situations, matchers were able to make appropriate inferences. Thus, common ground plays a crucial role for inferring or interpreting information about object orientation in all situations.

In future research we aim to investigate the strategies of the dynamic dialogue processes in this regard in more detail, towards further insight into how joint dialogic effort ties in with conversational inference processes.

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