Successful Strategies for Ambiguity Resolution in Dialogue

Gesa Schole
RTG 1808 Ambiguity
University of Tübingen
gesa.schole@uni-tuebingen.de

Thora Tenbrink
School of Linguistics and English Language
Bangor University
t.tenbrink@bangor.ac.uk

Elena Andonova
Research Centre for Cognitive Science
New Bulgarian University
eandonova@nbu.bg

Kenny Coventry
School of Psychology
University of East Anglia
k.coventry@uea.ac.uk

1 Introduction

Everyday communication is characterised by the common phenomenon of ambiguity (Winter-Froemel and Zirker, 2010), which occurs when more than one meaning is associated with one item (Ziegler, 2010). Many spatial terms, for example, can be interpreted in different ways and are thus inherently ambiguous (Schober, 1993).

In dialogue, speaker and addressee must agree on one of the potential interpretations to enable understanding. Our study addresses referring strategies that interlocutors use to specify object location, and associated problems that may cause a failure of object placement. We present a qualitative analysis of the negotiation of a bedside table's location as a case study for object placement in dialogue, contrasting the description of functional and non-functional spatial arrays.

2 Empirical Study

Our dialogue corpus (first reported in Tenbrink et al., 2008) was collected using a spatial reference task between two participants who were uninformed about the research goals. One of them (the *director*) had a furnished four-room doll's house in front of them; their task was to instruct the other one (the *matcher*) to furnish another (empty) doll's house in the same way.

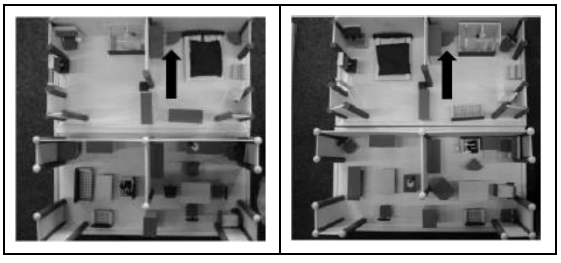

Figure 1: The functional (left) and the non-functional condition (right). Arrows mark the bedside table.

Verbal communication was not restricted, but the participants could not see each other. Conditions differed as to the arrangement of furniture (fig. 1). In the **functional** condition, rooms represented the functions of bathroom, bedroom, living room, and kitchen. In the **non-functional** condition, the furniture pieces were arranged randomly. Speakers often use functional features in spatial descriptions (Andonova et al., 2010).

3 Results

Out of the corpus, in the following we examine how eight randomly selected dyads in each condition negotiated the location of a bedside table that had the same position in both arrays.

In the **functional** condition, in six of eight cases the bedside table was positioned correctly. One placement error occurred as a consequence of the failed negotiation of the previous object, but the negotiation of the table itself was consistent and unproblematic. In these seven successful cases, the table was introduced in terms of a cluster (functional group) together with another bedside table and a bed between the two tables. The following exemplifies this:

(1) *director*: äh rechts und links vom Ehebett auch an der Wand stehen so Nachttischschränke, [uh to the right and left of the bed and against the wall there are sort of bedside tables] (…)
matcher: die stell ich? [I put them?]
director: die stellst du links und rechts vom Bett auf [you put them to the left and right of the bed]

Clustering objects implies that the furniture pieces share functionality, with the effect that the relations between the clustered objects may be inferred from world knowledge.

The only failed negotiation in the functional condition that was not a follow-up error did not use clustering:

(2) *matcher*: und der steht dann jetzt direkt an dem Schrank dran? [and it is now placed directly against the wardrobe?]
director: genau, so daneben dann. [exactly, sort of beside it.]

This information about the object's location is ambiguous. The preposition *daneben* (beside) requires a specification of perspective, as the bedside table may be standing beside the wardrobe from the speaker's viewpoint (fig. 2, left) or from the wardrobe's viewpoint (fig. 2, right). Since perspective is implicit in example (2), the error can be traced back to a perspective discrepancy that the director and matcher did not notice.

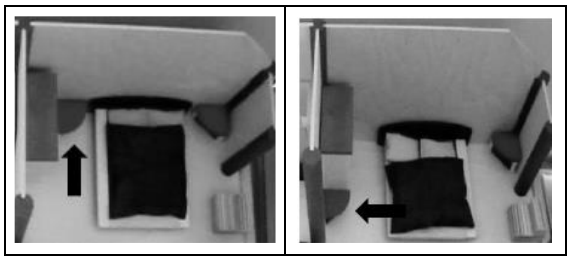

Figure 2: The bedside table beside the wardrobe: from the speaker's viewpoint (left) and from the wardrobe's viewpoint (right).

In the **non-functional** condition only four out of the eight dyads managed to place the bedside table correctly. One error depends on a similar perspective discrepancy as example (2):

(3) *director*: und das stellst du dann da so vor dass es ähm dies Runde [and then you put this in front of that so that the round part]
matcher: mhm [uhuh (affirmative feedback signal)]
director: ins Zimmer guckt das heißt ähm die beiden Ecken [faces the room that is uhm the two corners]
matcher: mhm [uhuh]
director: sind an den Wänden [are against the walls]
matcher: ja [yes]
director: einmal an dem Schrank und einmal an der Wand [one at the wardrobe and one at the wall]
matcher: ja, ja hab ich [yes, yes got it]

These instructions neither specify which wall is meant nor the perspective underlying the expression *in front of that*. The object may either be placed in front of the wardrobe from the speaker's viewpoint (fig. 2, right) or from the wardrobe's viewpoint (fig. 2, left), yielding the same ambiguity as with the term *daneben* seen above.

The remaining three location errors occur in spite of the fact that no ambiguous spatial information is given. The term *in front of* in example (4) is disambiguated by a specification of the wall against which the bedside table is placed:

(4) *director*: und vor diesem Regal steht ähm dieses, dieser kleine, wie so'n kleiner Hocker, [and in front of that shelf, there is uhm this, this small, like a small stool] (…) genau, das steht vor dem Regal [exactly, that is standing in front of the shelf] (…) das heißt die eine flache Seite is' an der Wand an der auch die Dusche steht und die andere flache Seite is' an dem Regal. [that means one of the plain sides is against the wall where also the shower is standing and the other plain side is against the shelf]

The matcher however does not take the information about the wall into account, but focuses on the first information provided by the director (*in front of that shelf*). Similarly, the remaining two matchers act on the basis of their initial assumption about the object's location and disregard the specifying information (*the back wall*).

The four successfully located tables in the non-functional condition were negotiated using complex references to neighbouring objects, the speaker's position, and the walls.

4 Discussion

In both conditions, negotiation of object placement could fail due to underspecification of underlying perspective. This kind of spatial ambiguity is a common phenomenon (Schober, 1995). To avoid miscommunication, interlocutors tend to be consistent in their perspective choice (Vorwerg, 2009), which saves the cost of discussing their choices explicitly while still being specific (Garrod and Anderson, 1987).

The remaining errors were due to the matcher disregarding relevant information. The dialogue extracts suggest that matchers had problems changing their initial assumptions about object location, even when provided precise, disambiguating information by the directors. In the examples, references to the walls as a feature of the overall environment played an important role for disambiguation. Although such reference to the environment is a frequent strategy (Carlson and Hill, 2008), our data suggest that it may be prone to being disregarded by matchers. These findings support the view that misunderstandings occur when the addressee disregards disambiguating information, or lacks contextual or world knowledge (Winter-Froemel and Zirker, 2010).

Of the successful strategies seen in our data, the clustering of objects into functional groups (where available) appeared as a frequent and very successful strategy, as it efficiently disambiguates location descriptions by implicitly relying on world knowledge.

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