How speakers represent size information in referential communication for knowing and unknowing recipients

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1   Introduction

Past research has shown that in order to communicate efficiently and effectively participants in conversation take into account their 'common ground' (e.g. Clark & Schäfer, 1989; Clark & Wilkes-Gibbs, 1986; Fussell & Krauss, 1989; Isaacs & Clark, 1987). Speakers tailor their utterances with respect to what their interlocutors already know about the respective topic of conversation and what they don't know. This concerns both common ground that exists from the outset, as well as the common ground that is accumulated over the course of a conversation. Most of the research focussing on this topic has considered exclusively verbal communication.

However, one major element of human communication is constituted by speakers' imagistic hand movements that accompany much of everyday talk. The gestural system bears a very close connection to the speech system and is thus considered as representing a core part of language; speakers' utterances are seen as comprising both a linguistic as well as an imagistic side (McNeill, 1992). When researching certain aspects of human communication it appears therefore essential that we apply a wider perspective which takes into account the gestural component of utterances.

To date, within the field of gesture, the connection between social processes and gesture use has been investigated to some extent. For example, some studies have explored the effect of gestures being visible to an interlocutor, or limited verbal interaction with an interlocutor, on the occurrence of gestures (Alibali, Heath & Meyers, 2001; Bavelas, Kenwood, Johnson & Phillips, 2002, Beattie & Aboudan, 1994). One study has focused on whether speakers' gesturing is influenced by them anticipating their listeners' potential understanding problems (Holler & Beattie, 2003). However, too little is still known about the communicational functions gesture fulfils in conjunction with speech in the context of conversational interaction.

One interesting starting point in this respect is the investigation of common ground. A study by Gerwing & Bavelas (2004) has already analysed imagistic gestures in association with common ground. The findings revealed that the gestures produced when common ground did exist were less precise, complex and informative than corresponding gestures produced without common ground.

The present study is a first attempt to find out more about how exactly the semantic information encoded in gesture and speech is affected when common ground does or does not exist. In the first instance, the analysis focuses on the communication of size information only.

2   Empirical Study

2.1 Experimental design and procedure

40 participants took part in this study, who were randomly allocated to one of two groups, a common ground (CG) and a no common ground (NCG) condition. The participants took part in pairs, and took on either the role of the speaker or the role of the listener.

The pairs were asked to collaborate on a referential communication task, which involved the speakers describing the location of a certain target entity in three different pictures which also showed many other entities. The listener was asked to later locate the target entity based on the speaker's description. The two experimental conditions differed in that in the CG condition

speaker and listener were given the opportunity to jointly examine the picture without the target entity in it before the start of the actual task. This was thought to induce common ground (i.e. knowledge about the entities shown in each picture).

2.2 Analysis

The speech and gesture data were analysed with respect to how the speakers encoded size information relating to certain particularly large entities shown in each picture. Furthermore, two independent judges were asked to rate the size of the respective entities represented by the gestures that accompanied these references (agreement = 74%).

2.3 Results and Conclusion

The results revealed that how speakers encoded size information in the NCG and CG conditions differed significantly. When size information was encoded verbally, speakers from the NCG condition were more likely to accompany their references with gestures, while in the CG condition they tended to produce purely verbal utterances. Further, when we considered only those gestures that did represent the accurate size of the respective entities, it was found that they were significantly more likely to occur in the NCG condition than in the CG condition. Overall, speakers in the NCG condition represented size predominantly either in gesture only, or in gesture and speech, whereas speakers in the CG condition represented the information mainly exclusively verbally.

The findings are interpreted with respect to the pragmatic functions gesture may fulfil during dialogue. They provide important insights regarding gesture production theories and they advance our understanding of how people in talk use language.

3 Work in Progress

The present study is a first attempt to determine how the semantic information conveyed by gesture and speech is affected by common ground. Work currently in progress builds on this study by focusing on a more collaborative, interactive setting. Using a variation of Clark and Wilkes-Gibbs' (1986) tangram task it explores the role of gestural communication in the accumulation of common ground over the course

of a conversation, focussing in particular on gestural and verbal alignment as well as systematic changes in how information is encoded in gesture and speech over the consecutive trials. This work will provide us with further insights into how speakers use language to collaborate in talk.

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