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# **Proceedings of the Annual Meeting of the Cognitive Science Society**

### **Title**

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### **Permalink**

<https://escholarship.org/uc/item/4d95t54k>

### **Journal**

Proceedings of the Annual Meeting of the Cognitive Science Society, 26(26)

### **ISSN**

1069-7977

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### **Publication Date**

2004

Peer reviewed

# Empirical Results for the Use of Meta-language in Dialog Management

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## Introduction and Background

As is well known, dialog partners manage the uncertainty inherent in conversation by continually providing and eliciting feedback, monitoring their own comprehension and the apparent comprehension of their dialog partner, and initiating repairs as needed (see e.g., Cahn & Brennan, 1999; Clark & Brennan, 1991). Given the nature of such monitoring and repair, one might reasonably hypothesize that a good portion of the utterances involved in dialog management employ meta-language. But while there has been a great deal of work on the specific topic of dialog management, and it is widely (if often tacitly) accepted that meta-language is frequently involved, there has been no work specifically investigating and quantifying the role of meta-language in dialog management. Thus, this small study investigated the correlation between meta-language and dialog management utterances in three dialog files of the British National Corpus (BNC).

## Approach and Methods

The three BNC files used in this study, KRF, KRG, and KRH, are transcripts of a series of *Ideas in Action* radio programs, some of which are interviews. Because interviews are more structured than informal conversation, they involve explicit dialog management, and are therefore a good place to start an investigation into the relation between meta-language and dialog management. Focusing exclusively on the interviews in these three files gives 5900 lines to study.

These three files had been previously annotated for meta-language, using the annotation scheme and methods reported in (Anderson, *et al.*, 2004).

To identify and annotate the dialog management utterances, we were guided by an analogy with the TRAINS domain and dialogs (Gross, Allen & Traum, 1993). In the TRAINS domain, the base-level actions are moving trains between cities, and the assigned task is to plan and manage these moves through cooperative dialog. In our case, we defined the interview itself as the task domain, the base-level actions as utterances, and the task as planning and managing these base-level actions, i.e. planning and managing the interview itself. As in TRAINS, this management is accomplished through dialog. The utterances involved in planning and managing the interview were identified and annotated according to Dialog Act Markup in Several Layers (DAMSL) (Allen & Core, 1977).

We are still analyzing the results of this annotation for specific correlations between meta-language and the different DAMSL information levels and functions.

However, we report some preliminary results, below, for the overall relation between dialog management and meta-language.

## Results

Of the 5900 lines annotated, 581 were dialog management utterances, and 1020 included meta-language. 312 lines were both dialog management and meta-language.

Table 1: Meta-language and dialog management results

	Meta	-Meta	Totals
DM	312	269	581
-DM	708	4611	5319
Totals	1020	4880	5900
$X^2 = 597.56$ $p \ll 0.001$ $\Phi = 0.318247$			

Thus, 53.7% of dialog management utterances involved meta-language. To the best of our knowledge, this is the first quantitative confirmation of the tacitly held assumption that meta-language is frequently involved in dialog management. Detailed results can be found at <http://www.cs.umd.edu/projects/metallanguage>

## Acknowledgments

This work was supported in part by a grant from the ONR.

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