

# 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 annotate dialog management utterances we applied a suitably modified version of Dialog Act Markup in Several Layers (DAMSL) (Allen & Core, 1977). DAMSL generally identifies three levels of utterance: Task, Task-management and Communication-management. However, when the task is *itself* a discussion, two issues need to be addressed. First, the distinction between the last two categories largely dissolves; all Task-management becomes a kind of Communication-management. Second, some Task level utterances, that do not involve discussion of the dialog *per se*, are effectively part of the dialog management. An example of such an utterance is: “And can you give me some examples of the firms that the University’s managed to help?” (BNC KRH 818).

To address these issues, we (a) collapsed the Task-management and Communication-management levels, categorizing all relevant utterances under the latter, and (b)

added a Task-level marker, applied on top of the standard markers, for utterances having an explicit, intended effect on the course of the discussion. Such utterances, along with the Communication-management utterances, were counted as instances of dialog management.

## Results

Of the 5900 lines annotated, 741 were dialog management utterances, and 1085 included meta-language. 407 lines were both dialog management and meta-language, giving  $X^2 = 753.74$ ,  $p \ll .001$ , and  $\Phi = 0.357$ . (See Table 1.)

Table 1: Meta-language and dialog management results

	Meta	-Meta	Totals
DM	407	334	741
-DM	678	4481	5159
Totals	1085	4815	5900
$X^2 = 753.74$ $p \ll 0.001$ $\Phi = 0.357425$			

Thus, 54.93% 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/metalinguage>

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## References

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