

Critically Analyzing Workplace Discourse to Inform AAC Device Design

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Abstract

The purpose of this paper is to introduce a study on workplace discourse that will be conducted to inform design of AAC vocabulary to better support workers' communication needs. Although some work has been done by AAC researchers and mainstream discourse researchers, there is limited evidence that can be used in AAC device prediction systems that is related to workplace and, more specifically, task-oriented discourse. The limitations in our understanding of workers' conversational needs warrant investigation into their discourse and the associated physical, temporal, and social environment factors. This study will collect and critically analyze spoken workplace conversation from 20 workers using discourse analysis and corpus linguistic techniques.

Introduction

For over 3.5 million individuals with severe communication impairments [6], full inclusion into the workplace is not guaranteed due to difficulties meeting the spoken and written demands of the job. Consequently, working-age adults with severe communication impairments may use augmentative and alternative communication (AAC) strategies and technologies such as communication boards and speech generating devices to minimize or eliminate communication barriers.

While AAC systems can potentially provide access to predictable and unpredictable workplace vocabulary, one of the most commonly cited challenges is slow communication rate compared to natural speech [5, 9, 20, 22]. Furthermore, limitations in the vocabulary available to and spoken by the user of the AAC system impact the mechanics of the communication exchange, resulting in an imbalance in conversational equity (e.g., lower initiation rates and/or fewer conversational turns) [23]. Moreover, speed and message content have been shown to negatively effect a partner's attitude towards the person who uses an AAC system [5, 13]. Consequently, an individual who uses an AAC system is likely at a disadvantage when collaborating with colleagues, interacting with customers, and conversing with superiors and subordinates due to the significantly slower communication rate and the limitations associated with available vocabulary, as well as the potentially negative attitudes and conversational inequality that result from rate and vocabulary issues.

Research on rate enhancement strategies for AAC systems, specifically in speech generating devices, has been ongoing for over 25 years. A substantial amount of effort has concentrated on automated prediction of single words, phrases, utterances, and topics [for example, 1, 4, 12, 18, 19, 21]. Language modeling and natural language processing (NLP) have played a significant role in these prediction systems in an effort to improve prediction success rates and therefore, produce utterances that more closely

resemble natural speech in speed and message content. In a majority of word and phrase prediction systems, language models are trained on databases of spoken or written text called corpora. However, only a small number of formalized corpora, such as the Cambridge and Nottingham Business English Corpus (CANBEC) and the Enron emails, relate to work settings. In this limited pool of work-related corpora, none specifically include people with disabilities, have been analyzed to inform AAC devices, or have been included in AAC prediction development efforts. Consequently, corpora used in AAC prediction systems have not included work-specific language that could improve communication efficiency and effectiveness in workplaces.

Despite the absence of workplace data in prediction corpora, there are a few researchers who have investigated workplace conversations to identify potential vocabulary needs of individuals who use AAC [2, 3, 11, 20]. Balandin and Iacono [2, 3] and Tönsing and Alant [20] examined social conversations among workers without disabilities and found that they discussed fairly similar topics during meal breaks. However, they did not investigate conversations *during* work tasks, including task-oriented discussions. In contrast, File and colleagues [11] collected conversational samples during work tasks. This project yielded a corpus with examples of task-oriented conversation, but further analysis would be required to identify detailed discourse information (e.g., pragmatic functions and discourse markers). Consequently, there is a limited evidence base within AAC research for understanding what workplace and task-oriented conversational data is missing from existing devices.

Literature outside of AAC can potentially provide insight into workplace conversation as spoken and written discourse has been more extensively studied. These studies have characterized and analyzed work-related and social discourse that occurs through face-to-face, phone, or computer mediated communication (CMC) (e.g., instant messaging, email, and chat) interactions [7, 8, 10, 14-17]. The results of these studies indicate that there are conversational differences depending on various factors, including the interaction medium (e.g., face-to-face, email, etc.) and the goal of the interaction (e.g., small talk, gossip, etc.). However, similar to the AAC literature, much of the research in workplace discourse has not specifically looked at discourse during work tasks.

Purpose

Based on the stated gaps in our understanding of task-oriented workplace conversations for informing AAC vocabulary and the potentially useful research in mainstream workplace discourse, a multi-phase formal study of workplace discourse across various communication channels including face-to-face, email, and instant messaging is being undertaken. This study will initially investigate face-to-face workplace discourse, focusing on task-oriented conversation. Additionally, contextual factors, such as time, location (e.g., a colleague's office versus the copy room), and conversational partner (e.g., a supervisor and an employee versus two coworkers) will be attributed to the discourse to determine any potential associations. It is hypothesized that this critical analysis of workplace discourse based on temporal, physical, and social environmental information (i.e., when, where, and with whom one is conversing) could better guide NLP techniques used in AAC device prediction systems, consequently enhancing communication rate and message content [11]. This paper discusses the methodology for this initial phase of the study.

Methodology

Participants

To obtain a representative sample of office discourse, 20 employees without communication impairments whose primary job tasks require verbal communication (e.g., public speaking, phone use, or working on group projects) will be recruited from at least 10 different office settings.

Data Collection

Discourse samples will be gathered over the course of 5 consecutive work days to ensure that a wide range of routine and novel topics are included. Participants will meet with the researcher to discuss the procedures of the study, map out the workplace, participate in a brief discussion about conversation habits at work, and review operation of the recording device. Conversations will be recorded via wearable voice activated audio recorders. Participants will be asked to maintain a journal of conversation-related information such as location, partner, and tasks. Conversations will be *time-stamped* to provide a record of when they took place. *Location* and *conversational partner* will be identified through participant reporting in the journal and prompted recall (using samples or description of audio recording to retrospectively prompt identification). Locational references will include space (e.g., copy room, personal office, etc.) and/or products (e.g., copy machine, telephone, etc.). While the participant may provide a name code for the partner, the researcher will ask the participant to characterize the person according to role (e.g., immediate supervisor, in-office authority above supervisor, etc.) and level of social closeness (e.g., stranger, acquaintance, etc.) during a prompted recall session that will occur within one week of the recording dates.

Data Analysis

Although participants' conversations will be continuously recorded, specific time intervals will be selected for transcription and analysis to ensure that conversational content is task-oriented. Transcription and coding will be performed on each sample using common discourse analysis and corpus linguistics techniques.

The results of this phase of the study on spoken discourse will be compared to other forms of discourse (e.g., email and instant messaging) that will be collected and analyzed in later phases. The compilation of discourse vocabulary will be incorporated into a context-aware AAC device that will use location, conversational partner, and time to predict work-relevant vocabulary. The new device will improve communication rate and facilitate access to work-relevant vocabulary, thus enabling greater workforce participation by individuals who use AAC.

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About the author:



Carrie Bruce is a research scientist at the Center for Assistive Technology and Environmental Access (CATEA) at Georgia Tech and an investigator for the RERC on Workplace Accommodations. She is distinguished for her work in examining environmental design issues that impact participation. Her recent work has focused on descriptive analyses of assessment instruments with a person-environment fit focus, development of a workplace accommodations assessment instrument, and investigation of universally designed exhibit interpretation. Additionally, Ms. Bruce is a PhD student in the Human-Centered Computing program at Georgia Tech where she is concentrating on developing a context-relevant communication system for workers with speech and language impairments.