

Assessing AAC Interaction II: Effect of Task Type on the Communication Grounding Process

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INTRODUCTION

Despite significant technological advances in AAC, many augmentative technologies are not designed to facilitate face-to-face social interaction^{1,6,8}. The current study extends the work of Higginbotham, et al.⁹ by examining the real-time interactions of non-disabled dyads in which one participant used an AAC device.

An underlying goal of any conversation is to achieve sufficient mutual understanding for the task at hand (e.g. telling a story, giving directions, solving a problem, etc.). The process by which participants arrive at a joint understanding of what the speaker has intended is called "grounding" or "achieving common ground". The basic unit of grounding, called a **Grounded Contribution (GC)** may be defined as the collaborative process in which a signal (e.g. gesture, word, utterance) is successfully understood.

To produce a GC, the AAC speaker may present a series of individual letters, words, gestures, vocalizations, etc. In response, the addressee will typically indicate their acceptance of these utterance parts through sustained attention, repetition, word completion, relevant next turn, contingent query, request for repetition, etc., until a collaboratively grounded contribution is achieved⁶.

This analysis focuses on describing the frequency and duration characteristics of the communication grounding process and the impact of task type on GCs.



Impact Word Predictor / Fujitsu touch tablet used by AAC speaker

METHODS

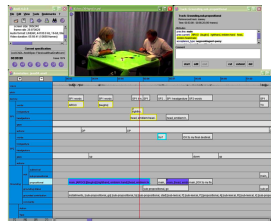
• **Participants:** 18 – 12 minute videos randomly sampled from 12 pairs of non-disabled adult dyads in the Higginbotham, et al.⁹ study.
• **Device:** Enkido Impact word predictor (1,975 word dictionary) used by AAC user.

3 experimental contexts

- Narrative – Unequal role relationship, referents not shared.
 - Map – unequal role relationship, referents partially shared.
 - Puzzle – equal role relationship, visually shared referents.
- ANVIL¹¹ used to transcribe and code interactions⁵:
- Utterances (speech, device, vocalizations)
 - Meaningful gestures (limb, head/face, task actions)
 - Index – pointing gestures
 - Illustrator – descriptive gestures (e.g., make a circle)
 - Emblems – culturally iconic gestures (e.g., thumbs up)
 - Logfile user-device interactions
 - Grounded contributions (GC) (*i.e.*, *interactive utterances*).
 - GCs analyzed in terms of frequency and composition (e.g., speech output, nonverbal behavior).

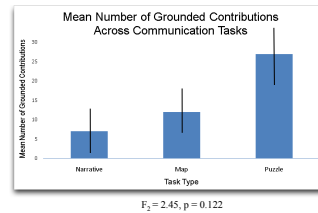
• **ANOVA:** Task (Narrative, Map, Puzzle) x Role (AAC, partner), paired comparison, tabular & survival analyses.

• **Inter-rater Agreement:** 3 transcribers, 15 hours training, transcription = 86%, coding 87%

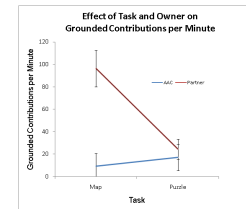


Example of annotation and coding using Anvil software

RESULTS & CONCLUSIONS



The number of grounded contributions across task was not significantly different. Lack of differences may be attributed in part to the large variability across relatively few dyads.



Effect Tests:
Task ($t_1 = -6.72, p = .0103$), GC owner ($t_1 = 14.72, p = .0002$)
Task x GC owner ($t_1 = 10.41, p = .0015$)

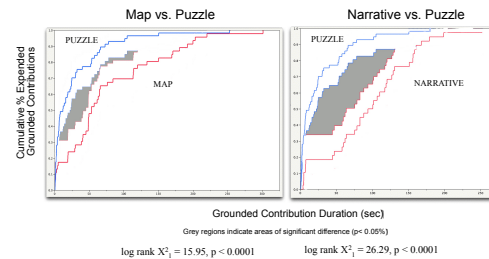
- AAC Speaker GC rates rose moderately between Map and Puzzle tasks, due primarily to increases in nonverbal behavior.
- Partner GC rates were approximately 6 times higher than AAC speaker rates in the Map task.
- Partner GC rates fell precipitously between the Map and Puzzle tasks, approaching AAC speaker rates for the Puzzle task.

- Temporal differences in GCs across tasks provide evidence that participants adapted to differing task demands by adopting different grounding strategies. Different participation patterns by speaker and partner across tasks suggest that participants coordinate their communication roles to accomplish the task at hand.
- Evidence for task and participant differences in the production of grounded contributions further a reconceptualization of interactive communication and how well AAC technologies successfully address the demands of daily communication tasks.

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Task Differences in the Duration of Grounded Contributions



- Puzzle GCs were significantly shorter in duration (Median = 10s) than either Map (Median = 50s) or Narrative (Median = 110s) GCs.
- GC durations relate to task-specific communication demands:
- Participants utilized more gestural forms of communication (more rapid) to transact the Puzzle task (points, illustrators) than in Narrative or Map tasks.
- Participants engaged in less joint communication activity in Narrative task compared to the other tasks. AAC speaker used device (slower) to produce the majority of GC components.

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