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A Pilot Study Comparing AAC Vocabulary Usage Patterns Based on User Experience

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Abstract

A pilot study with 4 participants compared augmentative and alternative communication (AAC) vocabulary usage patterns based on user experience. The cookie theft picture was administered to obtain a language sample. Samples were collected from two novice (3 weeks experience) and two expert (3 months experience) individuals who rely on high technology AAC systems. Data were collected using the Universal Language Activity Monitor (U-LAM) software and a video recorder for analysis. Reliability of the language sample analysis process was 93% for utterance segmentation. Frequency of core vocabulary and frequency of vocabulary based on language representation methods were calculated for both novices and experts. Novices were found to use significantly more spelling and word prediction, while experts were found to use rate enhancement strategies with a significantly higher frequency. The findings report the differences between novices and experts in vocabulary usage and discuss the clinical implications of this pilot study's results.

Research Description

Introduction/Background

The goal of AAC is to optimize communication for the individual being served. Achieving the goal with adults with complex communication needs (CNN) requires a language approach to intervention. Language sample analysis is a standard method of monitoring the progress of learning a new skill. The effective use of a high technology AAC system requires generating utterances by accessing vocabulary stored using available language representation methods.

Typical conversation of persons using natural speech is comprised of 80% core vocabulary. To increase the normalcy of conversation in individuals who rely on AAC, the effective use of core vocabulary is necessary. Therefore, clients need to learn the most efficient methods to access core vocabulary. Monitoring performance at the novice level should support intervention that increases efficiency of core

vocabulary selection. This will in turn increase frequency of use and naturalness of conversation.

Language representation methods (LRMs) have been identified as a factor influencing AAC system performance and outcomes. Three LRMs are available on high technology AAC systems: alphabet-based methods, single meaning pictures (SMP) and semantic compaction (SC). Although spelling is a standard text entry method, spelling requires multiple keystrokes and is slow. Word prediction may produce keystroke savings, but fails to increase communication rate (Koester & Levine, 1996). Single meaning pictures and semantic compaction rely on symbols/icons to store vocabulary. Research on semantic compaction shows a reduction in keystrokes with an increase in communication rate (Hill, Holko, & Romich, 2001).

Research on Human Computer Interface shows the importance of documenting performance distinctions between novice and expert users of technology, and identifying factors that influence performance (Mackenzie & Zhang, 2001). Practitioners providing AAC clinical service require similar data to support decisions about training and optimizing communication.

Purpose

The specific research questions for this study were: (a) What are the differences in AAC vocabulary usage patterns based on user experience? (b) Specifically, what are the differences in the LRMs of semantic compaction, spelling, word prediction, and single-meaning pictures? and (c) What is the word commonality by LRM used by experts and novices?

Methods

Participants. Four (N=4) adults (3 males; 1 female) of college age with cerebral palsy and complex communication needs who rely on AAC interventions using direct selection. Two (N=2) participants had 3 months experience on the AAC program and self-selected as expert users. Two (N=2) had 3 weeks experience on the same AAC program and were considered novices.

Instrumentation. The four participants used a high technology voice output hybrid display with 128 locations and a touch screen with a language application program (LAP) that contains core and extended vocabulary items. The LAP supported all three AAC language representation methods; alphabet-based methods (spelling and word prediction) and semantic compaction were available from the static display and single-meaning pictures and word prediction were available from the touch screen. U-LAM software was used to generate a logfile of device events once the AAC device was connected to a computer. A video recorder was used to collect a visual record of the procedure.

Procedure. The picture description task based on the Cookie Theft picture (Goodglass & Kaplan 1983) was administered to each participant. The participants were asked to describe the picture following the instructions in the manual.

Data Analysis. Data were analyzed using procedures outlined in Romich and Hill (2000). PeRT 1.0 (Performance Report Tool) was used to support data analysis (Hill & Romich, 2003). Descriptive statistics were used to report frequency of core vocabulary use, total number of words, number of different word roots, and frequency of LRM use. Word lists were generated to identify each token by LRM use. Analyses were conducted to examine commonality among the words for each LRM category for the two participant groups. Word commonality was reported by identifying those words used by novice participants that were common to the expert participants.

Results

The interrater reliability for word-by-word agreement was 100% and percentage agreement on utterance segmentation was 93%. In addition, inter-judge reliability was assessed for LAM data and videotape data based on 20% of the samples using three (3) judges. Percent agreement for word-by-word averaged 95% and for utterance segmentation averaged 96%.

Preliminary results indicate no clinical difference in the frequency of core vocabulary use. Participants used core vocabulary an average of 73% in their narratives with a range of 70% - 78%. However, clinical differences were found between experts and novices in the methods used to access vocabulary using an AAC system. Experts used significantly less spelling, word prediction and single-meaning pictures than novice users. More dramatic differences were observed in the use of alphabet-based methods. Both experts spelled 4 words each. Expert 1 predicted 1 word only and expert 2 did not use word prediction at all. However, Novice 1 spelled 19 words and used word prediction to select 27 words. Although Novice 2 did not use any spelling, 33 words were selected using word prediction. Frequency of use for the various AAC LRMs will be provided that show the significant differences that existed between the expert and novice users, also.

Word commonality was identified by LRM. Experts had a total of 32 words in common. Novices used only 8 or 25% of these common words. Commonality was not found among the other AAC LRMs. However, novices used spelling and word prediction to access words common to the SC list of the experts. In addition, novices relied on spelling and word prediction to access core vocabulary.

Conclusions/Clinical Impressions

The results of this study show the difference in how pre-stored vocabulary is accessed by novice and expert users of high technology AAC systems. Novice users rely on familiar text generation methods, e.g. spelling with word prediction at first encounter. However, the learning curve to become an expert user appears to be as short as three (3) months for individuals to become proficient in accessing stored vocabulary using semantic compaction.

The study demonstrates that LAM data can be used to reliably identify how vocabulary is being accessed based on LRMs. In addition, frequency of LRM use can be an indicator of

competence and can be used to distinguish a novice from expert user. Therefore, clinical intervention at the novice level can focus on identifying words selected using spelling and word prediction and providing training on the icon sequences for semantic compaction.

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