CAC 2009 PROPOSAL

Introduction

Augmentative and alternative communication (AAC) technology can improve the lives of people with aphasia (PWA), assuming willingness to use such aids in real-life communication. Research (e.g., Lasker & Bedrosian, 2000) suggests that some PWA avoid or abandon AAC for reasons that include fear or shame, preference for working on speech recovery, and the inadequacy of some AAC to express the user's own thoughts. Devices that feature flexibility in message creation (e.g., Lingraphica®; <www.aphasia.com>), or flexible approaches to delivery of stored messages, have the potential to mitigate some barriers, but their complexity, cognitive requirements, and steep learning curve add to risks of frustration and failure (Mollica, 1999).

Research indicates that the spoken language of PWA is more informative and better structured when produced with the aid of SentenceShaper® (www.sentenceshaper.com), a computer program for aphasia that incorporates flexibility in message creation (e.g., Albright & Purves, 2008; Linebarger, Schwartz, Romania, Kohn, & Stephens, 2000). Recent enhancements to the system introduce portability. With **SentenceShaper To Go**™ (SSR-TG; Linebarger, Romania, Fink, Bartlett, & Schwartz, in press) PWA can, in anticipation of an upcoming event or conversation, create a relevant message with SentenceShaper, link the recorded content of messages to buttons on a portable handheld device, and download the content to the handheld device (HH) (see Figs. 1 and 2). They can then use the HH to deliver the message in the appropriate context, using one or more of its flexible delivery modes (explained below).

(Figures 1 and 2 about here)

Seven PWA participated in an experiment with SSR-TG that involved instruction, practice, and extensive experience using SSR-TG to construct and communicate messages to familiar and unfamiliar listeners. Subsequently, they were interviewed about their experiences. This paper describes the aphasia-tailored interviews, qualitative analysis of the data, and results pertaining to participants' attitudes towards aided speech with SSR-TG and their preferences in relation to the optional modes of message delivery.

Methods

Participants

Seven participants who had extensive experience using SSR-TG in a controlled setting were interviewed one-on-one. Participant profiles are presented in Table 1.

(Table 1 about here)

Qualitative Interviews

Because standard interviewing techniques place heavy demands on spoken language skills, this study incorporated principles of supportive communication (Kagan, 1995; 1998) and directed cueing, including yes/no and multiple-choice question formats, slowed repetition, and rephrasing and personalizing of items in order to maximize comprehension and functional output (e.g., Cruice, Worrall, Hickson, & Murison, 2005; Luck & Rose, 2007). Each interview was conducted by an experienced qualitative interviewer and facilitated, as needed, by an experienced speech-language pathologist (SLP). Participants were encouraged to use gestures, facial expressions, pen/paper, and the HH to help them communicate. Interviews lasted about an hour.

For simplicity, most questions asked about the HH; however, since messages downloaded to the HH are generated with the core component, SentenceShaper, aided effects from SentenceShaper message creation are integral to overall aided effects, and thus contributed to respondents' perceptions about speech enhancements from the HH.

All interviews were audio-recorded and transcribed by the qualitative researcher, using a system of notations to signify non-verbal cues from the respondent. Field notes were also taken and later used in data analysis. Transcripts were then reviewed by the SLP, who provided additional comments or revisions based on her participation in the interview. Lastly, the research team reviewed the transcripts.

Data Analysis

Analysis and coding of transcripts and field notes was undertaken as the transcripts became available. Altas-ti software (Muhr, 2004) was used to facilitate data management, coding, and analysis. Data analysis followed the phenomenological approach to qualitative research in which researchers look for common themes underlying the studied phenomenon (van Mannen, 1990).

Results

Experiential Views on Aided Speech.

All of the respondents said they were able to communicate a complicated message "well" with the HH; five conveyed that their speech was better with the HH, compared to unaided. When probed for details, all reported (or acknowledged) improved word retrieval (e.g., S1 reported that using the HH helped her get the words out when her brain "doesn't respond"). Most acknowledged improved fluency (e.g., fewer pauses and fragmented utterances) and that "flow" and "flowing" describe their aided speech.

All brought up the concepts of *practice* and *repetition* as key to improvements they perceived in both their aided and unaided speech. For example, L3 said she would use the HH to help her prepare for a complicated conversation: "When you do it over and over again it will help…you just have to practice and practice and practice." Similarly, S1 said, "Over and over and over. I get it!"

Preference Hierarchy for Message Delivery

Messages on the HH could be delivered in several modes. Analysis of transcripts revealed a clear hierarchy of preferences among these modes. These preferences were informed by how participants envisioned using the HH in real-life situations and by their experience using the HH in two different modes in the lab. Most participants preferred to use the "partial-cue" mode, wherein the user plays to herself some amount of a button's recorded content and then speaks on her own. They were less enthusiastic about the "full-cue" mode, in which the user plays the entire button content to herself and then repeat it back to the listener. So while both the experienced modes allowed the PWA to communicate the message from their own mouths, they preferred partial cueing. Among the reasons given was greater perceived naturalness (S4: “More me”). The interviewer then demonstrated a third mode, involving just the playback of the recorded content. This was less preferred than either cue mode (S2’s explanation: “by myself!”). Most conveyed that this is something they would do only in specific contexts (e.g., when communicating a complicated issue or delivering a speech). Lastly, participants were enthusiastic about hearing their own voice on the HH, so it can be surmised that PWA prefer this option over synthesized or other-recorded speech.

Discussion

Like most PWA, these respondents aspired to communicate independently and be understood. They perceived that SSR-TG had the potential to help them achieve this goal. It is noteworthy that although these participants were independent in many life situations (consistent with their moderate aphasia; see Table 1), each identified situations in which use of SSR-TG would be beneficial. And although these individuals were not “techies” at the start, they were not frustrated or discouraged by this high flexibility approach. Indeed, several commented that the technology was “cool” and “awesome”. Of course, since at the time of the interviews, none of these individuals had yet used SSR-TG in real-life communication situations, it remains to be determined whether the expressed enthusiasm for the technology and perceived benefits are predictive of real-life use. What is clear is that assessing attitudes towards high flexibility AAC following extended experience in a controlled, “safe” setting can provide a useful bridge to real-life use. In our case, the data helped shape the design of a follow-up study in which one of the participants is now using SSR-TG with support in situations such as delivering a speech to a large audience and talking with a customer at his place of employment.

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Table 1. Profiles of the seven participants

Pt	Gender	Age	Educ.	MPO	WAB AQ	WAB Comp.	WAB Rep.	Subtype	PNT	NVNT N	NVNT V
S1	F	64	12	103	83.0	93.0	88.0	B/A	89.0	73.0	47.0
S2	F	58	18	213	67.0	68.0	72.0	B	69.0	70.0	27.0
S3	M	48	14	14	61.0	100.0	30.0	B	67.0	72.0	47.0
S4	F	77	12	15	78.0	81.0	52.0	C	67.0	83.0	53.0
L2	F	45	9	125	72.0	80.0	70.0	A	80.0	90.0	80.0
L3	F	53	16	89	85.0	72.0	94.0	A	86.0	87.0	77.0
L4	M	63	18	11	85.0	99.0	96.0	TM	94.0	83.0	53.0
Mn		**58.3**	**14.1**	**81.4**	**75.9**	**84.7**	**71.7**		**78.9**	**79.7**	**54.9**
SD		**10.9**	**3.4**	**74.9**	**9.5**	**12.8**	**24.1**		**11.3**	**8.0**	**18.4**

Mn, mean; SD, standard deviation; M, male; F, female; MPO, months post onset; WAB, Western Aphasia Battery (Kertesz, 1982); AQ, Aphasia quotient; Comp., % correct on all comprehension subtests of the WAB; Rep., % correct on repetition subtest of the WAB; Aphasia Subtypes: A, Anomic. B, Broca's. B/A, Broca's resolving to Anomia. C, Conduction. TM, Transcortical Motor; PNT, % correct on the Philadelphia Naming Test (Roach, Schwartz, Martin, Grewal, & Brecher, 1996); NVNT, Noun/Verb Naming Test (Zingeser & Berndt, 1990); N, % correct on noun subtest of NVNT; V, % correct on verb subtest of NVNT.

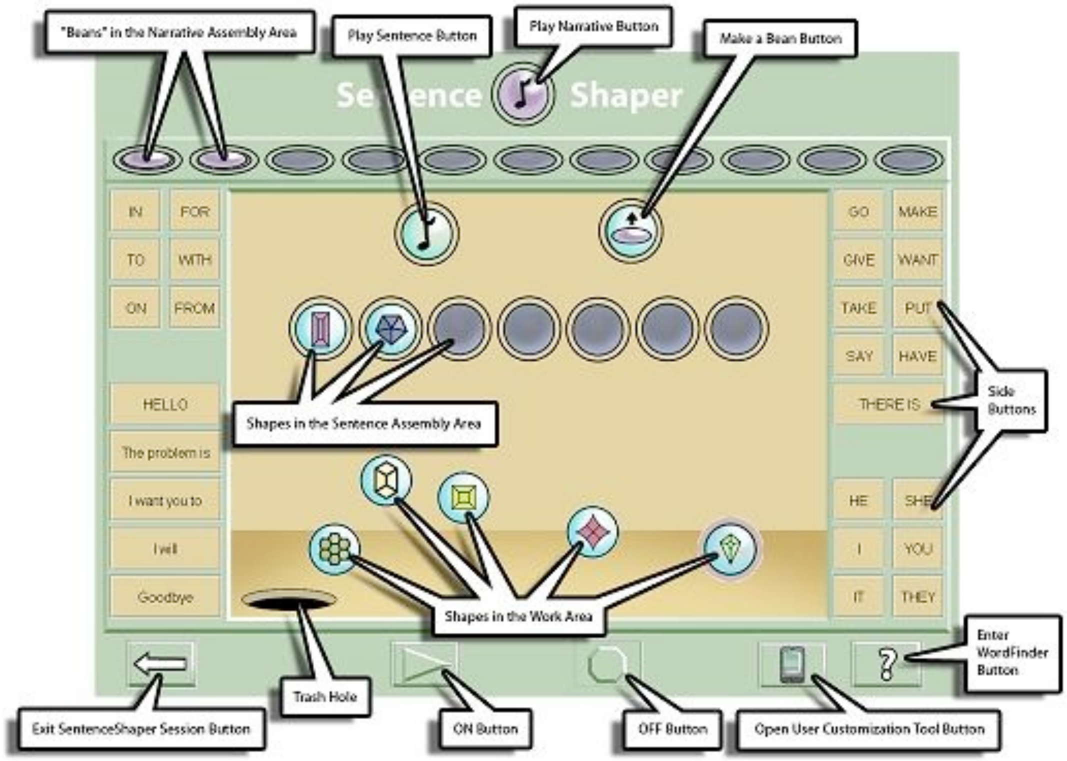

Figure 1. Interface to SentenceShaper, the core component in SentenceShaper To Go. The *On* and *Off Buttons* at the bottom of the screen control a sound recorder, allowing the language-impaired user to record a single word or phrase at a time. When the sound recorder is turned off, an arbitrary colored *shape* appears in the area above the On/Off Buttons, called the *Work Area*. Clicking this shape causes the recorded word or phrase to be replayed, which keeps the recorded item in memory, and allows the user to listen to his/her production and decide whether it is correct. An unsatisfactory recording can be deleted (by dragging the shape to the *Trash Hole*) and possibly re-recorded. Sentences are built up by dragging these shapes up to the *Sentence Assembly Area* and ordering them from left to right; the entire sequence can be replayed in order by clicking the *Play Sentence Button*. The user can reorder shapes in this area, dragging elements to the Trash Hole or back to the Work Area. When the user is satisfied with the sentence, clicking the *Make a Bean Button* causes the entire sequence to be moved up to the *Narrative Assembly Area* at the top of the screen, where it is now associated with a single purple *"bean"* icon, which replays the entire sequence when clicked. Side Buttons display text words and play the spoken word or phrase aloud when clicked. To incorporate a Side Button word or phrase into his production, the user records it in his/her own voice.

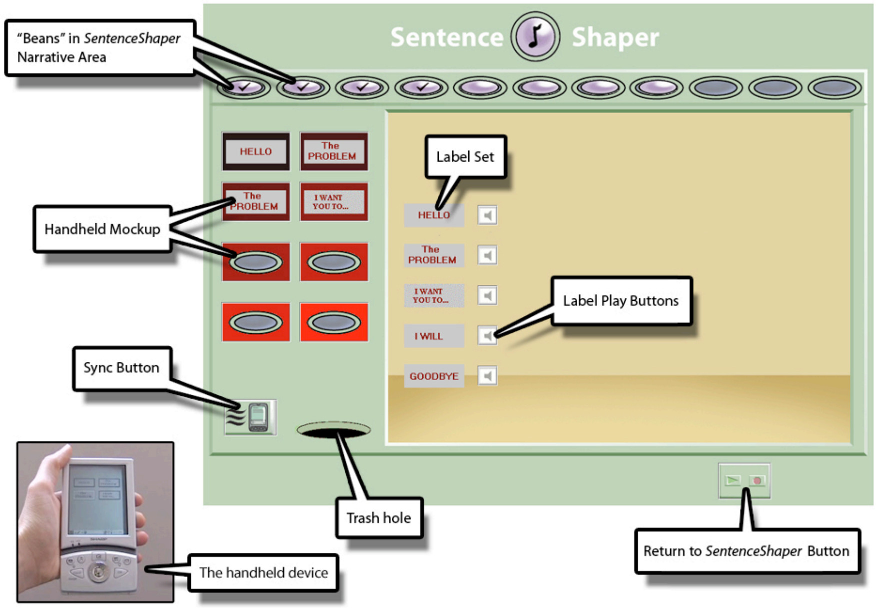

Figure 2. Interface to the Handheld Device in SentenceShaper To Go. The Handheld Customization Tool allows the language-impaired user to configure the screen of the handheld device (HH) (shown in bottom left corner) from within SentenceShaper, choosing which of his/her SentenceShaper utterances will be played by each button on the HH, and which text or image labels (if any) will be placed on the HH buttons. This tool is accessed by clicking a button on the main screen of SentenceShaper, which opens up the interface shown in the Figure. Here the user configures the HH by dragging purple beans – linked to spoken utterances, typically sentences – from the SentenceShaper Narrative Area (top) into the Handheld Mockup (middle left), a set of eight slots corresponding to positions on the HH screen. When the user clicks the Sync Button (lower left), the sound files and labels, along with information about how they should be arranged on the HH screen, are downloaded to the HH (bottom left) through a USB or wireless connection.
[Figure 2 originally appeared in Linebarger, M. C., Romania, J. F., Fink, R. B., Bartlett, M. R., & Schwartz, M. F. *Journal of Rehabilitation Research and Development,* in press.]