



Teaching advanced operation of an iPod-based speech-generating device to two students with autism spectrum disorders

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ABSTRACT

We evaluated a program for teaching two adolescents with autism spectrum disorders (ASD) to perform more advanced operations on an iPod-based speech-generating device (SGD). The effects of the teaching program were evaluated in a multiprobe multiple baseline across participants design that included two intervention phases. The first intervention focused on teaching the students to navigate between two screen pages and complete a multi-step response sequence to request preferred stimuli. The second intervention aimed to teach the students to turn on and unlock the device prior to navigating to the correct screen pages. Teaching procedures included response prompting, prompt fading, and differential reinforcement. Results showed that both interventions were effective in teaching the respective operations. Learning advanced operation of the iPod-based SGD could be seen as one way to promote greater independence in using such devices for multi-step communication.

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1. Introduction

Speech-generating devices (SGDs) are increasingly being used in communication intervention programs for individuals with autism spectrum disorders (ASD; van der Meer & Rispoli, 2010). Contemporary SGDs typically consist of a computer-based speech-synthesizing unit and visual display. Visual displays are usually configured with a number of icons (e.g., colored line drawings) representing words or phrases. Touching the icons produces corresponding speech output. Touching the icon of a ball, for example, might produce the phrase: “*I would like to play with the ball.*” SGDs are indicated when natural speech has failed to develop, when the person’s speech is significantly limited, and/or when speech is largely unintelligible (Schlosser, Sigafos, & Koul, 2009). These indications are present in a significant percentage of individuals with ASD (Matson, Mahan, Kozlowski, & Shoemaker, 2010).

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A relatively new type of SGD consists of an iPod Touch[®] or iPad[®] with Proloquo2Go[™] software (Sennott & Bowker, 2009). With this software, the iPod Touch[®] or iPad[®] can be used as a SGD with a potentially unlimited number of screen pages and icons. The software enables the device to be programmed so that tapping or lightly touching the icons produces corresponding synthesized speech output. Mirenda (2009) noted several potential advantages of this new SGD system, including (a) the large set of icons, (b) high-quality of the synthesized voice output, (c) portability due to its small size and light weight, and (d) relatively low cost (approximately US\$189.00 for the software plus another US\$200 for an iPod Touch[®]).

To date, only a few studies have aimed to teach individuals with ASD or other developmental disabilities to use the aforementioned types of SGDs (Flores et al., 2012; Kagohara et al., 2010, 2012; van der Meer et al., 2011). For example, van der Meer et al. taught two adolescents (13 and 14 years old) and one young adult (23 years old) to use an iPod Touch[®] with Proloquo2Go[™] software. The participants had severe intellectual disability, autistic-like behavior, and, at most, spoke only a few single words. For this study, the visual display on the iPod Touch[®] was configured with three icons (i.e., colored line drawings) representing snacks, toys, and social interaction. Touching the drawings produced corresponding synthesized speech output (i.e., “I want a snack please.”, “Can I play with a toy?”, and “What’s new with you?”). The initial target response for each participant was to request snacks and/or toys by selecting the corresponding icons from the SGD. To do this, preferred snacks and/or toys were offered and the participants were prompted to select the corresponding icon, if an independent request did not occur within 10 s. Prompting consisted of physical guidance, which was faded using a 10-s time delay procedure (Halle, Marshall, & Spradlin, 1979). With intervention, the two adolescents learned to make requests and discriminate among the screen icons, but the young adult participant did not make progress. Although the results were mixed, van der Meer et al. demonstrated a promising approach for teaching initial use of an iPod-based SGD.

One limitation of the van der Meer et al. (2011) study was that iPod Touch[®] was always turned on and opened to the correct screen page. Thus, participants only had to touch one of the available icons, rather than undertake more advanced operations, such as turning on the iPod and navigating to the correct screen page. This limitation is not uncommon in the literature. Indeed, studies on teaching SGD use to individuals with ASD rarely require participants to undertake these more advanced operations (see van der Meer & Rispoli, 2010 for a review). However, without these more advanced skills, the extent to which participants acquire independence with respect to SGD-based communication is limited.

Another limitation of the van der Meer et al. (2011) study, and the SGD/ASD literature more generally (van der Meer & Rispoli, 2010), is that participants have most often been taught a single-step requesting response. For example, the participant might be offered a cookie and taught to select a single (COOKIE) icon from the screen page. While this is a useful initial communication skill, communicative exchanges often require multi-step response sequences. For example, the person might request something to eat by first selecting a general SNACK icon. The listener might then respond to this general request by asking: *What type of snack do you want?* This would then set the occasion for the person to make a second, more specific request by selecting a second icon, such as COOKIE, CRACKER, or CHIP.

The present study was designed to address these two limitations in van der Meer et al. (2011) and the ASD/SGD literature more generally (van der Meer & Rispoli, 2010). Specifically, we evaluated a program for teaching two adolescents with ASD to perform new and more advanced operations on an iPod-based SGD. Two intervention targets were developed. The first intervention focused on teaching the students to navigate between two screen pages to locate icons necessary for completing a multi-step response sequence to request preferred stimuli. The second intervention aimed to teach the students to turn on and unlock the device before navigating to the correct screen pages. The two participants, Sam and Steven, had previously been taught to use an iPod Touch[®] to request preferred stimuli using a single-step response as described for Steven in Kagohara et al. (2010) and for Sam in van der Meer et al. (2011). Teaching these more advanced operational steps was intended to further develop their existing requesting repertoire and promote greater independence in using the iPod Touch[®] for communicative purposes.

2. Method

2.1. Ethical clearance and informed consent

The relevant university ethics committee approved the study and parental consent was obtained for the students’ participation. Although the students were unable to provide informed consent, their assent was inferred by the fact that they always accompanied research staff to the activity and participated throughout each session.

2.2. Participants

The participants, Steven and Sam, were diagnosed with ASD and obtained expressive language age equivalencies of less than 2 years on the Vineland Adaptive Behavior Scales, second edition (Vineland-II; Sparrow, Cicchetti, & Balla, 2005). Steven was 17 years old and Sam was 13 years old. Neither had any physical/sensory impairments and both had sufficient motor control to operate the iPod Touch[®]. Steven and Sam had previously learned to use an iPod Touch[®] to request preferred snacks and/or toys. During this prior intervention, the iPod Touch[®] was always turned on, unlocked, and opened to the correct screen page. They were taught to make a single-step request by touching icons for preferred snacks and/or toys. This prior intervention program was described in Kagohara et al. (2010) and van der Meer et al. (2011) for Steven and Sam,

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