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Using video modeling on an iPad to teach generalized matching on a sorting mail task to adolescents with autism

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ABSTRACT

Two multiple probe designs across three and four participants evaluated the effects of video modeling to teach a matching response (sorting mail) to seven adolescents with autism. Participants were instructed on one set of responses (five mail pieces) using video modeling, while concurrently monitoring two other sets for generalization effects. Results indicated that three participants learned their target set and generalized to the untrained sets, and two participants required an error correction procedure to achieve or approach mastery on their target set. Two participants did not acquire target sets with video based instruction. Data on setting generalization and maintenance are also provided for the participants who reached mastery. Participant variables that may relate to responding, limitations to the study, and directions for future research on video based instruction are discussed.

1. Introduction

Teachers of adolescents with developmental disabilities can increase the probability of positive post-secondary outcomes by using evidence-based practice (EBP; Mazzotti, Rowe, & Test, 2013) and teaching meaningful skills (Nietupski & Hamre-Nietupski, 1997). Despite increased attention and research identifying evidence based transition curriculum, educators have not fully adopted many of these strategies. This neglect adversely impacts post-school outcomes for individuals with disabilities (Test et al., 2009). One reason educators may fail to implement EBP is because they feel they do not have enough time (Klingner, Ahwee, Pilonieta, & Menendez, 2003). Researchers can help "bridge the research to practice gap" by developing effective, practical interventions, specifically ones requiring less time and fewer resources (Horner et al., 2005).

Wolery, Ault and Doyle (1992) argue that efficiency is an important consideration irrespective of the skill being taught. Specifically, students benefit by learning more in less time, acquiring more skills, and gaining additional opportunities to access reinforcement (Wolery & Gast, 1990). An instructional practice is deemed more efficient than another if the same effect is achieved but it requires less energy or time than the other intervention (Wolery et al., 1992). For example, if a job coach or teacher trains someone to put merchandise (e.g., store returns) in the proper place in a large department store, the trainer needs to select effective and time efficient instructional methods. By selecting efficient EBP the practitioner has more time for training additional skills (to this particular individual or others) or completing other important tasks related to the practitioner's job (Wolery & Gast, 1990). For example, in a department store there may be more time left to spend

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training the individual how to properly place the item back (e.g., folding clothes neatly) or other related duties. Additionally, as adolescents approach graduation and transition to post-secondary settings, the relevance of efficiency in instruction for skill acquisition increases as available time for adding new skills to the student's repertoire decreases. Capitalizing on methods that program for and promote generalization is a way to achieve greater efficiency in teaching (Stokes & Baer, 1977; Tekin-Iftar, Kurt, & Acar, 2007; Wolery et al., 1992).

Baer, Wolf and Risley (1968) included "generality of behavior change" as one of the seven essential components of applied behavior analysis (p. 96). Generalization takes place when a "relevant behavior occurs under different, non-training conditions" (Stokes & Baer, 1977, p. 350). For example, using a specific intervention where a job coach or teacher only trained the individual to return electronics and the trainee was able to also return merchandise to other departments without additional training, would be more desirable than one without these same effects. This demonstrates how planning and programming for generalization allows for more efficient instruction. Part of the planning process includes considering all relevant features of target stimuli in the training environment and how they relate to stimuli in the natural environment (Cooper, Heron, & Heward, 2007). Designing or developing a concept analysis reveals relevant and irrelevant features of the stimuli, across the range of possible stimulus conditions in an individual's environment (Becker, 1986). Comprehensive and efficient instructional programs include a set (or sets) of stimuli sampling the range of stimulus features identified in the concept analysis. By systematically intervening on these selected sets in a general case programming format, the practitioner increases the likelihood that the skill will generalize to novel, untrained stimuli (Sprague & Horner, 1984).

Another means to achieve generalization involves using interventions targeting an individual's response to a small set of stimuli in a way that it will have collateral effects on nontargeted stimuli within the same stimulus class. For example, if a student is learning to categorize items for restocking in a department store, the job coach or teacher may teach that "electronics" includes cameras, laptops, and printers. If the student can associate that stereos share something in common with the other items in "electronics", the student may generalize that stereos fit into that category without direct instruction. In this way, the instructional program has successfully facilitated generalization and thus is more efficient.

Substantial research exists documenting video based instruction (VBI) as an effective means for promoting generalization (Ayres & Langone, 2005; Bellini & Akullian, 2007; Delano, 2007; Hitchcock, Dowrick, & Prater, 2003; McCoy & Hermansen, 2007; Mechling, 2005). For example, Charlop-Christy, Le, and Freeman (2000) demonstrated that target behaviors (i.e., functional, social, and play skills) generalized with video modeling while other skills taught with live models did not. In their study, target behaviors generalized across people, settings, and materials. Positive generalization outcomes of target behaviors have occurred from VBI across settings (e.g., Kinney, Vedora, & Stromer, 2003; Mechling & Ortega-Hundon, 2007), stimuli (e.g., Mechling & Gast, 2003), communicative partners (e.g., Gena, Couloura, & Kymissis, 2005; Sherer et al., 2001), instructors (e.g., Norman, Collins, & Schuster, 2001), and materials (e.g., Nikopoulos & Keenan, 2003). Specific skills that have generalized following instruction with VBI include: social skills (e.g., Charlop & Milstein, 1989; Dauphin, Kinney, & Stromer, 2004), communication skills (e.g., Wert & Neisworth, 2003), prepositions (i.e., Mechling & Hunnicutt, 2011), spelling (e.g., Kinney et al., 2003), grocery shopping (e.g., Mechling & Gast, 2003), purchasing skills (e.g., Haring, Kennedy, Adams, & Pitts-Conway, 1987) job skills (e.g., Mechling & Ortega-Hundon, 2007), self-help skills (e.g., Norman et al., 2001), transportation skills (e.g., Mechling & O'Brien, 2010), safety skills (e.g., Mechling, Gast, & Gustafson, 2009), daily living skills (e.g., Lasater & Brady, 1995; Shipley-Benamou, Litzker, & Taubman, 2002), and play skills (i.e., Nikopoulos & Keenan, 2003). In addition to the clear demonstration that VBI promotes generalization, other benefits include the practitioner's ability to simulate generalization settings (Mechling & Ortega-Hundon, 2007), cost-effectiveness (Charlop-Christy et al., 2000; Haring et al., 1987; Mechling & Gast, 2003), time efficiency (Charlop-Christy et al., 2000) and ability to provide multiple exemplars (Marzullo-Kerth, Reeve, Reeve, & Townsend, 2011; Mechling & Hunnicutt, 2011).

While researchers have documented that VBI can lead to generalization, no work to date has shown the effects of VBI on generalized identity matching. Generalized identity matching occurs when an individual matches objects (or pictures) to a sample with a novel stimulus set after previously learning to match with one or more sets (Dube & Mcilvane, 1992). Although researchers have demonstrated that typically developing children can learn generalized identity matching (Brown, Brown, & Poulson, 1995), only a few studies documented a match-to-sample task for individuals with developmental disabilities with the purpose of probing for generalized identity matching (e.g., Dube, Iennaco, Rocco, Kledaras, & McIlvane, 1992; Gaisford & Mallot, 2010; McIlvane, Dube, Kledaras, Iennaco, & Stoddard, 1990; Saunders & Sherman, 1986). Most recently, Gaisford and Mallot (2010) evaluated a response prompting strategy for teaching three children with developmental delays to match identical objects. After participants demonstrated mastery with matching six different objects, all three participants generalized identity object matching to six additional novel objects.

Given the effectiveness of video modeling and the need for more efficient instruction, this study addresses the following two research questions: Will matching behaviors (sorting mail) taught via video modeling to adolescents with autism generalize to untrained sets of mail? Will acquisition of matching one set of mail generalize to a novel setting and mailbox?

2. Methods

2.1. Participants

This study included seven adolescents with autism enrolled in a suburban high school. Participants ranged in age from 15 to 18 years and received special education services in a classroom for individuals with moderate autism. Classroom