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Teaching caregivers to implement video modeling imitation training via iPad for their children with autism

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ABSTRACT

Children with autism fail to imitate from an early age and this lack of imitation is a salient diagnostic marker for the disorder. For children with Autism Spectrum Disorder (ASD), increased imitation skills appear to be related to increased skill development in a variety of areas. Video modeling was recently validated as a technique to support imitation acquisition in young children with autism. The purpose of this research was to determine if there is a functional relation between caregiver implemented Video Modeling Imitation Training (VMIT) via iPad and increased imitation skills in young children with autism. In addition, a secondary analysis of language development after exposure to VMIT was also conducted. A multiple baseline design across four caregivers and their children with autism was implemented. Results indicated that all four caregivers were able to successfully create video models on an iPad when provided with minimal training and implement VMIT with fidelity for their children. All four children made substantial gains in their imitation skills during caregiver implemented treatment. Imitation skills maintained post treatment and, to varying degrees, generalized to imitation of live models. Expressive language skills increased to varying degrees for all participants.

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Autism is one of the fastest growing disabilities, with an estimated one in 88 children being diagnosed with an Autism Spectrum Disorder (ASD; [Center for Disease Control, 2012](#)). While it is cautioned that these estimates apply to the 14 sites analyzed in the aforementioned study, with this ever-increasing population, innovative new approaches are needed to ensure optimal intervention strategies are being implemented for children with ASD ([Lord & McGee, 2001](#)). In addition, it is important that new approaches be cost effective strategies that caregivers can implement in the home environment to engage their child ([Dawson et al., 2010](#); [Koegel & Koegel, 2006](#)). An innovative intervention strategy with potential for caregiver implementation, specifically Video Modeling Imitation Training (VMIT) via an iPad, was the focus of this study.

1. Imitation and autism

For over 40 years, researchers have explored how to support skill development in children with ASD ([Dawson & Adams, 1984](#); [Lovaas, 1987](#); [Lovaas, Freitas, Nelson, & Whalen, 1967](#); [Rogers, Bennetto, McEvoy, & Pennington, 1996](#)). One skill that has garnered interest is imitation. Severity of autism is correlated with impaired imitation skills ([Rogers, Hepburn, Stackhouse, & Wehner, 2003](#)). As such, children with autism fail to imitate from an early age and this lack of imitation is a

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salient diagnostic marker for the disorder (Lord et al., 2000). For children with ASD, better imitation skills appear to be related to improved language performance (Stone, Ousley, & Littleford, 1997), play skills (Libby, Powell, Messer, & Jordan, 1997), and social skills (Carpenter, Pennington, & Rogers, 2002; Ingersoll, 2011).

Until recently, imitation skills were taught in discrete, analog settings in adult-led exchanges (Cardon & Wilcox, 2011; Ingersoll & Schreibman, 2006; Lovaas et al., 1967). Although some skill acquisition occurred in these settings, generalization of skills was extremely limited (Dawson & Adams, 1984). Recently, researchers have found that for children with ASD, imitation acquisition and generalization improves in naturalistic settings during child-motivated interactions (Cardon & Wilcox, 2011; Charlop-Christy, Le, & Freeman, 2000; Ingersoll, Lewis, & Kroman, 2006; Ingersoll & Schreibman, 2006).

2. Video modeling and autism

Although video modeling (VM) has been described in the literature for over 50 years, it is only over the past decade that VM has been utilized with children on the autism spectrum (Ayres & Langone, 2005; Bellini & Akullian, 2007; Buggie, Toombs, Gardener, & Cervetti, 1999; Charlop-Christy et al., 2000). A seminal study designed to teach a variety of skills to children with autism, compared the effectiveness of VM to live modeling (Charlop-Christy et al., 2000). Participants included five children with ASD with a chronological age range of 7–11 years old. Children with varying functioning levels (e.g., different mental ages, language ages, play skills) were purposefully selected to determine if VM would be effective in supporting skill development. Results indicated that children in the VM condition acquired skills faster. Children also demonstrated generalization of target behaviors after VM, but did not generalize target behaviors after live modeling (Charlop-Christy et al., 2000). The researchers concluded that VM is an effective technique that can support the development of a variety of behaviors such as play skills, expressive language, and self-help skills in children with ASD.

Ongoing research has shown video modeling to be an effective intervention tool for teaching preschool and school age children with ASD a variety of behaviors, including play skills, social skills, and self-help skills (e.g., Ayres & Langone, 2005; Bellini & Akullian, 2007; Carpenter, Charlop, Dennis, & Greenberg, 2010; D'Ateno, Mangiapanello, & Taylor, 2003; Nikopoulos & Keenan, 2003). Both single and multi-step tasks have been successfully taught using video modeling (Tereshko, MacDonald, & Ahearn, 2010). Previous research has also indicated that personalized video models are more effective than commercially distributed video models (Palechka & MacDonald, 2010; Rosenberg, Schwartz, & Davis, 2010). The persons used as models to present the actions in the videos has varied, with adults, children and siblings all being able to support positive outcomes (D'Ateno et al., 2003; Reagon, Higbee, & Endicott, 2006). It has been proposed that VM is an effective method because it capitalizes on characteristics associated with ASD (e.g., over-selectivity, social deficits, preference for visual stimuli; Corbett & Abdullah, 2005).

Several mediums have been successfully used to present the video model including television, computers, and portable DVD players. Video modeling has been validated as a technique to facilitate the four key components (i.e., attention, retention, production, and motivation; Bandura, 1977) required for observational learning to occur (Dowrick & Associates, 1991). The monitors (e.g., television, iPad screen, Portable DVD player) offer a restricted field of vision and can therefore direct children's attention to relevant stimuli while decreasing their tendency to attend to irrelevant stimuli (e.g., Charlop-Christy et al., 2000; Corbett, 2003). Retention is also supported via VM because of the consistent repetition of the modeled behavior. In addition, children are given the opportunity to practice, or produce, the behavior they saw occurring in the video. Finally, with regard to motivation, television has been found to be particularly motivating for children with autism (e.g., Charlop-Christy et al., 2000; Corbett, 2003; Nally, Houlton, & Ralph, 2000; Nikopoulos & Keenan, 2003; Shane & Albert, 2008).

While video modeling has been used with children with autism for over a decade (Ayres & Langone, 2005; Bellini & Akullian, 2007; Charlop-Christy et al., 2000), the use of personal computers (e.g., iPod touch, iPads, tablet computers, smart phones) to deliver the video model has only recently been studied (Cardon, 2012; Cihak, Fahenkrog, Ayres, & Smith, 2010). Studies supporting the benefits of personal computers as a medium to deliver video modeling protocols are still emerging; thus far, however, indicators suggest that iPod touches, smart phones, and iPads are viable alternatives to televisions, laptop computers, and portable DVD players (Cihak et al., 2010). In addition, use of tablet computers, such as the iPad, to support intervention has dramatically increased among children with ASD (Dunham, 2011; Sennet & Bowker, 2009). While there has been reported success anecdotally with iPads, empirical evidence supporting the systematic use of iPads in treatment is lacking.

3. Video Modeling Imitation Training

Video Modeling Imitation Training is a new imitation protocol designed to teach young children with autism to imitate using iPads. Conceptually based on video modeling, VMIT supplements video modeling by including specific prompt and praise procedures, similar to those used in a clinical setting. Developed from a video modeling protocol successfully used to teach object imitation (Cardon & Wilcox, 2011), VMIT was recently analyzed as a tool to teach young children with autism to imitate gestures. Results were promising with two out of three participants making substantial gains in imitation, as well as receptive and expressive language skills (Cardon, 2012).

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