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Peer-mediated discrete trial training within a school setting



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ABSTRACT

The present study evaluated the feasibility and effects of a peer-mediated, school-based, discrete trial training (DTT) protocol for students with autism spectrum disorder (ASD). Six typically developing elementary-age peers were trained to implement a basic DTT protocol. A multiple baseline across student interventionists design was utilized to evaluate the integrity with which trained peers implemented the DTT protocol and the efficacy of the student interventionists in training target academic behaviors. Results indicate that student interventionists acquired skills to implement the DTT protocol with high levels of integrity. Additionally, it was observed that participation in peer-mediated DTT resulted in mastery of target academic skills by participants with ASD. Measures of acceptability indicated high levels of student interventionist satisfaction with intervention procedures.

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1. Introduction

According to the [Centers for Disease Control Autism and Developmental Disabilities Monitoring Network \(2014\)](#), it is estimated 1 in 68 children have been identified with an autism spectrum disorder (ASD). Further, the U.S. Department of Education reports 7% of children between the ages of 6 and 21 receiving special education services in public schools under the Individuals with Disabilities Education Act (IDEA) fall into the autism category, and only 56% of children with an autism spectrum disorder finish high school ([Wagner, Newman, Cameto, Levine, & Garza, 2006](#)). Given poor academic outcomes of children with ASD (e.g., [Howlin, Mawhood, & Rutter, 2000](#)), it is necessary to identify interventions that may promote acquisition of academic skills.

Due to the amount of research that has been completed since the 1960s, applied behavior analysis (ABA) has been recognized by the Surgeon General of the United States as representative of best practice for individuals with ASD ([Department of Health, 1999](#)). Individuals with ASD often require specialized behaviorally based interventions to address deficits in communication, social interaction, and academics ([Matson & LoVullo, 2008](#); [National Research Council, 2001](#)). A common, evidence based instructional strategy which can be individualized to address each of these deficits is discrete trial training (DTT).

Grounded in the experimental analysis of behavior, DTT is a specific type of teacher-directed instruction that utilizes simple instructional cues, prompting, reinforcement, and data-based decision making to shape behavior and improve children's learning ([Smith, 2001](#)). The primary technique used throughout the DTT method of instruction, regardless of

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target skill, consists of four parts: (a) the trainer's presentation of a discriminative stimulus to which a child responds, (b) the child's response, (c) the consequence, and (d) a short pause prior to the next command (Anderson, Taras, & O'Malley-Cannon, 1996; Malott & Trojan-Suarez, 2004). DTT has been shown to be an efficient approach for teaching children with ASD new and difficult skills in important areas including, but not limited to, language, social, and academic skills (Leaf & McEachin, 1999; Lovaas & Smith, 2003; Smith, 2001; Sturmey & Fitzer, 2007). As a result, DTT has been utilized to significantly improve the developmental and educational outcomes of children with autism and developmental delay (Lovaas, 1987a, 2003; McEachin, Smith, & Lovaas, 1993; Smith, 1999); therefore, this approach has proven particularly effective in helping young children with autism acquire a wide range of new skills (e.g., Coe, Matson, Fee, Manikam, & Lanarello, 2009; Gutierrez et al., 2009; Sarokoff & Sturmey, 2008; Young, Krantz, McClannahan, & Poulson, 1994). Due to its many demonstrated strengths and apparent effectiveness, DTT has been classified as an evidence-based practice by the National Autism Center (2010) and the National Research Council (2001); and many parents of children with autism have increasingly requested that their children be provided publicly funded DTT-based educational programming (Choutka, Doloughty, & Zirkel, 2004). This method of instruction has been successfully implemented by teachers, parents, paraprofessionals, graduate and undergraduate students (Crockett, Fleming, Doepke, & Stevens, 2007; Devlin & Harber, 2004; Dib & Sturmey, 2007; Downs, Downs, & Rau, 2008; Fazio, Martin, Arnal, & Yu, 2009; Sarokoff & Sturmey, 2008; Severtson & Carr, 2012).

Despite this evidence, several challenges may prohibit utilization of DTT in school settings. The one-on-one format frequently utilized in schools removes children with ASD from settings in which they may interact with peers and limits their inclusion in the least restrictive environments (Skokut, Robinson, Openden, & Jimerson, 2008). Although DTT may be used to instruct groups of children (e.g., Leaf et al., 2013; Ledford, Gast, Luscre, & Ayres, 2008), group instruction is likely to reduce opportunities to respond, and such procedures may inefficiently target individual behaviors (e.g., Lovaas, 1987a,b; Skokut et al., 2008) – particularly when children within a classroom demonstrate different instructional objectives and goals. Possibly the most salient barrier to implementation of DTT in the school setting is that it is very time-consuming for teachers to implement, making DTT difficult to implement for teachers who may be responsible for multiple children with ASD at one time. As such, Steege, Mace, Perry, and Longenecker (2007) cautioned against using a school-based DTT program for students with ASD as there may not be enough time available for the teacher to implement the intervention successfully. In order to increase the feasibility of DTT in school settings, alternative strategies of implementation should be considered.

One strategy for promoting the feasibility of school-based DTT is to increase the number of trained interventionists. Previous research has found strategies such as video modeling and didactic instruction to be effective in prompting accurate use of a DTT protocol (e.g., Catania, Almeida, Liu-Constant, & DiGennaro-Reed, 2009; Hay-Hansson & Eldevik, 2013). Instruction in facilitation of DTT has been found to be particularly effective when training incorporates instruction, opportunities to practice DTT, and feedback (Catania et al., 2009). Increasing the number of trained interventionists allows for school-based DTT to target diverse academic objectives of multiple students simultaneously, addressing a substantial limitation of school-based DTT (e.g., Skokut et al., 2008). In addition to training additional staff to implement DTT, others have suggested that school feasibility be increased by utilizing students as interventionists to supplement teacher-facilitated intervention (Fazio et al., 2009) – particularly as peer-mediated DTT may allow children with ASD to develop important skills through both contact with typically developing peers and individualized instruction.

Peer-mediated intervention is a treatment approach in which students are trained to act as the intervention agents, implementing instructional programs, behavioral interventions, and facilitating social interactions (Garrison-Harrell, Kamps, & Kravitz, 1997; Laushey & Heflin, 2000a). Peer tutoring, a type of peer-mediated intervention, describes the process of peers providing one-one one individualized instruction (Utley, Mortweet, & Greenwood, 1997). There are many benefits to utilizing peer-mediated interventions, particularly peer tutoring, in schools. For example, the abundance of peers within the school means the availability of many intervention agents. Training peers to implement interventions may lead to additional opportunities for the generalization of skills across individuals and, since the child with ASD may have an opportunity to practice skills with multiple people (Carr & Darcy, 1990; Stokes & Baer, 1977; Stokes, Doud, Rowbury, & Baer, 1978). This may also reduce demands on teachers and other professionals while also increasing the amount of intervention access for the individual with ASD. An additional benefit is that the direct interaction between a student with ASD and typically developing students may also foster inclusion in school settings. This way, students with ASD have the opportunity to create relationships with peers without disabilities leading to an increase in the number of available social partners. In other words, as the individual with ASD acquires new skills, they may also gain greater access to the educational environment that may be augmented by facilitating relationships with the other people in that environment (Chan et al., 2009).

Peer-mediated interventions have received substantial support as a viable strategy for service delivery in schools. For example, some of the interventions that have previously used students as intervention agents have addressed a variety of issues such as improving reading fluency (Dufrene et al., 2010), teaching social studies (Scruggs, Mastropieri, & Marshak, 2012), improving social skills and prosocial behaviors (Harjusola-Webb, Hubbell, & Bedesem, 2012; Hughes et al., 2013), and using alternative and augmentative communication (Trembath, Balandin, Togher, & Stancliffe, 2009). These results have been achieved within both special education and general education for students in elementary school, middle school, and high school (Hughes et al., 2013; Lindauer & Petrie, 1997; Utley et al., 1997). The literature supporting the effectiveness of peer-mediated interventions specifically for students with ASD is also robust. Although

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