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Training vision screening behavior to children with developmental disabilities

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ABSTRACT

The American Academy of Pediatrics recommends vision screening of all children between 3 and 5 years of age, and states have mandated vision screening for all school children. Participants were three 4–6-year old school children with either a developmental delay or autism who scored “could not test” on the state required vision screening. Participants' screening performance indicated both a visual discrimination skill deficit and escape/avoidance behavior. Discrimination training procedures included preference assessment, match-to-sample discrimination discrete trials training, transfer of stimulus control procedures, differential reinforcement, and choice making. Escape/avoidance was treated by fading-in the aversive sensory stimulus (i.e., duration of wearing glasses), escape extinction, and reinforcement of alternative behavior. Following training, two children passed their vision screening and compliance generalized to their hearing screening. The third child met the performance criterion for the two vision screening behaviors trained.

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According to the [National Eye Institute \(2007\)](#), one of the most common causes of visual impairment in children is amblyopia (i.e., monocular reduced acuity), which affects approximately 3 in 100 children. Consequently, the American Academy of Pediatrics, as well as other medical organizations, recommended vision screening to detect amblyopia and amblyopiogenic factors in all children between 3 and 5 years of age ([Hartmann et al., 2000](#)). Screening also can identify refractive errors, muscle imbalance, and some eye diseases ([Kugel et al., 1972](#)).

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Illinois, as well as other states, have legally mandated vision screening for all preschool children. Illinois uses the Good-Lite Insta-Line HOTV screening test, which is one of the instruments recommended by the medical associations previously cited. Children are scored pass, fail, or could not test (CNT) on the screening. Children who either correctly identify three or fewer of the monocular symbols, do not complete the test, or are considered unable to acquire the vision screening skills by a certified vision technician, are scored CNT. Children who either fail or are scored CNT usually are rescreened within 10 days. If they do not pass again, parents are notified and a referral is made to an eye care physician.

Vision screening involves visual discrimination testing procedures, both with and without glasses that have one lens occluded. Children may score CNT for various reasons, including lack of letter discrimination skills and escape/avoidance from wearing the glasses that might function as an aversive sensory stimulus. Children with autism have demonstrated both a lack of learning basic skills, including letter discrimination, and escape/avoidance from a variety of sensory stimuli (Leekam, Nieto, Libby, Wing, & Gould, 2007; Talay-Ongan & Wood, 2000).

Children who score CNT are often provided additional training; however, there are few guidelines, instructions, or research data supporting the validity of specific training procedures (Hartmann et al., 2000). In addition, it is unlikely that children who score CNT in their familiar school environment would comply with instructions or tolerate testing equipment in a novel eye care professional's office (Souders, Freeman, DePaul, & Levy, 2002). Visual impairments, such as those previously cited, might be undetected until they present problems for the child's everyday functioning. Consequently, it is important that children who score CNT receive effective vision screening training, and school is the optimal location for that training because it is the children's everyday learning environment.

In one of the few relevant controlled studies, nonverbal children with developmental disabilities were presented a simultaneous discrimination task for measuring subjective visual acuity (Newsom & Simon, 1977). Participants were taught to discriminate Snellen Es with different orientations using a stimulus fading procedure. Psychophysical tracking was employed to measure acuity thresholds, and most of the participants were tested successfully.

Desensitization and preteaching procedures were employed to facilitate performance on vision screenings by children with developmental delays (Bachman, Bachman, Franzel, & Marcus, 1995). Desensitization involved physical contact (i.e., touching and holding) of the testing equipment, as well as the opportunity to ask questions. Verbal instructions and modeling also were used to teach children the testing procedures. The researchers stated that almost all of the children were screened successfully. This was a report of a program description and not a controlled experimental study; therefore, conclusions regarding the efficacy of the procedures cannot be made with confidence.

Teaching vision screening behavior also might benefit from instructional procedures that have been demonstrated to be generally effective in applied behavior analysis programs (Cooper et al., 2006). These best practices include match-to-sample discrete trial training, shaping, graduated prompting, transfer of stimulus control procedures, differential reinforcement, choice making, stimulus preference assessments, maintenance task interspersal, overlearning, escape extinction, and training to expand the stimulus class to the criterion environment.

The purpose of this study was to evaluate an intervention for preschool children with developmental delay or autism who scored CNT on their state mandated vision screening. It was anticipated that a child might not comply with some screening components because of: (a) a skill deficit, (b) escape and avoidance from aversive task stimuli, or (c) a combination of skill deficit and escape/avoidance. Consequently, an intervention package was implemented that included procedures to teach visual discriminations and reduce escape/avoidance from aversive task stimuli.

1. Method

1.1. Participants

Ten children who had scored CNT on Illinois' state mandated vision screening administered at school and had a current Individualized Education Plan (IEP) were referred as potential participants. Four of these 10 children were excluded from participation because they did not submit parental permission forms to participate in this research. The remaining six children received the preassessment.

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