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Overselective stimulus control in residential school students with intellectual disabilities

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Abstract

Overselective stimulus control was assessed in 29 students at residential schools for individuals with developmental disabilities. Overselectivity testing included three different delayed identity matching-to-sample tasks. Sample stimuli for the Form/Color Test were nine possible combinations of three colors and three forms. On each trial, the S+ stimulus was identical to the sample, one S− was the same color as the sample but a different form, and the other S− was the same form but a different color. Sample stimuli for the Two-Sample Test were two alphanumeric characters. The S+ stimulus was identical to one of the sample stimuli, and two S− stimuli were characters different from both samples. Sample stimuli for the Faces Test were six digital images of adult faces. On each trial, the S+ stimulus was identical to the sample, one S− stimulus was a non-matching face to which one sample feature had been added (e.g., an identical hat or scarf), and the other S− stimulus was an unaltered non-matching face. All participants were also tested with the Peabody Picture Vocabulary Test III (PPVT) and the Autism Diagnostic Observation Schedule (ADOS). Results indicated overselective stimulus control on at least one test for 18 of the 29 participants. Overselectivity (a) was distributed across a range of PPVT mental age equivalent scores from <1.75 to 8.83; (b) was more likely in individuals with higher ADOS scores; (c) was most likely on the Two-Sample Test; and (d) was found in five individuals on more than one of the tests. Thus, overselective stimulus control may occur across a range of characteristics typical for students who attend residential special-education programs.

Keywords: Stimulus overselectivity; Developmental disabilities; Residential schools; Discrimination learning; Matching to sample; Autism

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Stimulus overselectivity is a widely acknowledged problem in the education of individuals with developmental disabilities. Overselectivity refers to learning that is atypically limited with respect to range, breadth, or number of stimuli or stimulus features (Lovaas, Koegel, & Schreibman, 1979). Overselectivity can have wide-ranging deleterious effects on behavioral functioning; it can have a negative impact on observational learning, generalization, and transfer from prompts to teaching materials (Lovaas et al., 1979). Deficits in language and communication skills may be related to overselectivity with auditory (e.g., vocal speech) or visual cues (e.g., printed words; Birnie-Selwyn & Guerin, 1997; Koegel, Schreibman, Britten, & Laitinen, 1979). In addition to the obvious educational value of functional language and communication, such skills may also be essential for building social relationships, obtaining optimal school placement, making adaptive choices, and achieving maximal independence.

The first comprehensive assessments of stimulus overselectivity in children with autism took place in the 1970s and used discrimination procedures developed by Lovaas and colleagues (reviewed in Lovaas et al., 1979). Since that time, an increasing number of studies have documented stimulus overselectivity in special education students with developmental disabilities. Although overselectivity is often associated with autism, it is a common feature of the learning difficulties found in individuals with mental retardation both with and without autism (Allen & Fuqua, 1985; Dube & McIlvane, 1997; Huguenin, 1997; Litrownik, McInnis, Wetzel-Pritchard, & Filipelli, 1978; Meisel, 1981; Schneider & Salzberg, 1982; Stromer, McIlvane, Dube, & Mackay, 1993; Wilhelm & Lovaas, 1976). Overselectivity research has examined restricted stimulus control by stimulus dimensions such as form or color (e.g., Burke & Cerniglia, 1990; Fairbank, Powers, & Monaghan, 1986; Litrownik et al., 1978; Mackie & Mackay, 1982; Matthews, Shute, & Ress, 2001; Smeets, 1994), multiple discrete elements (e.g., Allen & Fuqua, 1985; Dube & McIlvane, 1997, 1999; Wilhelm & Lovaas, 1976), and socially relevant stimuli (e.g., Schreibman & Lovaas, 1973; cf. Carey & Diamond, 1977).

The current investigation had two goals. The first was to conduct a survey of overselectivity in children and adolescents across the range of intellectual functional levels typical for residential school settings. Several features of the experimental procedures were designed to test participants under optimal conditions: (a) Stimuli were presented on a computer monitor and responses were recorded by a touch screen. (b) Preliminary testing was conducted to verify discrimination among the relevant features or elements of stimuli. (c) All test trials were presented as delayed matching to sample (DMTS) with multiple samples or with a sample with multiple features (Stromer et al., 1993). The DMTS procedure presents a series of matching-to-sample trials in which the sample stimuli include two or more relevant features. After a sample observation period, the sample disappears from the display and an array of comparison stimuli is presented. One (and only one) comparison is identical to the sample and selecting it is the correct response; the incorrect comparison stimuli may share some features with the sample, but only one comparison shares all features. High accuracy requires observation of all relevant sample features on every trial. Intermediate accuracy scores are indicative of overselectivity; errors occur on trials in which at least some of the relevant sample stimulus feature(s) did not exert stimulus control.

The second goal of the study was to ask to what extent overselectivity was a general characteristic of an individual's discrimination learning, or whether it is more likely to be found with some types of stimuli than others. To answer this question, we conducted within-subject comparisons of overselectivity with several types of stimuli: compound stimuli with relevant stimulus dimensions of form and color, two-element arrays of alphanumeric stimuli, and pictures of adult human faces.