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Review

The formation of equivalence classes in individuals with autism spectrum disorder: A review of the literature

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ABSTRACT

Articles that empirically investigated the emergence of untaught equivalence relations among individuals with autism are presented in this review. Systematic searches of academic databases, journals and ancestry searches identified nine studies that met inclusion criteria. These studies were evaluated according to: (a) participants, (b) developmental assessments conducted and reported, (c) experimental design, (d) stimulus content, (e) setting, (f) teaching procedure variables, (g) independent variables, (h) emergent skills tested, (i) main findings, (j) retention testing, and (k) reliability measures. The results of this synthesis demonstrate that while most individuals with ASD are able to form equivalence classes, the findings are variable. There are several examples in the literature in which untaught equivalence relations only emerged for some of the participants, or under modified teaching and testing conditions. In view of the limited research in this area, the lack of replication of findings, and the lack of investigation into variables that may affect the formation of equivalence classes, several recommendations are made for further research.

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Contents

| | | |
|------|--|-----|
| 1. | Introduction | 419 |
| 1.1. | Relational frame theory (RFT) | 420 |
| 1.2. | Naming theory | 420 |
| 1.3. | Sidman's theory of derived responding | 420 |
| 2. | Methods | 422 |
| 2.1. | Search procedures | 422 |
| 2.2. | Inclusionary and exclusionary criteria | 422 |
| 2.3. | Data classification | 422 |
| 3. | Results | 423 |
| 3.1. | Participants | 423 |
| 3.2. | Learner assessments conducted and reported | 423 |
| 3.3. | Experimental design | 423 |

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| | | |
|------|---|-----|
| 3.4. | Stimulus content taught | 423 |
| 3.5. | Setting. | 426 |
| 3.6. | Teaching procedure and independent variables | 426 |
| 3.7. | Emergent skills tested | 426 |
| 3.8. | Key findings | 426 |
| 3.9. | Retention testing and reliability | 427 |
| 4. | Discussion | 427 |
| 4.1. | Emergence of untaught equivalence relations in children with ASD | 427 |
| 4.2. | Learner characteristics that may affect the emergence of untaught equivalence relations | 428 |
| 4.3. | The affect of the teaching conditions | 428 |
| 4.4. | Practical implications. | 428 |
| 4.5. | Recommendations for future research | 429 |
| | References | 430 |

1. Introduction

There have been several reviews of the research on general teaching strategies for children with Autism Spectrum Disorder (ASD) (Mudford et al., 2009; Virues-Ortega, 2010; Vismara & Rogers, 2010). The general conclusion is that intervention based on behavioral principles can be effective in improving communication and language, social functioning, daily living skills, cognitive functioning, and managing behavioral concerns in children with ASD. Outcomes are deemed to be most favorable when interventions begin at an early age, are sufficiently intensive, and address the core symptoms of Autism (National Research Council, 2001).

While there is extensive empirical support for the efficacy of behavioral approaches, critics of these strategies, and particularly the use of Discrete Trial Teaching (DTT) argue that the structured nature of this type of teaching can inhibit generalization (Daniel, 2004; Vismara & Rogers, 2010). Mudford et al. (2009) reviewed the literature to evaluate the effectiveness of intervention based on Applied Behavior Analysis (ABA) for individuals with ASD. They reported generalization outcomes for 169 of the 463 identified studies. Of the 169 studies, 45 assessed generalization of main effects. Twenty eight of the 45 studies demonstrated strong evidence of generalized main effects across behavior, academic skills, communication skills, interpersonal skills, and personal responsibility. However, in three studies, there was no evidence of a generalized main effect and in 14 of the 45 studies the evidence for a generalized main effect was limited. It was also concluded that there was no single intervention strategy that enhanced the likelihood of generalization across a broad range of target behaviors (Mudford et al., 2009). One of the key implications of this review is that generalization and maintenance are areas that need to be planned for with individuals with ASD due to generalization not necessarily being automatically attained with this group of learners.

The majority of the early research in the area of generalization which involves children with ASD has focused on two areas; setting and stimulus generalization, and the generalization of language responses. Setting or stimulus generalization research has generated studies that have examined whether the acquisition or performance of skills in a structured setting generalizes to novel settings (Betz, Higbee, & Pollard, 2010; Handleman, 1979, 1981; Jones, Feeley, & Takacs, 2007; Koegel, Camarata, Valdez-Menchaca, & Koegel, 1998; McGee, Krantz, Mason, & McClannahan, 1983; Rincover & Koegel, 1975), novel examples or novel presentation methods (Betz et al., 2010; Craighead, O'Leary, & Allen, 1973; Koegel et al., 1998; Pellechia & Hineline, 2007; Secan, Egel, & Tilley, 1989) or generalization from teachers to parents, peers, or siblings (Craighead et al., 1973; Jones et al., 2007; Koegel et al., 1998).

Research into the generalization of language responses has typically investigated one of two areas. The first is stimulus generalization, that is, generalization of verbal responses across stimulus classes. In this example, generalization is demonstrated when the child applies the correct label to various representations of a concept (e.g., a child applies the verbal label "three" not only to various forms of the written numeral "3" but also to various representations of the quantity "three"). The second type of language generalization is generalization across response classes. This is a type of response generalization. For example, there are several different language responses which can be used interchangeably because they each have the same meaning (e.g., a child can greet somebody by saying "hi" or "hello" or "good morning" as each of these phrases has the same meaning).

Much of the research that has examined the generalization of language responses has focused on the effects of teaching method on the generalization of language responses across stimulus classes or response classes (Egel, Shafer, & Neef, 1984; Young, Krantz, McClannahan, & Poulson, 1994). Some of these studies used spontaneous language use or spontaneous responding as their measure of response generalization. Other studies examined the degree of spontaneous language use which occurred during structured and unstructured teaching sessions (Kok, Kong, & Bernard-Opitz, 2002; Miranda-Linne & Melin, 1992). While one study investigated the effect of a verbal discriminative stimulus on the frequency of spontaneous responding (Williams, Carnerero, & Perez-Gonzalez, 2006).

What we can conclude from the research is that while many children with ASD demonstrate generalization across novel stimuli, settings, people and response topographies without additional programming (Jones et al., 2007; Koegel et al., 1998) there is an equally substantial body of evidence that suggests that children with ASD have difficulty generalizing responses

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