



Review

Effects of reducing stereotypy on other behaviors: A systematic review



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ABSTRACT

Researchers have shown that high levels of stereotypy in individuals diagnosed with autism spectrum disorders were correlated with more significant impairments in social and adaptive functioning. Reducing stereotypy may thus potentially occasion an increase in appropriate social and adaptive behaviors. Hence, the purpose of this systematic review was to examine the effects of reducing stereotypy on engagement in other behaviors. Following a thorough literature search, we identified 60 studies that both reduced engagement in stereotypy and measured engagement in at least one other behavior. We divided the studies into six broad categories: noncontingent reinforcement, differential reinforcement, punishment-based interventions, multiple contingencies, physical exercise, and other antecedent-based interventions. The results of our analyses suggest that reducing stereotypy produces reallocation toward other behaviors, albeit not necessarily appropriate. As such, clinicians and researchers targeting stereotypy should plan to strengthen an appropriate alternative behavior while targeting all response forms of stereotypy for reduction. Moreover, our review suggests that measuring untargeted behaviors when implementing interventions designed to reduce stereotypy may be essential in clinical and research settings.

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1. Introduction

Most children and adults with autism spectrum disorders (ASD) and other developmental disabilities engage in repetitive vocal and motor behaviors, which are generally referred to as stereotypy in the research literature (Bodfish, Symons, Parker, & Lewis, 2000; Campbell et al., 1990; Goldman et al., 2009; MacDonald et al., 2007; Matson & Dempsey, 2008; Matson, Dempsey, & Fodstad, 2009). Stereotypy can assume multiple forms: examples include mouthing non-edible items or body parts, body rocking, hand flapping, repetitive vocalizations, and object twirling or tapping (DiGennaro Reed, Hirst, & Hyman, 2012). In general, these behaviors do not have a social function; that is, stereotypy persists in the absence of social consequences (Rapp & Vollmer, 2005). Typically developing infants often engage in stereotypy, but the frequency of these behaviors decrease after the age of 2 (Thelen, 1981). For many individuals with ASD and other developmental disabilities, stereotypy often continues unabated long after age 2, the effects of which may severely curtail the emerging behaviors within their social repertoire (Cunningham & Shreibman, 2008; Goldman et al., 2009; MacDonald et al., 2007). Although researchers have implicated both the dopaminergic system and the basal ganglia, the exact neurobiological mechanisms responsible for the maintenance of stereotypy in individuals with ASD and other developmental disabilities remain largely unknown (Lanovaz, 2011).

One clinical concern with stereotypy is that it has been correlated with other behavioral deficits and excesses. More specifically, researchers have found a positive correlation between engagement in stereotypy and severity of autism, and a negative correlation between engagement in stereotypy and IQ (Bodfish et al., 2000; Campbell et al., 1990; Goldman et al., 2009; Matson, Wilkins, & Macken, 2008). For example, individuals with lower IQs generally engage in more forms of stereotypy and emit stereotypy more often than do individuals with higher IQs. In a series of studies, Matson and colleagues have also shown that higher levels of stereotypy were associated with more significant impairments in social and adaptive skills (Matson et al., 1997; Matson, Kiely, & Bamburg, 1997; Matson, Smiroldo, & Bamburg, 1998; Matson, Minshawi, Gonzalez, & Mayville, 2006). As such, stereotypy is associated with a paucity of skills essential to facilitate the social participation of individuals with ASD and other developmental disabilities.

The results of the previous research raise the following question: Is the relationship between stereotypy and skill deficits correlational only, or does engagement in stereotypy interfere with the acquisition and maintenance of emerging social and adaptive skills? One approach to answering this question is to implement interventions while also measuring other behaviors. If stereotypy was interfering with the acquisition or maintenance of skills, appropriate behaviors should increase when an intervention designed to reduce stereotypy is being implemented. To this end, several studies have examined the effects of reducing one or more forms of stereotypy on engagement in other appropriate and inappropriate behaviors, but their results have not been systematically compared and reviewed (e.g., Cuvo, May, & Post, 2001; Lang et al., 2010; Rapp, Vollmer, Peter, Dozier, & Cotnoir, 2004; Saunders, Saunders, & Marquis, 1998).

Despite the publication of several review articles on the assessment and treatment of vocal and motor stereotypy (Boyd, McDonough, & Bodfish, 2012; DiGennaro Reed et al., 2012; Lanovaz & Sladeczek, 2012; Rapp & Vollmer, 2005), no prior review has systematically examined the effects of reducing stereotypy on engagement in other behaviors. Conducting a review on the topic may be important because one of the most oft-cited reasons for reducing stereotypy is that it interferes with learning and engagement in appropriate behaviors (e.g., Cunningham & Shreibman, 2008; MacDonald et al., 2007). Clinicians and researchers both need an overview of what happens to appropriate and inappropriate behaviors when stereotypy is reduced. Thus, the purpose of our study is to systematically review previous research that examined the effects of reducing engagement in stereotypy on other behaviors.

2. Method

To identify relevant articles, we first conducted a literature search in September 2012 in the PsycInfo[®] database using the keywords *stereotypy*, *stereotyped behavior*, *repetitive behavior*, *stereotypic behavior*, *self-stimulation*, *self-stimulatory*, *sensory reinforcement*, and *automatic reinforcement* combined with *autism*, *pervasive developmental disorder*, *developmental disability*, *intellectual disability*, and *mental retardation* as well as *intervention* and *treatment*. Second, we read the title and abstract of each article and excluded all those that did not involve the treatment of stereotypy. Third, a research assistant reviewed all the remaining articles and retained only those that met the inclusion and exclusion criteria (see below). Fourth, a second assistant reviewed the rejected articles to ensure that no study had been inadvertently left out. Fifth, we examined the references of each article that met the inclusion criteria to identify additional articles that may have been overlooked by our original search terms. Finally, the principal investigator set up a Google Scholar[®] alert to identify articles that were published or indexed following the initial search (i.e., articles available after September 2012).

To be included in the review, the research study had to (a) include participants with an ASD, an intellectual disability (ID), or a developmental delay (DD), (b) target at least one form of stereotypy, (c) measure at least one other behavior, and (d) implement an intervention that resulted in the reduction of stereotypy. For the purpose of the literature search, we defined stereotypy as repetitive and invariant vocal and motor behaviors that generally persisted in the absence of social consequences (Rapp & Vollmer, 2005). However, we included all studies regardless of whether the researchers had confirmed an automatic function via a functional analysis. The other behaviors could be either appropriate (e.g., on-task, play, item engagement) or inappropriate (e.g., aggression). We also included studies that targeted one form of stereotypy and examined its effects on other untargeted forms of stereotypy.

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