



Pica in persons with developmental disabilities: Approaches to treatment



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ABSTRACT

Pica is a very serious problem in which an individual ingests substances without nutrition value, such as paper and paint. As this behavior is often life-threatening resulting in surgery, pica has received attention from researchers for several decades. During that time, a number of interventions have been devised, such as behavioral methods (e.g., aversive stimuli, overcorrection, time-out, reinforcement) and biological interventions (e.g., pharmacotherapy, nutritional supplements). This paper is a broad review of the research on treatment studies for this problem, with a focus on persons with autism and/or intellectual disability (ID), which constitutes almost all of the published treatment papers. In addition, strengths and weaknesses of different pica treatments are discussed. Upon review, applied behavior analysis (ABA) was found to have the most robust empirical support to treat this behavior. Most clinicians are drifting away from aversive techniques and relying on more positive procedures to guide their treatment plans. The implications of current status and future directions for research are also addressed.

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1. Introduction

Developmental disabilities constitute a broad range of disorders, with perhaps the two most prominent of these being intellectual disability (ID) and autism, both of which overlap to a large extent (Dawson, Matson, & Cherry, 1998; Matson, Dempsey, & LuVullo, 2009; Matson et al., 1996; Matson, Wilkins, et al., 2009). Problems that are evident in these persons are generally of three types: skill deficits, challenging behaviors (CBs), and psychopathology. Typical skill deficits involve communication, social skills, and adaptive behaviors (Fodstad, Rojahn, & Matson, 2010; Fodstad, Matson, Hess, & Neal, 2009; Lancioni et al., 2010; Matson, Dempsey, & Fodstad, 2009; Matson et al., 1996; Matson, Hess, & Boisjoli, 2010; Matson, Mahan, Hess, & Fodstad, 2010; Matson, Matson, & Rivet, 2007; Petry, Kuppens, Vos, & Maes, 2010; Smith & Matson, 2010; Sturmey, Laud, Cooper, Matson, & Fodstad, 2010). Among the CBs common in persons with developmental disabilities are stereotypies, aggression, self-injury, property destruction, and pica (Embregts, du Bois, & Graef, 2010; Kuhn & Matson, 2004; Matson, Hamilton, et al., 1997; Matson, Kiely, & Bamburg, 1997; Matsuura, Hashimoto, & Toichi, 2010; Murphy, Healy, & Leader, 2010; Paclawskyj, Matson, Bamburg, & Baglio, 1997; Poppes, van der Putten, & Vlaskamp, 2010; Rose, 2010; Strachan et al., 2010).

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For obvious reasons, a range of interventions have been used to treat CBs. Psychotropic medications have been frequently used, but their effectiveness is open to question (Singh et al., 2010). Additionally, they are often used long term with serious, irreversible side effects occurring (Advocate, Mayville, & Matson, 2000; Fodstad, Bamburg, et al., 2010; Mahan et al., 2010; Matson et al., 2006; Matson, Fodstad, Neal, Dempsey, & Rivet, 2010; Matson & Mahan, 2010). More research has accumulated on the effectiveness of ABA than other treatment methods for CBs in general, and the side effects are less serious (Matson & Boisjoli, 2009; Matson & Keyes, 1988, 1990; Matson & LoVullo, 2008, 2009; Matson, Mahan, & LoVullo, 2009; Matson, Mahan, & Matson, 2009; Matson & Taras, 1989; Taras, Matson, & Leary, 1988).

One of the most serious of these CBs is pica. Pica is defined as repetitively ingesting items with no nutritional value (e.g., paint, hair, cigarette butts; Bell & Stein, 1992; Bugle & Rubin, 1993; Carter, Wheeler, & Mayton, 2004; Pace & Toyer, 2000; Swift, Paquette, Davison, & Saeed, 1999; Tewari, Krishan, Valsalan, & Roy, 1995). According to the Diagnostic and Statistical Manual of Mental Disorder, Fourth Edition-Text Revision (DSM-IV-TR), the current diagnostic criteria state that pica is the persistent eating of nonnutritive items for at least 1 month, the behavior must be developmentally inappropriate, and the behavior must not be part of a culturally sanctioned practice (American Psychiatric Association, 2000). Prevalence rates have been found to range anywhere from 4% to approximately 26% (Ali, 2001; Ashworth, Hirdes, & Martin, 2009; Danford, 1982; Hardon & Sahl, 1997; Swift et al., 1999). Pica often results in very serious effects including surgery and a high mortality rate (Bell & Stein, 1992). Thus, it should be a very high priority for treatment research. Having said this, the studies in this area have been very sporadic. Additionally, self-injury and aggression have been topics that have received considerably more attention.

The purpose of this paper was to provide a review of research on the development of interventions for pica. Efforts are also made to identify strengths and weaknesses in the current literature and to emphasize various areas for further study. Most importantly, we hope to highlight the importance of more attention and research, to what is certainly one of the most critical topics in the field of developmental disabilities. All studies referenced in this general review of pica treatments were acquired by a search for pica treatments at www.scopus.com.

2. Treatment

A few reviews have been conducted in the past on pica treatments (e.g., Bell & Stein, 1992; McAdam, Sherman, Sheldon, & Napolitano, 2004). Bell and Stein (1992) reviewed 45 articles and three dissertations on the behavioral treatments of pica. The authors reviewed pica interventions such as self-protective devices, overcorrection, water mist and aromatic ammonia, brief restraint, differential reinforcement, discrimination training, patient self-report, and ecological modifications. While many of the interventions were found to effective in the reduction of pica, methodological problems were also found in several of the reviewed studies such as differing operational definitions of pica (Bell & Stein, 1992). McAdam, Sherman, Sheldon, and Napolitano (2004) also conducted a review investigating 26 published studies examining the efficacy of behavioral-intervention packages (e.g., differential reinforcement of other behavior, noncontingent attention, and overcorrection) for the treatment of pica in individuals with developmental disabilities. However, since the two aforementioned reviews were published eight or more years ago, it is important to highlight the recent clinical advancements that have been advanced in the various treatment approaches (e.g., behavioral, biological) of pica.

Recently, Hagopian, Rooker, and Rolider (2011) analyzed 34 pica treatment studies and determined behavioral treatments involving both reinforcement and response reduction to be well-established treatments for pica for individuals with IDs. The authors of the current manuscript, however, have provided a more descriptive analysis of various treatment approaches that have developed over time. We have followed the lead of past researchers, dividing studies into those with and without aversive components and then subdividing treatments further based on the specific interventions used. Most interventions have multiple components; therefore, we have categorized treatments based on the most intrusive aspect of the intervention.

2.1. Punishment procedures

2.1.1. Aversive stimuli

The existing studies fall into three categories: lemon juice, food aversion, and water mist. Paisey and Whitney (1989) were the only authors to use lemon juice as aversive stimuli. They treated a 16-year-old institutionalized boy with profound ID for what they described as life threatening pica. Lemon juice was sprayed into the boy's mouth when pica was attempted. Additionally, water mist was used contingent on his attempts at wandering into different parts of the hospital grounds. A concurrent schedule of reinforcement was also used and pica substantially decreased with low rates being maintained for 18 months. The authors attributed the treatment effects to the aversive stimuli. Water mist was employed in a second study involving an autistic adolescent with severe ID (Rojahn, McGonigle, Curcio, & Dixon, 1987). As with Paisey and Whitney (1989), the authors paired the water mist with an aversive stimulus, in this case aromatic ammonia. The pica was suppressed to low levels and maintained over a three-month period. In addition to lemon juice and water mist, auditory stimulation has also been effective in suppressing pica of a six-year-old autistic girl (Rapp, Dozier, & Carr, 2001).

Taste aversion, which has been tested in laboratory animals (Mitchell, Winter, & Morisaki, 1997), has been used in humans in one study. Ferreri, Tamm, and Wier (2006) treated a four year old boy with autism who had been ingesting plastic from a variety of toys, resulting in digestive complications. Tapioca pudding was used as the mild aversive because the boy

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