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## Pica in persons with developmental disabilities: Characteristics, diagnosis, and assessment

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### ABSTRACT

Pica is a very serious and often life threatening problem which occurs largely in persons with developmental disabilities. The topic has received sporadic attention from researchers for several decades. This paper reviews definitions, diagnostic implications, causes, prevalence, and assessment methods that have been described in the research literature. A review of available studies is presented and the current state of our knowledge with respect to these areas is covered. The implication of these findings and future areas of research are discussed.

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### 1. Introduction

Persons with developmental disabilities, particularly autism and/or intellectual disability (ID), have lifelong problems in perception and learning (Chiang, 2009; Cheung & Siu, 2009; Da Fonseca et al., 2009; Duncan, Matson, Bamburg, Cherry, & Backley, 1999; Embregts, Didden, Schreuder, Huitink, & van Nieuwenhuijzen, 2009; Kouijzer, de Moor, Gerrits, Congedo, & van Schie, 2009; Matson & Shoemaker, 2009; Munde, Vlaskamp, Ruijsenaars, & Nakken, 2009; Pry, Petersen, & Baghdadli, 2009; Tsao & Kindelberger, 2009; Rose, Bramham, Young, Paliokostas, & Xenitidis, 2009). These individuals also experience high rates of psychopathology and challenging behaviors (CBs) (Cherry, Matson, & Paclawskyj, 1997; Farmer & Aman, 2009; LoVullo & Matson, 2009; MacNeil, Lopes, & Minnes, 2009; Matson & Smiroldo, 1997; Matson, Smiroldo, & Bamburg, 1998; Matson, Smiroldo, Hamilton, & Baglio, 1997). Often, several of these behaviors occur for the same person (Murphy, Healy, & Leader, 2009).

CBs have been especially prone to applications of intrusive interventions such as restraint and psychotropic drugs (Advocate, Mayville, & Matson, 2000; Garcia & Matson, 2008; Matson, Bamburg, Mayville, & Logan, 2000; Matson, Fodstad, & Rivet, 2008; Matson, Mayville, Bielecki, Smalls, & Echoldt, 2002; Matson & Neal, 2009). Unfortunately, these interventions have not proven to be particularly effective and they have multiple side effects. The development of applied behavior analysis (ABA) has a long tradition on the development of effective methods for assessing and treating these behaviors and adaptive/social problems (Devlin, Leader, & Healy, 2009; Goin-Kochel, Mackintosh, & Myers, 2009; Matson, Bamburg, Smalls, & Smiroldo, 1997; Matson & LoVullo, 2009; Rose, 2010; Sigafos et al., 2009). Among the most studied, and arguably one of the most important problems treated with those psychological methods are challenging behaviors (Applegate, Matson, & Cherry, 1999; Coe et al., 1999; Dawson, Matson, & Cherry, 1998; Embregts, duBois, & Graef, 2010; Farmer & Aman, 2009; Matson, Bamburg, Cherry, & Paclawskyj, 1999; Matson & Minshawi, 2007; Matson, Minshawi, Gonzalez, & Mayville, 2006; Matson & Rivet, 2008; Smith &

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Matson, 2010; Poppes, Vander Putten, & Vlaskamp, 2010; Weeden, Ehrhardt, & Poling, 2009). Among the most commonly treated of these problems are aggression (Matson & Wilkins, 2008, 2009; Rojahn, Aman, Matson, & Mayville, 2003; Tenneij, Didden, Stolker, & Koot, 2009), self-injurious behavior (Matson, Cooper, Malone, & Moskow, 2008; Matson & Nebel-Schwalm, 2007; Rojahn, Matson, Lott, Esbensen, & Smalls, 2001), stereotypes (Matson & Dempsey, 2008; Matson, Dempsey, & Fodstad, 2009; Moore, 2009), and feeding problems (Kuhn & Matson, 2002, 2004; Matson & Fodstad, 2009; Matson, Fodstad, & Dempsey, 2009; Matson, Mayville, et al., 2005). Perhaps the most serious and frequently treated feeding problem, pica, is the topic of this paper. The available literature is reviewed with respect to definitions, causes, characteristics, diagnosis, and assessment issues.

## 2. Pica overview

Pica is defined as the ingestion of any inedible substance (Fovel, Lash, Barron, & Roberts, 1989). The word pica itself comes from the magpie, which is pica in Latin. This bird has the characteristic of stealing items that are inedible, thus leading to this name for ingesting inedible items (Tewari, Krishnan, Valsalan, & Roy, 1995). Pica is manifested in many forms. Among the inedible items people have eaten and which are reported in the literature are clay, ice, corn starch, finger nails, stones, grass, laundry starch, baking soda, plastic gloves, cigarette butts, sand, ashes, feces, paint chips, paper, and rotten food (Baker, 2005; Calabrese & Stanek, 1992; Choure, Quinn, & Franco, 2006; Mensah, Twumasi, Amenawonyo, Larbie, & Jnr, 2010). Feeding problems in general and pica in particular occur in much higher rates in persons with ID relative to the general public (Gonzalez et al., 2009; McClintock, Hall, & Oliver, 2003; Matson, Mayville, et al., 2005). Given that ID occurs in very high rates among persons with autism, this population is also at high risk (Matson, Fodstad, et al. 2009; Matson & LoVullo, 2008). Additionally, the more severe the ID, the higher a person is at risk for a variety of CB including pica (Hardon & Sahl, 1997; Matson, Dixon, & Matson, 2005; Matson, LoVullo, Boisjoli, & Gonzalez, 2008)

Hardon and Sahl (1997) found that the prevalence of pica was 4.3%. Ali (2001) and Ashworth, Hirdes, and Martin (2009) report much higher rates of pica (i.e., 22%). Danford and Huber (1982) found pica in 25.8% of 991 institutionalized persons with ID and Swift, Paquette, Davidson, and Saeed (1999) found a 22.1% rate of pica among 689 persons in a Canadian developmental center. As noted, these studies often represent persons living in developmental centers, where more persons with ID, and persons with the most serious levels of challenging behavior reside (Paclawskyj, Matson, Bamburg, & Boglio, 1997; Matson, Gonzalez, et al., 2006; Matson, Mayville, et al., 1998).

Thus, higher pica rates are for a particularly challenged group of persons with ID, versus the general population of individuals with ID. Also, pica is less frequent in men than women and decreases with age (Rose, Porcerelli, & Neale, 2000). Pica can have very serious consequences. For example, McLoughlin (1988) found that over a period of four years, three of 94 developmental center deaths were attributable to various forms of pica. Also, Decker (1993) reported that for persons with foreign objects in their bodies due to pica ( $N = 35$ ), 75% required surgery. Medical complications occurred for 30% of these cases and there was a death rate of 11%. Additionally, Kamal, Thompson, and Paquette (1999) reported on five people with ID, four of whom had a history of pica. All participants were hospitalized for swallowing vinyl gloves. One person died while awaiting surgery due to “massive gastrointestinal bleeding from a large gastric ulcer caused by vinyl glove bezoars.” For the other four persons, the gloves were removed. However, these surgical procedures were very difficult because the gloves had become hardened and matted in the intestinal track. The deadly nature of pica was further documented by Foxx and Livesay (1984) who reported that three of four children treated with pica had died within 10 years after treatment. In young children, the effects of pica may not be this severe, but researchers have reported that as many as 24% of children with pica have probable lead poisoning. Collateral behaviors such as social isolation, restricted recreational activities, and challenging behaviors occur hand in hand with pica (Ashworth et al., 2009). These co-occurring problems present additional burdens on caregivers and require specific treatments in their own right (Fodstad, Rojahn, & Matson, 2010; Matson & LoVullo, 2008; Matson, Mahan, Hess, & Fodstad, 2010; Matson, Mahan, Hess, Fodstad, & Neal, 2010; Matson, Neal, Fodstad, & Hess, 2010). Thus, pica is a core or pivotal skill that should be a high priority for assessment and treatment.

### 2.1. Causes and characteristics

Causes of pica are multifactorial. As previously noted, the disorder occurs most frequently in persons with autism and/or ID (Beecroft, Bach, Tunstall, & Howard, 1998). The disorder occurs worldwide and across the full spectrum of IQ. Iron deficiency, anemia, brain damage, and cultural factors have also been associated with pica (Chatuvedi, 1988; Danford, 1982; Feldman, 1986; Kushner, Gleason, & Shanta-Retelny, 2004; McLoughlin & Hassanyeh, 1990; Shisslak, Swain, & Crago, 1987; Snowden, 1977). Webb, Ryan, and Weinrich (2003) found that pregnant women were more likely to engage in pica and African-American women in the south were at more risk. For clay pica, however, we draw a major distinction from unarmful clay ingestion in normal people from the seriously harmful pica in persons with intellectual disability and/or autism. While both are pica, at the same time one is relatively normal (clay eating), while the bulk of the other pica is very serious clinically, and very dangerous.

### 2.2. Diagnosis

Most researchers studying pica see it as a standalone disorder, which is largely caused and maintained by operant/environmental factors, in most cases. These maintaining variables, as they are labeled, are best exemplified by the

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