Research in Autism Spectrum Disorders 15–16 (2015) 53–59

Contents lists available at ScienceDirect

Research in Autism Spectrum Disorders

Journal homepage: http://ees.elsevier.com/RASD/default.asp

A preliminary study of self-reported food selectivity in adolescents and young adults with autism spectrum disorder

Emily S. Kuschner [a], Ian W. Eisenberg [b], Bako Orionzi [b], W. Kyle Simmons [c], Lauren Kenworthy [d], Alex Martin [b], Gregory L. Wallace [b,e,*]

[a] Children's Hospital of Philadelphia, USA
[b] Laboratory of Brain and Cognition, National Institute of Mental Health, USA
[c] Laureate Institute for Brain Research, USA
[d] Children's National Medical Center, USA
[e] Department of Speech and Hearing Sciences, George Washington University, 2115 G Street NW, Hall of Government 201, Washington, DC, 20052, USA

ARTICLE INFO

Article history:
Received 26 November 2014
Received in revised form 14 April 2015
Accepted 24 April 2015
Available online 16 May 2015

Keywords:
Autism
Food
Taste
Sensory
Adolescent
Adult

ABSTRACT

Although it is well-established that picky eating is a common feature of early development in autism spectrum disorder (ASD), far less is known about food selectivity during adolescence and adulthood. Using portions of the Adult/Adolescent Sensory Profile, food selectivity self-ratings were obtained from 65 high-functioning adolescents/young adults with ASD and compared to those of 59 typically developing controls matched on age, IQ, and sex ratio. Individuals with ASD reported preferring familiar foods (food neophobia) and disliking foods with particular textures and strong flavors. Providing linkage to everyday behavior, parent ratings of daily living skills were lower among individuals with ASD and food neophobia than among those without food neophobia. Food selectivity continues to be an important issue for adolescents/young adults with ASD.

Picky eating is a common problem in children with autism spectrum disorder (ASD) apparent across age groups and intellectual ability levels (Ahearn, Castine, Nault, & Green, 2001; Bandini et al., 2010; Fodstad & Matson, 2008; Kozlowski, Matson, Belva, & Rieske, 2012; Schreck, Williams, & Smith, 2004; Williams, Gibbons, & Schreck, 2005; Zimmer et al., 2011; for a review see Cermak, Curtin, & Bandini, 2010; Ledford & Gast, 2006; Sharp, Berry, McCracken, & Nuhu, 2013). Historically, atypical eating was so common in children with ASD that it was considered a criterion for diagnosis (Ritvo & Freeman, 1978). Eating is a complex behavior that relies on skills and functions that are often challenging for children with ASD (reviewed in Twachtman-Reilly, Amaral, & Zebrowski, 2008). Development of food preferences and diet variety requires repeated exposure to novel foods, along with processing the similarities and differences of items within a food group or category (e.g., cheese varies widely in color, flavor, and form). Mealtime is also inherently variable, with most people regularly changing menus, utensils and dishes, and eating environments. Difficulties with managing novelty (Maes, Eling, Wezenberg, & Vissers, 2011; Spratt et al., 2012), prototype formation and generalization (Gastgeb, Dundas, Minshew, & Strauss, 2012; Klinger & Dawson, 2001), and behavioral inflexibility and a need for sameness (D'Cruz et al., 2013; Yerys, Wallace, Harrison, & Celano,

* Corresponding author at: Department of Speech and Hearing Sciences, George Washington University, 2115 G Street NW, Hall of Government 201, Washington, DC, 20052, USA. Tel.: +1 202994 8285.
E-mail address: gwallac1@gwu.edu (G.L. Wallace).

http://dx.doi.org/10.1016/j.rasd.2015.04.005
1750-9467/

2009; Reed, Watts, & Truzoli, 2011; South, Ozonoff, & McMahon, 2007) prime children with ASD to have feeding challenges. Sensory processing differences (Ben-Sasson et al., 2009; Lane, Young, Baker, & Angley, 2010), oral motor impairments, (Dowell, Mahone, & Mostofsky, 2009; Dziuk et al., 2007), fine motor impairments (Barron-Linnankoski et al., 2015; Green, Charman, Pickles, & Chandler, 2009), and gastrointestinal problems (Coury et al., 2012; Kang, Wagner, & Ming, 2014; McElhanon, McCracken, Karpen, & Sharp, 2014) common in individuals ASD may also contribute to feeding challenges.

Neurologically, taste processing involves a complex network involving portions of the brainstem, thalamus, and multiple cortical regions, most crucially, the mid-insula and surrounding operculum. The insula and overlying operculum are classified as primary gustatory cortex, based on many non-human primate single/multi-neuron recording and tract-tracing investigations, as well as human functional neuroimaging studies (Baylis, Rolls, & Baylis, 1995; O'Doherty, Rolls, Francis, Bowtell, & McGlone, 2001; Rolls, 2006; Yaxley, Rolls, & Sienkiewicz, 1990). fMRI studies indicate that brain activity within the insula is correlated with the subjective intensity of taste and is likely the critical region involved in taste identification (Grabenhorst, Rolls, & Bilderbeck, 2008). Likewise the same regions of the insula that are involved in taste are also implicated in oral texture processing (de Araujo & Rolls, 2004; Verhagen, Kadohisa, & Rolls, 2004.). To date, only one food-related fMRI study has been completed in a sample of individuals with ASD (Cascio et al., 2012). Compared to matched controls, the ASD group exhibited greater activity to food pictures in bilateral mid-insula (Cascio et al., 2012), the same region shown in earlier studies to be both primary gustatory cortex and a center for oral texture processing (Verhagen et al., 2004).

While picky eating is common in neurotypical development between 2 and 6 years (Birch, 1999), food selectivity in ASD does not necessarily resolve in these early years. Severity of food selectivity appears to decrease across childhood in ASD (Beighley, Matson, Rieske, & Adams, 2013); however, several studies suggest that symptoms may persist into adulthood (Fodstad & Matson, 2008). The majority of research on food selectivity in ASD has focused on early childhood and primary school age children. Some studies documenting increased food selectivity in ASD have included adolescent participants (e.g., Beighley et al., 2013; Collins et al., 2003; Matson, Fodstad, & Dempsey, 2009), but mean ages across groups are primary school age or younger.

Prior research broadly related to food selectivity and associated symptoms in adults with ASD has generally focused on broad sensory functioning or olfactory or taste processing via laboratory tasks. For example, Crane, Goddard, and Pring (2009) utilized the Adult/Adolescent Sensory Profile to obtain self-ratings of overall sensory functioning among 18 adults with ASD and 18 matched controls. These investigators found that the overwhelming majority of participants with ASD reported at least some examples of extreme levels of sensory sensitivity. However, it should be noted that data were collapsed across sensory modalities (e.g., taste/smell vs. vision vs. audition), rather than examining modality-specific abnormalities; thus, food-related atypicalities specifically were not reported. Using laboratory-based tasks, Tavassoli and Baron-Cohen (2012a) found comparable olfactory detection thresholds among 38 adults with ASD compared to 42 matched controls in one study but documented lower taste identification scores for 23 adults with ASD compared to 26 matched controls in a separate investigation (Tavassoli & Baron-Cohen, 2012b). Finally, Damiano et al. (2014) recently showed equivalent sweet taste sensitivity and preferences for sweet tastes between 20 adults with ASD and 38 matched controls. The adults' ASD symptom severity was associated with sweet taste sensitivity (i.e., greater symptoms related to lower sensitivity), but not with sweet taste hedonic responses.

Although evidence of differences in laboratory tests of sensory sensitivity is important, it remains unclear how these findings relate to real-world eating behaviors. One previous study by Fodstad and Matson (2008) examined general feeding and mealtime behavior in a sample of 30 adults with ASD and intellectual disability (ID) and 30 adults with ID alone (age range 18–69) using the Screening Tool of Feeding Problems (STEP). Adults with both ASD and ID demonstrated more feeding difficulties than the adults with ID alone, particularly with respect to behaviorally based food selectivity and refusal. At present, to the author's knowledge, there are no extant published findings addressing aberrant eating in young adults with ASD without ID or the relationship of eating problems to adaptive behavior or daily living skills in this age group (see Lane et al., 2010 for associations between taste sensitivity and adaptive functioning in children with ASD). The present study focuses on self-ratings of these issues in a relatively large sample of adolescents and young adults with ASD compared to neurotypical adolescents and young adults. Secondary analyses from a broader study examining brain and behavioral functioning in ASD contribute to first steps toward examining food selectivity in older adolescents and young adults with ASD. Using items from the *Adult/Adolescent Sensory Profile* (AASP; Brown & Dunn, 2002) as a measure of convenience, we hypothesized that self-rated food selectivity would still be evident in this older age range of the ASD population and that these food-related issues would be negatively correlated with parent ratings of adaptive behavior skills, suggesting ongoing real-world impact.

1. Methods

1.1. Participants

Participants included 65 adolescents/young adults with ASD (12–28 years) and 59 adolescents/young adults with neurotypical development (12–23 years) recruited from the Washington, DC metropolitan area. All 65 participants with ASD met Diagnostic and Statistical Manual of Mental Disorders-5 diagnostic criteria as assessed by an experienced clinician. ASD diagnoses were confirmed with the Autism Diagnostic Observation Schedule (Lord et al., 2000) and the Autism Diagnostic Inventory (Le Couteur, Rutter, & Lord, 1989) or Autism Diagnostic Inventory-Revised (Lord, Rutter, & Le Couteur, 1994),