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Experience sampling of positive affect in adolescents with autism: Feasibility and preliminary findings

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ABSTRACT

Background: Experience sampling is a powerful method for obtaining ecologically valid data from research participants in real-world contexts. Given the urgent need for innovative and sensitive outcome measures in autism spectrum disorder (ASD) research, the present study sought to examine the feasibility of using experience sampling of positive affect and behavior in adolescents with ASD.
Method: Nineteen high functioning adolescents with ASD and 20 sex and age matched controls completed smartphone- and Qualtrics® –based experience sampling of positive affect and behavior six times over four days.
Results: Adherence was excellent: adolescents with ASD completed 85% of the assessments, compared to 93% in controls, and response rates were not impacted by age or IQ. Groups did not differ in positive affect overall or as a function of activities, nor did groups differ in the proportion of assessments completed during social or nonsocial activities. However, groups did differ in the proportion of assessments completed during preferred activities.
Conclusions: Results suggest that smartphone- and Qualtrics® –based experience sampling with high functioning adolescents with ASD is feasible and captures real-world behaviors that would not be possible using laboratory-based measures.

1. Introduction

Nearly all questionnaire-based autism spectrum disorder (ASD) research measures are laboratory-based caregiver-report or self-report instruments. Experience sampling is a method for obtaining subjective information in a natural setting that is useful for gathering information about context-dependent states (Stone & Shiffman, 2002). Experience sampling offers new methods to examine social-affective functioning in ASD with strong ecological validity because data are collected in real-time during naturalistic behaviors. Additionally, there is an urgent need for novel, sensitive, and standardized outcome measures in ASD treatment studies (Vivanti, Prior, Williams, & Dissanayake, 2014; Warren et al., 2011), and the high

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ecological validity of experience sampling suggests that this method may have the potential to be a sensitive ASD treatment outcome measure.

Experience sampling has been used in a number of psychiatric contexts as well as with pediatric and severely mentally ill populations (aan het Rot, Hogenelst, & Schoevers, 2012; Granholm, Ben-Zeev, Fulford, & Swendsen, 2013; Marhe, Waters, van de Wetering, & Franken, 2013; Shiffman, Stone, & Hufford, 2008; Silk, Steinberg, & Morris, 2003; Tan et al., 2012). Experience sampling also offers relatively increased ecological validity relative to laboratory measures and is thus a natural complement to laboratory-based studies (Myin-Germeys et al., 2009; Shiffman et al., 2008; Stone & Shiffman, 2002). For example, experience sampling leads to less underreporting of mood fluctuations (Piasecki, Hufford, Solhan, & Trull, 2007), and experience sampling of mood has very good temporal stability and internal consistency (Larson, 1989). Experience sampling is particularly valuable for gathering information about states and behaviors that may be context-dependent, such as affect (Moskowitz & Young, 2006), and the accessibility of smartphones and freely-available survey software has made experience sampling a valuable method to collect self-report data in naturalistic contexts.

Though there is little ASD research that has used experience sampling, there are a number of factors that suggest that experience sampling may be a particularly suitable assessment method for ASD research. First, the accessibility of smartphones and survey software makes experience sampling accessible to most researchers and families. Second, experience sampling via smartphones may be well suited for older children and adolescents given the high use of smartphones by this age group (nearly 70% of 10 year olds use smartphones daily (Rice et al., 2014)). Finally, experience sampling via smartphones may be ideal for adolescents with ASD given this population's strengths in using technology (Klin, McPartland, & Volkmar, 2005) and the preference for screen media over other leisure activities for individuals with ASD (Shane & Albert, 2008).

Only a few studies have evaluated experience sampling in ASD. Chen, Bundy, Cordier, and Einfeld (2014) used experience sampling to identify the contexts and content of daily life in a small sample (n = 6) of children with high functioning ASD using an iPod Touch. They reported descriptive analyses of the quality of experiences and corresponding emotions in everyday social interactions in ASD, however children without ASD were not included in this study. Similarly, Chen et al. 2014, 2013) investigated the feasibility of experience sampling in small samples of individuals with and without high functioning ASD (n = 6 and n = 4, respectively), and found acceptable response rates and response validity for seven surveys administered over seven consecutive days. Finally, Khor, Gray, Reid, and Melvin, (2014) used experience sampling across two weeks in adolescents with high-functioning ASD to evaluate stress and coping and reported moderate compliance with the experience sampling protocol as well as moderate concurrent validity with retrospective measures of coping. They also found that similarities between child-reported and parent-reported variables of behavior and emotional difficulty provided promising evidence of the ability of high functioning adolescents with Autism Spectrum Disorders to report on internal states.

In this study, experience sampling of positive affect and behavioral context were examined in high functioning adolescents with ASD (i.e., characterized by average IQ scores). Although research on affective experience in ASD has focused primarily on negative affect (e.g., White et al., 2014; Yirmiya, Kasari, Sigman, & Mundy, 1989), the recent emphasis on understanding motivational aspects of ASD has focused research attention on positive affect given its relevance for the social motivational deficits that characterize the disorder (Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012; Dawson, Webb, & McPartland, 2005). Additionally, theories that focus on impaired motivational systems in ASD have begun to examine behaviors related to restricted interests, a core symptom of ASD (American Psychiatric Association, 2013), because of converging lines of evidence that ASD is characterized by increased positive affect while processing stimuli related to restricted interests (Cascio et al., 2014; Sasson, Dichter, & Bodfish, 2012; Watson et al., 2015).

The primary goal of this study was to establish the feasibility of experience sampling of positive affect in high functioning adolescents with ASD. Accessibility was emphasized when developing the experience sampling protocol to ensure that promising findings would be replicable in a diverse range of settings. Our secondary goals were to use experience sampling to investigate (1) differences in positive affect and behavioral context in ASD; (2) the relative proportions of time individuals with ASD were engaged in various activities related to preferred activities, and (3) whether the social context of sampling (i.e., if participants were alone or with other people) differentially influenced positive affect in ASD.

2. Methods

2.1. Participants

Twenty-two adolescents with ASD and 20 controls between 9 and 19 years old consented to a protocol approved by the local human investigations committee at UNC-Chapel Hill. Groups were recruited to be matched on age, gender distribution, and IQ. Three adolescents with ASD withdrew before completing any assessments, citing conflicts with their schedules in two cases and unspecified reasons in the third case. Thus, the final sample was 19 adolescents with ASD and 20 typically developing controls. Adolescents with ASD were recruited via the Autism Subject Registry maintained through the Carolina Institute for Developmental Disabilities. Typically developing controls were recruited via an email listserve at UNC-Chapel Hill.

Inclusion criteria were as follows. Control participants scored below the recommended cutoff of 15 on the Social Communication Questionnaire, an ASD screening measure (Mulligan, Richardson, Anney, & Gill, 2009). ASD participants had