



The indirect assessment of social anhedonia in Chinese adolescents: Preliminary findings



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ABSTRACT

Nearly all self-report measures of anhedonia have been developed for use in adults. Recently we developed an age and developmentally appropriate measure of social/interpersonal pleasure for adolescents (ACIPS-A), whereby lower scores are indicative of social anhedonia. However the scale had not been administered to Eastern samples. The adolescent version of the Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS-A) was administered to a general, community-derived Chinese adolescent sample of 442 students, including 186 males (44%), who ranged in age from 12 to 18 years old. The 20-item Chinese Temporal Experience of Pleasure (TEPS) was also administered to the sample. Exploratory factor analysis revealed that three factors (Casual bonding, Close relationships, and Shared interests) accounted for nearly 69% of the variance. The total ACIPS-A showed excellent internal consistency, with ordinal alpha = 0.94. Scores on the adolescent version of the ACIPS were positively and significantly associated with total scores on the four Chinese TEPS subscales. The ACIPS-A is a sufficiently robust measure to be useful and valid in Chinese samples as well as in Western (i.e. European and U.S.) samples.

1. Introduction

In general, human beings define themselves partly in relation to others, whether in terms of their connections, role relationships, or social interactions with others (Liu and Eckert, 2014). The socializing functions of friendships and relationships play an important role in terms of helping adolescents master developmental challenges such as sense of self, trust and intimacy, social cognition, and self-efficacy (Casey et al., 2008; Hartup and Stevens, 1997; Okamoto et al., 2011). Researchers (Chen et al., 2001) have concluded that friendships and peer groups appear to contribute, independently and/or in interaction with adults' influences, to adolescents' socioemotional and cognitive development. As such, friendships and other social relationships are an important developmental context for adolescents (Furrer, 2010). Involvement in close and intimate peer relationships becomes increasingly important during adolescence (Bowker et al., 2014). Thus, it is important to measure individual differences in hedonic capacity for social and interpersonal relationships in an age-appropriate and sensitive manner during this period.

The adolescent brain displays heightened responsivity to several aspects of reward, compared with other age groups (Galván, 2013; Smith et al., 2015). In particular, there are age-related changes in the dopaminergic rich areas implicated in reward processing, with reports of increased striatal responding to rewards during adolescence (Smith et al., 2015). Rewards can be defined as encompassing learning, motivation, and hedonic response (Berridge and Robinson, 2003). A particular class of reward that is especially salient in terms of mental illness is social reward. Indeed, the value and role of social incentives increases markedly during the adolescent developmental period (Crone and Dahl, 2012; Forbes and Dahl, 2012). These developmental changes in reward responsivity and reward processing appear to be universal, i.e., similar developmental trajectories predicted by pubertal maturation have been empirically in youths and adolescents across cultures from multiple countries (Icenogle et al., 2016).

Although social and nonsocial reward share a common 'neural currency' in terms of reward circuitry involving mesocorticolimbic activity (Izuma et al., 2008; Rademacher et al., 2016), there are some key differences in terms of the processing of social and nonsocial rewards.

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The neuropeptide oxytocin activates the dopaminergic system in response to social stimuli (Rademacher et al., 2016). Social anhedonia is a particular form of lowered reward responsiveness that involves reduced motivation to pursue rewarding outcomes such as social events and activities and interpersonal interactions and relationships. Social anhedonia also involves reduced enjoyment of the experience of social and interpersonal interactions. Using incentive delay tasks, investigators (Xie et al., 2014) observed that individuals with social anhedonia displayed comparable responses to monetary stimuli as controls, but lowered anticipatory sensitivity and consummatory experience to positive social stimuli. Another group (Gromann et al., 2013) observed that psychotic patients displayed decreased striatal sensitivity to rewarding aspects of social interaction, i.e., cooperation in the context of trust games. Taken together, it appears that social reward can be considered a distinct construct from nonsocial reward.

Several investigators have asserted that lowered reward responsiveness may be an etiological factor in the onset and/or maintenance of depression (Depue and Iacono, 1989; Forbes and Dahl, 2012; Olino et al., 2015; Rawal et al., 2013). Rates of depressive symptoms and depressive episodes rise significantly during adolescence (Lewinsohn et al., 1994). Indeed, some researchers (Morgan et al., 2013b) have hypothesized that neural response to reward may serve as a predictor of increases in depressive symptoms and may be moderated by gender and pubertal development. Others, such as Meehl (Meehl, 1962) have postulated a particularly important role for social anhedonia in the etiology of schizophrenia-spectrum disorders. These factors provide further impetus to study reward responsiveness in general, and responsiveness to social stimuli in particular, in adolescents.

Despite the fact that social anhedonia and decreased reward responsiveness may be particularly important to assess during the adolescent period, there is a relative paucity of measures of social anhedonia that are suitable for use with this population. To date, nearly all self-report measures of anhedonia have been developed for use with adult samples. Gooding and Pflum (2014b) developed an indirect measure of social anhedonia, namely, the Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS) which they subsequently adapted in order to create an age-appropriate and sensitive tool for the assessment of adolescents. The resultant adolescent version of the ACIPS (called the ACIPS-A) was recently introduced in the literature (Gooding et al., 2016).

1.1. Prior Research based on the ACIPS-A

Briefly, the adolescent version of the ACIPS (ACIPS-A; Gooding et al., 2016) was administered to a large sample of community-derived adolescents, along with the Temporal Experience of Pleasure Scale (TEPS; Gard et al., 2006), General Health Questionnaire (GHQ; Goldberg and Williams, 1988) and the anhedonia subscales from a schizotypy scale specifically developed for administration to adolescent samples, namely, the ESQUIZO-Q (Fonseca-Pedrero et al., 2010). The TEPS was administered as a general measure of pleasure, or reward responsiveness. Although it is not specifically developed for use with adolescents, in adult samples, it correlates moderately with the adult version of the ACIPS. Among the Spanish adolescents, Gooding et al. (Gooding et al., 2016) observed moderate and significant positive correlations between the ACIPS-A and measures of related constructs, such as anticipatory pleasure and consummatory pleasure, as well as moderate and inverse correlations with measures of social anhedonia, thereby providing an important source of convergent validity. Evidence of discriminant validity was derived from its nonsignificant associations with total GHQ scores. It is also noteworthy that the ACIPS-A showed high internal consistency, and factor analysis revealed a four-factor structure: close relationships; casual friendships and relationships; social bonding; and emancipation/ negative affiliation.

The ACIPS-A was subsequently administered to a subset of American participants as part of an ongoing longitudinal twin study of

the development of emotions, temperament, and psychopathology (see (Schmidt et al., 2013) for detailed description of longitudinal project). The ACIPS-A was administered as part of a battery of self-report questionnaires that included the Behavioral Inhibition Scale (BIS) /Behavioral Activation Scales (BAS) (Carver and White, 1994), Early Adolescent Temperament Questionnaire-Revised (EATQ-R; Ellis and Rothbart, 2001) and the Children's Depression Inventory (CDI; Kovacs, 1992). Among the American adolescents, et al. (Moore et al., 2016) observed moderate and significant correlations between the ACIPS-A and measures of related constructs such as the desire to have warm, close relationships with others (EATQ-R Affiliation subscale), reward responsiveness, (BAS-RR subscale) and low-intensity pleasurable sensations (EATQ-R Pleasure Sensitivity), providing important evidence of construct validity. Evidence of discriminant validity was derived from nonsignificant associations between the ACIPS-A and measures of shyness (EATQ-R Shyness), or BAS Drive or Fun-Seeking. The investigation also revealed that higher levels of interpersonal pleasure, as measured by the ACIPS-A, were associated with fewer depressive symptoms over the past two weeks, as measured by the CDI. Overall, the findings based upon the American adolescents, e.g., high internal consistency and factor structure, appeared quite similar to those observed among the Spanish adolescents. One difference, however, is that the gender difference was not significant, perhaps due to the small sample size ($n = 129$). The ACIPS is able to capture individual differences in social and interpersonal pleasure and summarize them in terms of a total score. Further consideration and factor analysis of the scale revealed that the items could not be distinguished in terms of anticipatory and consummatory items, because most of the ACIPS items, like social pleasure itself, contain aspects of anticipatory as well as consummatory pleasure (see Gooding and Pflum, 2014a).

1.2. The present study

Not only is it important to assess social anhedonia during adolescence, but it is important to examine whether any type of socially withdrawn behavior during adolescence can be similarly detected in Western and nonWestern cultures. In Western societies, adolescence is a developmental period characterized by changes, in terms of the youth's relationship with their parents, increasing conflicts and challenges with authority figures, and concomitant increasingly complex processing of social evaluative information. Social hierarchies in school and after-school activities become more salient, peer relationships become more intense and romantic relationships may begin to develop and/or become more emotionally laden.

We were particularly interested in investigating individual differences in hedonic capacity for social/interpersonal interactions among adolescents within the Chinese context. We hypothesized that the factor structure of the ACIPS-A in Chinese adolescents' responses might look different than the factor structure observed in the ACIPS-A response data produced by American and Spanish adolescents. There are several reasons why the factor structure of the ACIPS-A in Chinese adolescents may be different. First, in Chinese culture, there is an overall emphasis on self-transcendent rather than self-enhancement goals. That is, in the Chinese culture, during adolescent development there is more of a moral, prosocial focus on collective and communal values as opposed to a focus on the development of individual concerns (Bond and Chi, 1997). In addition to the different cultural emphasis on collective versus individualistic goals, there are cultural differences in terms of opportunities for peer interactions. In Chinese culture, the emphasis on education results in Chinese adolescents spending more of their peer group socialization outside of school on academic-related activities (Chen et al., 2003), whereas American adolescents, on whom the measure was initially developed, have more varied extracurricular activities, including part-time employment, sports, and dating. Moreover, Chinese adolescents' online socialization patterns differ somewhat from their Western counterparts, in terms of level of disclosure (Ji et al., 2014).

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