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Assessing social anhedonia in adolescence: The ACIPS-A in a community sample

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ABSTRACT

To date, nearly all self-report measures of anhedonia have been developed for use with adult samples. A valid measure of anhedonia that can be used with adolescents would be useful in order to address key questions about the nature and course of anhedonia during adolescence. This study examined the psychometric properties of an adolescent version of a relatively new measure of social anhedonia, namely, the Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS-A). The ACIPS-A was administered to a general, community-derived Spanish adolescent sample of 449 students, including 251 males (55.9%), who ranged in age from 13 to 19 years old. Other measures included the Temporal Experience of Pleasure Scale (TEPS), anhedonia subscales from the Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q), and the General Health Questionnaire-12 (GHQ-12). Exploratory factor analysis yielded a four-factor solution (close relationships, casual friendships and relationships, social bonding, and negative affiliation/emancipation). The total ACIPS-A showed excellent internal consistency, with ordinal alpha = 0.95. The ACIPS-A total scores were positively correlated with the TEPS-Anticipatory scores ($r = 0.44$, $P < 0.001$) and TEPS-Consummatory scores ($r = 0.30$, $P < 0.001$) but not with total GHQ-12 scores. The ACIPS-A total scores were negatively correlated with social anhedonia subscale scores ($r = -0.55$) taken from a measure developed for use with adolescents. These results suggest that the ACIPS-A is a valid measure for use with non-clinical adolescents and is likely to prove useful for screening purposes.

1. Introduction

Anhedonia is conceptualized as the loss or reduction in the ability to experience pleasure. As such, anhedonia is a transdiagnostic symptom, in that it appears central to several forms of psychopathology and psychopathological states, including but not limited to depression, schizophrenia, and psychoactive substance withdrawal [1,2]. Anhedonia can be assessed directly through self-report measures of anhedonia such as the revised Social Anhedonia Scale [3] and the revised Physical Anhedonia Scale [4], as well as indirectly through self-report measures of pleasure such as the Fawcett-Clark Pleasure Scale [5], the Snaith-Hamilton Pleasure Scale (SHAPS) [6] and the Temporal Experience of Pleasure Scale (TEPS) [7]. A description and review of these scales can be found elsewhere [8].

To date, nearly all self-report measures of anhedonia have been developed for use with adult samples. A valid measure of anhedonia that can be used with adolescents would be useful in order to address key questions about the nature and course of anhedonia during adolescence, a period of considerable biological and psychosocial changes and challenges. Few of the aforementioned anhedonia scales have been systematically analyzed in terms of their suitability for measuring anhedonia in adolescent participants. One exception is the SHAPS, which was recently administered to nearly 600 ninth grade students by Leventhal et al. [9]. Using Item Response Theory (IRT) modeling, Leventhal et al. demonstrated that the individual SHAPS items show convergent validity with other measures related to pleasure, happiness, and positive affect, and discriminant validity by being less related to measures related to negative affect and distress. One notable exception, however was a significant inverse correlation between the SHAPS and a measure related to social phobia. This significant association between the measure of anhedonia and social phobia is a potential limitation of the measure's utility. Indeed, the

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correlation between social anxiety and social anhedonia in the original Social Anhedonia Scale prompted the revision of the Chapman's measure [3]. Thus it appears that the SHAPS may be suitable for assessing adolescents in terms of being able to detect general anhedonia, i.e., a general decrease in pleasure experiences, including some social experiences (e.g. helping others, seeing smiling faces) and some sensory experiences such as smells, landscape, bath or shower. However, the SHAPS does not seem to be a developmentally appropriate substitute for the 40-item revised Social Anhedonia Scale that is regularly used in adult clinical and non-clinical samples. This is not wholly unexpected, given that the 14-item measure contains only five items that assess pleasure for social or interpersonal stimuli. Additionally, the investigators noted that the Hispanic participants in their sample (50% of the total) displayed significantly lower SHAPS scores, raising concerns regarding possible cultural bias inherent in the measure.

We believe that it is especially important to measure social anhedonia, the reduced experience of pleasure from interpersonal interactions, during adolescence. Adolescence is a period associated with considerable neuroplasticity as well as considerable affective and social development [10]. Indeed, in Western cultures, adolescence is typically the period when most individuals experience their first romantic relationships. Moreover, for certain forms of psychopathology, such as schizophrenia-spectrum disorders [2,11–14], and autism spectrum disorders [15–17], we assert that compared to general anhedonia, social anhedonia may have more prognostic and/or diagnostic significance and therefore warrant greater attention. Thus, we thought it would be important to measure social anhedonia in an age-appropriate and sensitive manner in adolescents.

Previously, the first two authors (DCG and MJP) developed an indirect measure of social anhedonia for use with adults, namely, the Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS) [8,18]. Its psychometric properties [19–21] have been well documented. Some investigations of the factor structure of the ACIPS [8,22] reveal an overall tripartite structure, consisting of pleasure associated with intimate social interactions; pleasure derived from social bonding and making connections; and the pleasure that accompanies group social interactions. Other investigations of the ACIPS [19] revealed a four-factor structure: close relationships; family-related interaction; general social interactions, and bonding over shared interests and experiences. It is noteworthy that two of the factors, namely, close relationships and family-related interactions were previously subsumed under the "intimate social interactions factor" in the three-factor model. Regardless of the exact name, the three- and four-factor solutions have been consistent across translations, such as the Chinese translation of the adult version of the ACIPS [22,23].

The purpose of the present investigation was to introduce and validate the adolescent version of the ACIPS (called the ACIPS-A) in a relatively large sample of individuals between the ages of 13 and 19. The Spanish translation of the adult version of the ACIPS [22] is already available for use with adult Spanish-speaking populations.

This study examined the psychometric properties of the ACIPS-A in a general, community-derived Spanish adolescent sample. We hypothesized that the factor structure of the adolescent version of the ACIPS would be similar to the factor structure of the adult versions, i.e., show a three- or four-factor structure. For example, we expected that there would be a distinction between more intimate and casual relationships. We also wished to examine whether the gender difference we observed in terms of self-reported social and interpersonal pleasure in adults would also be evident in adolescents. A tertiary goal of the study was to establish evidence of convergent and discriminant validity by examining the association between the ACIPS-A and other self-report measures, including: the TEPS, a measure of general pleasure; two anhedonia subscales from the ESQUIZO-Q, a standardized measure of schizotypy for adolescents; and the GHQ-12, a measure of general psychological distress. We hypothesized that there would be an association between the ACIPS-A and the TEPS though it might be less robust than the one observed in adult samples, because the TEPS was not specifically designed to be administered to adolescents. We expected that there would be significant and inverse associations between measures of anhedonia and the ACIPS-A. We also predicted that there would be a stronger relationship between the social anhedonia subscale of the ESQUIZO-Q and the ACIPS-A compared to the relationship between physical anhedonia subscale of the ESQUIZO-Q and the ACIPS-A. Finally, we hypothesized that, because this was a non-clinical population, there would not be a significant relationship between self-report ratings of social/interpersonal pleasure, as measured by the ACIPS-A, and self-report ratings of general psychological distress, as measured by the GHQ-12.

2. Methods

2.1. Participants

In order to obtain a representative sample of adolescents, we recruited students from different cities and different types of secondary schools (e.g., public, funded, and private) belonging to Principality of Asturias, from a region in northern Spain. Both rural and urban areas were represented, as well as a range of socioeconomic levels. Some of the institutions were technical/vocational ($n = 4$), whereas some were preparatory (secondary or higher) schools from rural areas ($n = 3$) and 3 were preparatory schools located in urban areas.

The initial sample included 518 students. We omitted participants whose age was outside the range, i.e., younger than 13 or older than 19 years old ($n = 16$); and/or whose total score on an infrequency scale, namely, the Oviedo Infrequency Scale [24], administered as part of the questionnaire packet, was higher than 3 ($n = 43$). The age of the participants ranged from 13 to 19 years old. The resultant sample consisted of 449 students, including 251 males (55.9%). The age distribution of the sample was as follows: 13 years ($n = 7$; 1.6%), 14 years ($n = 196$; 43.7%), 15 years ($n = 110$; 24.5%), 16 years ($n = 69$; 15.4%), 17 years ($n = 23$; 5.1%), 18 years ($n = 17$; 3.8%) and 19 years ($n = 27$; 6.0%).

2.2. Measures

We administered two measures of hedonic capacity as part of a larger investigation of "adolescent health and well-being". The Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS)–Adolescent Version (ACIPS-A; [25]) is a 17-item self-report measure that assesses individual differences in one's capacity to enjoy interpersonal interactions. It contains the same items as the adult version (ACIPS; [18,22]). Similar to the adult version of the measure, it contains items that assess anticipatory ("looking forward to", "wanting") and consummatory ("liking") aspects of social and interpersonal pleasure. In our prior research [8,19,22] we have not found that analysis of its factor structure divided the items according to anticipatory versus consummatory content. Indeed, there is some question whether social pleasure is best characterized as an amalgam of remembered, anticipated, and in-the-moment experiences.

However, the adolescent version of the ACIPS differs from the adult version in terms of response options and wording. The adolescent version of the ACIPS is designed to use a response format that is developmentally appropriate for the youngest adolescent's cognitive representation of their internal state, i.e., their ability to make judgments about their internal feelings and differentiate

between abstract levels [26]. Given that most questionnaires designed for youths and adolescents assessing constructs such as peer relations, feelings, and perceptions, use Likert-like scale response formats providing from 3 to 5 options, the number of response options was decreased from six to four, so that the options ranged from 1 (“totally false for me”) to 4 (“totally true for me”). Also, the wording was slightly altered (e.g., placement of “school” before work, etc.). Thus, for the adolescent version of the ACIPS (“the ACIPS-A”), total scores range from 17 to 68, with lower scores indicating greater likelihood of social anhedonia.

Translation of the ACIPS was performed using a back translation procedure in accordance with international guidelines for translation of psychological measures [27]. An expert in the subject matter translated the American English original version of the adolescent version of the ACIPS into Spanish. Subsequently, this version was translated into English by another bilingual researcher who was familiar with American culture. A third researcher compared the two English versions (original and translated). The final Spanish version of the ACIPS-A that was used is presented in the Appendix A.

Given concerns regarding the potential limitations of the SHAPS (described earlier), we opted to use a relatively newer measure, namely, the Temporal Experience of Pleasure Scale. The Temporal Experience of Pleasure Scale (TEPS; [7]) is an 18-item self-report measure designed to distinguish between anticipatory pleasure and consummatory pleasure. In contrast to the ACIPS, the TEPS focuses primarily on general pleasure; it does not provide a good assay of social pleasure. At present, the TEPS has been administered primarily to adult samples. Each of the items is rated on a Likert-based scale, ranging from 1 (“very false for me”) to 6 (“very true for me”). The TEPS is scored in terms of its two subscales; the TEPS-Anticipatory subscale contains 10 items, whereas the TEPS-Consummatory subscale contains 8 items. Higher scores indicated greater experience of pleasure. We used a validated Spanish translation of the TEPS that has been used in prior research [28]. The TEPS-Anticipatory subscale and TEPS-Consummatory subscale also showed good internal consistency (ordinal $\alpha = 0.86$ and 0.83, respectively) in this adolescent sample.

We also administered the 12-item version of the General Health Questionnaire (GHQ-12; [29]) in order to assess self-reported subjective and psychological well-being. The GHQ-12 is a widely used self-report screen for identifying symptoms of mental distress. Each item is rated on a 4-point Likert-type format; the positively worded items were rated from 0 (“always”) to 3 (“never”) and the negative items were rated from 3 (“always”) to 0 (“never”). Thus, the total score ranged from 0 to 36, with higher scores indicating higher levels of psychological distress. We relied upon the Spanish version of the GHQ-12 [30]. In this sample, the internal consistency of the measure was high (ordinal $\alpha = 0.98$).

The Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q; [31]) is a self-report measure developed for the assessment of schizotypal traits in adolescents. The ESQUIZO-Q items were selected based upon a review of the extant literature on schizotypy, and consists of 10 empirically-derived subscales. In this study we used two of those subscales, namely the Social Anhedonia and Physical Anhedonia subscales. For both of these subscales, each item is rated on a 5-point Likert-type format, ranging from 1 (“totally disagree”) to 5 (“totally agree”). Higher scores indicate higher levels of anhedonia. The Social Anhedonia subscale consists of 5 items ($\alpha = 0.77$), whereas the Physical Anhedonia subscale consists of 4 items ($\alpha = 0.68$). The Social and Physical Anhedonia subscales comprise the negative dimension of the ESQUIZO-Q. The original validation of the ESQUIZO-Q was conducted on a sample of 1653 non-clinical adolescents [31].

The Oviedo Infrequency Scale [24] is a 12-item self-report instrument with a Likert-type response format using five categories (from 1 “totally disagree” to 5 “totally agree”). Its objective is to detect those participants who respond to self-reports in a random, pseudo-random, or dishonest manner. Respondents who replied to more than three of these items incorrectly were automatically omitted from further inclusion in study analyses. This cut-off point is based on previous empirical research [24]. An example item is: “The distance between Madrid and Barcelona is greater than the distance between Madrid and New York”.

2.3. Procedure

Questionnaires were administered in groups of 10 to 15 individuals sitting in classrooms under psychologist supervision. Assessment took place during school hours and in a classroom specially prepared for this purpose. A letter of endorsement from the director of the Educational Department aided recruitment for the Principality of Asturias, which was sent to all the parents and guardians informing them of the project and seeking their consent. These questionnaires were part of a study described as an investigation of adolescent health and well-being. For all participants under the age of 18, parents and guardians were asked to provide written informed consent in order for their child to participate in the study. Participants were informed of the confidentiality of their responses and the voluntary nature of the study. They were not provided with any incentives for their participation. The research was approved by the research and ethics committee of the Department of Psychology at the University of Oviedo as well as the Education and Social and Behavioral Sciences Institutional Review Board of the University of Wisconsin-Madison.

2.4. Data analyses

We calculated descriptive statistics for the distributions of age, gender, total ACIPS-A scores, TEPS-Anticipatory, TEPS-Consummatory scores, and scores from the ESQUIZO-Q anhedonia subscales. We explored the relationship between age and ACIPS-A scores by computing Pearson correlation coefficients. We examined the questionnaire data for evidence of gender differences using the *t*-test for independent samples. In the case of significant findings, we computed Cohen’s *d* to provide an estimate of the effect size of the difference. In order to explore the factor structure of the ACIPS-A, we conducted principal components analysis with promax rotation. We examined the internal consistency for the total ACIPS-A using reliability analysis, calculating the ordinal alpha coefficient based on the polychoric correlation matrix. Pearson product moment correlation analyses were also conducted to calculate the association between the scores from the TEPS, GHQ, and ESQUIZO-Q anhedonia subscales and the total ACIPS-A scores in order to examine the convergent and discriminant validity of the ACIPS-A. When comparing associations between the scales, we used Meng’s test [32] in order to test for the significance of the difference between correlated correlation coefficients. SPSS version 23 [33] and FACTOR 9.2 [34] were used for the analyses.

3. Results

3.1. Demographic description

The mean age for the entire sample, as well as for males and females separately is provided in Table 1. We observed a small but significant association between age and total score on the ACIPS-A, whereby, age was inversely correlated with hedonic capacity for social and interpersonal pleasure, $r = -0.13$, $P < 0.01$. As indicated in Table 1, the female participants in our sample were slightly younger than the males, $t(447) = 4.22$, $P < 0.001$. Consistent with the ethnic make-up of the student population, most of the sample (446 or 99.3%) of the sample was Spanish, with the remaining participants

Table 1
Descriptive statistics for the sample and by gender.

Variable	Total sample (n = 449) M (SD)	Males (n = 251) M (SD)	Females (n = 198) M (SD)
Age	15.14 (1.47)	15.39 (1.57)	14.83 (1.25)
Total ACIPS-A	54.83 (7.47)	53.07 (7.75)	57.07 (6.46)
TEPS-anticipatory	44.45 (7.52)	43.76 (8.12)	45.32 (6.59)
TEPS-consummatory	29.73 (6.55)	29.23 (6.80)	30.35 (6.20)
GHQ-12	22.16 (5.29)	21.20 (4.75)	23.28 (5.71)
Social anhedonia	7.76 (2.83)	8.10 (2.96)	7.33 (2.61)
Physical anhedonia	7.47 (2.91)	7.76 (3.02)	7.11 (2.73)

The ACIPS-A is the adolescent version of the Anticipatory and Consummatory Interpersonal Pleasure Scale (Gooding and Pflum, 2014 [18,25]); the TEPS-Anticipatory and TEPS-Consummatory are the anticipatory and consummatory subscales of the Temporal Experience of Pleasure Scale (Gard et al., 2006 [7]); and the GHQ-12 is the 12-item version of General Health Questionnaire (Goldberg and Williams, 1988 [29]). The social anhedonia and physical anhedonia subscales are part of the Oviedo Schizotypy Assessment Questionnaire (Fonseca-Pedrero et al., 2010 [31]).

from other Spanish-speaking, Latin American nationalities (Equadorian, Brazilian, and dual Spanish and English nationality).

3.2. Factor structure of the Spanish translation of the ACIPS-A

A principal components factor analysis on the Spanish translation of the ACIPS-A yielded a four-factor solution, which accounted for 49.10% of the variance (see Table 2). All four factors assessed both anticipatory and consummatory aspects of social and interpersonal pleasure. Nine of the seventeen items loaded onto the first factor (close relationships), which accounted for 28.81% of the common variance. The second factor, casual relationships, accounted for 7.36% of the common variance. The third factor, social bonding, accounted for 6.59% of the common variance, and the fourth factor, negative affiliation/emancipation, accounted for 6.34%. Other than the additional fourth factor, the general factor themes obtained with the adolescent version of the ACIPS appear quite similar to the factors that emerged from analysis with the adult version of the measure [22]. Table 3 provides the intercorrelations between each of the factors.

3.3. Internal consistency

The total ACIPS-A showed excellent internal consistency, with ordinal alpha = 0.95. The internal consistency estimates for each of the ACIPS-A factors are provided on the diagonal in Table 3. The anticipatory pleasure items were correlated with the consummatory pleasure items on the ACIPS-A (r = 0.75, $P < 0.001$).

Table 3
Intercorrelation matrix for the ACIPS-A factors.

Factor	Factor I	Factor II	Factor III	Factor IV
I	**0.948**			
II	0.484	**0.836**		
III	0.460	0.371	**0.695**	
IV	0.058	−0.019	0.074	**0.805**

The bold values in the diagonal are the reliability estimates (ordinal alpha) for each of the factors. All correlations were statistically significant ($P < 0.05$)

3.4. Convergent and discriminant validity

Scores from the adolescent version of the ACIPS should correlate with other measures of pleasure and show relatively low correlations with measures of dissimilar constructs (i.e., demonstrate discriminant validity). Overall, the ACIPS-A total scores appeared to be more positively correlated with the TEPS-Anticipatory scores (r = 0.44, $P < 0.001$) than the TEPS-Consummatory scores (r = 0.30, $P < 0.001$). The ACIPS-A total scores were negatively and significantly associated with total scores on the social anhedonia subscale of the ESQUIZO-Q (r = −0.55, $P < 0.001$) and as well as total scores on the physical anhedonia subscale (r = −0.34, $P < 0.$ 001). A test of the significance of the difference between two correlation coefficients revealed that the ACIPS-A was more significantly associated with the social anhedonia subscale than the physical anhedonia subscale (Z = 8.95, $P < 0.001$). However, the ACIPS-A scores were not significantly associated with total GHQ-12 scores,r's ranged from -0.05 to 0.06, n.s.

3.5. Gender differences in self-reported pleasure

Fig. 1 provides a depiction of adolescents' mean ACIPS-A and TEPS scores, grouped by gender. We observed a significant difference between male and female participants in terms of their total scores on the ACIPS-A, with the female adolescents reporting significantly greater social and interpersonal pleasure, $t(446)$ = 5.95, $P < 0.001$, Cohen's d = 0.56. Similarly, a 2 (sex: male, female) × 2 (TEPS-ANT, TEPS-CONS) repeated measures analysis of variance revealed a significant gender effect, $F(1, 447)$ = 4.95,

Table 2
Factor structure and estimated factor loadings of the ACIPS-A.

ACIPS-A item	Factor			
	I	II	III	IV
1. I look forward to seeing people when I'm on my way to a party or get-together	**0.478**	0.025	0.163	0.174
2. I enjoy looking at photographs of my friends and family	**0.454**	−0.170	0.386	0.198
3. I don't really look forward to family get-togethers or gatherings	0.082	0.073	−0.029	**0.813**
4. I enjoy joking and talking with a friend or coworker	**0.449**	0.089	0.050	0.021
5. A good meal always tastes better when you eat it with someone you feel close to	0.017	**0.645**	0.101	−0.175
6. I like it when people call or text me to say hi	−0.261	0.135	**0.821**	0.094
7. When something good happens to me, I can't wait to share the news with others	0.062	0.156	**0.472**	−0.370
8. If I learned of a group where the people shared similar interests as me, I would be interested in joining it	0.141	−0.229	**0.654**	−0.218
9. I enjoy watching films about friendships or relationships with my friends	0.090	0.247	**0.417**	0.143
10. I imagine how much fun it would be to go on vacation with a friend or someone I love	**0.670**	−0.029	0.008	0.006
11. I appreciate being invited to hang out with people I know after school or work	**0.414**	0.103	0.301	0.099
12. I am pleased when I see a friend or someone I love who I haven't seen for a while	**0.892**	−0.238	−0.035	−0.002
13. I enjoy going on group activities like attending sports events or concerts with my friends	**0.676**	0.184	−0.214	0.188
14. I look forward to watching my favorite TV shows with my friends	0.028	**0.753**	−0.043	0.112
15. I am excited when a friend that I haven't seen in a while contacts me to make plans	**0.523**	0.296	−0.131	−0.276
16. I like talking with others while waiting in line	−0.067	**0.687**	0.001	0.107
17. I enjoy it when a friend and I can discuss important things	**0.647**	0.078	−0.038	−0.173

Rotated component matrix for the Spanish translation of the adolescent version of the ACIPS (ACIPS-A; Gooding and Pflum, 2014 [25]). Principal components analysis with promax rotation. Variance explained = 49.10%. The four factors identified are as follows: Factor I: close relationships; Factor II: casual friendships and relationships; Factor III: social bonding; and Factor IV: emancipation/negative affiliation.

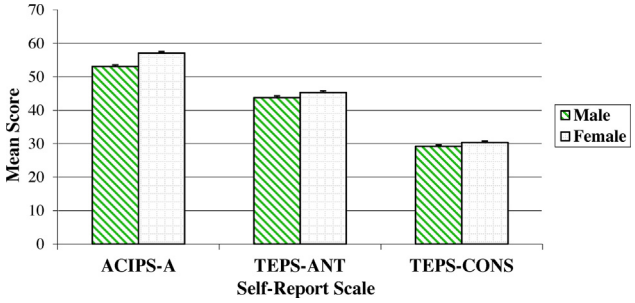

Fig. 1. Measures of self-reported pleasure by gender. Mean total scores for male ($n = 251$) and female ($n = 198$) adolescents' ACIPS-A, TEPS-Anticipatory subscale, and TEPS-Consummatory subscale, respectively. Items on the adolescent version of the ACIPS (ACIPS-A) are scored on a Likert scale ranging from one to four; total possible scores range from 17 to 68. Items on both the TEPS-ANT and TEPS-CONS scales are scored on a Likert scale ranging from one to six; total possible scores range from 10 to 60, and 8 to 48, respectively. Error bars depict standard error of the mean.

$P < 0.05$, partial eta$^2 = 0.01$. The analysis also revealed a significant effect of TEPS type (anticipatory vs consummatory), $F(1, 447) = 2577.82$, $P < 0.001$, though there was no significant interaction between gender and TEPS type, $F(1, 447) = 0.55$, n.s. Follow-up t-tests indicated that female adolescents scored significantly higher than males in their TEPS-ANT scores [$t(447) = 2.24$, $P = 0.03$, Cohen's $d = 0.21$] but the groups did not differ significantly in terms of their TEPS-CON scores [$t(447) = 1.81$, $P = 0.07$].

4. Discussion

This study was intended to validate the adolescent version of the ACIPS in a sufficiently large sample of community-derived adolescents. Using 449 Spanish adolescents, we were able to demonstrate that the psychometric properties of the ACIPS-A are robust. The scale has high internal consistency, as evidenced by the ordinal alpha coefficient. We also found some evidence regarding convergent and discriminant validity. The adolescent version of the ACIPS also appears to be characterized by four factors.

Scores on the adolescent version of the ACIPS were negatively and significantly associated with scores on the social anhedonia and physical anhedonia subscales from the ESQUIZO-Q. The inverse relationships between the ACIPS-A total scores, which provide an assay of participants' enjoyment of social and interpersonal interactions, and measures of anhedonia, especially social anhedonia, provide an important source of convergent validity. It is noteworthy that both the ACIPS-A and the ESQUIZO-Q (from which the anhedonia measures were drawn) were especially developed for administration to adolescent samples. The association observed between the ACIPS-A total score and the social anhedonia subscale of the ESQUIZO-Q in the present adolescent sample is similar in magnitude to the association previously observed in adult samples (see, for example, [20]) between the ACIPS total score and scores on the Chapman revised Social Anhedonia Scale [3].

Scores on the adolescent version of the ACIPS were positively and significantly associated with total scores on the TEPS-anticipatory and consummatory subscales. We noted however, that the total scores on the ACIPS-A showed smaller associations with the TEPS-ANT and TEPS-CONS, compared to prior reports of associations between the ACIPS and TEPS subscales [8,19]. This is not surprising, given that although the ACIPS-A was designed to be more developmentally appropriate for a younger age group, the TEPS was not. Thus, it seems possible that the pleasure experiences that were assayed by the TEPS measure may be less relevant to an adolescent sample[1]. We also observed some evidence of discriminant validity, because in the present sample, psychological distress, as measured by total scores on the GHQ-12, was not significantly associated with total scores on the adolescent version of the ACIPS.

In contrast to the Spanish translation of the adult version of the ACIPS, which is characterized by three factors, the Spanish translation of the ACIPS-A is characterized by four factors. The factors that were in common across both versions correspond to close relationships, casual relationships, and social bonding; the ACIPS-A had the additional factor best characterized as "negative affiliation and emancipation". Factor one, the factor which accounted for the largest amount of variance in the ACIPS-A, related to close relationships, whether those relationships were dyads such as best friendships, dating relationships, or close-knit groups such as the family unit or small close friendship units. This is, perhaps, reflective of the changing nature of interpersonal relationships during adolescence, i.e., the decreasing amount of time with parents, increasing time with peers, and perhaps the formation of a romantic relationship [35]. Factor two reflected the value of casual friendships and socialization with larger groups that are less intimate, but nonetheless still important in the growing social network of adolescents. The three items reflect a great deal of a typical adolescent's social interactions, namely, eating with others (whether during the school day or after school), watching television and movies with others, and talking with others while waiting for events to commence. The items in Factor three center largely on communication and correspond to pleasure derived from shared interests and activities. The additional fourth factor in the ACIPS-A was the one that differed from the factor structure observed with the adult version of the Spanish ACIPS. We did not find this altogether surprising, in that adolescence is a period characterized by several psychosocial developmental tasks, including, but not limited to, increasing independence from one's parents and development of one's own identity. Concomitant with these tasks, there may be greater emancipation from the familial unit and greater affiliation with other social networks, i.e., same-sex friends or romantic partners. We look forward to examining whether this negative affiliation/emancipation factor will replicate in other samples of adolescents, and whether this amount of variance accounted for by this factor will vary according to culture (Western vs Eastern, for example).

We observed gender differences in terms of the self-report of both social/interpersonal pleasure, as measured by the ACIPS-A, and general pleasure, as measured by the TEPS. These findings are wholly consistent with prior results based upon adult samples [19,20]. However, these findings warrant replication with another adolescent sample, because the male participants were older than the females, and there was a small but significant inverse correlation between age and total score on the ACIPS-A. It is important to note also that the present sample consisted largely of 14- and 15-year old participants; this demographic characteristic may have influenced the results, given indications [36] that the experience of anhedonia is decreasing during adolescence. Future research would benefit from sampling larger groups of participants over the entire range of adolescence. Future research would also benefit from longitudinal assessment of adolescents on the measure, in order to address whether social anhedonia is temporally stable during this dynamic developmental period. This research question is especially compelling, given the longitudinal work of Bennik et al. [36] that suggests that the stability of anhedonia increases during adolescence and gender differences in anhedonia appear at age 16.5, but not before then. It is noteworthy, however, that this group studied anhedonia overall, rather than social anhedonia in particular.

Administration of the ACIPS-A is likely to prove useful for screening purposes, for the identification of adolescents at risk

[1] To our knowledge, this is the first time the TEPS has been administered to an adolescent sample this young.

who would benefit from early and/or preventive intervention. It is helpful, too, that the ACIPS-A enables researchers and clinicians to assay anhedonia from a non-pathological perspective, thereby making it possible to obtain better norms for use across the spectrum of functioning. Like the adult version, the adolescent version of the ACIPS is also intended for use with patient populations. Therefore, one future research aim would be to administer the ACIPS-A to various adolescent inpatient and outpatient populations.

It is noteworthy that all the participants in the present study were students; this could raise the question whether amotivation was an issue among any of the participants, and if so, whether amotivation was representatively distributed. While amotivation is a negative symptom that may accompany anhedonia, given the nature of the non-patient, voluntary sample, we believe that it is less of an issue. Nonetheless, it cannot be ruled out completely. It is, however, less likely, given that those participants who displayed a random response pattern were excluded from further analyses.

A limitation of the present study is that we did not include a comprehensive measure of depressive symptomatology in our assessment. Anhedonia, particularly social anhedonia, frequently accompanies depressive episodes in adolescents as well as in adults [37]. Moreover, in our investigation of the Spanish translation of the adult version of the ACIPS [22] we noted that total scores on the ACIPS were negatively associated with scores on the BDI-II [38]. A future direction would be to explore the relationship between social and interpersonal pleasure in adolescents and risk for depression, particularly in terms of whether there are gender differences. Similarly, it would be useful and important to include a measure of social phobia and/or social anxiety in future assessments of social anhedonia in adolescent samples.

Other limitations of the present study include the fact that all the measures were self-report. Reliance upon any single method of assessment is always subject to the risk that there are inherent biases associated with that method. Behavioral measures of social anhedonia and/or social reward would be valuable for further concurrent validation of the ACIPS-A. One strength of the study was that our sample was socioeconomically diverse. However, it was not ethnically or geographically diverse. We used a general community sample of students in northern Spain; generalizability to non-European or non-Western adolescent samples is therefore limited.

Notwithstanding these limitations, the present investigation has provided additional information regarding the assessment of anhedonia in adolescents. One strength of this study is that it is the first examination of a measure containing more than 5 items that focus on enjoyment of social and interpersonal interactions that is suitable for adolescents. This study demonstrates that the Spanish version of the adolescent ACIPS is suitable for assessment purposes in Spanish-speaking settings. Through its unique focus on the characterization of social and interpersonal pleasure, the ACIPS-A can help elucidate the ways in which individual differences in hedonic capacity for social and interpersonal relationships relate meaningfully to risk for various forms of psychopathology. Further studies are needed to replicate these findings with other translated versions of the measure, other clinical and non-clinical samples, in other countries and regions, and to study the relationship between social anhedonia and behavioral assays of social functioning.

Disclosure of interest

The authors declare that they have no competing interest.

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Appendix A. ACIPS-A (in Spanish)

Por favor lea cada afirmación cuidadosamente y decide cómo de verdades tal ítem para ti en general. Por favor, responde a todas los ítems. Si nunca has tenido la experiencia descrita en la afirmación, piensa en la experiencia más parecida que hayas tenido y da tu respuesta. No dejes ningún espacio en blanco. Escoge sólo una respuesta encada afirmación. No te preocupes por ser coherente en tus respuestas. Elige entre las siguientes 4 opciones de respuesta y rodea el número correspondiente.

1 = Totalmente falsa para mí; 2 = Algo falsa para mí; 3 = Algo verdadera para mí; 4 = Totalmente verdadera para mí.

Por favor responde a todas las afirmaciones. Muchas gracias por tu colaboración.

1. Estoy deseando ver a la gente cuando voy de camino a una fiesta o a quedar con otras personas.	1	2	3	4
2. Disfruto mirando fotografías de mis amigos y familia.	1	2	3	4
3. Realmente no me gustan las reuniones familiares o las tertulias (reuniones con otras personas).	1	2	3	4
4. Disfruto bromeando y hablando con un amigo o un compañero de trabajo.	1	2	3	4
5. Una buena comida siempre tiene mejor sabor cuando comes con un amigo cercano.	1	2	3	4
6. Me gusta cuando la gente llama o manda mensajes de texto sólo para decir hola.	1	2	3	4
7. Cuando algo bueno me pasa, no puedo esperar a compartirlo con otros.	1	2	3	4
8. Si conociera un grupo donde las personas compartieran los mismos intereses que yo, estaría interesado en unirme a ellos.	1	2	3	4
9. Disfruto viendo películas sobre la amistad o relaciones, con mis amigos.	1	2	3	4
10. Me imagino que sería muy divertido ir de vacaciones con un amigo o alguien a quien amas.	1	2	3	4
11. Valoro mucho cuando me invitan a quedar con gente que conozco después del colegio o del trabajo.	1	2	3	4
12. Estoy feliz cuando veo un amigo o alguien a quien amo que no he visto en mucho un tiempo.	1	2	3	4
13. Disfruto haciendo actividades grupales, como ir a eventos deportivos o conciertos con mis amigos.	1	2	3	4
14. Me gusta ver mis programas favoritos de televisión con mis amigos.	1	2	3	4
15. Me emociono cuando un amigo que no he visto en un tiempo me llama para hacer planes.	1	2	3	4
16. Me gusta hablar con otros mientras espero en una fila.	1	2	3	4
17. Disfruto cuando charlo con un amigo sobre cosas importantes.	1	2	3	4

Appendix B. Anticipatory and Consummatory Interpersonal Pleasure Scale, Adolescent Version (ACIPS-A)

Each item in this questionnaire includes statements and asks how true each of them is for you in general. In order to answer the items, just circle the number that matches the response that is most accurate for you. If you have not had the experience that is described in the statement (that is, it has never happened to you), think about the most similar experience that you've had and use that experience to make your response.

There are no right or wrong answers. Please answer all the items. Do not leave anything blank. Only give one response to each statement. The responses range from 1 to 4, where:

1 = Really false for me; 2 = Somewhat false for me; 3 = Somewhat true for me; 4 = Really true for me.

Please answer all the items. Thank you for your participation.

1. I look forward to seeing people when I'm on my way to a party or get-together.	1	2	3	4
2. I enjoy looking at photographs of my friends and family.	1	2	3	4
3. I don't really look forward to family get-togethers or gatherings.	1	2	3	4
4. I enjoy joking and talking with a friend or coworker.	1	2	3	4
5. A good meal always tastes better when you eat it with someone you feel close to.	1	2	3	4
6. I like it when people call or text me to say hi.	1	2	3	4
7. When something good happens to me, I can't wait to share the news with others.	1	2	3	4
8. If I learned of a group where the people shared similar interests as me, I would be interested in joining it.	1	2	3	4
9. I enjoy watching films about friendships or relationships with my friends.	1	2	3	4
10. I imagine how much fun it would be to go on vacation with a friend or someone I love.	1	2	3	4
11. I appreciate being invited to hang out with people I know after school or work.	1	2	3	4
12. I am pleased when I see a friend or someone I love who I haven't seen for a while.	1	2	3	4
13. I enjoy going on group activities like attending sports events or concerts with my friends.	1	2	3	4
14. I look forward to watching my favorite TV shows with my friends.	1	2	3	4
15. I am excited when a friend that I haven't seen in a while contacts me to make plans.	1	2	3	4
16. I like talking with others while waiting in line.	1	2	3	4
17. I enjoy it when a friend and I can discuss important things.	1	2	3	4

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