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Impulsivity and internalizing disorders in childhood

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ABSTRACT

Impulsivity has often been related to externalizing disorders, but little is known about how it is related to symptoms of internalizing disorders. This study aims to examine the relationship between impulsivity and depression and anxiety symptoms of depression and anxiety in childhood, and compare it with its relationship with a measure of aggressive behavior, which is present in many externalizing disorders. We administered the *Barratt Impulsiveness Scale-11 for children*, *the Children's Depression Inventory* and the *Screen for Children's Anxiety Related Emotional Disorders* to a case–control sample of 562 children aged between 9 and 13 who were selected from an epidemiological study of anxiety and depression and whose teachers provided information about their proactive and reactive aggression. Impulsivity was related to measures of anxiety, depression and aggressive behavior, and showed higher relationships with measures of internalizing symptoms than with aggression. Motor impulsivity, a component of impulsivity related to inhibition deficits, was the component most related to anxiety and depression. Cognitive impulsivity, on the other hand, was negatively related to anxiety and depression. The relationships between impulsivity and symptoms of internalizing disorders seem to indicate that impulsivity should be taken into account not only in externalizing problems, but also in depression and anxiety in children and adolescents.

1. Introduction

Impulsivity plays an important role in several theoretical models of personality (i.e. Buss and Plomin, 1975; Eysenck and Eysenck, 1985; Dickman, 1990; Cloninger et al., 1991; Zuckerman et al., 1991). It has been associated with such psychiatric disorders as attention deficit hyperactivity disorder (ADHD), mania, substance abuse and personality disorders (Fink and McCown, 1993; Zaparniuk and Taylor, 1997; American Psychiatric Association, 2000; Moeller et al., 2001). Impulsivity is also present in various etiologic theories of psychopathy, crime and substance abuse, indicating that it may be maladaptive (Moffitt, 1993; Lynam, 1996; Stanford et al., 2009).

Impulsivity is fundamental for the understanding and diagnosis of several pathologies because, after distress, it is one of the most common diagnostic criteria in Diagnostic and Statistical Manual of Mental Disorders-4th Edition Text Revision (DSM-IV-TR) (American Psychiatric Association, 2000; Whiteside and Lynam, 2001). In DSM-IV-TR, impulsivity is an essential symptom in several disorders, and the first signs appear in childhood and adolescence (for example, ADHD, conduct disorder and disruptive behavior disorder). Nevertheless, very few studies have addressed the issue of the role of impulsivity in psychopathological disorders in childhood, with the exception of ADHD. In this regard the prevalence of anxiety or depression disorders in children with ADHD is around one-third (Jensen et al., 1993). Nevertheless, anxiety and depression usually co-occur with the inattentive subtype, while the hyperactive/impulsive subtype usually co-occurs with externalizing pathologies (Wolraich et al., 1998; Adewuya and Famuyiwa, 2007).

Within the framework of Achenbach's (1966) differentiation between externalizing and internalizing disorders, impulsivity and disinhibition have usually been related to externalizing disorders (Sher and Trull, 1994). Neuroticism and negative affect, on the other hand, have been more related to internalizing disorders (Ruiperez et al., 2001). In this regard, with the exception of studies on suicide and depression, and mania, and the results of the inattentive subtype of ADHD mentioned above, there are few references in the literature relating impulsivity and internalizing psychopathology.

There is some evidence to suggest that impulsivity is related to unipolar depression in adulthood (Corruble et al., 1999, 2003; Granö et al., 2007), but few studies have analyzed this relationship in childhood. One exception is Cataldo et al. (2005), who show that depressive children are perceived by their parents as significantly more impulsive than controls. Furthermore, although epidemiological data show high rates of comorbidity between depression, anxiety and impulse control disorders in adulthood (Kessler et al., 2005), there is a lack of studies in children relating depression and anxiety to impulsivity (Costello et al., 2004). This is not a minor point because in both adolescence and in childhood, impulsivity and anxiety appear to be major dimensions for the expression of pathology. In this

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regard Askénazy et al. (2003) reported that impulsive and anxious adolescents had more severe risk behaviors (i.e. suicide and mood disorders) than the impulsive, anxious or control sub-groups. Anxiety and impulsivity are also related to obsessive-compulsive and bipolar disorders (Summerfeldt et al., 2004; Taylor et al., 2008; Sulkowski et al., 2009) and often to disruptive behavior disorders (Angold et al., 1999).

Finally, we found only one study that related depression and anxiety to impulsive aggression, a kind of aggression characterized by its high level of impulsivity. Gauthier et al. (2009) found that impulsive aggression in adolescents was related to both the self-reported and the parent-reported scale of neuroticism of the Revised NEO Personality Inventory (NEO-PI-R), and especially to its depression and anxiety facets. This relationship is stronger with the self-reported scale than with the parent's reported scale.

Bearing in mind that very few studies have been made of impulsivity, depression and anxiety disorders in childhood, the main objective of this study is to examine the relationship between impulsivity and internalizing disorders in a sample of children and young adolescents. We also obtained a measure of aggressive behavior. Symptoms of aggression are one of the most prevalent criteria in externalizing disorders (American Psychiatric Association, 2000). Furthermore, aggressive behavior has often been related to impulsivity and externalizing psychopathology, so although we do not have any direct measure of externalizing pathologies, we will be able to compare the magnitude of the relationships between impulsivity and internalizing disorders with the relationships between impulsivity and aggressive behavior, which is present in many externalizing disorders and has been consistently related to impulsivity (Tremblay et al., 1994; Archer et al., 1995; Barratt et al., 1999; Archer and Webb, 2006; Vigil-Colet et al., 2008).

2. Method

2.1. Participants

The participants were 562 children (254 boys and 308 girls) aged between 9 and 13, with a mean of 11.24 years (S.D. = 1.04). Of these, 264 went to state schools and 298 went to private schools. Because the children came from different types of schools we compared all the variables of both groups and found significant differences in only five of them. State-school pupils had higher values on Non-Planning Impulsivity and all Aggression scales and lower values on Cognitive Impulsivity, and Generalized Anxiety. Nevertheless, the effect sizes were quite small (ranging from $d = 0.15$ to $d = 0.20$) so it was not necessary to analyze both groups separately. During 2007, we performed an epidemiological study of anxiety and depression on a sample of 1508 children, 404 of whom were selected as a risk group for the second phase of the study. A child was considered to be at risk if he/she had a score equal to or greater than 25 on the Screen for Children's Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997) and/or a score equal to or greater than 17 on Kovacs' (1985) Children's Depression Inventory (CDI). These cut-off values were the ones proposed by Birmaher et al. (1999) and Canals et al. (2002), respectively. In addition, for the control group one child without risk (with scores below 25 on SCARED and below 17 on CDI) was selected for every three at risk, matching for age, gender and type of school. This group was composed of 158 children.

2.2. Measures

2.2.1. Barratt Impulsiveness Scale-11 for children (BIS-11c; Cosi et al., 2008; Chahin et al., 2010)

This is a self-report questionnaire for assessing impulsivity that is specifically designed for children and adolescents. The scales are composed of 26 items with a 4-point response format (0 = never/almost never, 3 = always/almost always).

Factor analysis of the items revealed three factors: Motor Impulsivity (MI), Non-Planning Impulsivity (N-PI) and Cognitive Impulsivity (CI), with moderate to good reliabilities (Cronbach's alpha) ranging from $\alpha = 0.80$ to $\alpha = 0.69$ depending on the scale. MI is related to lack of inhibition and delay (e.g. *I say things without thinking*). N-PI is related to planning abilities (e.g. *I plan what I have to do*), while CI is related to the tendency to make quick cognitive decisions (e.g. *I make up my mind quickly*).

2.2.2. The Children's Depression Inventory (CDI; Kovacs, 1985)

The CDI is a widely used self-report inventory for assessing depression in school-aged children. It contains 27 items, each of which consists of three graded choices in order of increasing severity from 0 to 2. Children selected the sentence from each group that best described themselves in the previous 2 weeks.

Kovacs (1985) described five factors: negative mood, interpersonal problems, ineffectiveness, anhedonia and negative self-esteem. The Spanish version of CDI displays a factor structure consisting of the same five scales with a reliability of $\alpha = 0.85$ for the total scale (Del Barrio et al., 1999). A good reliability of $\alpha = 0.81$ for this version was also reported by Aluja and Blanch (2002), while a recent study by Figueras et al. (2010)analyzed the reliability of the Spanish version in community and clinical samples. They found reliabilities of $\alpha = 0.81$ and $\alpha = 0.85$, respectively, and good concurrent validity with other depression measures such as The Reynolds Child Depression Scale ($r = 0.76$) or The Reynolds Adolescent Depression Scale ($r = 0.81$).

2.2.3. Screen for Children's Anxiety Related Emotional Disorders (SCARED)

We administered the Spanish version (Vigil-Colet et al., 2009). The SCARED is a self-report questionnaire that assesses anxiety disorder symptoms and which, in the Spanish adaptation, has four scales: Panic/Somatic, Social Phobia, Generalized Anxiety and Separation Anxiety. It consisted of 41 items and subjects were asked the frequency of each symptom on a 3-point response format (0 = never/almost never; 2 = always/almost always). The Spanish version of SCARED had good overall reliability ($\alpha = 0.86$) and moderate to good reliabilities for their scales, ranging from $\alpha = 0.69$ to $\alpha = 0.78$ depending on the scale. We preferred the child version to the parent-reported version of SCARED because it showed higher relationships with all the anxiety categories recorded by a clinician in a scheduled interview (Cosi et al., 2010).

2.2.4. Proactive/Reactive Aggression questionnaire for teachers (PRA-t; Cosi et al., 2009)

This is an aggressiveness questionnaire for children reported by teachers in a five point scale. It consisted of eight items measuring proactive and reactive aggression (e.g. *Hurts others to win a game* for proactive aggression, e.g. *Gotten angry when others threatened him/her* for reactive aggression), which were chosen among the items of three widely used questionnaires developed by Dodge and Coie (1987), Brown et al. (1996) and Raine et al. (2006). The items were assessed by experts on the subject, who determined whether they were related to proactive aggression, reactive aggression, neither of them or both of them. They also rated them. The eight items (four for each scale) with the highest inter-judge agreement and best ratings were finally chosen for the questionnaire.

PRA-t has good reliability for both the total score ($\alpha = 0.91$) and reactive and proactive scales ($\alpha = 0.90$; $\alpha = 0.91$, respectively).

2.3. Procedure

The children that participated in the study completed consecutively the SCARED, the CDI and the BIS-11c in small groups of 3 to 4 in their schools. Professional child psychologists gave them instructions on how to answer the test and helped them during the session. The teacher filled out the PRA-t for each of the pupils.

Before the study the parents of the participating children received a letter informing them about the project and they gave written informed consent for them to participate in the study.

2.4. Statistical analysis

The degree of association between measures was analyzed using Pearson's product moment coefficient correlation, and Fisher's Z test to compare the correlation sizes. We performed an exploratory factor analysis to summarize the information observed in the correlation matrix. The number of retained factors was determined by means of parallel analysis (Lattin et al., 2003) and an oblique rotation method was applied. Separate stepwise multiple regression analyses were performed to determine the predictive power of BIS-11c scales on anxiety and depression measures.

3. Results

Table 1 shows the Pearson correlation coefficients between the BIS-11c subscales and CDI, SCARED and PRA-t. As can be seen, motor impulsivity had moderate to high correlations with internalizing measures and low correlations with aggression measures. Non-Planning Impulsivity is particularly related to depression measures although correlation values are low. Finally, Cognitive Impulsivity presents a negative pattern of relationships with both anxiety and depression measures, and no significant relationships with aggression measures. It should be noted that when the analysis was performed for the control and risk groups separately the correlation coefficients obtained for each matrix did not differ significantly.

Using Fisher's *Z* test we verified that MI had significantly higher correlations with CDI and SCARED scales than with PRA-t scales. It was also shown that the correlation of MI and Social Phobia is significantly lower than the correlations between impulsivity and the other SCARED scales. The same analyses applied to NPI showed no significant