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## Emotional reactivity in referred youth with disruptive behavior disorders: The role of the callous-unemotional traits



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### ABSTRACT

Deficits in emotional reactivity are frequently reported in Disruptive Behavior Disorders (DBDs). A deficit in prosocial emotions, namely the callous unemotional traits (CU), may be a mediator of emotional reactivity. Our aim is to investigate subjective emotional reactivity towards visual stimuli with different affective valence in youths with DBDs and healthy controls. The clinical sample included 62 youths with DBDs (51 males, 8 to 16 years, mean  $11.3 \pm 2.1$  years), the control group 53 subjects (36 males, 8 to 16 years, mean  $10.8 \pm 1.5$  years). The groups were compared using the Child Behavior Checklist (CBCL), the Inventory of Callous-Unemotional Traits (ICU), and the International Affective Picture System (IAPS), which explores the affective (pleasant/unpleasant emotional reaction) and arousal (low/high intensity of emotion) dimensions. The DBD group presented higher scores in externalizing and internalizing CBCL scores, and in ICU callous and indifferent subscales. At the IAPS, DBD patients differed from controls in the affective valence of the images, rating less unpleasant neutral and negative images. The CU traits were the only predictor of emotional reactivity in the DBD sample. A less aversive way to interpret neutral and negative stimuli may explain why DBD patients are less responsive to negative reinforcements.

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### 1. Introduction

Disruptive Behavior Disorders (DBDs), including Conduct Disorder (CD) and Oppositional Defiant Disorder (ODD), are among the most common reasons for youth referrals to mental health clinics (Steiner and Remsing, 2007) and can be associated with psychosocial impairment, poor prognosis and antisocial outcomes (Fergusson et al., 2005). A major goal in clinical research is to discover possible predictors of negative social outcome of DBDs, according to specific clinical, personality and temperamental variables on one side, and social and environmental variables on the other. These factors may allow further subtyping of the broad category of DBDs into more specific and homogeneous groups, improving intervention strategies (Mason et al., 2004; Vaughn et al., 2011). According to the recent DSM-5, DBDs are classified into a new cluster, named Disruptive, Impulse-control and Conduct disorders, including disorders

characterized by difficulties in emotional and behavioral self-control (American Psychiatric Association, 2013).

Among the clinical specifiers for a high-risk antisocial pattern, the DSM-5 has included limited pro-social emotions (Pardini et al., 2010; Burt et al., 2011). This proposed specifier is diagnosed if the patient meets full criteria for CD, and shows two or more of the following characteristics persistently over at least 12 months in more than one relationship setting: lack of remorse or guilt, callous-lack of empathy, unconcerned about performance, shallow or deficient affect. Individuals with callous-lack of empathy are cold and uncaring, and unconcerned about the feelings of others, even when their behavior results in harm to others. They do not express feelings and do not show emotions to others, or their emotions are insincere and used to manipulate others. These features were previously included in the concept of Callous Unemotional (CU) traits (Frick et al., 2003; Frick and White, 2008), and are also considered core elements in the clinical descriptions of adult psychopathy (Blair et al., 2006b). An additional feature of the CU traits is their stability from childhood to adolescence (Burke et al., 2007) and adulthood (Lynam et al., 2007). Previous research has

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shown that CU traits in childhood and adolescence have been related concurrently and prospectively with a higher rate of conduct problems (Rowe et al., 2010; López-Romero et al., 2011, 2012), aggressive behaviors (Marsee and Frick, 2007), and lower levels of pro-social behavior and social skills (Viding et al., 2009).

A significant body of research has been devoted to understanding temperamental and biological underpinnings of CU traits and psychopathy (Marsh et al., 2008; Viding et al., 2008, 2013; Jones et al., 2009), and also emotional reactivity to external stimuli has been explored in youth with high CU traits, as recently reviewed in Herpers et al. (2014). Children, adolescents and adults with psychopathic-like traits show some deficits in processing of negative emotional stimuli, or are less accurate in identifying sad facial expression (Kimonis et al., 2006; Woodworth and Waschbusch, 2008). A deficit in subjective arousal to fear and distress may lead youths to experience a lower impact of the negative consequences due to their own behaviors (Blair et al., 1997, 2001, 2006a, 2006b). The same emotional feature may also be associated with a reduced sensitivity to behavioral interventions (i.e., punishment) (Blair et al., 1997, 2001, 2006a, 2006b). A lower fear of social punishment may explain why youth with high CU traits are less responsive to treatment than peers with conduct problems, but low CU traits (Hawes and Dadds, 2005; Masi et al., 2013). A better understanding of the nature of CU traits can thus target more efficient treatment strategies specifically geared to the specific needs of the patients.

The International Affective Picture System (IAPS) is one of the most reliable and valid instruments for the experimental investigation of emotions based on a set of visual stimuli for the exploration of the relationships between the affective valence of the emotional stimuli (from pleasant to unpleasant), and the individuals' reaction in terms of arousal to emotional stimuli (from excited to calm) (Lang et al., 1999). Recently, IAPS has been applied to youths, based on norms by Lang et al. (1999). Early studies support the validity of IAPS for use in young samples from the community (McManis et al., 2001), as well its utility the exploration of psychopathic-like traits and conduct problems (Sharp et al., 2006, 2008). Following McManis et al. (2001) work with pre-adolescent children, words like happy, pleased, good, and unhappy, scared, angry, bad or sad were used in the instructions to describe the endpoints of the pleasure (valence) scales. Words like calm, relaxed, bored, or sleepy and excited, nervous or wide-awake described the endpoints for the arousal scale. Sharp et al. (2006) selected 27 IAPS pictures to explore a wide range of affective content in a large unselected community cohort of 659 children aged 7–11, while concurrent symptoms of DBDs and psychopathy were collected from multiple sources. According to this study, children above the cut-off on measures of antisocial behavior presented lower arousal to unpleasant picture, but higher arousal to pleasant picture.

A recent article by Herpers et al. (2014) reviewed the current literature on neurocognitive aspects of CU traits in youths. A lower emotional responsivity to distressing stimuli was found in the majority of studies, as well as a reduced response of the amygdala and a weaker connectivity between amygdala and the ventromedial prefrontal cortex, suggesting impaired emotional reactivity over and beyond conduct problems. These findings are in line with other studies, suggesting that specific emotion processing deficits, namely in the response to sad or fear stimuli, are related to changes in brain structure and function (Fairchild et al., 2013; Frick et al., 2014). These issues support the interest in using IAPS pictures in CD, as they comprise a various set of different emotions.

The current study on referred Italian children and adolescents with DBDs, is aimed at further exploring emotional reactivity associated with the presence of CU traits. Our hypothesis is that youth with DBDs that may show a different emotional subjective experience, evaluated on a self-report clinical scale, compared to healthy subjects. Based on previous neurobiological and psycho-

physiological studies (Patrick et al., 1993; Fowles, 2000; Van Goozen et al., 2007; De Wied et al., 2009), the presence of CU traits could be associated with reduced arousal and increased valence subjectively perceived against negative visual stimuli. The questions addressed in this study are therefore the following: 1) is there a specific pattern of emotional response, in terms of valence, arousal, or both in referred youth with DBDs, compared to healthy controls? 2) is there any relationship between arousal/valence facing emotional engaging stimuli and high level of CU traits?

## 2. Material and method

### 2.1. Participants

The clinical sample consisted of 62 children and adolescents with DBDs (ODD and/or CD), (51 males, age-range 8 to 16 years, mean age  $11.3 \pm 2.1$  years), consecutively referred to two third-level Italian departments of Child and Adolescent Psychiatry, settled in the Scientific Institute "Stella Maris" in Pisa and the Scientific Institute "Bambino Gesù" in Rome from January 2012 to February 2013. Our clinics are research hospitals with a national catchment for children and adolescents presenting a wide range of neuropsychiatric disorders. The children were referred by community-based child psychiatrists or pediatricians, or family members. All patients were diagnosed according to a systematic evaluation, including historical information, prolonged observation of interactions with peers, parents and/or examiners, and a structured clinical interview according DSM-IV criteria, the Schedule of Affective Disorders and Schizophrenia for School-Age Children - Present and Lifetime Version (K-SADS-PL) (Kaufman et al., 1997), administered by trained child psychiatrists. All the patients with current or past diagnosis of autism spectrum disorder, psychotic disorder, or with a Full Scale IQ below 75 according to Wechsler Intelligence Scale for Children-III (WISC-III), were excluded from the study. The control group consisted of 53 normal subjects (36 males, age-ranged 8 to 16 years, mean age  $10.8 \pm 1.5$ ). The clinical and the control groups did not differ according to both age and gender ratio (Table 1).

### 2.2. Procedures

The study design consisted in a multicenter, cross-sectional evaluation of children and adolescents, aged from 8 to 16 years, admitted to our clinics. The clinical sample was compared with a healthy control group, matched for age and gender ratio.

The control group was drawn from public elementary and junior high schools in the area of Pisa and Rome, all following regular education programs. The schools were selected randomly, and agreed to participate in the study. Handicapped children (i.e., intellectual disabilities, neurological disorders, autism spectrum disorders, or any other impairing condition identified during the school years) were excluded. After obtaining informed consent from school directors and teachers, the parents of the students were asked to complete the Italian version of Child Behavior Check List (CBCL) (Achenbach, 1991), and the participants were screened for behavioral and emotional problems.

All subjects participated voluntarily in the study after a written informed consent was obtained from parents or legal caregivers. The entire study protocol, which includes a wide range of neuropsychological tasks and psychopathological questionnaires, was approved by the Ethical Committee of both Hospitals.

### 2.3. Measures

Both the clinical and the control samples were assessed with the CBCL, a 118-item scale, completed by parents, which is one of the most frequently used instruments for epidemiological and clinical studies. Items are scored on a 3-step response scale, and grouped in 8 different syndromes (Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior and Aggressive Behavior). The CBCL provides a Total Problem Score, two broad-band scores designated as Internalizing Problems (including Withdrawn, Somatic Complaints and Anxious/Depressed syndromes) and Externalizing Problems (including Delinquent Behavior and Aggressive Behavior). CBCL inattention scale was more specifically considered, given the high ADHD comorbidity in the clinical sample.

The clinical sample was assessed with the K-SADS for the diagnosis of DBDs and comorbidities. The K-SADS was administered individually to the adolescents and their parents by trained child psychiatrists with specific experience in child and adolescent psychiatric disorders. To improve the reliability and validity of the diagnoses, after each interview, clinical data from each subject-parent pair were reviewed by the research clinicians for the purpose of consensus.

The Children's Global Assessment Scale (C-GAS) (Shaffer et al., 1983) was used to assess the functional impairment in both the clinical and control groups. The

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