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Irritability, Not Sad Low Mood Contributes to Conduct Disorder Rule Breaking Symptoms in Children and Adolescents with Major Depressive Disorder With/Without Persistent Depressive Disorder

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Abstract

The specific relationships between conduct disorder symptoms, anxiety and the two main mood components of depressive disorders – sad, low mood and irritability – have not been systematically examined in young people with major depressive disorder with and without persistent depressive disorder. The relationships are important to clarify because these symptom dimensions are common, affect associated morbidity and treatment responsiveness of children and adolescents with these depressive disorders. 313 medication naïve young people (aged 6-16 years), with active major depressive disorder (MDD) alone, persistent depressive disorder (DD), alone and comorbid active MDD and DD were identified through semi-structured clinical interview and parent and/or child standardized questionnaires. 'Anxiety', 'sad/unhappy' and 'irritable' mood were identified by parent standardized questionnaire. Standard multiple regression was used to investigate how well 'Anxiety', 'sad/unhappy' and 'irritable' mood predict conduct disorder rule breaking symptoms. Only 'Anxiety' (3% of the variance – decreased) and 'irritable' mood (18% of the variance- increased) made independent significant contributions to conduct disorder rule breaking symptoms. A main limitation of these results is that oppositional defiant disorder and conduct disorder symptoms were not analyzed separately. Nevertheless, the association of irritability with conduct disorder rule breaking symptoms may reflect a unique contribution of irritable mood to conduct disorder features in young people whether depressive disorders are present or not or only when they are present. Decreasing irritability and managing increased anxiety via more targeted and comprehensive management approaches may ameliorate conduct disorder in young people with these depressive disorders.

ABBREVIATIONS

MDD: Major Depressive Disorder; DD: Persistent Depressive Disorder; CD: Conduct Disorder

INTRODUCTION

The greater than chance association of depressive disorders including major depressive disorder (MDD) with/without persistent depressive disorder (DD) has been reported in clinical samples [1,2]. Moreover, depressive disorders may predispose young people to develop conduct disorder (CD) [3]. Together, both depressive disorders and CD can lead to diminished social competence [4], physical and mental health problems [5], and predict the development of anxiety disorders, depressive disorders and antisocial personality disorder in adulthood [6-9]. Importantly, decreased anxiety has been associated with depressive disorders and CD [10,11].

Recently, sad, low mood has begun to be separated from irritable mood in young people with depressive disorders [12], and the role of irritability as a core feature of depressive disorders in children and adolescence called into question [13].

To date, the specific relationships between sad, low mood, irritable mood, anxiety and core CD symptoms have not been studied in young people with MDD alone, DD alone and MDD and DD. In this study, how well sad, unhappy mood, irritability and anxiety predict CD rule breaking symptoms will be examined in a clinical sample of young people with MDD with and without DD. We hypothesize that sad low mood and irritable mood will predict CD rule breaking symptoms while anxiety will not.

MATERIALS AND METHODS

Participants

154 children and adolescents with DD alone, 29 with MDD alone and 130 with MDD and DD, all aged 6-16 years, were recruited from 50 primary and secondary schools. These 313 children were screened from a total sample of 913 children and adolescents identified by teachers and/or school support staff as having depressive difficulties who then referred them to specialized university clinics in metropolitan Melbourne (Australia), over a 10 year period (2008-2018). All 913 young people were assessed but only 313 met the inclusion/exclusion criteria: the referred children and adolescents were all anxiolytic and/or antidepressant medication naïve at the time of their assessment and had only received school-based individual and/or group psychosocial treatments delivered by teachers and/or school support staff. MDD and DD (DSM-IV-TR equivalent criteria) [14], were categorically defined by the semi-structured clinical interview of their parents using the Anxiety Disorders Interview Schedule for Children (A-DISC) [15], and dimensionally by the Children's Depression Inventory (CDI) (young person) [16], and/or the Children's Depression Scale (CDS) (parent) [17], scores of the core symptom domains of MDD and DD being greater than 1.5 standard deviations above the mean for a given child's age and gender. The MDD participants had *active* major depressive episodes at the time of their assessments. All the children and adolescents met the inclusion criteria of living in a family home (and not in an institution) and attending normal primary and secondary schools. All had non-age corrected Intelligence Quotients above 70 [18], and none had identifiable learning disorders (reading, spelling and/or maths scores < 9th percentile) [19], overt neurological disease, endocrine disease, ADHD combined type, conduct disorder or psychotic symptoms, to remove confounding factors for the dependent variables under examination. There was no refusal to participate. The clinical research protocol was Hospital Ethics Committee approved. All participants and their caregivers were given verbal and written information and written informed consent was obtained from each participant's caregiver before entering the study. [Subject characteristics – *MDD +/- DD groups did not differ*: Age (years) - 11.62 (3.17) to 13.48 (3.08); Gender (M, F) – 199,114; CDS – 148.00 (23.42) to 165.39 (23.96) (all clinical range); CDI – 57.84 (14.08) to 64.83 (16.04); social adversity scale – 7.35 (1.43) to 7.89 (1.75); and fullscale IQ 89.82 (11.73) to 93.28 (13.58).

Measures

The Anxiety Disorders Interview Schedule for Children (A-DISC) [15], the Children's Depression Inventory (CDI) [16], the Children's Depression Scale (CDS) [17], Wechsler Intelligence Scale for Children 4th edition (WISC 4) [18], the Wide Range Achievement Test 4th edition (WRAT 4) [19], the Werry and Aman questionnaire [20], Child Behavior Checklist (CBCL) [21], and the Parental Account of Childhood Symptoms (PACS), social adversity scale [22] were used. All these measures have published adequate psychometric properties, particularly inter-rater reliability.

Procedure

A registered psychologist interviewed the child and administered the WISC 4 and WRAT 4 and asked the child to complete the CDI. Concurrently, a trainee Child and Adolescent Psychiatrist interviewed their parent and administered the PACS and A-DISC and asked the parent to complete the CBCL, Werry and Aman Questionnaire and the CDS.

Statistical analysis

A standard multiple regression using the Statistical Package for the Social Sciences (SPSS/SC) was performed between the parent-reported CBCL [21], delinquent subscale as the dependent variable and the Werry and Aman questionnaire [20] parent reported 'sad/unhappy', 'irritable' mood and 'anxiety' in their child as independent variables. CD rule breaking symptoms in the children were defined by the CBCL delinquent subscale, and 'sad/unhappy' mood, 'irritable' mood and 'anxiety' were defined by the parent-reported Werry and Aman Questionnaire about their child's symptoms. Preliminary assumption testing was performed to ensure there were no violations of normality, linearity, outliers, multicollinearity and homoscedasticity of residuals.

RESULTS AND DISCUSSION

'Irritable' mood (18% of the variance-increased), and 'anxiety' (3% of the variance-decreased), made independent significant contributions to the prediction of CD rule breaking symptoms (Table 1). There was no further contribution to the variance by the variables together in combination. Altogether, 21% of the variance in CD rules breaking symptoms was predicted by knowing the scores on these two variables. 'Sad/unhappy' mood did not contribute significantly to the regression.

The participant characteristics were all consistent with the published literature [23]. The independent contribution of 'anxiety' to decreased CD rule breaking symptoms is congruent with the extant literature [10,11]. An important new finding is the independent contribution of irritability alone to increased CD rule breaking symptoms in depressed young people with MDD with/without DD. This confirms Stringaris et al.'s [13], findings in girls and extends them to boys. Our results are also consistent with Loeber et al.'s [24], findings that CD symptoms are increased when comorbid with depressive disorders and extends this association to DD symptoms specifically in children and adolescents. The lack of sad low mood to make an independent contribution to CD rule breaking symptoms confirms the importance of irritability as a core aspect of depressive disorders in young people that needs further careful systematic study [12].

Three clear implications arise from these novel findings: First, the association of irritability with CD rule breaking behaviour may reflect a unique contribution of irritability to CD patterns of behaviour in children and/or vice versa. A common set of biological and/or psychosocial risk factors may predispose children with irritability to develop CD and/or vice versa. This predisposition may manifest through impairment of one or more key functional domains such as cognition. For example, impaired verbal and/or visuospatial working memory has been shown to be impaired in depressive disorders (including irritable mood) [12,25] and CD [26]. Future study of such well-defined potential predisposing vulnerability factors in epidemiological samples of irritability alone, CD and irritability and CD alone

Table 1: Standard multiple regression of 'sad/unhappy' mood, 'irritable' mood and 'anxiety' on conduct disorder rule breaking symptoms in children and adolescents with MDD with and without DD.

Variables	CD	Sad/unhappy	Irritable	Anxious	*B*	*β*	sr^2
Sad/unhappy	.16**				0.043	0.01	
Irritable	.42***	.49***			**1.867**	**0.50**	**.18**
Anxious	.03 *NS*	.48***	.44***		**-0.654**	**-0.20**	**.03**
p<.0005 ***		*a* unique variability = .21		R^2 = .21			
p<.005 **				Adjusted R^2 = .20 *a*			
NS ^				R= .46 ***			

Abbreviations: *B*: unstandardized regression coefficient; *β*: standardized regression coefficient; sr^2: semipartial correlations; R^2: coefficient of determination

groups, carefully defined to avoid subsyndromal effects of either comorbid disorder in the pure disorder groups, will further specify the nature of the association between irritability, CD in depressive disorders.

Second, the nature of the association between irritability, CD and depressive disorders needs to be systematically studied both within and across defined physiological developmental periods: for example, pre- and post-adrenarche and pre- and post-pubarche [27].

Third, it is important to recognise irritability in young people with depressive disorders because (1) it is common [2], (2) depressive disorder (and irritability) frequently precedes the onset of CD [3], and (3) the comorbid condition is associated with significantly greater morbidity [4-9]. If irritability fails to resolve with specific psychological and/or medication treatments for depressive disorders and separately CD, then this comorbid group can receive systematic trials of specific psychological and/or medication treatments for irritability [28], in combination with known psychological and/or medication treatments for depressive disorders and CD and the potential synergism between these treatment modalities investigated.

CONCLUSION

In summary, the association of irritability with conduct disorder rule breaking symptoms may reflect a unique contribution of irritable mood to conduct disorder features in young people whether depressive disorders are present or not or only when they are present. Decreasing irritability and managing increased anxiety via more targeted and comprehensive management approaches may ameliorate conduct disorder in young people with these depressive disorders.

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