



Short Communication

Temperament and depressive symptoms in at-risk children: Aggression and learning problems as mediating factors


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ABSTRACT

Adaptability is a temperament trait that is highly relevant to children in school contexts, yet it has not garnered the necessary attention of researchers. This study examined adaptability and its relation to depression in a sample of at-risk children. The results not only demonstrated the importance of temperament in understanding childhood depression, but also revealed two pathways that help explain this link. These pathways highlight the roles that students' school experiences with adaptability, aggression, and learning problems have on their mental health.

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Depression is an illness which poses a major challenge to the health and well-being of children worldwide. Depressive symptoms are associated with a wide range of problems from poor academic performance (Chen, Rubin, & Li, 1995) to peer victimization (Hoglund & Chisholm, 2014). In addition, childhood depression is a potent risk factor for the development of future psychiatric conditions (Copeland et al., 2013) and suicide attempts (Kerr, Reinke, & Eddy, 2013). One causal determinant of depression that has long been recognized by researchers is temperament (Clark, Watson, & Mineka, 1994). Negative emotionality, in particular, is a temperament trait that has garnered much empirical attention, because of its robust ability to predict both depression and behavioral problems in children (see Al-Hendawi, 2013). Consequently, the impacts of other relevant temperament traits on childhood depression have received much less attention.

Adaptability, which is a dimension of temperament that focuses on the ease by which one can adapt to changes in their environment (Thomas & Chess, 1977), is one such trait. This is surprising given that this temperament trait is tied to a host of positive attributes such as helpfulness (Stanhope, Bell, & Parker-Cohen, 1987), peer acceptance (Walker, Berthelsen, & Irving, 2001), and self-esteem (Klein, 1992). Moreover, adaptability promotes resiliency in children. For instance, in the face of post-surgical hospitalization (Carson & Council, 1991) and

sexual abuse (Carson, Council, & Volk, 1989), adaptable children generally recover better from negative experiences than their less flexible counterparts.

Adaptability is an important dimension of temperament to consider in the study of childhood depression because the school environment that children spend much of their time in is a dynamic setting with ever changing sets of rules and expectations. As such, children who are not naturally adaptable will exhibit a number of problematic behaviors as they struggle to meet the social and academic challenges of a school setting. According to the Failure Model (Patterson & Capaldi, 1990), these problematic behaviors could ultimately lead to depression, because of the children's deep experiences with failure. Although researchers have found adaptability, depressive symptoms, and problematic behaviors such as academic difficulties and aggression to be inter-correlated in normative samples (Nelson, Martin, Hodge, Havill, & Kamphaus, 1999; Reynolds & Kamphaus, 2004), the extent to which these patterns generalize to children who are at risk for developing psychiatric disorders due to the presence of elevated symptoms, has not been extensively studied. In addition, the extent to which the link between adaptability and depression is explained by problematic behaviors, such as aggression and learning problems, has also not been evaluated.

To fill this void in the literature, we examined the relationship between adaptability and depressive symptoms among a sample of at-risk children. Although there are many ways to identify children as being at-risk, such as family history (e.g., Hammen & Goodman-Brown, 1990) or victimization (e.g., Kaltiala-Heino, Rimpela, Rantanen, & Rimpela, 2000), we defined our sample by symptom severity

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(e.g., Choon et al., 2015). We also treated the variables in our analyses based on the literature that suggests that they are causally related to one another, even though this study is based on cross-sectional data. Specifically, because longitudinal research has shown that adaptability is a predictor of problematic behavior in children (Earls & Jung, 1987) and that the Failure model (Patterson & Capaldi, 1990) suggests that problematic behaviors are causal antecedents to depression, we modeled our analyses based on these ordered relations. In addition, we examined the extent to which problematic behaviors, as expressed through aggression and learning problems, mediate the link between adaptability and depression.

1. Method

1.1. Participants and procedure

Data from 96 grade school children with a mean age of 8.38 years ($SD = 1.81$) were used in this study. The sample consisted of 70 boys and 26 girls with a mean IQ of 88.09 ($SD = 13.01$). The children generally scored in the *at-risk* range for depression, learning problems, aggression, and adaptability (see Table 1). Scores in the *at-risk* range indicate the presence of problems that are severe enough to merit clinical attention, but do not yet warrant formal diagnoses (Reynolds & Kamphaus, 2004).

The data were drawn from archived school psychology reports of American grade school children who were formally evaluated because of academic-related concerns. Because these records were for educational purposes, they did not include information commonly reported in research studies, such as race and item-level scores (see Medway & Skedsvold, 1992). In addition, some of the reports had missing data. Thus, only reports that contained complete information regarding age, IQ, and teacher rated scores from scales of the Behavior Assessment System for Children-2 (BASC-2 TRS-C; Reynolds & Kamphaus, 2004) were included in this study. The BASC-2 TRS-C is a behavioral-rating scale commonly used to evaluate problems in children (Reynolds & Kamphaus, 2004). In general, behavior-rating scales have been increasingly popular among school psychologists because they are an easy to use and valid means to assess social and emotional aspects of children's behavior (Shapiro & Heick, 2004).

1.2. Measures

This study focused on four primary scales of the BASC-2 TRS-C (Reynolds & Kamphaus, 2004): *Depression* measures feelings of unhappiness, sadness, and stress that are associated with clinical depression. *Learning Problems* assesses the presence of academic difficulties, with particular emphasis on understanding or completing homework. *Aggression* measures tendencies to act in hostile and threatening ways

toward others. *Adaptability* assesses a temperament trait that is characterized by the ability to adapt to changes. These scales, which are reported in *t*-scores, have demonstrated solid psychometric properties with high internal consistency ($\alpha s > .83$) and test-retest ($r s > .84$) reliability (Reynolds & Kamphaus, 2004).

Age, gender, and IQ scores were also drawn from the reports as control variables. IQ scores were derived from a range of standardized tests such as the WISC-4 (45.8%; Wechsler, 2003), WJ-3 (20.8%; Woodcock, McGrew, & Mather, 2001), RIAS (18.8%; Reynolds & Kamphaus, 2003), DAS-2 (11.5%; Elliot, 2007), and other commonly used instruments (3.0%). Although different intelligence tests were given, their manuals report solid psychometric features and strong convergent validity with one another.

2. Results

2.1. Bivariate correlations

A number of significant correlations were found among the variables (see Table 1). IQ scores were higher among the girls ($r = -.20, p < .05$) and negatively associated with learning problems ($r = -.25, p < .05$). Depression was positively associated with aggression ($r = .59, p < .001$) and learning problems ($r = .32, p < .01$), but negatively associated with adaptability ($r = -.59, p < .001$). Aggression was positively associated with learning problems ($r = .26, p < .01$) but negatively associated with adaptability ($r = -.68, p < .001$), while adaptability was negatively associated with learning problems ($r = -.21, p < .05$). Age was not associated with any of the variables and was consequently excluded from the regression analysis as a control variable.

2.2. Hierarchical multiple regression

A hierarchical multiple regression analysis was conducted in order to clarify the predictive relation of aggression, learning problems, and adaptability on depressive symptoms. We screened the data prior to running the regression model and found no violations to the assumptions of multivariate analysis nor were any outlier cases detected (Tabachnick & Fidell, 2001). In the first step, which included gender and IQ, none of these control variables were significant predictors of depressive symptoms, $F(2, 93) = .34, p = .68, ns$. In the second step which accounted for 37% of explained variance, aggression ($\beta = .54, p < .001$) and learning problems ($\beta = .21, p < .05$) emerged as significant predictors of depressive symptoms, $F(4, 91) = 14.83, p < .001$. In the final step, which accounted for an additional 5% of explained variance, aggression ($\beta = .32, p < .01$) and learning problems ($\beta = .19, p < .05$) continued to be predictors while adaptability ($\beta = -.32, p < .01$) emerged as a predictor of depressive symptoms as well, $F(5, 90) = 14.67, p < .001$. The final model accounted for 42% (adjusted R^2) of the variance in depressive symptoms.

2.3. Mediation analyses

Results of the regression analysis revealed the possibility of mediation effects. Thus, formal tests of mediation following Baron and Kenny's (1986) conditions and Shrout and Bolger's (2002) bias-corrected bootstrap procedure using 2000 resamples were conducted. We chose a bootstrap resampling method because its calculation of confidence intervals is not biased by sample size, effect size, or level of statistical significance (Mallinckrodt, Abraham, Wei, & Russell, 2006). The results revealed the presence of partial mediating effects. Specifically, aggression partially mediated ($\beta = -.59$ to $-.35, p < .01$) the relationship between adaptability and depressive symptoms (standardized indirect effect = $-.35$, 95% CI: $-.56$ to $-.16$; see Fig. 1). Similarly, but with less impact, learning problems also partially mediated ($\beta = -.59$ to $-.55, p < .01$) the relationship between adaptability and depressive symptoms (standardized indirect effect = $-.55$, 95% CI: $-.66$ to $-.40$; see Fig. 2).

Table 1
Descriptive statistics and bivariate correlations.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Gender	.27	.45	–					
2. Age	8.38	1.81	.00	–				
3. IQ	88.09	13.01	–.20*	–.15	–			
4. Adaptability	36.77	10.10	.13	.06	–.06	–		
5. Aggression	69.32	18.62	–.08	–.11	–.04	–.68***	–	
6. Learning problems	65.39	11.28	.09	–.02	–.25*	–.21*	.26**	–
7. Depression	66.46	17.18	–.08	–.09	.06	–.59***	.59***	.32**

Note. $N = 96$. Gender (0 = male; 1 = female).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

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