



Brief report

Predicting children's school grades: Unique and interactive effects of parental beliefs and child inattention/hyperactivity symptoms

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Parental beliefs about school involvement are key in predicting individual differences in children's academic success. The current study examined unique and interactive relations between parental beliefs and child inattention/hyperactivity symptoms in predicting children's achievement. Participants ($N = 348$) were caregivers of children aged 8–12. Caregivers completed questionnaires regarding their beliefs and their child's inattention/hyperactivity and achievement. Hierarchical regression analyses indicated lower child inattention/hyperactivity and greater parental confidence in their ability to help their child academically predicted better achievement. Parent/child interactions probed with simple slopes suggested an achievement gap for children with higher inattention/hyperactivity only when their parents felt less efficacious or more responsible for their child's academic success. This suggests parent self-efficacy may buffer the negative relation between children's inattention/hyperactivity symptoms and underachievement, and parents of children with higher inattention/hyperactivity may increasingly assume responsibility for their success due to feedback from the school.

Statement of contribution

What is already known on this subject?

- Academic achievement predicts several short- and long-term outcomes for children.
- Parental involvement beliefs are multi-faceted and predict children's academic success.
- Child inattention/hyperactivity symptoms are related to lower academic achievement.

What does this study add?

- It provides specificity of previous relations for children with a range of inattention/hyperactivity symptoms.
- It identifies parental self-efficacy as a promising moderator of the relation between child behaviour and academics.
- It provides a preliminary evidence base for future work on the role of parental beliefs in child academic outcomes.

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Academic underachievement in elementary school is a risk factor for myriad adverse long-term outcomes including lower high school achievement and attention problems (Sarver *et al.*, 2012). Parent involvement is an important predictor of children's achievement (Kim & Hill, 2015) and predicts academic attainment concurrently (Tan & Goldberg, 2009) and longitudinally (Amato & Fowler, 2002).

Thus, research has focused on identifying parental beliefs that may be important for increasing school involvement and thus maximizing students' academic potential (Kim & Hill, 2015). According to the Hoover-Dempsey and Sandler (1997) model of parent involvement, parents decide to become involved in their child's schooling based on considerations regarding the extent to which they believe that (1) it is their responsibility, (2) they can successfully help their child, and (3) the school and their child welcome their involvement. In support of this model, parental beliefs regarding the locus of responsibility (parent vs. school role) and beliefs about the extent to which they have the ability (self-efficacy; Bandura, 1986) to help their child's academic success have been positively linked with children's achievement and self-efficacy (Bandura, 1986; Ice & Hoover-Dempsey, 2011; Jones & Prinz, 2005). Additionally, higher parental perceptions of invitations for involvement from their child and the school predict increased parental role beliefs (Whitaker & Hoover-Dempsey, 2013).

Child characteristics are also important predictors of achievement. In particular, child inattentive/hyperactive symptoms have been linked with underachievement across academic outcomes, including standardized achievement tests (Sarver *et al.*, 2012) and parent reports of their child's grades (Amato & Fowler, 2002).

Although some work has looked at additive effects of parent and child factors (Rogers, Wiener, Marton, & Tannock, 2009), there may be interactive effects as well, such that certain parenting factors matter more for certain children (Fei-Yin Ng, Kenney-Benson, & Pomerantz, 2004). Research has examined how variables, such as maternal punishment, control, affect, and mastery-oriented practices, interact with child achievement, helplessness, and perceived competence (e.g., Fei-Yin Ng *et al.*, 2004). However, no studies have examined how parent beliefs interact with child inattention/hyperactivity to predict children's achievement.

The current study addresses this critical omission by examining unique and interactive effects of parental beliefs and child inattentive/hyperactive behaviour in predicting achievement. We hypothesized more inattention/hyperactivity symptoms and less positive parental beliefs would predict lower achievement. No hypotheses were made regarding potential interaction effects given the paucity of research in this area. If replicated, findings may have implications for identifying intervention targets and maximizing the efficacy of parenting interventions to improve academic success for children based on their behavioural profile.

Method

Participants/procedure

Participants were 348 caregivers of children aged 8–12 years in the United States recruited through Amazon's Mechanical Turk (Table 1). Institutional Review Board approval was obtained/maintained. Screening questions ensured participants were caregivers of a non-homeschooled child aged 8–12. Caregivers completed online questionnaires and were compensated.

Table 1. Demographic variables

	Parent	Child
Gender (%)		
Male	52.0	57.5
Female	46.0	41.7
Prefer not to respond	1.0	0.9
Ethnicity (%)		
Hispanic or Latino	9.2	9.5
Non-Hispanic or Latino	90.5	90.2
Race (%)		
Caucasian	83.6	81.6
African American	6.6	6.6
American Indian/Alaskan Native	1.1	0.9
Asian (including Hawaiian/Pacific Islander)	6.3	3.4
Multiracial	1.4	0.9
Other	0.9	4.3
Age (%)		
8		22.1
9		25.0
10		25.9
11		14.4
12		12.6
21–30	19.8	
31–40	58.1	
41–50	18.9	
51–60	3.2	
Income (%)		
Less than 25,000	8.4	
25,000–34,999	12.1	
35,000–49,999	15.9	
50,000–74,999	27.1	
75,000–99,999	21.0	
100,000–149,999	12.7	
150,000 or more	2.9	

Measures

Inattention/hyperactivity symptoms

The ADHD Rating Scale-IV: Home Version (ADHD-RS-IV; DuPaul *et al.*, 1998) assessed symptoms of inattention/hyperactivity (18 items; 4-point Likert scale). Higher scores reflect more inattentive/hyperactive symptoms.

Parent involvement

The 48-item Parent Involvement Project-Parent Questionnaire (Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005) measures parents' beliefs (6-point Likert scale) across six subscales (Table 2). Higher scores reflect parents' perceptions that it is their responsibility (parent-focused role construction) or the school's responsibility (school-focused role construction) to maximize their child's academic success, that they have the ability to help their child academically (parent self-efficacy), that they work with their

Table 2. Descriptive statistics for variables

	α	Items	N	Mean	SD
Inattention/hyperactivity	.95	18	348	1.76	0.58
Parent self-efficacy	.79	11	348	4.77	0.66
Partnership-focused role	.79	7	348	3.61	0.73
Parent-focused role	.81	8	347	4.84	0.69
School-focused role	.58	7	348	3.82	0.86
Invitations from school	.91	11	348	4.85	0.78
Invitations from child	.49	4	348	4.45	0.76
Academic achievement	–	1	348	8.10	1.34
Socioeconomic status	–	1	333	3.14	1.63

Note. Internal consistency (α) values are for the current sample.

child's teacher (Partnership-focused Role Construction), and that the school (Invitations from School) and their child (Invitations from Child) welcome their involvement.

Academic achievement

Parents reported their child's overall grades for the current school year by choosing one of 10 categories. Responses were scored so that 'all As' = 10 and 'mostly Fs' = 1. Due to a negative skew, all children with 'Cs and Ds' or below were grouped together.

Socioeconomic status

An income-to-needs ratio (McLoyd, 1998) was computed by dividing the mean for the annual household income range reported by the caregiver by the 2014 poverty threshold for their reported family size.

Data analysis

All predictors with adequate internal consistency in the current sample ($\alpha \geq .70$) and significant zero-order correlations with achievement (Table 3) were retained for hierarchical regression analyses that included demographics (Step 1), child inattention/hyperactivity and parental beliefs (Step 2), and interactions between parental beliefs and inattention/hyperactivity (Step 3)¹ with simple slopes to probe significant interactions.

Results

Preliminary analyses

Descriptive statistics and correlations for all variables are in Tables 2 and 3. Preliminary analyses indicated no significant differences between mothers' ($n = 160$) and fathers' ($n = 180$) ratings on parental beliefs measures ($ps > .05$). Parent and child gender and race were not significant predictors of achievement ($ps > .05$) and were therefore

¹ Results were highly consistent with all parent beliefs variables in Step 2; reporting is truncated for this Brief Report. Full results are available upon request.

Table 3. Correlations among variables

	1.	2.	3.	4.	5.	6.	7.	8.
1. Socioeconomic status	1							
2. Inattention/hyperactivity	-.05	1						
3. Parent self-efficacy	-.04	-.50**	1					
4. Partnership-focused role	.07	.13*	.02	1				
5. Parent-focused role	.06	-.18**	.54**	.38**	1			
6. School-focused role	-.01	.12*	-.18**	.24**	.05	1		
7. Invitations from school	.09	-.34**	.52**	.24**	.58**	.01	1	
8. Invitations from child	-.04	-.11*	.37**	.35**	.54**	.07	.51**	1
9. Academic achievement	.12*	-.42**	.47**	-.03	.21**	-.09	.24**	.03

Note. * $p < .05$; ** $p < .01$.

excluded. Socioeconomic status (SES) was retained because it was significantly correlated with achievement ($r = .12, p = .04$).

Unique and interactive effects

Socioeconomic status significantly predicted achievement ($\beta = .12, p = .04$; Table 4, Step 1). This relation remained in Step 2 ($\beta = .13, p = .004$), where inattention/hyperactivity symptoms ($\beta = -.23, p < .001$) and parent self-efficacy ($\beta = .46, p < .001$) significantly predicted achievement. When adding the interaction terms (Step 3), SES ($\beta = .12, p = .008$), inattention/hyperactivity ($\beta = -.18, p = .001$), and parent self-efficacy ($\beta = .44, p < .001$) remained significant. The interactions between parent self-efficacy ($\beta = .12, p = .02$) and parent-focused role ($\beta = -.12, p = .02$) with inattention/hyperactivity were statistically significant.

To interpret the interactions, we probed simple slopes at one standard deviation above and below the mean of each parent belief variable (Figures 1 and 2). The first interaction showed that there was a significant achievement gap between children with higher and lower inattention/hyperactivity symptoms for parents with lower parenting self-efficacy ($\beta = -.28, p < .001$), but not for parents with higher parenting self-efficacy ($\beta = -.09, p = .26$). The second interaction was attributable to there being a significant achievement gap between children with higher relative to lower inattention/hyperactivity symptoms for parents who reported higher ($\beta = -.30, p < .001$) but not lower ($\beta = -.06, p = .47$) sense of responsibility for their child's academic performance.

Discussion

This study was the first to examine interactions between aspects of parental beliefs and inattention/hyperactivity symptoms for predicting children's achievement in a large, nationwide sample of mothers and fathers. Results revealed that SES, parental self-efficacy, and child inattention/hyperactivity symptoms uniquely predicted child achievement. These findings were consistent with previous studies demonstrating the importance of parent self-efficacy and inattention/hyperactivity symptoms for achievement (Ice & Hoover-Dempsey, 2011; Sarver *et al.*, 2012).

Interestingly, we also found evidence for interactive effects between parental beliefs variables and child inattention/hyperactivity. For parental self-efficacy, children with

Table 4. Regression results for predicting academic achievement

	Model 1			Model 2			Model 3		
	<i>b</i>	SE	β	<i>b</i>	SE	β	<i>b</i>	SE	β
Intercept	8.10**	.07		8.08**	.06		8.11**	.07	
Socioeconomic status	0.16*	.07	.12	0.18**	.06	.13	0.16**	.06	.12
Inattention/hyperactivity				-0.31**	.07	-.23	-0.25**	.08	-.18
Parent self-efficacy				0.63**	.09	.46	0.60**	.08	.44
Parent-focused role				-0.01	.08	-.004	0.007	.08	.01
Invitations from school				-0.11	.08	-.08	-0.07	.08	-.06
Parent self-efficacy \times IH							0.13*	.06	.12
Parent-focused \times IH							-0.17*	.07	-.12
Invitation school \times IH							-0.04	.07	-.03
ΔR^2									
Total R^2			1.3%**			33.1%**			2.1%*
						34.4%**			36.4%**

Notes. IH = inattention/hyperactivity.
 * $p < .05$; ** $p < .01$.

higher inattention/hyperactivity demonstrated lower grades in school only when parents perceived themselves as less able to affect their child’s success. This suggests parenting beliefs may provide a buffer against these children’s well-documented underachievement (Sarver *et al.*, 2012). Alternatively, because these are cross-sectional data, it may be that parental beliefs are a response to their child’s academic successes/difficulties (Whitaker & Hoover-Dempsey, 2013). For example, parents may feel less able to help children who have both behavioural and academic difficulties, relative to children who present behavioural challenges but succeed in school (Rogers *et al.*, 2009).

This alternative interpretation may help explain the somewhat counterintuitive finding from the other interaction, which was that of an achievement gap between children with higher and lower inattention/hyperactivity symptoms only when parents believe they have more responsibility for their child’s achievement. It is possible that



Figure 1. The relation between parental self-efficacy and child academic achievement at different levels of child inattention/hyperactivity symptoms. Note. Low and high are defined as 1 SD below or above the mean, respectively.

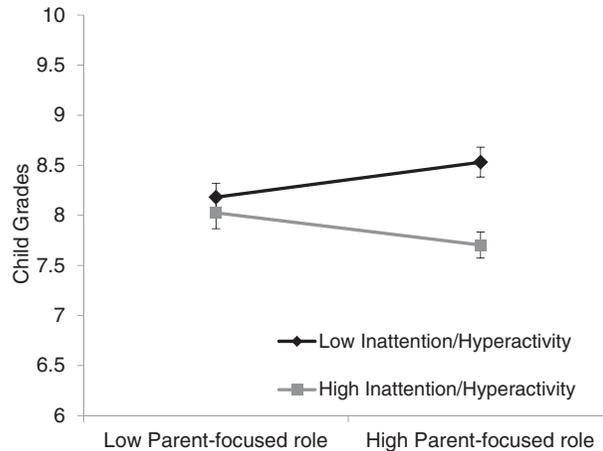


Figure 2. The relation between parent-focused role and child academic achievement at different levels of child inattention/hyperactivity symptoms. Note. Low and high are defined as 1 SD below or above the mean, respectively.

parents of children with higher inattention/hyperactivity may increasingly assume responsibility for their success due to teacher comments, and these parents of underachieving children may take more responsibility for their child's success because they need closer contact with the school (Frazier, Youngstrom, Glutting, & Watkins, 2007). Experimental investigations are needed to better understand the directional nature of the associations in both interactions.

Limitations/future directions

There are several caveats that must be considered. The study focused exclusively on parental self-report; thus, it is possible the magnitude of associations is inflated. Although nationwide, the sample was slightly more affluent and less diverse than U.S. population estimates, and the applicability of our findings to diverse cultural and clinical populations (e.g., ADHD) is unknown. Lastly, the cross-sectional nature of this study precludes causal attributions, and the interactions likely reflect part of a more complex process in which parent and child factors interact with feedback regarding child academic performance over time.

Conclusion

These findings suggest parent perceptions regarding their ability to influence their child's academic success may be particularly important for children with more inattention/hyperactivity symptoms. This association is likely part of a more complex feedback loop, wherein parents who believe their efforts will be successful are more likely to intervene (Jones & Prinz, 2005) when their child's grades decline. Thus, interventions may be more likely to improve the child's achievement when their low grades are due to modifiable factors (e.g., distracted easily; Sarver *et al.*, 2012), while negative feedback over time regarding their child's academic performance is likely to blunt parental confidence (Rogers *et al.*, 2009). These results are especially important because academic achievement in elementary school is a key developmental outcome for children's success concurrently and long term (Sarver *et al.*, 2012). These findings suggest parenting

interventions may benefit from more explicit consideration of parental self-efficacy. Importantly, this conclusion remains speculative, and treatment-mediation studies are needed to establish causal links.

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