

Parents' Intelligence Mindsets Relate to Child Internalizing Problems: Moderation Through Child Gender

Jessica L. Schleider¹ · Hans S. Schroder² · Sharon L. Lo² · Megan Fisher² · Judith H. Danovitch³ · John R. Weisz¹ · Jason S. Moser²

© Springer Science+Business Media New York 2016

Abstract Parental belief systems can strongly influence children's affect, behavior, and mental health. However, associations between specific kinds of parental beliefs and children's mental health have not been thoroughly explored. One relevant belief system is parental *intelligence mindset*: beliefs about the malleability of intelligence. Children of parents who view intelligence as static (known as a *fixed intelligence mindset*), rather than malleable through effort (known as a *growth intelligence mindset*), experience more academic, self-regulatory, and motivational difficulty. However, associations between parental intelligence mindset and child mental health problems are unclear. Accordingly, we tested whether parents' intelligence mindsets related to internalizing problems in their children ($N = 131$, ages 5–8). Overall, parents with stronger fixed intelligence mindsets had children with greater internalizing problems, particularly social anxiety (characterized by fear of negative evaluation). Results further revealed that parents' fixed intelligence mindsets were associated with overall internalizing problems and depressive symptoms in boys, but not girls. Results are the first to suggest and parse direct

links between parents' intelligence mindsets and youth internalizing problems.

Keywords Mindset · Internalizing problems · Child mental health · Parent beliefs

Introduction

Internalizing problems (anxiety and depression) are debilitating and prevalent in youth (Campo et al. 2004). Because earlier onset of these problems predicts poorer long-term functional outcomes (Copeland et al. 2015), it is crucial to identify factors associated with childhood internalizing difficulties. Although many genetic, neurobiological, and psychosocial factors have been proposed (Pine and Leibenluft 2015), increasing evidence highlights parental cognitions, or belief systems, as key contributors to youth internalizing problems (see Bögels and Brechman-Toussaint 2006; Bugental and Johnston 2000, for reviews). Belief systems guide parents' interpretation of and responses to different contexts and events (Mischel and Shoda 1995), particularly those experienced as threatening (Dix et al. 1990; Strassberg 1995). Whether by shaping parent–child dynamics, the broader family environment, or children's own beliefs, evidence suggests that parental beliefs affect psychological health in offspring (Bornstein 2006; Bugental and Johnston 2000).

Parents' beliefs about the malleability of intelligence, or *intelligence mindsets*, are one kind of parent belief that may be relevant to youth internalizing distress. People tend to hold one of two kinds of intelligence mindsets, which are understood as two ends of a continuum (Dweck 1999; Dweck and Leggett 1988). Whereas the *fixed* mindset holds

Electronic supplementary material The online version of this article (doi:10.1007/s10826-016-0513-7) contains supplementary material, which is available to authorized users.

✉ Jessica L. Schleider
jschleider@fas.harvard.edu

¹ Department of Psychology, Harvard University, Cambridge, MA, USA

² Department of Psychology, Michigan State University, East Lansing, MI, USA

³ Department of Psychological and Brain Sciences, University of Louisville, Louisville, KY, USA

that intelligence is near-impossible to change, the *growth* mindset holds that intelligence is malleable through effort. Mindsets shape individuals' interpretations and responses to numerous situations, particularly when challenges arise (Dweck 1999; Dweck et al. 1995).

In the academic domain, fixed-mindset individuals attribute test performance to innate ability; thus, unsatisfactory performance suggests fundamentally low ability. Accordingly, fixed-mindset individuals strive to demonstrate to themselves and others that they are capable of success. They often engage in tasks that are easy but unhelpful for skill improvement (Hong et al. 1999) and lie to cover-up unsatisfactory performance (Mueller and Dweck 1998). In contrast, growth-minded individuals consider motivational and situational factors following academic setbacks, prioritizing learning over "proving" their ability (Dweck and Leggett 1988). They view challenges not as threats to be avoided but as opportunities to strengthen their intellect.

Because mindsets shape interpretations of setbacks and performance, it is unsurprising that they differentially contribute to performance-related distress. Facing failure often leads fixed-minded individuals to question their ability, employ ineffective coping strategies, and experience greater helplessness (Dweck and Leggett 1988; Hong et al. 1999). In particular, fixed mindsets are strongly associated with high anxiety about negative evaluation, including social anxiety and maladaptive perfectionism (Schroder et al. 2015; Shih 2011).

Given these associations, children with fixed-minded *parents* may be more likely to become anxious and/or depressed than children with growth-minded parents (Dweck 1999; Mueller and Dweck 1998). Compared to parents with a growth intelligence mindset, those with a fixed mindset are more likely to view their children's intelligence as static and resistant to change (Moorman and Pomerantz 2010). As a result, children in fixed-mindset households might receive more emphasis on ability and performance, communicating that intelligence is something they either have or do not. For example, when children face stressors such as challenging homework assignments—an increasingly probable event as children progress through elementary school—fixed-minded parents may be highly distressed by their child's possible failure. To these parents, poor performance would reflect low intrinsic ability, carrying serious implications for the child's future success. Accordingly, to avoid their child's chance of failure in the face of challenge, these parents they might instruct their children how to solve problems rather than encouraging them to problem-solve independently, or they may express frustration or anger when children make mistakes. Empirical research lends support to this possibility. Moorman and Pomerantz (2010) found that mothers induced to hold a fixed

intelligence mindset displayed more adverse involvement in 6-to-9-year-old children's learning—that is, they used more controlling and critical language and actions—than were mothers induced to hold a growth intelligence mindset.

Following poor performance, along with critical parental feedback suggesting that ability is static, children as young as 4 years old may conclude that they lack intelligence and engage in more self-blame for perceived failure, falling into fixed-mindset patterns of disengagement and helplessness about her ability to improve (Burhans and Dweck 1995; Kamins and Dweck 1999; Mueller and Dweck 1998). Given fixed-minded parents' emphasis on the *appearance* of intelligence, as well as the negative consequences of appearing unintelligent to others, these children may grow hypersensitive to parents' negative evaluation—and to the prospect of negative evaluation more broadly. This constant worry related to performance, judgment, and evaluation is a hallmark of social anxiety (Watson and Clark 1991). Thus, it is possible that parents' fixed mindsets may relate especially strongly to social anxiety in offspring, as compared to other anxiety domains that are not characterized by evaluation-focused worries (e.g., generalized anxiety; OCD; separation anxiety). In contrast, children of growth-minded parents may receive more messages from parents about strategies, effort, and process. They may approach tasks with the goal of *learning* as much as possible rather than appearing intelligent. Indeed, messages from parents and teachers regarding the malleability of personal traits and the importance of effort in improvement can influence their motivational frameworks and responses to setbacks (Haimovitz and Dweck 2016; Gunderson et al. 2013; Pomerantz and Kempner 2013). Thus, having growth-minded parents may buffer children's performance worries. This study is the first to empirically examine the relation between parents' mindsets and mental health problems in offspring.

Parental mindsets may influence children's internalizing distress, potentially by guiding parents' responses to challenges their children face (Pomerantz and Dong 2006). For instance, when children struggle with homework, fixed-mindset parents may be distressed by their child's possible failure: poor performance would reflect low ability, carrying serious implications for the child's future success. These parents may become greatly invested in ensuring their child's success and may even provide the answers, rather than encouraging independent problem-solving (Moorman and Pomerantz 2010). In addition to dampening children's intrinsic motivation, these parenting practices teach children that failure is shameful and unacceptable, heightening their anxiety when mistakes are likely. Additionally, parental over-control and autonomy-reducing behaviors predict child anxiety (McLeod et al. 2007). Thus, fixed mindsets may increase the likelihood of parenting styles that intensify children's internalizing problems.

Parents' intelligence mindsets and associated parent–child interactions may affect girls and boys in different ways, although the nature of these differences is poorly understood (Henderlong and Lepper 2002; Pomerantz and Moorman 2010). Although some studies suggest that fixed parental mindsets might affect girls more negatively than boys, others suggest that boys might be more adversely affected.

Evidence that fixed parental mindsets might affect girls more negatively than boys comes from studies of parent reactions to *failure*. For example, research has found that girls are especially sensitive to autonomy-diminishing feedback from parents, such as a parent's instructing his child how she *should* feel following a stressor, or solving a challenging puzzle for the child when she shows signs of struggling (Kast and Connor 1988). This pattern has been explained by the socialization of girls to be dependent and interpersonally-aware (particularly by their mothers), versus that of boys to be independent and achievement-focused (Deci and Ryan 1985). As discussed, when fixed-minded parents see their child struggling with challenges, they often exhibit over-controlling, autonomy-reducing behaviors (Moorman and Pomerantz 2010). Such feedback may elicit greater self-consciousness and negative affect in girls than in boys, disproportionately increasing girls' risk for internalizing problems.

However, other research suggests that following *success*, boys may be more responsive to parents' person-praise (e.g., "You're so talented!"), whereas girls may respond more positively to process-praise (e.g., "You worked so hard!"); Koestner et al. 1989). In one study, 10-to-12-year-old boys persisted more when they received person praise (Koestner et al. 1989), consistent with research suggesting that boys worry more than girls about how smart and capable they appear relative to others (Kenney-Benson et al. 2006). When fixed-mindset mothers see their children succeed, research suggests that they tend to praise their children for ability rather than effort (Pomerantz and Dong 2006). Given boys' socialized performance orientation and concern with perceived achievement (Deci and Ryan 1985), boys may internalize this person praise more than girls. Seeing boys' positive reactions to person praise might encourage parents to continue praising their sons' ability rather than effort, inadvertently reinforcing boys' drives to appear smart, competent, and successful. Although boys may respond well to person praise in the moment, their continued focus on performance over process may be detrimental over time (Mueller and Dweck 1998). When boys accustomed to person praise inevitably face failure, they might view poor performance as indicative of a permanent deficit, increasing their susceptibility to self-criticism, self-consciousness, and depression.

Given research suggesting strong links between parents' fixed mindsets and children's affect and anxiety, we explored

direct relations between parents' intelligence mindsets and child internalizing problems in a sample of parents and their 5-to-8-year-old offspring. Although most research on mindsets and youth psychopathology has targeted adolescents (e.g., Schleider et al. 2015; Schleider and Weisz 2016), parent–child dynamics can shape affect and anxiety in much younger children (Burststein et al. 2010). Targeting 5-to-8-year-olds may clarify how these links take shape early in development. We predicted associations between parents' fixed intelligence mindsets and higher child internalizing problems, particularly social anxiety. If initial tests supported this hypothesis, we planned to examine child gender as a candidate moderator of the relation between parent mindsets and child internalizing problems. Given conflicting research findings, we had no specific hypotheses regarding the direction of moderation by gender.

Method

Participants

Participants were 131 parents (Meanage = 37.07 years, SD = 5.57) of children ages 5–8 (53 % girls, Meanage = 6.99 years, SD = 0.74) recruited as part of a larger project examining the development of children's social and cognitive skills. Families were 83.2 % Caucasian, 3.1 % African–American, 3.1 %, Asian–American, and 9.2 % multiracial; 9.2 % of families identified as Hispanic. Most parents had completed college (95.42 %).

Procedures

Families were recruited from a mid-size Midwestern city through advertisements and a laboratory database. Parents were told that the purpose of their participation was to investigate how children's responses related to parent beliefs and opinions. Parents were not instructed that the questionnaires included measures of anxiety, mindset, etc., and the measures reported in this paper were interspersed with other measures that are not reported here. Families were compensated with a \$50 gift card for their participation in the study. The Michigan State University IRB approved all study procedures.

Measures

Intelligence Mindset Scale (see Hong et al. 1999, for Full Measure)

The parent intelligence mindset scale includes four fixed-mindset items, which ask respondents to indicate their general beliefs about the malleability of intelligence

(e.g., “You have a certain amount of intelligence and there is really not much you can do to change it”; “You can learn new things, but you can’t really change your intelligence”). Participants rated their agreement/disagreement with each item on a scale from 1 (Strongly Disagree) to 6 (Strongly Agree). Items are reverse-scored and then averaged such that higher scores reflect higher growth mindset endorsement (i.e., lower fixed mindset endorsement). This measure has demonstrated adequate psychometric properties in adult samples (Dweck 1999; Schroder et al. 2015, 2016). Internal consistency in this sample was $\alpha = 0.94$.

Consistent with previous studies, only fixed-mindset statements are included this questionnaire: several studies (Faria and Fontaine 1989; Leggett 1985) have found that when both the fixed and growth statements are included, individuals tend to endorse incremental statements disproportionately strongly—especially as they work through a series of the contrasting statements. This result suggests that the growth mindset beliefs may be perceived as the more socially desirable choice. By presenting only the fixed statements, the measure yields as more valid and reliable assessment of one’s beliefs about the malleability of intelligence (Erdley et al. 1997).

Revised Children’s Anxiety and Depression Scale-Parent Report (RCADS-P; Ebesutani et al. 2010)

The RCADS-P is a parent-report questionnaire of child anxiety and depression with scales corresponding to the DSM diagnoses of separation anxiety (e.g., “fears being alone at home”; “scared to sleep alone”), social anxiety (“scared to take a test”; “worries about mistakes”; “afraid of looking foolish in front of people”), generalized anxiety (e.g., “worries about things”; “worries in bed at night”), panic (e.g., “suddenly feels really scared for no reason”; “suddenly has trouble breathing for no reason”), obsessive-compulsive (e.g., “can’t get bad or silly thoughts out of head”; “has to do things over and over again”), and major depressive disorders (e.g., “has no energy for things”; “feels worthless”). It yields an anxiety total score (sum of the five anxiety subscales) and a total internalizing problems score (sum of all subscales). Parents rate the degree to which each item applies to their children a 0–3 scale. Of relevance to the present study, the social anxiety subscale focuses on worries about negative evaluation from general others (i.e., it is non-specific regarding evaluation from peers, parents, and/or teachers), and most items address worries about evaluation in academic contexts (e.g., poor performance on homework or tests). RCADS-P total and subscale scores have demonstrated strong psychometric properties in clinical and school-based child samples (Ebesutani et al. 2010, 2011). In this study, internal consistency was $\alpha = 0.91$ for the total internalizing score, $\alpha = 0.89$ for the

total anxiety score, $\alpha = 0.84$ for the social phobia subscore, $\alpha = 0.75$ for the major depression subscore, $\alpha = 0.81$ for the generalized anxiety subscore, $\alpha = 0.67$ for the obsessive compulsive disorder subscore, $\alpha = 0.69$ for the separation anxiety subscore, and $\alpha = 0.60$ for the panic disorder subscore.

Penn State Worry Questionnaire (PSWQ; Meyer et al. 1990)

The PSWQ is a 16-item measure of trait worry. Adult participants rate how much each statement (e.g., “I worry all the time”) applies to them on a 1–5 scale. The PSWQ is a well-studied measure and has shown excellent psychometric properties (Brown 2003). Internal consistency in this sample was $\alpha = 0.96$.

Mood and Anxiety Symptom Questionnaire-Anhedonic Depression (MASQ-AD; Watson and Clark 1995)

The MASQ-AD asks adult participants to rate how much they have experienced symptoms of depression in the past week on a 1–5 scale. The MASQ-AD subscale includes 22 anhedonia-related items (e.g., “Felt really happy”; reverse-scored). The MASQ-AD is a reliable, valid measure of adult depressive symptoms (Bredemier et al. 2010). Internal consistency in this sample was $\alpha = 0.93$.

Demographics

Parents reported their child’s age, gender, race and ethnicity, as well as their own educational attainment and approximate annual household income.

Data Analyses

We used hierarchical linear regression to test associations between parents’ fixed intelligence mindsets and greater child internalizing problems. In Step 1 of these regressions, we included a number of covariates, including child age and gender, family income, parent education level, and child ethnicity. We also included parents’ trait worry (PSWQ) and depression symptoms (MASQ-AD) as covariates, as parents’ internalizing symptoms are often associated with their reporting of child problems (Durbin and Wilson 2012). Parental mindset was added in Step 2. In accordance with study hypotheses dependent variable (DV) was child total internalizing problems for the first model, and child social anxiety for the second. To determine whether associations were specific to overall internalizing problems and social anxiety, we conduct additional regressions specifying each RCADS-P subscale as DVs. To reduce problems related to multicollinearity, we included the total RCADS-P total child internalizing score but *not* the RCADS-P total child anxiety score in present analyses; the correlation between

these variables was $r = 0.98$ in the present sample, whereas correlations among other RCADS-P subscales ranged from $r_s = 0.35-0.80$.

To evaluate the moderating roles of child gender, we added a Step 3 to each of any regressions that emerged as statistically significant. This third step included an additional interaction term (mindset \times child gender). The significance of the R^2 change from Steps 2 to 3 indexed whether an interaction term predicted parent mindset-child problems links. As a continuous predictor variable, parental mindset was mean-centered prior to calculation of interaction terms. As suggested by Aiken and West (1991), significant interactions were probed post-hoc by plotting and testing the simple slope of the child symptom variable regressed on the parent mindset variable girls and boys, separately.

Per study hypotheses, we entered total child internalizing problems as the DV for the first planned moderation model, and child social anxiety as the DV for the second. If significant, direct associations emerged between parent mindsets and any other RCADS-P subscales, we planned to conduct additional models with these subscales specified as DVs. Finally, regardless of these models' results, we planned to conduct moderation tests for the RCADS-P internalizing scale and for each problem type subscale, as moderated effects may emerge even in the absence of direct associations. For completeness, we report results with and without covariates included; however, we focus on models including covariates, given their theoretical and statistical importance in minimizing biased effects.

Results

Table 1 summarizes descriptive statistics and correlations between study variables. Children's total internalizing

scores on the RCADS-P ranged from normative to clinically elevated (T -scores from 41 to 88), and 34.4 % of parents' PSWQ scores exceeded the cutoff for GAD risk (Behar et al. 2003). Notably, the PSWQ may overestimate the prevalence of GAD in adult community samples, and the present rate of PSWQ-indicated GAD risk is consistent with rates observed in previous studies (Schroder et al. 2015). Separately, just 3 % of parents reported clinically-elevated depression based on the MASQ (Buckby et al. 2007). Together, these scores suggest parents endorsed a wide range of anxiety and depression.

Parental Mindsets and Children's Internalizing Symptoms

Regression tables for all multivariate tests are presented in Table 2. Consistent with predictions, parental fixed mindset correlated with higher child internalizing symptoms, and most strongly with child social anxiety symptoms. Hierarchical regression analyses indicated that stronger parental fixed intelligence mindsets were associated with higher total child internalizing problems, $F(1, 119) = 4.08, \Delta R^2 = 0.03, p = 0.04, 95\% \text{ CI} [-3.36, -0.03]$, controlling for aforementioned covariates. Further, parents' fixed mindsets of intelligence were significantly associated with children's social anxiety symptoms, $F(1, 119) = 9.15, \Delta R^2 = 0.07, p = 0.003, 95\% \text{ CI} [-1.50, -0.31]$ but were not significantly associated with anyother specific child internalizing problem type, based on RCADS-P subscales. Results were unchanged regardless of the inclusion of covariates.

Moderation by Child Gender

We first assessed child gender as a moderator of the association between parent intelligence mindsets and total child internalizing problems. The parent mindset \times child gender

Table 1 Means, standard deviations, and bivariate correlations for all study variables

	Mean (SD)	Score range	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Parent worry (PSWQ)	52.02 (16.45)	16–80	0.46**	-0.15 ⁺	0.25**	0.23**	0.14	0.08	0.14	0.01	0.18*
2. Parent depression (MASQ-AD)	47.36 (13.59)	14–70	–	-0.14	0.18*	0.16 ⁺	0.09	0.08	0.12	0.22*	0.20*
3. Parent fixed intelligence mindset ^a	4.78 (1.26)	1–6	–	–	-0.15 ⁺	-0.09	-0.02	-0.23**	-0.03	-0.06	-0.15 ⁺
4. Child separation anxiety symptoms	4.14 (3.18)	0–21	–	–	–	0.53**	0.48**	0.35**	0.45**	0.45**	0.73**
5. Child generalized anxiety symptoms	4.14 (2.62)	0–18	–	–	–	–	0.54**	0.43**	0.64**	0.51**	0.79**
6. Child panic symptoms	1.48 (1.76)	0–27	–	–	–	–	–	0.39**	0.52**	0.49**	0.71**
7. Child social phobia	7.54 (4.40)	0–27	–	–	–	–	–	–	0.36**	0.43**	0.74**
8. Child OCD symptoms	1.53 (1.91)	0–18	–	–	–	–	–	–	–	0.48**	0.72**
9. Child depression symptoms	3.37 (3.12)	0–30	–	–	–	–	–	–	–	–	0.76**
10. Child total internalizing symptoms	22.20 (12.63)	0–141	–	–	–	–	–	–	–	–	–

⁺ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

Note ^a Lower scores on this measure indicate a stronger fixed intelligence mindset, whereas higher scores indicate a stronger growth intelligence mindset (i.e., a weaker fixed intelligence mindset).

Table 2 Hierarchical linear regression analyses testing (a) associations between parental intelligence mindset and child problems, and (b) youth gender as a moderator of links between parental intelligence mindset and child problems

Predictor (Step 2 variable)		Dependent variable													
		Child internalizing problems		Child social anxiety		Child depression		Child GAD		Child OCD		Child panic		Child separation anxiety	
		β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1:	Youth gender	0.07		-0.06		0.74*		0.47		0.78*		0.49		0.61	
	Youth age	0.16		0.20*		0.07		0.20*		0.02		0.23*		-0.07	
	Parental education level	0.05		0.03		-0.01		-0.01		0.11		0.12		0.07	
	Family income	-0.16		-0.01		-0.01		-0.01		-0.09		-0.18		-0.22	
	Parent worry/anxiety symptoms	0.03		-0.03		0.02		0.08		0.08		0.01		0.00	
	Parent depressive symptoms	0.16		-0.09		-0.15		0.15		0.02		0.08		0.17	
	Caucasian	-0.09		-0.08		0.10		0.09		-0.03		0.07		0.06	
	African American	0.07		0.03		-0.03		-0.08		-0.08		0.09		-0.07	
	Asian American	-0.04		0.02		-0.02		-0.03		-0.09		-0.13		-0.14	
	Hispanic	-0.10		-0.02		-0.03		-0.02		-0.06		-0.07		-0.02	
	Mixed/other	-0.27		-0.24		-0.28		-0.12		-0.18		-0.02		-0.04	
Step 2:	Parental fixed intelligence mindset	-0.18*	0.04*	-0.27**	0.07**	0.08	0.00	0.09	0.00	0.18	0.00	0.14	0.00	-0.01	0.02
Step 3:	Youth gender \times parental intelligence mindset	-0.73*	0.03*	-0.58	0.01	-0.66*	0.03*	-0.40	0.01	-0.55	0.02	-0.55	0.02	-0.54	0.02

All analyses control for demographically and conceptually related variables
 * $p < 0.05$, ** $p < 0.01$

interaction produced a significant R^2 change for parent-reported total child internalizing problems, $F(1,107) = 4.84$, $\Delta R^2 = 0.03$, $p = 0.03$, 95 % CI [-6.79, -0.35], but not for child social anxiety, over and above aforementioned covariates. (Excluding covariates, results were in the same direction but nonsignificant, $F(1,126) = 2.54$, $\Delta R^2 = 0.02$, $p = 0.11$.) Figure 1 illustrates the simple effects for parent-reported total internalizing problems. Boys whose parents reported stronger fixed intelligence mindsets had significantly more internalizing problems than did boys whose parents reported stronger growth mindsets, $t(125) = -2.09$, $p = 0.03$, 95 % CI [-12.55, -0.30]. Girls' internalizing problems did not differ as a function of parents' intelligence mindsets.

We then tested gender as a moderator of the association between parent intelligence mindsets and each RCADS-P subscale. Results showed that the parent intelligence mindset \times child gender interaction produced a significant change in R^2 for parent-reported total child depression, $F(1, 115) = 4.84$, $\Delta R^2 = 0.03$, $p = 0.03$, 95 % CI [-1.56, -0.08]. Consistent with results for total child internalizing problems, boys with more fixed-minded parents had more depressive symptoms than did boys with more growth-minded parents, $t(125) = -2.15$, $p = 0.03$, 95 % CI [-11.32, -0.33]. Girls' depressive symptoms did not differ as a function of parents' intelligence mindsets. No significant

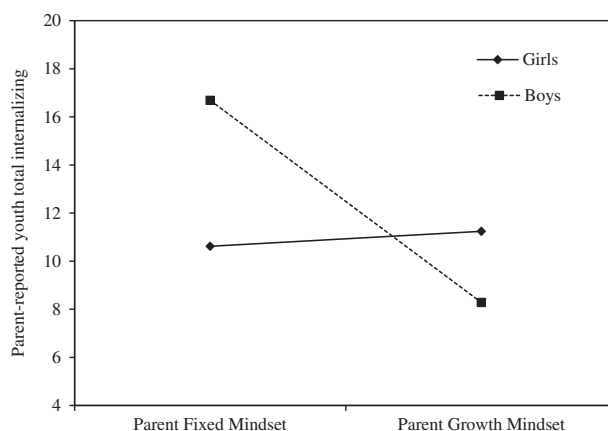


Fig. 1 Relation between parent-reported child internalizing problems and parent mindset type (-1SD, +1SD on the Implicit Theories of Intelligence Questionnaire) as a function of child gender

moderation effects emerged for any other RCADS-P subscale (social anxiety, panic, OCD, GAD, or separation anxiety).

In addition to child gender, we initially planned to explore parents' differential endorsement of *mastery* versus *performance goals* for their children as a moderator of associations between parents' intelligence mindsets and internalizing problems in offspring. However, bivariate

correlations revealed that parental mastery orientation was not significantly associated with parents' intelligence mindsets, child internalizing problems, or child anxiety of any type, and moderation effects were non-significant. Thus, we chose not to focus on parental mastery orientation in the present paper. For completeness, our initial rationale for considering parental mastery orientation as a moderator, as well as relevant results, are included in Supplement A.

Discussion

Researchers have highlighted the need to incorporate parental cognitions into models of risk for child psychopathology (Alloy et al. 2006). Specifically, decades of psychological research suggest that parental intelligence mindsets might relate to internalizing problems in offspring, yet this link has remained unexplored. This study provides, to our knowledge, the first empirical exploration of this possibility. Parents' fixed mindsets were associated with greater internalizing problems in offspring, particularly social anxiety. Additionally, child gender moderated this link.

Results supported our hypothesis that parents' fixed mindsets would relate to higher overall child internalizing problems, controlling for conceptually relevant factors, particularly for boys. Regarding specific symptom clusters, parents' fixed mindsets were associated with children's social anxiety, consistent with demonstrated links between fixed intelligence mindsets and performance-related anxiety (Schroder et al. 2015; Shih 2011). Present findings provide a critical advance in knowledge, showing that consequences of parents' fixed mindsets may be passed onto their children. When their children face challenges, fixed-minded parents may exclusively praise observable success and criticize failure, which they may find especially distressing. Such selective praise and criticism may lead children to equate self-worth with performance success, reinforcing worries about embarrassment and negative evaluation—both hallmarks of social anxiety (Watson and Clark 1991).

Relations with overall internalizing distress and depressive symptoms were moderated by child gender, qualifying the notion that parents' fixed intelligence mindsets uniformly relate to children's psychological symptoms. Boys with fixed-minded parents, but not girls, had relatively high total internalizing and depressive symptoms, whereas parental fixed mindsets were equally associated with high social anxiety in children of both genders. Mothers with fixed mindsets are more likely to praise their children for performance than for effort (Pomerantz and Dong 2006), potentially reinforcing boys' already-heightened concern about appearing smart (Kenney-Benson et al. 2006). In turn, these boys may be more likely to perceive their own failures

or struggles as indicative of low intelligence, rendering them more susceptible to the negative self-talk and hopelessness that characterize internalizing problems— and depression, in particular—over time. This is consistent with research suggesting that boys, more than girls, value and respond to parental praise for achievements and tangible success (Anderman and Midgley 1997; Kenney-Benson et al. 2006). Regarding the effect's specificity to depression, the age range of the present sample is worth considering: some evidence suggests that boys are more likely than girls to be depressed prior to adolescence, whereas girls are more likely to be depressed during adolescence and adulthood (Anderson et al. 1987; Cohen and Brook 1987; Cyranowski et al. 2000). Consistent with this possibility, parents reported boys as being marginally more depressed than girls in the present sample, $t(131) = -1.78$, $p = 0.076$, 95 % CI $[-2.05, 0.10]$. However, this study cannot rule out the possibility that girls, in certain circumstances, might have more adverse reactions than boys to parents' fixed intelligence mindsets. Additional studies targeting different age groups (e.g., adolescence) may explore the consistency of effects seen here across development.

In interpreting present moderation effects by child gender, it may be helpful to consider the fact that the majority of parents in this study (~90 %) were mothers. This is consistent with most developmental psychopathology studies involving families, including prior research on links between parents' mindset-related feedback and child outcomes (e.g. Gunderson et al. 2013; Moorman and Pomerantz 2008; Ng et al. 2007; Pomerantz and Dong 2006; Pomerantz and Kempner 2013). Thus, extant literature suggests that fixed-minded *mothers*, specifically, provide more person- than process-praise to offspring. Further, although the findings are not entirely consistent (e.g., Lytton and Romney 1991), there is evidence that mothers tend to view girls' academic performance as due to their effort and boys' performance as resulting from natural ability (Eccles et al. 1990). This pattern may help explain present findings: perhaps fixed-minded mothers are more likely to emphasize fixed nature of intelligence to sons than to daughters, disproportionately increasing boys' susceptibility to self-criticism and anxiety. Future experimental and observational studies may test this possibility directly, as well as the role of fathers' mindsets in sons and daughters psychological health.

It is notable that only parent-report measures of children's internalizing problems were used in this study. Given discrepancies between parent- and child-reports of children's anxiety and depression symptoms (De Los Reyes and Kazdin 2005), multi-informant assessment of child psychopathology are often recommended to improve diagnostic validity. However, the age range of children in this study supports our focus on parent-report measures alone.

Widely-used youth-report psychopathology measures, including the Youth Self Report (Achenbach and Edelbrock 1987), the RCADS-Child (Chorpita et al. 2005), and the Strengths and Difficulties Questionnaire (Goodman 1999) are not validated for children under 8 years of age. Further, most well-validated measures designed to assess symptoms in younger children rely on parent reports only (e.g., the Child Behavior Checklist—1.5–5, Ivanova et al. 2010; the Eatly Childhood Screening Assessment, Gleason et al. 2010). Indeed, because younger children have difficulty reporting on their own symptoms, even randomized-controlled trials evaluating treatments for child internalizing disorders tend not to include child-report symptom measures (e.g., Comer et al. 2012; Hirschfeld-Becker et al. 2010). Thus, our present focus on parent reports of symptoms in offspring is consistent with prior research on mental health in younger children.

Some limitations of the present study should be addressed in future research. First, because data were cross-sectional, directionality of effects cannot be established. That is, we cannot conclude that parents' beliefs *caused* their children's internalizing symptoms or vice-versa. Future studies might test the possibility that higher internalizing problems in children might facilitate increases in parents' beliefs about the malleability of intelligence, or other personal traits. If parents observe their children struggling with anxiety or depression, they may come to believe that basic traits such as intelligence or personality cannot change very much. To be sure, the relationship between parental mindsets and children's symptoms is likely to be quite nuanced, and will require much further research. Although our study provides an initial step in establishing a link, future research is needed to consider many other variables, including, for example, child personality characteristics or academic achievement. Future longitudinal studies may also improve understandings of how these factors influence one another over time.

Second, we relied on parent-report measures and our findings might have been influenced by the biases inherent in all informant-report instruments. Related to this point, this study lacked direct observational measures of parent–child interactions and of parents' feedback to children, which might have helped clarify the processes through which mindset-consistent behavior might influence child distress. Third, while children in this study had widely-ranging symptoms, it is unclear whether present findings would generalize to clinical samples.

Despite these limitations, the current findings substantially improve our understanding of links between parental mindsets and child internalizing problems. Results suggest that stronger fixed mindsets in parents are associated with greater child internalizing problems—especially social anxiety—and more so with boys than with girls.

Future studies will be needed to assess the generalizability of these findings across diverse samples, including older children and clinical populations, and to explore the directionality of these relations over time.

Compliance with Ethical Standards

Conflict of interest The authors have no conflicts of interest to disclose.

Research Involving Human Subjects The Michigan State University institutional review board approved all procedures. All parents and children provided written consent and assent, respectively, prior to their participation in the study.

References

- Achenbach, T. M., & Edelbrock, C. S. (1987). *Manual for the youth self-report and profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.
- Alloy, L. B., Abramson, L. Y., Whitehouse, W. G., Hogan, M. E., Panzarella, C., & Rose, D. T. (2006). Prospective incidence of first onsets and recurrences of depression in individuals at high and low cognitive risk for depression. *Journal of Abnormal Psychology, 115*, 145.
- Anderman, E. M., & Midgley, C. (1997). Changes in achievement goal orientations, perceived academic competence, and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*(3), 269–298.
- Anderson, J. C., Williams, S., McGee, R., & Silva, P. A. (1987). DSM-III disorders in preadolescent children: Prevalence in a large sample from the general population. *Archives of General Psychiatry, 44*(1), 69–76.
- Behar, E., Alcaine, O., Zuellig, A. R., & Borkovec, T. D. (2003). Screening for generalized anxiety disorder using the Penn State Worry Questionnaire: a receiver operating characteristic analysis. *Journal of Behavior Therapy and Experimental Psychiatry, 34* (1), 25–43.
- Bögels, S. M., & Brechman-Toussaint, M. L. (2006). Family issues in child anxiety: Attachment, family functioning, parental rearing and beliefs. *Clinical Psychology Review, 26*, 834–856.
- Bornstein, M. H. (Ed.). (2006). *Handbook of parenting: volume 4 social conditions and applied parenting*. Hove: Psychology Press.
- Bredemeier, K., Spielberg, J. M., Siltan, R. L., Berenbaum, H., Heller, W., & Miller, G. A. (2010). Screening for depressive disorders using the Mood and Anxiety Symptoms Questionnaire Anhedonic Depression Scale: a receiver-operating characteristic analysis. *Psychological Assessment, 22*, 702–710.
- Brown, T. A. (2003). Confirmatory factor analysis of the Penn State Worry Questionnaire: Multiple factors or method effects? *Behaviour Research and Therapy, 41*(12), 1411–1426.
- Buckby, J. A., Yung, A. R., Cosgrave, E. M., & Killackey, E. J. (2007). Clinical utility of the Mood and Anxiety Symptom Questionnaire (MASQ) in a sample of young help-seekers. *BMC Psychiatry, 7*, 50.
- Bugental, D. B., & Johnston, C. (2000). Parental and child cognitions in the context of the family. *Annual Review of Psychology, 51*, 315–344.

- Burhans, K. K., & Dweck, C. S. (1995). Helplessness in early childhood: The role of contingent worth. *Child Development, 66*, 1719–1738.
- Burstein, M., Ginsburg, G. S., & Tein, J. -Y. (2010). Parental anxiety and child symptomatology: an examination of additive and interactive effects of parent psychopathology. *Journal of Abnormal Child Psychology, 38*(7), 897–909.
- Campo, J. V., Bridge, J., Ehmann, M., Altman, S., Lucas, A., Birmaher, B., et al. (2004). Recurrent abdominal pain, anxiety, and depression in primary care. *Pediatrics, 113*(4), 817–824.
- Chorpita, B. F., Moffitt, C. E., & Gray, J. (2005). Psychometric properties of the revised child anxiety and depression scale in a clinical sample. *Behaviour Research and Therapy, 43*, 309–322.
- Cohen, P., & Brook, J. (1987). Family factors related to the persistence of psychopathology in childhood and adolescence. *Psychiatry, 50* (4), 332–345.
- Comer, J.S., Puliafico, A. C., Aschenbrand, S. G., McKnight, K., Robin, J. A., Goldfine, M. E., & Albano, A. M. (2012). A pilot feasibility evaluation of the CALM Program for anxiety disorders in early childhood. *Journal of Anxiety Disorders, 26*(1), 40–49.
- Copeland, W. E., Wolke, D., Shanahan, L., & Costello, E. J. (2015). Adult functional outcomes of common childhood psychiatric problems: A prospective, longitudinal study. *JAMA Psychiatry, 72*, 892–899.
- Cyranowski, J. M., Frank, E., Young, E., & Shear, M.K. (2000). Adolescent onset of the gender difference in lifetime rates of major depression: A theoretical model. *Archives of General Psychiatry, 57*(1), 21–27.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Springer Science & Business Media.
- Dix, T., Reinhold, D. P., & Zambarano, R. J. (1990). Mothers' judgments in moments of anger. *Merrill Palmer Quarterly, 36*, 465–486.
- Durbin, C. E., & Wilson, S. (2012). Convergent validity of and bias in maternal reports of child emotion. *Psychological Assessment, 24*, 647–660.
- Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development*. Hove: Psychology Press.
- Dweck, C. S., Chiu, C. Y., & Hong, Y. Y. (1995). Implicit theories and their role in judgments and reactions: A word from two perspectives. *Psychological Inquiry, 6*(4), 267–285.
- De Los Reyes, A., & Kazdin, A. E. (2005). Informant discrepancies in the assessment of childhood psychopathology: a critical review, theoretical framework, and recommendations for further study. *Psychological Bulletin, 131*, 483–509.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256.
- Ebesutani, C., Bernstein, A., Nakamura, B. J., Chorpita, B. F., Weisz, J. R., et al. (2010). A psychometric analysis of the revised child anxiety and depression scale-parent version in a clinical sample. *Journal of Abnormal Child Psychology, 38*(2), 249–260.
- Ebesutani, C., Chorpita, B. F., Higa-McMillan, C. K., Nakamura, B. J., Regan, J., & Lynch, R. E. (2011). A psychometric analysis of the Revised Child Anxiety and Depression Scales–parent version in a school sample. *Journal of Abnormal Child Psychology, 39*, 173–185.
- Eccles, J. S., Jacobs, J. E., & Harold, R. D. (1990). Gender role stereotypes, expectancy effects, and parents' socialization of gender differences. *Journal of Social Issues, 46*(2), 183–201.
- Erdley, C. A., Cain, K. M., Loomis, C. C., Dumas-Hines, F., & Dweck, C. S. (1997). Relations among children's social goals, implicit personality theories, and responses to social failure, 33 (2), 263–272.
- Faria, L., & Fontaine, A. M. (1989, July). Implicit conceptions of intelligence scale. Paper presented at the First European Congress of Psychology, Amsterdam.
- Gleason, M. M., Zeanah, C. H., & Dickstein, S. (2010). Recognizing young children in need of mental health assessment: development and preliminary validity of the early childhood screening assessment. *Infant Mental Health Journal, 31*(3), 335–357.
- Goodman, R. (1999). The extended version of the Strengths and Difficulties Questionnaire as a guide to child psychiatric caseness and consequent burden. *Journal of Child Psychology and Psychiatry, 40*(05), 791–799.
- Gunderson, E. A., Gripshover, S. J., Romero, C., Dweck, C. S., Goldin-Meadow, S., & Levine, S. C. (2013). Parent praise to 1-to 3-year-olds predicts children's motivational frameworks 5 years later. *Child Development, 84*(5), 1526–1541.
- Haimovitz, K., & Dweck, C. S. (2016). What predicts children's fixed and growth intelligence mind-sets? Not their parents' views of intelligence but their parents' views of failure. *Psychological Science, 27*, 1043–1046.
- Henderlong, J., & Lepper, M. R. (2002). The effects of praise on children's intrinsic motivation: a review and synthesis. *Psychological Bulletin, 128*(5), 774.
- Hirshfeld-Becker, D. R., Masek, B., Henin, A., Blakely, L. R., Pollock-Wurman, R. A., McQuade, J., ... & Biederman, J. (2010). Cognitive behavioral therapy for 4-to 7-year-old children with anxiety disorders: a randomized clinical trial. *Journal of Consulting and Clinical Psychology, 78*, 498–510.
- Hong, Y. Y., Chiu, C. Y., Dweck, C. S., Lin, D. M. S., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology, 77*(3), 588.
- Ivanova, M. Y., Achenbach, T. M., Rescorla, L. A., Harder, V. S., Ang, R. P., Bilenberg, N., et al. (2010). Preschool psychopathology reported by parents in 23 societies: Testing the seven-symptom model of the child behavior checklist for ages 1.5–5. *Journal of the American Academy of Child & Adolescent Psychiatry, 49*(12), 1215–1224.
- Kamins, M. L., & Dweck, C. S. (1999). Person versus process praise and criticism: Implications for contingent self-worth and coping. *Developmental Psychology, 35*(3), 835–847.
- Kast, A., & Connor, K. (1988). Sex and age differences in response to informational and controlling feedback. *Personality and Social Psychology Bulletin, 14*(3), 514–523.
- Kenney-Benson, G. A., Pomerantz, E. M., Ryan, A. M., & Patrick, H. (2006). Sex differences in math performance: The role of children's approach to schoolwork. *Developmental Psychology, 42* (1), 11.
- Koestner, R., Zuckerman, M., & Koestner, J. (1989). Attributional focus of praise and children's intrinsic motivation: the moderating role of gender. *Personality and Social Psychology Bulletin, 15*(1), 61–72.
- Leggett, E. L. (1985, March). Children's entity and incremental theories of intelligence: Relationships to achievement behavior. Paper presented at the annual meeting of the Eastern Psychological Association, Boston.
- Lytton, H., & Romney, D. M. (1991). Parents' differential socialization of boys and girls: A meta analysis. *Psychological Bulletin, 109*(2), 267.
- McLeod, B. D., Wood, J. J., & Weisz, J. R. (2007). Examining the association between parenting and childhood anxiety: A meta-analysis. *Clinical Psychology Review, 27*, 155–72.
- Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State worry questionnaire. *Behaviour Research and Therapy, 28*, 487–495.

- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, *102*, 246–268.
- Moorman, E. A., & Pomerantz, E. M. (2008). Mothers' Cognitions about Children's Self-control: Implications for Mothers' Responses to Children's Helplessness. *Social Development*, *17*, 960–979.
- Moorman, E. A., & Pomerantz, E. M. (2010). Ability mindsets influence the quality of mothers' involvement in children's learning: An experimental investigation. *Developmental Psychology*, *46*(5), 1354.
- Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, *75*(1), 33.
- Ng, F. F. Y., Pomerantz, E. M., & Lam, S. F. (2007). European American and Chinese parents' responses to children's success and failure: implications for children's responses. *Developmental Psychology*, *43*(5), 1239.
- Pine, D. S., & Leibenluft, E. (2015). Biomarkers with a mechanistic focus. *JAMA psychiatry*, *72*(7), 633–634.
- Pomerantz, E. M., & Dong, W. (2006). Effects of mothers' perceptions of children's competence: the moderating role of mothers' theories of competence. *Developmental Psychology*, *42*, 950–961.
- Pomerantz, E. M., & Kempner, S. G. (2013). Mothers' daily person and process praise: implications for children's theory of intelligence and motivation. *Developmental Psychology*, *49*, 2040–2046.
- Pomerantz, E. M., & Moorman, E. A. (2010). Parents' involvement in children's school lives: A context for children's development. In J. Meece and J. Eccles (Eds.), *Handbook of research on schools, schooling, and human development* (pp. 398–416). New York: Routledge.
- Schleider, J. L., Abel, M. R., & Weisz, J. R. (2015). Implicit theories and youth mental health problems: A random-effects meta-analysis. *Clinical Psychology Review*, *35*, 1–9.
- Schleider, J. L., & Weisz, J. R. (2016). Implicit theories relate to youth psychopathology, but how? A longitudinal test of two predictive models. *Child Psychiatry & Human Development*, *47*, 603–617.
- Schroder, H. S., Dawood, S., Yalch, M. M., Donnellan, M. B., & Moser, J. S. (2015). The role of implicit theories in mental health symptoms, emotion regulation, and hypothetical treatment choices in college students. *Cognitive Therapy and Research*, *39*(2), 120–139.
- Schroder, H. S., Dawood, S., Yalch, M. M., Donnellan, M. B., & Moser, J. S. (2016). Evaluating the domain specificity of mental health-related mindsets. *Social Psychological and Personality Science*, *7*, 508–520.
- Shih, S. (2011). Perfectionism, Implicit Theories of Intelligence, and Taiwanese Eighth-Grade Students' Academic Engagement. *The Journal of Educational Research*, *104*, 131–142.
- Strassberg, Z. (1995). Social information processing in compliance with situations by mothers of behavior-problem boys. *Child Development*, *66*, 376–389.
- Watson, D., & Clark, L. A. (1991). The mood and anxiety symptom questionnaire. Unpublished manuscript. Iowa City, IA: University of Iowa.
- Watson, D., & Clark, L. A. (1995). Depression and the melancholic temperament. *European Journal of Personality*, *9*, 351–366.