

# **Corrigendum: What Predicts Children's Fixed and Growth Intelligence Mind-Sets? Not Their Parents' Views of Intelligence but Their Parents' Views of Failure**

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In light of the potential for misunderstanding, the authors have changed this article's title to clarify the key hypotheses and claims. The new title is "Parents' Views of Failure Predict Children's Fixed and Growth Intelligence Mind-Sets." The new title properly emphasizes the key hypotheses and findings: that parents who believe failure is enhancing have children who tend to believe they can change their intelligence. The previous title (and certain sentences in the article) may have implied that the relationship between parents' failure mind-sets and their children's intelligence mind-sets is stronger than the relationship between parents' own intelligence mind-sets and their children's intelligence mind-sets. The analyses did not test this comparison, and the findings of the research do not rest on it.

# Parents' Views of Failure Predict Children's Fixed and Growth Intelligence Mind-Sets



**Kyla Haimovitz and Carol S. Dweck**

Department of Psychology, Stanford University

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## Abstract

Children's *intelligence mind-sets* (i.e., their beliefs about whether intelligence is fixed or malleable) robustly influence their motivation and learning. Yet, surprisingly, research has not linked parents' intelligence mind-sets to their children's. We tested the hypothesis that a different belief of parents—their *failure mind-sets*—may be more visible to children and therefore more prominent in shaping their beliefs. In Study 1, we found that parents can view failure as debilitating or enhancing, and that these failure mind-sets predict parenting practices and, in turn, children's intelligence mind-sets. Study 2 probed more deeply into how parents display failure mind-sets. In Study 3a, we found that children can indeed accurately perceive their parents' failure mind-sets but not their parents' intelligence mind-sets. Study 3b showed that children's perceptions of their parents' failure mind-sets also predicted their own intelligence mind-sets. Finally, Study 4 showed a causal effect of parents' failure mind-sets on their responses to their children's hypothetical failure. Overall, parents who see failure as debilitating focus on their children's performance and ability rather than on their children's learning, and their children, in turn, tend to believe that intelligence is fixed rather than malleable.

## Keywords

academic achievement, childhood development, educational psychology, motivation, open materials

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Researchers, educators, and policymakers agree that parents are key to children's motivation and success in school and beyond (e.g., Duncan, 2010; Hill & Taylor, 2004; Pomerantz, Grolnick, & Price, 2005). Indeed, two thirds of U.S. parents wish they could do more to support their children's education (Public Agenda, 2011). Yet how parents can best do this is less clear. For example, the self-esteem movement led American parents to believe that praising children's intelligence and talents would lead to their greater success (see Silver, 2012). However, much research has called this practice into serious question, showing that an overfocus on talent can actually undermine children's motivation and learning (e.g., Kamins & Dweck, 1999; Mueller & Dweck, 1998). The question then remains: What can parents do to help their children stay motivated and successful in school?

One thing they can do is to encourage children to think about their intelligence and abilities as something

they can develop. Research has repeatedly shown that students' beliefs about the malleability of intelligence—their *implicit theories*, or *mind-sets*, about intelligence—influence their motivation and achievement. This pattern has been observed both when mind-sets have been measured (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Cury, Elliot, Da Fonseca, & Moller, 2006; Mangels, Butterfield, Lamb, Good, & Dweck, 2006) and when they have been manipulated or taught (e.g., Blackwell et al., 2007; Good, Aronson, & Inzlicht, 2003; Paunesku et al., 2015; see Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013, for a meta-analysis). Children with a *fixed mind-set* believe that they have a fixed amount of

## Corresponding Author:

Kyla Haimovitz, Stanford University—Psychology, 450 Serra Mall,  
Jordan Hall, Stanford, CA 94305  
E-mail: kylah@stanford.edu

intelligence that they cannot change. As a result, when work becomes difficult, they may question their ability, stop trying, and achieve less (e.g., Blackwell et al., 2007; Cury et al., 2006; Haimovitz, Wormington, & Corpus, 2011). Children with a *growth mind-set*, however, see their intelligence as something that is malleable and that can be developed through hard work, good strategies, and instruction. As a result, when work becomes difficult, they are more likely to increase their efforts and end up learning or achieving more (e.g., Blackwell et al., 2007; see Dweck & Leggett, 1988).

Given the potential of intelligence mind-sets to change students' learning trajectories, it is important to understand where these beliefs come from. Yet little research has examined their development. Thus far, researchers have focused primarily on how adults' praise influences children's intelligence mind-sets (e.g., Gunderson et al., 2013; Mueller & Dweck, 1998). However, that cannot be the whole story, and little is known about other adult influences. Moreover, what is known is puzzling.

Surprisingly, no clear link has been found between parents' intelligence mind-sets and their children's. That is, despite some evidence that parents' intelligence mind-sets may be linked to other outcomes (see Jose & Bellamy, 2012; Moorman & Pomerantz, 2010; Pomerantz & Dong, 2006), parents' (and teachers') intelligence mind-sets are inconsistently linked (if at all) to their children's mind-sets (e.g., Gunderson et al., 2013; Park, Gunderson, Tsukayama, Levine, & Beilock, in press; Sun, 2015). This unexpected finding led us to ask: Why might parents' intelligence mind-sets not reliably predict their children's? And is there a parent belief that does?

It may be that parents, like children, have mind-sets that shape their own goals and behaviors, but that these beliefs are relevant to shaping their children's beliefs only if they lead to practices that children pick up on. We suggest that parents' intelligence mind-sets are generally not visible to children—that they typically do not manifest themselves clearly in parental practices. For example, parents may hold a growth mind-set but still praise their children's talent. We suggest that another parental theory may be more visible to children: a parent's *failure mind-set*. Children report that academic failures (problems with homework or low grades) are the most common distressing events in their daily experiences (Greene, 1988; Mantzicopoulos, 1997), and parents often share their concern (e.g., Pew Research Center, 2015; Public Agenda, 2011). We propose that parents can view failure as either enhancing or debilitating, that this belief manifests itself in their reactions to their children's setbacks, and that it influences their children's intelligence mind-sets.

More specifically, we hypothesized that parents can believe that failure is an enhancing experience that facilitates learning and growth (a *failure-is-enhancing*

*mind-set*) or that failure is a debilitating experience that inhibits learning and productivity (a *failure-is-debilitating mind-set*; see Crum, Salovey, & Achor, 2013, for a similar analysis of stress). Given the salience of failure for both parents and children, these beliefs may influence parents' practices, such as their reactions to their children's failure, in a way that is more visible to their children than the manifestations of their more abstract beliefs about the nature of intelligence.

Parents who see failure as debilitating may feel anxious when they see signs of their children failing, such that anxiety and concerns about poor performance and ability are apparent in their conversations with and reactions to their children. That is, such parents may have a *performance orientation*. Parents who view failure as enhancing may instead approach their children's performance with a focus on how to learn and improve, with less worry about setbacks and what they might mean about their children. That is, such parents may have a *learning orientation*. A performance orientation may in turn send children the message that intelligence is mostly fixed, such that poor performance should be worrisome, whereas a learning orientation may send children the message that intelligence can be built through learning (Hokoda & Fincham, 1995; for other effects of parental learning and performance orientations, see Grolnick, Gurland, DeCoursey, & Jacob, 2002; Pomerantz, Ng, & Wang, 2006).

Thus, our primary hypothesis was that, relative to parents who view failure as enhancing, parents who view failure as debilitating would have children who believe that intelligence is more fixed. We additionally hypothesized that this would occur because parents with the failure-is-debilitating mind-set are more visibly concerned with their children's performance and abilities than with their learning.

## Study 1

In Study 1, we asked: Do parents with a failure-is-debilitating mind-set, relative to those with a failure-is-enhancing mind-set, have children who believe that intelligence is more fixed? If so, does this occur because those children see their parents as focusing more on performance and ability than on learning?

## Method

**Participants.** Seventy-three parent-child dyads participated. The children were fourth- and fifth-grade students (66% fifth grade; 55% female) drawn from two schools in the San Francisco Bay Area. The parents (mean age = 44.5 years,  $SD = 6.6$  years) were primarily mothers (81%) and quite well educated (95.8% with at least a college

degree). We intended to collect more demographic information in a second survey session, which did not take place. The parents provided written consent for their children and themselves to participate, and the children provided assent to their own participation. In this first study, data collection occurred in the last months of the academic year and was stopped at the end of the school year after all parents who had given consent for their child to participate had received two e-mails reminding them to complete the parent survey.

**Procedure.** Parents were recruited through children's schools and completed an online survey of their failure mind-sets, their intelligence mind-sets, and their perceptions of their children's competence in school. During normal school hours, the children completed a survey of their intelligence mind-sets and reported on their parents' learning and performance orientations. Except as indicated, all measures used a 6-point rating scale from 1 (*strongly disagree*) to 6 (*strongly agree*).

**Parent reports.** Parents' failure mind-sets were assessed with six items: "The effects of failure are positive and should be utilized," "Experiencing failure facilitates learning and growth," "Experiencing failure enhances my performance and productivity," "Experiencing failure inhibits my learning and growth," "Experiencing failure debilitates my performance and productivity," and "The effects of failure are negative and should be avoided." The scale had a reliable internal structure (Cronbach's  $\alpha = .88$ ) that was distinct from that of other related constructs such as intelligence mind-sets.<sup>1</sup> Principal components analysis revealed that all items loaded onto one factor, explaining 62% of the variance. For this measure, we created a composite variable by reverse-scoring items that represented a failure-is-enhancing mind-set and then averaging responses to all the items; thus, higher numbers indicated a more debilitating view of failure.

Parents' intelligence mind-sets were assessed with four items (e.g., "You can learn new things but you can't really change how intelligent you are";  $\alpha = .90$ ; Blackwell et al., 2007). Higher numbers indicate more agreement with a fixed view of intelligence.

We additionally assessed parents' perceptions of their children's competence to control for possible influences of how parents viewed their children's ability level. Parents rated how competent their child was in four core school subjects (math, science, social studies, and English) using a Likert-type scale from 1 (*not at all good*) to 6 (*very good*). Responses were averaged to form a composite score ( $\alpha = .86$ ; from Frome & Eccles, 1998).

**Child reports.** Children's intelligence mind-sets were assessed with a four-item variant of the adult measure

(Cain & Dweck, 1995), which used the term "smart" instead of "intelligent" (e.g., "How smart you are is something about you that you can't change very much";  $\alpha = .77$ ).

Why might parents' failure mind-sets predict their children's intelligence mind-sets? In this initial study, we asked whether it was because of children's perceptions of their parents' relative orientation toward performance as opposed to learning. We assessed these perceptions with 8 items taken from the original 11-item scale by Friedel, Cortina, Turner, and Midgley (2007). Four of the items tapped into the children's perceptions of their parents' concerns regarding the children's performance and ability (e.g., "My parents would be pleased if I could show that school is easy for me"; "My parents ask me how my work in school compares with the work of other students in my class"). The other 4 concerned the children's perceptions of their parents' focus on learning and the learning process (e.g., "My parents want me to understand homework problems, not just memorize how to do them"; "My parents think how hard I work in school is more important than the grades I get";  $\alpha = .73$ ). Responses to the learning-focus items were reverse-scored, and then responses to all items were averaged, such that higher numbers indicated more agreement with a performance (vs. learning) orientation.

## Results

There were no effects of child's age, gender, or socioeconomic status on any of the key variables, so these demographics were not considered in further analyses. The means, standard deviations, and intercorrelations of the variables of interest are reported in Table 1. We first address how parental failure mind-sets and parental intelligence mind-sets relate to children's intelligence mind-sets.

The parents' intelligence mind-sets were not significantly related to their children's intelligence mind-sets ( $\beta = 0.17, p = .162$ ). However, as predicted, we did see a significant relationship between the parents' failure mind-sets and their children's intelligence mind-sets ( $\beta = 0.24, p = .038$ ). Parents who had more of a failure-is-debilitating mind-set had children who were significantly more likely to believe that intelligence is fixed. To rule out alternative explanations, we entered parents' perceptions of their children's competence in school into the regression. Above and beyond the effects of the parents' perceptions of their children's competence, the parents' failure mind-sets still predicted their children's intelligence mind-sets ( $\beta = 0.26, p = .035$ ).

Do children's perceptions of their parents' performance-versus-learning orientation explain the relationship between parents' failure mind-sets and their

**Table 1.** Means, Standard Deviations, and Intercorrelations for the Key Variables in Study 1

Variable	<i>M</i>	<i>SD</i>	Correlations			
			1	2	3	4
Parent reports						
1. Parent's failure mind-set	2.59	0.66	—			
2. Parent's intelligence mind-set	2.69	1.03	.29*	—		
3. Parent's perceptions of child's competence	4.96	0.80	-.29*	-.06	—	
Child reports						
4. Child's intelligence mind-set	2.64	1.11	.24*	.17	-.07	—
5. Parents' performance-versus-learning orientation	2.49	0.76	.37**	.01	-.32**	.44**

\* $p < .05$ . \*\* $p < .01$ .

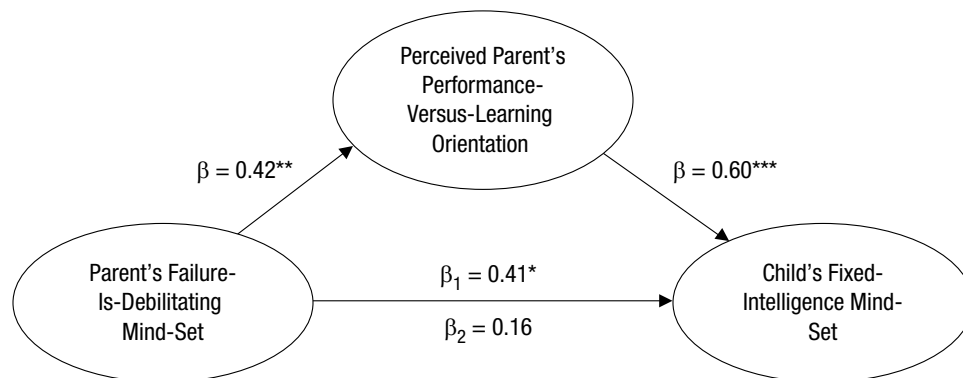
children's intelligence mind-sets? As expected, the more parents believed that failure is debilitating, the more likely their children were to see them as concerned with their performance outcomes and grades rather than their learning and improvement ( $\beta = 0.37, p = .002$ ). This relationship held even when we controlled for the parents' perceptions of their children's competence ( $\beta = 0.30, p = .011$ ). In contrast, parents' intelligence mind-sets were not significantly related to their children's perceptions of their parents' performance-versus-learning orientation ( $\beta = 0.01, p > .25$ ).

To test for mediation, we used a bootstrapping procedure suggested by Preacher and Hayes (2008), with 5,000 bootstrap samples and bias-corrected (BC) 95% confidence intervals (CIs). As shown in Figure 1, the total indirect effect of parent's failure mind-set on child's intelligence mind-set was significant,  $\beta = 0.41, p = 0.038$ , 95% BC CI = [0.0924, 0.5011], which indicated that parents' performance-versus-learning orientation mediated the relationship between their failure mind-sets and their children's intelligence mind-sets. The direct effect of parent's failure mind-set on child's intelligence mind-set

was no longer significant after the model controlled for perceived parental performance-versus-learning orientation,  $\beta = 0.16, p > .25$ , which indicated a full mediation. The children whose parents believed more that failure is debilitating saw their parents as more focused on their performance rather than their learning, which in turn led the children to believe that intelligence is more fixed.

## Discussion

Study 1 may begin to solve the mystery of why parents' intelligence mind-sets do not tend to predict their children's mind-sets: because parents' intelligence mind-sets are not visible. In contrast, parents' failure mind-sets do seem to translate into parental concerns and behaviors that are visible. Although it is possible that parents' intelligence mind-sets could predict their children's in a larger sample, parents' intelligence mind-sets did not enter into the mediational model; they did not predict children's report of their parents' performance-versus-learning orientation. Note that parents' failure mind-sets correlated with their own intelligence mind-sets (Table 1). Thus, it is



**Fig. 1.** Mediation model for Study 1: child's perceptions of parent's performance-versus-learning orientation as a mediator of the effect of parent's failure mind-set on child's intelligence mind-set. Along the bottom path, the value above the arrow indicates the effect without the mediator included in the model ( $\beta_1$ ), and the value below the arrow indicates the effect with the mediator included in the model ( $\beta_2$ ). Asterisks indicate significant coefficients (\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ).

possible that parents' intelligence mind-sets help shape their failure mind-sets, but that it is the failure mind-sets that go on to predict their children's intelligence mind-sets.

As we hypothesized, parents who viewed failure as debilitating showed that they did. According to their children, these parents wanted them to prove their abilities through their performance. These perceptions in turn led the children to believe that intelligence is fixed. This work gave us a first glimpse at how this important transmission process may work.

## Study 2

Given the mediating role of children's perceptions, we next wanted to better understand where children get these impressions of their parents. On the basis of past research, we hypothesized a series of practices that might distinguish parents with different failure mind-sets, and we assessed parents' endorsement of these practices as they responded to a scenario of their child failing. Parents who believe more strongly that failure is debilitating should convey their performance orientation by worrying about their children's ability (see Kamins & Dweck, 1999; Weiner, 1994), pitying their children when they fail (see Graham, 1990), or trying to comfort their children for not having enough ability (see Rattan, Good, & Dweck, 2012)—all emotions or practices that may lead children to believe that they have a fixed ability that is easily discernible from an instance of failure. Parents who believe that failure increases learning, in contrast, should convey their learning orientation when their children fail by helping their children focus on the processes they engaged in, such as their effort and strategies (e.g., Hokoda & Fincham, 1995; Kamins & Dweck, 1999; Rattan et al., 2012), and should express expectations that their children can improve (e.g., Haimovitz, Kenthirarajah, Walton, & Dweck, 2014; Rattan et al., 2012; Yeager et al., 2014). We expected that these practices would lead children to believe that their intelligence can grow.

## Method

**Participants.** Participants were 160 parents of students currently enrolled in any level of formal education, recruited through Amazon's Mechanical Turk Web site. Participants (35% female) were from diverse socioeconomic backgrounds (48% with a high school diploma or some college education, 40% with a college degree, 13% with a postgraduate degree). These participants made up 40% of a larger sample of 400 adults, who were selected to participate in the current study if they reported in an initial survey that they were a parent.

**Procedure and measures.** Participants completed an online survey assessing their failure mind-set, intelligence mind-set, perceptions of their child's competence, and reactions to a scenario in which their child came home with a failing grade. Failure mind-set ( $\alpha = .82$ ), intelligence mind-set ( $\alpha = .86$ ), and child's perceived competence ( $\alpha = .79$ ) were assessed with the same measures used in Study 1.

Next, we asked the parents to read a scenario and vividly imagine that their child came home from school with a failing grade on a quiz. They then indicated how likely they would be to have each of several reactions that reflected *performance-oriented responses* (six items; e.g., "I might worry (at least for a moment) that my child isn't good at this subject," "I'd try to comfort my child to tell her it's okay if she isn't the most talented in all subjects," "I'd probably find myself dwelling on his/her performance";  $\alpha = .79$ ) and *learning-oriented responses* (six items; "I'd encourage my child to tell me what she learned from doing poorly on the quiz," "I'd discuss with my child whether it would be useful to ask the teacher for help," "I'd let my child know that this is a great opportunity to learn this material well";  $\alpha = .78$ ). We additionally manipulated whether the scenario referred to a 4th- or 11th-grade child, or did not specify a grade level. Because these wording changes were not the focus of our research, and because no differences were found between groups, we report analyses in which the data were collapsed across all participants.

## Results

We first examined effects of participant's age, socioeconomic status, and gender. Only age was significantly related to any variable of interest (older parents were more likely to endorse a failure-is-enhancing mind-set and less likely to endorse performance-oriented responses), so we controlled for age in subsequent analyses but did not consider gender and socioeconomic status further. However, results did not differ when age was not considered in the analyses.

Next, we wanted to know whether parents' failure mind-sets predicted their specific reactions to the scenario in which their child failed. Results supported our findings in Study 1. We found that parents' failure mind-sets did predict their responses to the scenario. The more parents believed that failure is debilitating, the more likely they were to react with concerns about their child's performance and lack of ability ( $\beta = 0.30, p < .001$ ) and the less likely they were to react with support for their child's learning and improvement ( $\beta = -0.32, p < .001$ ). In contrast, parents' intelligence mind-sets did not significantly predict their performance-oriented ( $\beta = -0.096$ ,

$p = .23$ ) or learning-oriented ( $\beta = -0.11$ ,  $p = 0.16$ ) reactions to their child's failure in the scenario.

As before, to rule out alternative explanations, we entered the parents' perceptions of their children's competence in school into the regressions. Above and beyond the effects of these perceptions, failure mind-set still predicted performance-oriented responses ( $\beta = 0.31$ ,  $p < .001$ ) and learning-oriented responses ( $\beta = -0.29$ ,  $p < .001$ ) to children's failure.

## Discussion

Study 2 demonstrated that parents with a failure-is-debilitating mind-set were more likely to endorse performance-oriented reactions to their children's hypothetical failure (pitying their children, doubting their ability, comforting them for not having enough ability) than to endorse learning-oriented reactions (discussing what their children could learn from the experience and how they might improve in the future).

## Study 3a

We have been arguing that parents' failure mind-sets, and not their intelligence mind-sets, are visible to children. In Study 3a, we asked how visible failure mind-sets themselves actually are. Do children know their parents' failure mind-sets but not their intelligence mind-sets?

## Method

**Participants.** Participants were 102 parents and their children (31% girls; mean age = 10 years, range = 8–12). We aimed for approximately 100 participant dyads, which a power analysis determined would provide 90% power to detect an effect of the size observed in Study 1.

**Procedure and measures.** Participants were recruited in malls and community centers in the San Francisco Bay Area and were asked to fill out a brief survey. The parents were asked about their failure mind-sets, their intelligence mind-sets, and their child's age. The children were asked about their perceptions of their parents' failure mind-sets and intelligence mind-sets. The researcher provided individual help reading the survey when the children needed it.

We did not ask about demographics in this study so that we could collect data quickly from a reasonable number of parents and children in public places, and thus get a sample relatively unconstrained by the time that passersby had available to participate.

**Parent reports.** Failure mind-set ( $\alpha = .78$ ) was assessed with the same items used in Study 1, and intelligence

mind-set ( $\alpha = .88$ ) was assessed with a two-item measure shortened for this survey ("You have a certain amount of intelligence, and you really can't do much to change it"; "You can learn new things but you can't really change how intelligent you are").

**Child reports.** We assessed the children's perceptions of their parents' failure mind-sets using four items ("My parents think failure is bad and should be avoided," "My parents think failure hurts my learning," "My parents think failure can help me learn," "My parents think failure can help me grow";  $\alpha = .77$ ). We assessed the children's perceptions of their parents' intelligence mind-sets using three items ("My parents think you can learn new things but you can't change how smart you really are," "My parents think how smart you are is something you can't change very much," "My parents think you can always change how smart you really are";  $\alpha = .67$ ). Reliability did not differ by age. All measures used a 6-point rating scale from 1 (*strongly disagree*) to 6 (*strongly agree*).

## Results

There were no effects of child's age or gender on any of the key variables, so these demographics were not considered in further analyses. The means, standard deviations, and intercorrelations of the variables of interest are reported in Table 2.

Next, we assessed whether the children were indeed accurate in discerning their parents' failure mind-sets. As expected, the children's perceptions of their parents' failure mind-sets were significantly related to their parents' reports of their own failure mind-sets ( $\beta = 0.30$ ,  $p = .002$ ). However, the children's perceptions of their parents' intelligence mind-sets were not significantly related to their parents' reports of their own intelligence mind-sets ( $\beta = 0.11$ ,  $p > .25$ ). Parents' failure mind-sets were also significantly related to their children's perceptions of their intelligence mind-sets ( $\beta = 0.23$ ,  $p = .022$ ). Parents' reports of their own failure mind-sets and intelligence mind-sets were not significantly related to one another in this study ( $\beta = 0.07$ ,  $p > .25$ ).

## Study 3b

If parents' actual failure mind-sets relate to their children's beliefs about intelligence (Study 1), and if children can discern their parents' beliefs about failure (Study 3a), it seems that children's perceptions of their parents' failure mind-sets should predict children's own intelligence mind-sets. In Study 3b, we used a new sample of children to examine how children's views of their parents relate to their own intelligence mind-sets.

**Table 2.** Means, Standard Deviations, and Intercorrelations for the Key Variables in Study 3a

Variable	<i>M</i>	<i>SD</i>	Correlations		
			1	2	3
Parent reports					
1. Parent's failure mind-set	2.20	0.75	—		
2. Parent's intelligence mind-set	2.51	1.34	.07	—	
Child reports					
3. Parent's failure mind-set	2.75	1.14	.30**	.03	—
4. Parent's intelligence mind-set	2.41	1.08	.23*	.11	.49**

\* $p < .05$ . \*\* $p < .01$ .

## Method

**Participants.** A new sample of 100 fourth- and fifth-grade students (54% female; mean age = 10.3 years, range = 9–12) from three schools in the San Francisco Bay Area participated. We stopped data collection when all students whose parents had given consent, and who were present in class during the main data collection or a make-up survey session, had participated. A power analysis based on estimates from the previous studies and targeting power of 90% determined that 100 participants was an appropriate sample size.

**Procedure and measures.** During normal school hours, the students filled out a questionnaire that contained the same child-reported measure of intelligence mind-set as in Study 1 ( $\alpha = .81$ ). We additionally assessed the children's perceptions of their parents' failure mind-sets, using a shortened two-item scale because of constraints on the survey's length ("My parents think failure can help me learn," "My parents think failure is bad and should be avoided"). The items had reasonable reliability ( $\alpha = .64$ ), so we reverse-scored the first item and then averaged responses to form a composite variable such that higher numbers indicated greater perceptions of a failure-is-debilitating mind-set in parents. We also tapped children's perceptions of their competence in school with four items (Anderman & Midgley, 1997; e.g., "Even if the work in school is hard, I can learn it";  $\alpha = .65$ ). This study included a number of additional measures that are unrelated to the current research question and not reported here (see the Supplemental Material).

## Results

We ran a series of linear regressions to examine the effects of the children's perceptions of their parents' failure

mind-sets on the children's own intelligence mind-sets. Results were consistent with those of Study 1: The children's reports of their parents' failure mind-sets significantly predicted their own intelligence mind-sets ( $\beta = 0.30$ ,  $p = .003$ ). Children who more strongly perceived their parents as holding the view that failure is debilitating were significantly more likely to believe that intelligence is fixed. This effect held even when we controlled for the children's perceptions of their own academic competence ( $\beta = 0.26$ ,  $p = .010$ ).

## Study 4

Finally, we wanted determine whether parents' failure mind-sets have a causal effect on their reactions to their children's failures.

## Method

**Participants.** One hundred thirty-two parents were recruited through Amazon's Mechanical Turk Web site. These participants (57% female) were from diverse socioeconomic backgrounds (31% had a high school diploma or some college education, 51% had a college degree, 18% had a postgraduate degree). The sample was 75% White, 12% African American, 7% Asian American, and 6% Hispanic. These participants made up 43% of a larger sample of 310 adults, who were selected to participate in the current study if they reported in an initial survey that they were a parent.

**Procedure and measures.** Participants completed an online survey initially assessing several beliefs, including their perceptions of their child's competence (assessed with same measure as in Study 1;  $\alpha = .79$ ). Then we temporarily manipulated failure mind-sets by randomly assigning the parents to complete one of two five-item biased questionnaires, written to foster agreement with either a failure-is-debilitating mind-set (e.g., "Experiencing failure can lead to negative feelings, like shame or sadness, that interfere with learning") or a failure-is-enhancing mind-set (e.g., "Experiencing failure can improve performance in the long run if you learn from it"). All measures used a 6-point rating scale from 1 (*strongly disagree*) to 6 (*strongly agree*). One-sample *t* tests comparing the mean in each priming condition with the scale's midpoint (3.5) showed that participants' agreement with the intended mind-set was above the midpoint in both the failure-is-debilitating condition ( $M = 4.41$ ,  $SD = 1.07$ ),  $t(56) = 6.45$ ,  $p < .001$ , and the failure-is-enhancing condition ( $M = 5.14$ ,  $SD = 0.829$ ),  $t(74) = 17.11$ ,  $p < .001$ .

We then asked participants to read and vividly imagine a scenario in which their child came home from



school with a failing grade on a math quiz, as in Study 2. They then wrote what they would do, think, and feel in response. Finally, participants reported on their failure mind-sets ( $\alpha = .82$ ), using the same items as in Study 1, as part of a survey that included a few other items.

**Coding.** Two raters, blind to condition, coded the open-ended responses. The first author developed a coding scheme on the basis of an initial reading of the responses and then made clarifying revisions on the basis of feedback from the two raters.

The codes were broken down into two main categories of interest: performance-oriented responses and learning-oriented responses. Coders gave a score of 1 each time a code was present. Codes in the performance-oriented category were responses that focused on *judgments of ability*, particularly as a stable trait (e.g., “I would think maybe my child is just not that good at math”); *comfort for lack of ability* (e.g., “It’s ok that you got an F. You tried your best”); *contingent self-worth* based on their child’s performance (e.g., “I’d feel bad about myself”); *pity* for their child’s lack of ability (“I would feel a little nervous for my child because I know how hard it can be”); *grades as a goal* (e.g., “I would . . . hope their grades from previous [tests] are high enough to make up for the test”); and *social comparison* (“I would also want to know how the other children in the class scored”). Codes in the learning-oriented category were responses that focused on *judgments of effort* (e.g., “I would tell my son he needs to study harder”); *strategies*, which included both general strategies (e.g., “he didn’t study the material in the right way”) and specific study or test-taking strategies (e.g., “I would also say that double checking your work before you hand it in is a good habit to get into”); *help seeking* (e.g., “I would get her a math tutor”); *mastery*, or conceptual understanding, as a goal (e.g., “the important thing we need to do is try to understand the concepts behind the problems he got wrong, and then study those”); *interest* (e.g., “I would hope that the results of the test would not stop her from enjoying the class and wonder about ways I could help keep her liking of the subject going”); and explicit characterizations of *failure as enhancing*, or good (e.g., “It is ok to make mistakes and fail sometimes, because that’s how people learn”).

Two statements that repeated the same sentiment were not coded as two instances (e.g., “I would question how much studying did they do” and “I would also ask . . . do they think they studied enough” would be one code for effort). However, two statements that expressed different ideas but fell under the same code were marked as two instances (e.g., “I would question my child to make sure that she studied the correct material thoroughly” and “I would ask to make sure that she was paying attention in class” would be marked as two codes for

strategies, as these statements represent different strategies). If a statement fell under two codes and one was more specific than the other, only the more specific classification was counted. That is, although effort and help seeking can be different types of strategies, statements expressing these ideas were coded only as effort and help seeking, not also as strategies.

Scores for performance-oriented and learning-oriented responses were each created by summing all instances of their respective subcategories. Two coders rated 20 responses (15%) to assess reliability. Intraclass correlation coefficients (ICCs) were high for both measures (performance-oriented responses: ICC = .91; learning-oriented responses: ICC = .90).

## Results

There were no effects of child’s age, gender, or socioeconomic status on any of the key variables, so these demographics were not considered in further analyses.

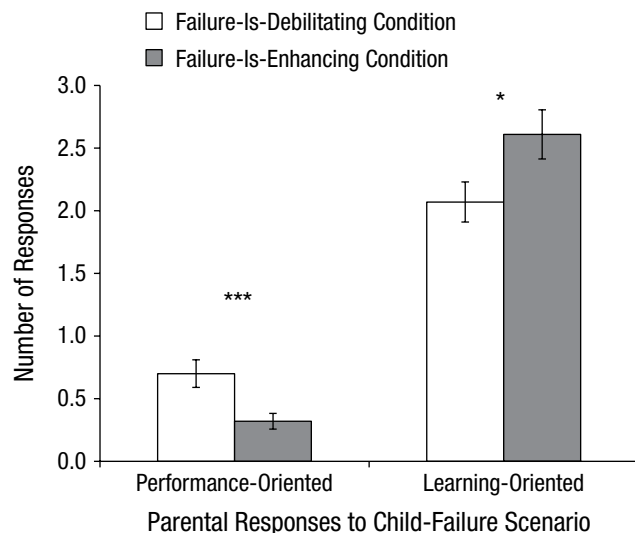
Next, we wanted to know whether our biased-questionnaire manipulation effectively changed parents’ self-reported failure mind-sets at the end of the survey. Indeed, the manipulation seemed to shift parents’ mind-sets,  $t(124) = 2.53$ ,  $p = 0.013$ : Parents in the failure-is-enhancing condition reported more of a failure-is-enhancing mind-set than did parents in the failure-is-debilitating condition. 이부분을 첫번째 replication할때 안본 부분 같음.

Finally, we tested whether parents in the two conditions reacted differently to the child-failure scenario. Results paralleled those of Study 2: Parents who were induced to hold a failure-is-debilitating mind-set were more likely to react with concerns about their child’s performance and lack of ability,  $t(131) = 3.246$ ,  $p < .001$ ,  $\eta_p^2 = .075$ , and less likely to react with support for their child’s learning and mastery,  $t(131) = -2.04$ ,  $p = .043$ ,  $\eta_p^2 = .031$ , compared with those who were induced to hold a failure-is-enhancing mind-set (see Fig. 2). Parents in both conditions did not report performance-oriented responses ( $M = 0.485$ ,  $SD = 0.693$ ) nearly as often as learning-oriented responses ( $M = 2.38$ ,  $SD = 1.53$ ).

When we controlled for parents’ perception of their children’s competence in school, failure-mind-set condition still predicted performance-oriented,  $t(131) = 3.249$ ,  $p = .002$ , and learning-oriented,  $t(1, 131) = -2.02$ ,  $p = .046$ , responses to children’s failure.

## General Discussion

We started with the perplexing finding that parents’ intelligence mind-sets are often not predictive of their children’s intelligence mind-sets, and we proposed that instead a more “visible” belief of parents, their failure mind-sets, might be more consistently predictive of their



**Fig. 2.** Results of Study 4: parents' mean number of reported performance- and learning-oriented responses to the child-failure scenario as a function of failure-mind-set condition. Asterisks indicate significant differences between conditions (\* $p < .05$ , \*\*\* $p < .001$ ).

children's intelligence mind-sets. Our findings indeed show that parents who believe failure is a debilitating experience have children who believe they cannot develop their intelligence. The findings further suggest that this is because these parents react to their children's failures by focusing more on their children's ability or performance than on their learning. Taken together, our findings seem to have identified a parental belief that translates into concerns and behaviors that are visible to children and that, in turn, shape children's own beliefs.

Demonstrating causality, we also have shown that parents who are primed with a different failure mind-sets respond differently to their children's hypothetical failure. This finding opens many possible directions for future research, such as examining the bi-directional influence between parents and children or the possibly different outcomes that parents' intelligence mind-sets and failure mind-sets might foster. The latter comparison might be done by inducing both kinds of mind-sets in a controlled experimental context where effects may be more visible (see Moorman & Pomerantz, 2010).

By establishing these links, we have taken a step toward understanding how children's motivation is socialized. It may not be sufficient to teach parents a growth mind-set and expect that they will naturally transmit it to their children. Instead, an intervention targeting parents' failure mind-sets could teach parents how failure can be beneficial, and how to react to their children's setbacks so as to maintain their children's motivation and learning. This type of intervention not only could lead children to adopt a growth mind-set (which encourages perseverance; e.g., Blackwell et al., 2007; Robins & Pals, 2002),

but also could directly teach them perseverance, or "grit" (Duckworth, Peterson, Matthews, & Kelly, 2007), if failures become interesting, informative, and motivating rather than discouraging (e.g., Dweck & Leggett, 1988).

More and more people are talking about how important it is to experience failures in education (e.g., Rowling, 2008), business (e.g., Jobs, 2005), and sports (e.g., Jordan & Vancil, 1994). This article illuminates how people can help create both an openness to failure and the ability to use it effectively.

### Action Editor

Brian P. Ackerman served as action editor for this article.

### Author Contributions

Both authors contributed to the study concept and design. K. Haimovitz collected and analyzed the data. K. Haimovitz drafted the manuscript, and C. S. Dweck provided critical revisions. Both authors approved the final version of the manuscript for submission.

### Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

### Supplemental Material

Additional supporting information can be found at <http://pss.sagepub.com/content/by/supplemental-data>

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### Note

1. We also measured parents' mind-sets about personality and emotions as fixed or malleable to determine whether these mind-sets predict children's intelligence mind-sets, but found that they did not.

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