ORIGINAL ARTICLE

Links between Depression and Fixed Versus Growth Mindsets

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ABSTRACT

Being labeled "hardworking" in childhood by various sources subsequently reduced the risk of several depression symptoms and increased self-esteem in undergraduates, while being labeled "smart" only reduced two depression symptoms and did not elevate self-esteem. Those with a history of being labeled either "smart" or "hardworking" generally reported that this increased both their confidence and academic risk-taking. Women who reported being labeled "smart" as children were more likely than similarly labeled men to report that the label increased their academic risk-taking. Of those who reported being labeled "hardworking," males were more likely to report that being labeled "hardworking" increased their confidence. Overall, females were more likely to report being labeled "hardworking." An independent samples *t*-test comparing individuals with a history of being labeled "smart" and those labeled without such a history revealed a significant difference in likelihood of taking difficult courses in college. This challenges Dweck's theory that being labeled "smart" discourages academic risk-taking. Furthermore, those who believed being labeled "smart" increased their academic risk-taking had lower scores on the beck depression inventory-II. These findings support the potential mental health value of fostering a growth mindset in children.

Key words: Depression, fixed mindset, growth mindset, academic risk-taking

INTRODUCTION

According to Dweck,[9] Dweck and Leggett, Grant and Dweck, Grierson, and Mangels *et al.*,[10,11,12,16] self-theories about intelligence can profoundly shape one's motivation to learn. Those who hold more of a "fixed" mindset theory often focus on how "smart" they are, and as a result prefer tasks offering a high probability of success. Such individuals also typically avoid tasks posing a high risk of failure. This defensive avoidance of challenge may ultimately limit people's ability to achieve their full potential. On the other hand, those endorsing a "growth" theory of intelligence are more likely to embrace challenges as an opportunity to expand one's abilities, and therefore tolerate the prospect of failure more resiliently. As a result, they may learn more and cope well more consistently.[8]

Intelligence and fixed versus growth mindsets

The United States is considered to be an achievement-based society, yet many find its international rank in math and reading to be disappointing. Many common teaching strategies may actually hinder the learning process, as well as leave students more extrinsically motivated.[14] This is problematic because intrinsically motivated students generally achieve better academic outcomes, including higher grades. In addressing these problems, Dweck and Dweck and Leggett[9,10] have emphasized the role of fixed versus growth mindsets in limiting students' achievement.

There has been much meaningful research on the subject of how individuals think about and perceive intelligence. How an individual perceives intelligence has been shown to be linked to their actual performance and how they approach their own education and tasks. Expanding our understanding

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of how intelligence is conceptualized may enable students to come closer to reaching their full potential in the educational system as well as in other areas of life.

Mangels *et al.*[16] investigated how beliefs about intelligence and goals could influence learning success. They divided views of intelligence into two groups, entity models (whose adherents believe intelligence is a fixed, stable entity) and incremental models (whose adherents believe intelligences are malleable). Fixed or entity theory students typically emphasize performance goals in their lives, leaving them vulnerable to negative feedback because it can threaten their conceptualization of their stable intelligence. As a result, these students are more likely to disengage from challenging learning opportunities. In contrast, growth or incremental theory students emphasize learning goals and rebound well from occasional failures.

A total of 535 undergraduate students were selected to explore the question of how beliefs and goals about intelligence influence learning. A survey was given to assess whether the subject was an entity theorist, incremental theorist, or labeled as ambiguous due to the lack of statistically significant adherence to either entity or incremental theory. The survey determined what theory they adhered to but also asked other questions that were about how they perceived their performance in the classroom as well.

Survey responses from the entity and incremental theorists were compared to determine how the perception of intelligence influenced perceptions of learning environments. Results illustrated that incremental theorists endorsed more ambitious learning goals. For example, they were more likely to support the concept that it is important for coursework to make the subject feel challenged. In contrast, those whose questionnaire reflected that they ascribed to entity theory were more likely to endorse comparative and competitive performance-based goals. For example, they more typically supported the notion that it is important for them to prove that they are smarter and doing better in the class than their peers. Interestingly, the entity (fixed mindset) and increment (growth mindset) theorist groups' responses did not differ in how they conceptualized outcomes. They both answered that it was important for them to do well in their classes, though their pathways to reach that conclusion were different as discussed above.

Students in the entity and incremental categories then also participated in the second part of the study, which involved a general knowledge test and administration of electroencephalogram (EEG) to determine reactions to correct and wrong response to the questions. A wrong response was accompanied by a red asterisk on the subject's screen to indicate the response was wrong. If the second response to the same question was correct, a green asterisk appeared. The goal was to evaluate responses to the re-test of the same question, to see if the respondent would change their answer after being told their first answer was incorrect (under a time restraint). Activity on the EEG was recorded during both of the different reactions to determine how the individual was affected by the failure or success.

Results on the EEG found evidence indicating that entity theorists oriented differently toward negative performance feedback, as indicated by an enhanced anterior frontal P3, which was also positively correlated with concerns about proving ability relative to others. Yet, after negative feedback, entity theorists demonstrated less sustained memory-related activity (left temporal negativity) to corrective information, suggesting reduced effortful conceptual encoding of this material. Use of this strategy may have contributed to their reduced error correction on a subsequent unexpected retest.

Incremental theorists demonstrated greater improvement on the retest responses than did the entity theorists, which suggests that incremental theorists were more likely to respond to negative feedback in a constructive way.

There was no interaction between theory of intelligence and how confident students were in their responses. This indicated that incremental theorists' advantage on the retest was not related to confidence but instead was most likely related to their beliefs about intelligence being malleable and expandable, which immunized them against a counterproductive response to error feedback. Work by Mangels *et al*.[16] shows that incremental theorists demonstrated greater overall gains in knowledge than did entity theorists, and also engaged in greater remediation of errors, despite having a similar confidence level as their entity theorist peers.

Blackwell *et al.*[3] studied the direct outcomes of intelligence theories (incremental and entity theories) on performance in mathematics in a longitudinal study, while also exploring if there would be a difference in student outcomes if incremental theory was taught to them in middle school. These researchers followed four waves of matriculating junior high school students, measuring their implicit theories and other achievement-related beliefs at the outset of junior high and then assessing their achievement outcomes as they progressed through the seventh and eighth grades. The participants in the study were 373 students (approximately half male and half female) in four successive entering seventh-grade classes at a public secondary school in New York City. Their grades at the beginning of the study varied greatly, but during the data analysis, this was taken into account by measuring a student against their own levels of achievement and not against their peers. The study was conducted over the course of 5 years (each year the mathematics grades of the students were collected). At the start of the study, the students each completed a survey to assess their intelligence

theories (entity or incremental), learning goals, and beliefs about effort, which then permitted placement of the students into categories based on whether or not they felt helpless in their own education or displayed positive strategies.

Results showed that incremental theorists consistently had more positive effort beliefs, set more learning goals, and were less likely to feel helpless in their education. In the first 2 years of the study there was a low correlation between theory and achievement, but as participants passed the threshold into high school from middle school, there was large improvement each year among those who were incremental theorists. In contrast, the gains of entity theorists were extremely low.

The second segment of the study, which focused on how an "incremental theory" intervention could shape academic outcomes, involved a group of 99 students in a New York City public secondary school. The experimental group received a number of educational sessions on how intelligence is malleable. Implementing this program did, in fact, appear to benefit achievement in mathematics.

Diener and Dweck[8] sought to explore the implications of a child's perceptions of their own ability in terms of helplessness or mastery orientation. Children prone to the helplessness orientation feel as though their failures are a result of their lack of ability, while children with a mastery orientation feel as though their failures are only situational and that their failures are, therefore, surmountable. Data collection in this study focused on how a child's helplessness or mastery orientation affected their thought processes when they failed and when they succeeded at academic tasks, guided by the knowledge that helpless children tend to devalue their achievements and mastery-oriented children tend to focus on their successes and therefore overcome failure experiences with greater ease.

Participants were 14 fourth graders, 72 fifth graders, and 28 sixth graders from a working-class school district. A 34 question test, administered to each of the participants, was used to determine helplessness or mastery orientation. The test consisted of questions which focused on positive and negative achievement experiences in which the children were made to respond to whether or not the child's response was a result of his/her environment or a result of his/her behavior.

Each child participating in the study (both the helplessness group and the mastery group) received eight problems that were solvable (success) followed by four problems that were not solvable (failure). The experimenter would give a simple "right" or "wrong" response for the first (success) questions and gradually give no response when the experimenter reached the failure questions.

Before the failure questions were introduced the children were asked to report how they perceived themselves to be doing on the test (this was measured on a scale of one to 10, in which 10 indicated they perceived themselves to be doing the best and one being the worst). They were also asked about how well they thought they would perform on a similar task in the future.[8]

The failure problems consisted of similar card-matching in which there was no correct response available and the experimenter would only respond "wrong." After these questions, the children were instructed to complete the same questions as were administered before the failure problems to gauge the effects of failure on the children's perceptions of their ability to achieve at the present task and on future tasks. The results showed that before failure questions were presented both helplessness oriented and mastery-oriented students displayed the same responses to their ability to achieve and their confidence in the task at hand.

As expected, the results after the failure problems were administered revealed a difference between the helplessness oriented students and the mastery-oriented students. Helplessness oriented students addressing the unsolvable problems continued to decrease their effort as they continued to fail, and by the end no longer formulated testable hypothesizes. In contrast, mastery-oriented students showed little disparity in the manner in which they approached a solvable question as opposed to an unsolvable one.

Analysis of the children's perceptions of their own performance showed that the mastery-oriented children expected that they would both do better in the future and would get more right than did the helpless children. The mastery-oriented students expected to get about 90% of the problems correct if they were given more of the same type, whereas the helpless children expected to solve only 50% of the problems. When asked to estimate how well most children of the same age would do at these problems, the helpless children believed that most other children would be better at the task than did the mastery-oriented children.

The authors argued that if there is a way to devalue one's present performance or to be pessimistic about one's future performance, the helpless children are more likely to make use of it. In fact, such students do not even have to experience a negative outcome for this tendency to become manifest. In sharp contrast, the mastery-oriented students are realistically optimistic when they are succeeding and are surprisingly undaunted by failure.

Influence of praise and criticism on depression and self-esteem

The type of praise students receive can also be an important factor in shaping children's success. Type of praise is a

controllable factor, and some types may have debilitating effects, as when person praise promotes a fixed mindset or entity view of intelligence. In 1998, Mueller and Dweck[17] conducted a study in which fifth graders received either person praise or process praise. The fifth graders that were given person praise had worse task performance than those who were given process praise. In addition, types of praise influence how people handle long-term consequences, such as willingness to apply effort in the face of difficulty.[6]

Cuellar and Johnson[7] investigated how depression relates to affect after an analog of expressed emotion (EE). Since earlier research indicated that episodes of depression are frequently triggered by interpersonal stressors, especially criticism by a family member, they examined how current and lifetime depression related to praising, criticizing, and neutral letters from participants' mothers. They hypothesized that current and lifetime depression would be associated with greater increase in negative affect after maternal criticism.

The participants completed the inventory to diagnose depression-lifetime, which measures symptom severity of depression. Mothers were then contacted through mail. After completing informed consent procedures, mothers were asked to write three letters to their children: One praising her child, one criticizing her child, and one neutral letter discussing the weather. The questionnaire included items such as money management, time management, dating choices, schoolwork, and driving habits. Mothers were asked to rank the level of conflict they experienced with their child regarding each area.

The researchers found that current depression was related to significant elevations in negative affect after maternal criticism. Although prior research had found that a history of depression was related to greater negative affect after critical letters, the Cuellar and Johnson study did not replicate this.

Praise inflation and self-esteem

Brummelman *et al*.[4] assessed how praise inflation potentially affects a child's self-esteem. Previous research has found that parents in Western societies often overly praise their children to promote self-esteem. Parents also seemed more likely to provide inflated praise to children whose self-esteem seemed low.[5] According to the self-deflation theory, when low self-esteem children receive inflated praise, this praise actually may hinder their ability to elevate their self-esteem because the children feel they have to maintain "high standards." Alternatively, self-inflation theory suggests that praise inflation fosters narcissistic traits within a child.

The main purpose of the Brummelman *et al*. study was to assess how praise inflation contributes to either self-inflation or self-deflation. They conducted a 2-year longitudinal study with 120 children ages 7–11. It was found that praise inflation did not contribute to higher levels of self-esteem when a child began with a lower level. This data support the self-inflation theory. It was also found that there was no relationship between inflated praise and narcissism. However, if a child had a higher initial level of self-esteem, this praise inflation did increase traits of narcissism. Social judgment theory may account for this outcome. Social judgment theory involves the belief that when a child receives the praise, it is only internalized when it is congruent with their current values. This study suggests that parents not use inflated praise with their children.

Generic praise and children's success and motivation

Cimpian *et al*.[5] assessed whether children can distinguish between generic and non-generic statements and if a child is able to do so, what possible effects might occur. It was hypothesized that if a child was able to distinguish a generic statement, they might believe it to be a trait term, which could undermine motivation and have negative effects. This study was conducted with 20 4 year old children. Children were presented puppets who acted as teachers, and the teachers then made remarks about the children's drawings. There was a baseline self-assessment which the child completed after they finished their imaginary drawing. They were asked to complete a series of drawings, and they either received generic or non-generic praise. Within the experiment, the teacher puppet noted when a mistake was made.

Cimpian *et al*.[5] found that there was no difference in self-assessment scores between generic and non-generic statements when a child experienced success. However, when a child made mistakes, they demonstrated helplessness. It was also found that those that had received generic praise after failure experienced less persistence in their self-evaluations. In addition, children who received generic praise tended to evaluate their drawings more critically. In contrast, children who had received specific praise wanted to fix their mistakes and showed less emotional reactions.

Person praise and children's self-esteem

Brummelman *et al*.[4] assessed whether parents delivered more person-praise for children with low self-esteem and if this would cause negative effects, such as experiencing higher levels of shame. Previous research has found there are distinguishable effects between person-praise and process-praise. Person-praise is directed toward an individual's personality qualities, and process-praise is directed toward an individual's behavior. Studies have shown that when a child receives person-praise for a task, they may experience negative effects if they make a mistake on that same task, therefore, leading the individual to think more critically about themselves.[5,16] This may result from the tendency to treat person-praise as a reflection of the individual rather than their behaviors.

In this study assessing whether or not parents tend to praise their children more when they have low self-esteem and if person-praise would lead to negative effects, such as feeling ashamed when failing at a particular task, 313 children, aged 8–13 participated. It was found that parents tended to give a child more person-praise when the child's self-esteem was low. In addition, children with low self-esteem experienced more shame than those with high levels of self-esteem.

Parental praise and fixed versus growth mindsets

Gunderson *et al*.[13] assessed whether the type of praise a parent gives to their young child can mold their beliefs on the malleability of traits such as intelligence, willingness to pursue difficult challenges, how to problem solve, and how they view failure or success. Gunderson *et al*. hypothesized that parental praise (static or malleable) influences children's mindsets. This research was conducted over 5 years to assess how parents influence children's views of intelligence (malleable and fixed) and if this varies by gender.

It was found that parents do have a significant influence on a child during their early years. When parents used more process praise, children were more likely to believe that their intelligence was more malleable. They were, therefore, motivated to accept challenges and to learn more about how to fix their mistakes. There were also gender differences in praise for boys and girls. Boys received more process praise than girls did. As a result, boys were more likely to develop beliefs that align with the incremental theory (growth or malleable intelligence). On the other hand, girls were more likely to endorse the entity theory. Therefore, they were less motivated to take a hard class and were less persistent. This was probably because the girls were more likely to believe that their intelligence was more static and unchangeable.

Stress, mental health, and fixed versus growth mindsets

Dweck's and others work on the development of fixed and growth mindsets has attracted widespread attention in the educational sphere. Recently, integrating biopsychosocial model of responses to challenge and threat with the implicit theories model, Lee *et al*.[15] assessed high school students' responses to declining grades. They found that students who endorsed a fixed or entity theory of intelligence (i.e., the belief that intelligence is stably fixed) showed higher cortisol levels when grades were declining. They also found that implicit theories accounted for lingering effects on the next day's cortisol levels. This work suggests some of the mechanisms that may underlie to the deleterious impact of fixed mindset promoting labels in childhood.

These fixed versus growth mindsets are also likely to shape responses to various behavioral health challenges individuals face. Those who embrace a fixed mindset should be more likely to view a psychiatric diagnosis as an immutable predictor of functioning. Alternatively, those adopting a growth mindset may be more likely to view psychological coping as involving an ever-expanding behavioral repertoire that can improve significantly over time, with effort. The implications of such mindset differences for such things as motivation to engage in various types of psychotherapy and adhere to psychopharmacotherapy recommendations could be very important for recovery from a wide variety of illnesses.

The role of various cognitive factors in clinical depression is now widely recognized. Although Seligman initially proposed a simpler learned helplessness model of depression based on animal uncontrollability research, arguing that depression was often caused by repeated exposure to uncontrollable aversive stimuli or life events, he later incorporated attributional factors to enhance the predictive ability of his model. The reformulated model of depression focuses on the idea that the distinctive, habitual explanatory style adopted by those with depression fosters an exaggerated and chronic negative response to failure, resulting in depressive affect, and lack of motivation.[1] This theory is consistent with research showing that the attributive style found among many with depression emphasizes internal, stable, and global explanations for negative outcomes and external, unstable, and specific explanations for positive outcomes.

We have long known that attributional style has a potentially powerful effect on risk for depression. Global self-blame worsens depression, and depression worsens self-blame. Dweck *et al*.[10] have argued that helping individuals to appreciate that some negative life events lie outside of their control may reduce their vulnerability to depression.[12] It is also possible that a history of childhood experiences conducive to a fixed mindset regarding intelligence might affect the risk of depression. Being labeled "smart" throughout childhood could reinforce cognitive schema that increase the likelihood of making stable, global, and internal attributions in various arenas in life. While these may be advantageous for self-esteem following success, they may be toxic following failure. Alternatively, being labeled "hardworking" could increase the likelihood of one's making unstable, effort-based attributions following adverse experiences. This might be psychologically protective and possibly reduce the risk of depression later on.

The current study investigated the relationship between depressive symptoms and childhood experiences with labels fostering either a fixed versus growth mindset regarding intelligence. Undergraduates' present levels of depression were expected to vary as a function of their retrospective accounts of being labeled "smart" or "hardworking" as children, by a variety of authority figures (parent, teachers, and coaches) and peers (siblings and friends). Those labeled "smart" had childhood experiences supporting a fixed,

ability-based mindset, which was expected to increase the risk for subsequent depression. Alternatively, since those labeled "hardworking" as children had been exposed to psychologically protective experiences supporting a growth, effort-based causal attributional mindset, they were expected to show fewer depressive symptoms as young adults.

METHOD

This study examined the impact of intelligence, and effort labeling in childhood for 138 men and 220 women undergraduates enrolled in an introductory psychology course at a small, liberal arts college in the Mid-Atlantic region of the U.S. Students' ages ranged from 18 to 24. To assess reactions to ability and effort labeling, participants were given 16 author-devised, self-report, Likert-format items asking them to rate the magnitude of their childhood experience of labeling (4-point scales), the source of labeling, and the impact of both types of labeling on confidence and academic risk-taking (5-point scales).

Depression symptoms were assessed using the Beck Depression Inventory-II (BDI-II).[2] This is a self-report measure containing 21 items scored on a scale of 0–3. Each question assesses a symptom of depressive disorders. The 10-item Rosenberg Self Concept Scale[18] was used to measure self-esteem. Subjects were asked to indicate on a 4-point Likert scale how strongly they agreed or disagreed with statements assessing participants' perceptions of their self-worth and competence.

RESULTS

Fixed versus growth fostering labels and depression

Independent samples t-tests were used to compare the depression scores of participants who had a history of being labeled "smart" (fixed mindset fostering) with those reporting no such history. Those labeled "smart" had lower scores on two items of the BDI-II. The first item involved feelings of failure (labeled "smart" x = 0.53, s.d. = 0.74, n = 318 vs. not labeled "smart" x = 0.81, s.d. = 0.80, n = 47; t = 2.34, df = 363, P = 0.02). The second item involved loss of pleasure (labeled "smart" x = 0.35, s.d. = 0.59, n = 319 vs. not labeled "smart" x = 0.57, s.d. = 0.71, n = 47; t = 2.02, df = 55, P = 0.04). Although having a history of being labeled as "smart" was not significantly related to overall level of depression symptoms, when siblings or friends were the source of this label, this labeling history was significantly negatively correlated with overall depression scores. In addition, a childhood history of being labeled "hardworking" by one's mother, father, sibling(s), friends, or coach was all associated with lower depression scores. Being labeled as "smart" by parents, teachers, or coaches had no effect on depression scores.

Relationship between adult depression and childhood history of labeling by various sources [Tables 1 and 2].

An independent samples t-test was also performed to compare the self-esteem scores of participants who had a history of being labeled "smart" with those reporting no such history. No significant differences on the Rosenberg emerged.

An independent samples t-test was next used to compare the depression scores of participants who had a history of being labeled "hardworking" (growth mindset fostering) with those reporting no such history. Although the groups did not differ in terms of overall BDI-II scores, those labeled "hardworking" had lower scores on six individual items of the BDI-II [Table 3].

Independent samples t-tests were also performed comparing the self-esteem scale and individual item scores of participants who had a history of being labeled "hardworking" with those reporting no such history. Those labeled "hardworking" had higher self-esteem scale scores (labeled x = 70.87, s.d. = 17.31, n = 306 vs. not labeled x = 65.76, s.d. = 19.65, n = 55; t = 2.50, df = 359, p = 0.04). Those so labeled also had higher scores on three of the Rosenberg items in particular.

Comparison of BDI-II item scores and Rosenberg self-concept item scores for undergraduates labeled as hardworking during childhood versus those not so labeled.

Table 1: Relationship between adult depression and childhood history of labeling by various sources

Labeled "smart" by sibling (s)	*r*	**–0.12**
	P	0.03
	n	354
Labeled "smart" by friends	*r*	–0.13
	P	0.02
	n	352
Labeled "hardworking" by mother	*r*	–0.16
	P	0.002
	n	356
Labeled "hardworking" by father	*R*	–0.15
	P	0.004
	n	357
Labeled "hardworking" by sibling (s)	*r*	–0.11
	P	0.036
	n	352
Labeled "hardworking" by friends	*r*	–0.14
	P	0.010
	n	356
Labeled "hardworking" by coach	*r*	–0.13
	P	0.013
	n	355

Table 2: Percentages of women and men labeled "smart" or "hardworking" in childhood by potential influencers

Labeling History	Men (%)	Women (%)	Chi-square
Labeled "smart" by			
Mothers	89.10	90.90	
Fathers	69.60	65.90	
Teachers	78.10	75.50	
Sibilings	37.50	32.60	
Friends	79	83.20	
Coach	54.10	34.70	χ^2=0.01, df=2, P<0.05
Labeled "hardworking" by			
Mothers	74.60%	80.60%	
Fathers	57.40%	60.10%	χ^2=0.01, df=l, P<0.05
Teachers	69.60%	81	
Sibilings	36.00%	31.20%	
Friends	69.60%	70.20%	
Coach	64.00%	50.90%	

Table 3: Differences between those labeled hardworking and not labeled hardworking

Adult scores on BDI-II items	Childhood history	*n*	Mean±SD
Past failure	Not labeled "hardworking"	57	0.77±0.76
t=2.23, df=364, *P*=0.03	Labeled "hardworking"	309	0.53±0.75
Self-dislike	Not labeled "hardworking"	57	0.95±1.09
t=2.34, df=69, *P*=0.02	Labeled "hardworking"	310	0.59±0.86
Suicidal thoughts or wishes	Not labeled "hardworking"	57	0.32±0.51
t=2., df=70, *P*=0.04	Labeled "hardworking"	310	0.17±0.40
Loss of Interest	Not labeled "hardworking"	57	0.66±0.90
t=2.30, df=66, *P*=0.02	Labeled "hardworking"	310	0.37±0.62
Worthlessness	Not labeled "hardworking"	57	0.61±0.92
t=2.34, df=67, *P*=0.02	Labeled "hardworking"	310	0.31±0.66
Loss of interest in sex	Not labeled "hardworking"	57	0.42±0.75
t=2.24, df=67, *P*=0.03	Labeled "hardworking"	310	0.19±0.54
Adult scores on Rosenberg self-concept scale items			
Lack Pride	Not labeled "hardworking"	55	4.20±2.86
t=3.00, df=66, *P*=0.004	Labeled "hardworking"	308	2.98±2.17
Feel Useless	Not labeled "hardworking"	55	4.60±2.79
t=2.66, df=69, *P*=0.01	Labeled "hardworking"	308	3.53±2.41
Lack self-respect	Not labeled "hardworking"	55	5.47±3.38
t=2.06, df=361, *P*=0.04	Labeled "hardworking"	308	4.47±3.27

BDI-II: Beck depression inventory-II, SD: Standard deviation

Fixed versus growth labels and confidence and risk-taking

Among those reporting a history of being labeled "smart" in childhood, 84.3% perceived this experience as having increased their likelihood of taking challenging college courses later on. An independent sample *t*-test was used to investigate the depression scores of participants who believed being labeled "smart" increased their willingness to take difficult courses with those who did not believe this. Those who believed being labeled "smart" increased their academic risk-taking had lower scores on the BDI-II (No Belief x = 14.42, s.d. = 10.85, n = 56 vs. High Belief

x = 10.39, s.d. = 8.51, n = 294; t = 2.63, df = 68.47, P = 0.01). An independent samples t-test was also performed to compare the depression scores of participants who believed being labeled "hardworking" increased their willingness to take difficult courses with those who did not believe this. No significant differences found. History of labeling was not associated with RCI subscale scores.

Paired samples t-tests of the responses to whether or not participants reported the "smart" label or the "hardworking" label increased their confidence was significantly different in that responders were more likely to report that the "hardworking" label increased their confidence ("smart" confidence x = 3.62, s.d. = 1.02 n = 352 vs. "hardworking" confidence x = 3.74, s.d. = 1.07, n = 352; t = −2.06, df = 351, P < 0.04) [Figure 1].

Paired samples t-tests of the responses to whether or not participants reported the '"smart"' label or the '"hardworking"' label increased their likelihood to take challenging classes were significantly different in that responders were more likely to report that the '"smart"' label increased their likelihood to take challenging classes (risk-taking) ("smart" risk x = 3.63, s.d. = 0.08 n = 348 vs. "hardworking" risk x = 3.43, s.d. = 1.08, n = 348; t=3.64, df = 347, P<0.001) [Figure 2].

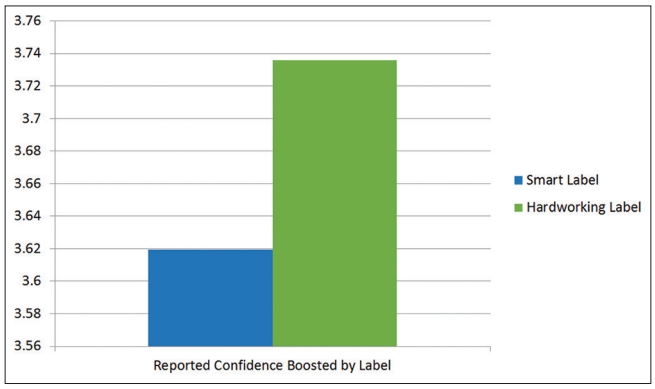

Figure 1: Reported confidence boosted by label

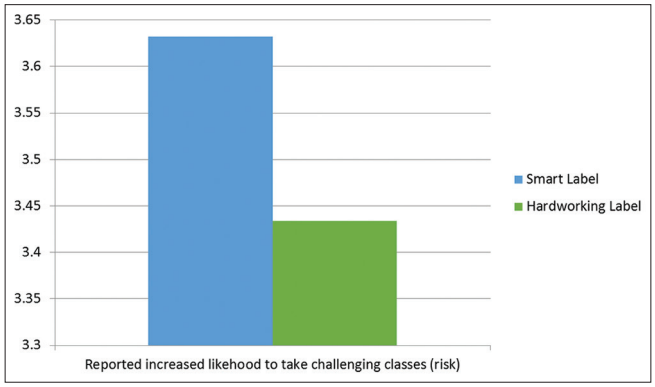

Figure 2: Reported increased likehood to take challenging classes (risk)

Gender differences

Independent samples t-tests were performed to compare the BDI-II scores of men and women. Women scored significantly higher on the BDI-II (men x = 8.78, s.d. = 7.39, n = 137 vs. women x = 12.64, s.d. = 9.90, n = 217; t=3.93, df = 352, P<0.001).

Significant sex differences emerged in how the "smart" label affected risk-taking and the reported experience of confidence resulting from the "hardworking" label. Women were more likely to report that being labeled "smart" made them more likely to take risks than men (men x = 3.46, s.d. = 1.12 n = 135 vs. women x = 3.7, s.d. = 1.08, n = 214; t = −1.92, df = 286.37, P<0.01). There were no gender differences reported on how the "smart" label influenced confidence [Figure 3].

Men were more likely to report that being labeled "hardworking" increased their confidence than women (men x = 3.9, s.d. = 0.99, n = 132 vs. women x = 3.65, s.d = 1.1, n = 217; t = 2.15, df = 347, P < 0.05). There was no significant difference between men's and women's feelings that being labeled "hardworking" increased their risk-taking [Figure 4].

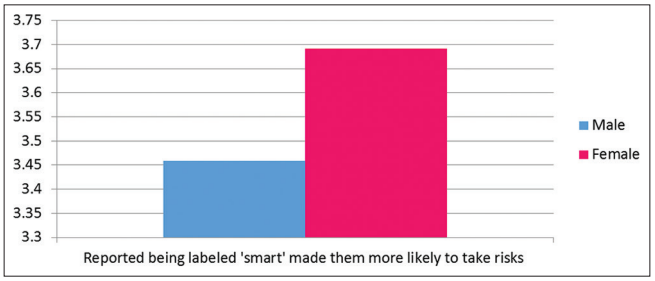

Figure 3: Reported being labeled "smart" made them more likely to take risks

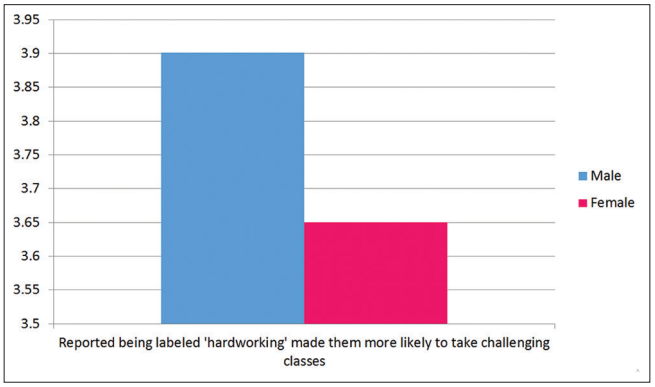

Figure 4: Reported being labeled "hardworking" made them more likely to take challenging classes

DISCUSSION

This study examined the influence of childhood experience of intelligence and effort praise on college students' depressive symptoms and self-esteem. In addition, the impact of labeling experiences on confidence and academic risk-taking was explored. Finally, some gender differences were assessed. The findings support the value to mental health of promoting a growth mindset throughout childhood. Characterizing children as "hardworking" was later associated with both higher self-esteem and reduced levels of several symptoms of depression. However, the expected pernicious impact of labels fostering a fixed mindset was not found. Labeling children as "smart," and thereby possibly encouraging them to adopt more of a fixed mindset, apparently had no harmful impact on subsequent mental health in this sample. In fact, a history of being so labeled was actually associated with reduced risk of two depression symptoms. However, somewhat surprisingly, being labeled "smart" as a child did not result in higher self-esteem in young adulthood. This was in contrast to participants' perception of the impact of being labeled "smart" on their confidence (most believed that being labeled "smart" in childhood had enhanced their confidence).

The sources of these labels differentially affected later experience depressive symptoms. Siblings' and peers' labeling generally had greater impact than that of authority figures, although parents' and coaches' describing children as hardworking did seem to affect later functioning beneficially.

Some of the current findings challenge the perceived negative impact of labeling a child "smart." Many of these participants reported that this label had positive effects. Those who reported being labeled "smart" when they were younger often reported that this label made them feel more confident. Contrary to expectations based on Dweck's work, here it was found that being labeled "smart" did not generally discourage students from taking challenging academic courses. In fact, those with a history of having been labeled "smart" were significantly more likely to do so. A majority (84% of the current sample) of those labeled "smart" believed that this childhood experience actually increased their academic risk-taking. Interestingly, the "smart" label was seen as increasing the likelihood of taking challenging college classes more than the "hardworking" label. This suggests that in some ways the "smart" label was more beneficial than the "hardworking" label.

Furthermore, those who believed being labeled "smart" increased their academic risk-taking had lower scores on the BDI-II, indicating reduced subsequent experience of depressive symptoms. A history of having been labeled "smart" may have increased confidence and perceived competence, which, in turn, may have increased academic risk-taking and consequent achievement. As a result of this enhanced accomplishment, students labeled "smart" in childhood may have developed a stronger sense of self-efficacy, diminishing their risk of feeling helpless and hopeless. This might account for their reduced risk of depression as undergraduates. However, interestingly, those students who were labeled "smart" in childhood but did not believe their academic risk-taking was affected by this label had more elevated scores on the BDI-II.

Consistent with many previous studies, here women had significantly higher scores than men on the BDI-II. There were no significant relationships between gender and either competitiveness or contentiousness. In this sample, boys were more often labeled "smart" by their coaches than girls, and girls were labeled "hardworking" by teachers more so than boys.

Limitations and future directions

Sampling issues may limit the generalizability of the current findings. While in this undergraduate sample there was little support for the concern that being labeled "smart" in childhood promotes defensiveness that hampers learning, these students may represent the successful survivors for whom this adverse outcome did not apply. It may be that the casualties of labeling and the fixed mindset it promotes are less likely to gain admission to a competitive college.

Actual ability and effort differences across the labeled and unlabeled groups offer an alternative explanation of these findings. The "smart" labeling experienced by these participants as children could have accurately reflected their superior abilities, which may have persisted through young adulthood. Since the present study did not assess intelligence, it is possible that those labeled "smart" as children, in fact, were more intelligent, and therefore had some academic and behavioral health advantages their peers lacked. Their lower risk of certain depressive symptoms as undergraduates may simply have been tied to these correlates of the "smart" label.

Similarly, if the "hardworking" childhood labels were veridical and this characteristic persisted into adulthood, actual differences in the application of effort may have been responsible for their enhanced self-esteem and depression scores. Future research should address these potential confounds and assess the extent to which IQ and effort differences mediated the observed relationships. In addition, the role of socioeconomic status, ethnic, and racial factors in moderating these relationships should be explored.

REFERENCES

1. Abramson LY, Seligman ME, Teasdale JD. Learned helplessness in humans: Critique and reformulation. J Abnorm Psychol 1978;87:49-74.
2. Beck AT, Steer RA, Brown GK. Manual for Beck Depression Inventory II (BDIII). San Antonio: Psychology Corporation; 1996.

3. Blackwell LS, Trzesniewski KH, Dweck CS. Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. Child Dev 2007;78:246-63.
4. Brummelman E, Nelemans SA, Thomaes S, Orobio de Castro B. When parents' praise inflates, children's self-esteem deflates. Child Dev 2017;88:1799-809.
5. Brummelman E, Thomaes S, Overbeek G, Orobio de Castro B, van den Hout MA, Bushman BJ, *et al.* On feeding those hungry for praise: Person praise backfires in children with low self-esteem. J Exp Psychol Gen 2014;143:9-14.
6. Cimpian A, Arce HM, Markman EM, Dweck CS. Subtle linguistic cues affect children's motivation. Psychol Sci 2007;18:314-6.
7. Cuellar AK, Johnson SL. Depressive symptoms and affective reactivity to maternal praise and criticism. J Soc Clin Psychol 2009;28:1173-94.
8. Diener CI, Dweck CS. An analysis of learned helplessness: II. The processing of success. J Pers Soc Psychol 1980;39:940-52.
9. Dweck CS. Mindset. New York: Random House; 2006.
10. Dweck CS, Leggett EL. A social-cognitive approach to motivation and personality. Psychol Rev 1988;95:256-73.
11. Grant H, Dweck CS. Clarifying achievement goals and their impact. J Pers Soc Psychol 2003;85:541-53.
12. Grierson B. Nine ways to fail better. Psychol Today 2009;42:72-3.
13. Gunderson EA, Gripshover SJ, Romero C, Dweck CS, Goldin-Meadow S, Levine SC, *et al.* Parent praise to 1- to 3-year-olds predicts children's motivational frameworks 5 years later. Child Dev 2013;84:1526-41.
14. Henderlong J, Lepper MR. The effects of praise on children's intrinsic motivation: A review and synthesis. Psychol Bull 2002;128:774-95.
15. Lee HY, Jamieson JP, Miu AS, Josephs RA, Yeager DS. An entity theory of intelligence predicts higher cortisol levels when high school grades are declining. Child Dev 2018. DOI: 10.1111/cdev.13116.
16. Mangels JA, Butterfield B, Lamb J, Good C, Dweck CS. Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. Soc Cogn Affect Neurosci 2006;1:75-86.
17. Mueller CM, Dweck CS. Praise for intelligence can undermine children's motivation and performance. J Pers Soc Psychol 1998;75:33-52.
18. Rosenberg M. Society and the Adolescent Self-Image. Princeton, NJ: Princeton University Press; 1965.

How to cite this article: Chambliss C, Gow R, Budny A, Garcia T, Damato K, Gould R, *et al.* Links between Depression and Fixed Versus Growth Mindsets. Clin Res Psychol 2018;1(2):1-10