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Self-Theories of Intelligence: Implications for School Psychology

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Abstract

School psychology has long benefited from the insights of social psychologists. Lab research and field studies have developed concepts such as the elaboration-likelihood model of persuasion, the fundamental attribution error, and stereotype threat, all of which have influenced school psychological theory and practice. One contemporary social psychological area of inquiry that remains underutilized by professionals working in school settings is that on *self-theories*, even though self-esteem and self-concept research has been central to school-based practitioners' efforts to translate research into practice. Rather than focusing on individuals' assessments of their current abilities or personalities, self-theories research investigates individuals' theories about the malleability of those very constructs. For example, students might see mathematical ability as either a fixed entity or as something that can be increased through persistent effort. Self-theories of this sort have important consequences within and beyond the classroom. A failing test grade, depending on one's self-theory, may be interpreted either as a confirmation of one's inferior aptitude or, more helpfully, as a challenge to be overcome through steadfast dedication to one's studies. Drawing on this research, the challenge for school psychology is to cultivate in students adaptive self-theories that emphasize growth and potential rather than constraint and stagnation.

Self-Theories of Intelligence: Implications for School Psychology

The roles and functions of school psychologists call for knowledge of research and theory from many areas of psychology (Merrell, Ervin, & Gimpel, 2005; Reynolds & Gutkin, 1999), including social psychology. Although Conoley and Gutkin (1995) complained that school psychology training programs do not include sufficient coursework in social psychology, scholarship in school psychology has often benefited from work by social psychologists. For instance, school consultation relies on the ability of psychologists to change teachers' attitudes (Erchul & Martens, 2002), and models of persuasion from social psychology have been applied usefully to consultation (e.g., O'Keefe & Medaway, 1997; Petty, Heesacker, & Hughes, 1997). Similarly, the prevention of school violence requires an understanding of the determinants of aggressive behavior, and school violence experts have found social psychological research on aggression to be helpful in school and community settings (e.g., Bradshaw & Garbarino, 2004; Goldstein, 1999). Given these strong demonstrations of the utility of basic research in social psychology to practicing school psychologists, it is surprising that so many areas of social psychology research have *not* been applied to school psychology. One such area is research on self-theories of intelligence, our focus in the present chapter.

Self-Theories of Intelligence

Researchers in social and developmental psychology have established that people's beliefs about how their minds work (often called *self-theories* or *implicit theories*) can have profound effects on their goals, beliefs, strategies, and behaviors in many domains of life (Dweck, Chiu, & Hong, 1995; Dweck & Leggett, 1988; Molden & Dweck, 2006). Although self-theories research has extended to a variety of topics such as personality traits (e.g., Chiu, Hong, & Dweck, 1997), we will focus here on the area most relevant to school psychologists: academic

performance. In order to fully understand students' scholastic performance, according to research in this tradition, one must attend to the way that students' implicit theories of their own (and others') intelligence help to construct their academic world and confer subjective meaning on successes and failures.

People subscribe primarily to one of two self-theories of intelligence. These theories are rarely articulated explicitly by laypeople, but they have been shown to have major impacts on achievement. According to the *incremental theory*, intelligence is malleable and can be increased through sustained effort (Dweck & Leggett, 1988; Dweck, 1999). According to the *entity theory*, on the other hand, intelligence is a fixed trait, stable throughout the lifespan and incapable of being changed through effort (Dweck & Leggett; Dweck). Empirical research has led to standardized rating scales measuring individuals' self-theories of intelligence and has identified many academic benefits in subscribing to the incremental theory of intelligence.

The Benefits of an Incremental Theory of Intelligence

Adoption of Learning Goals

Scholars have argued that entity theorists, with their "fixed mindset," may be interested mainly in demonstrating their intellectual abilities, whereas incremental theorists, with their "growth mindset," may be more interested in developing their intellectual abilities (Dweck, 2006; Dweck & Leggett, 1988). In other words, incremental theorists may focus more on learning goals—the acquisition of new knowledge and skills, and the enhancement of their current abilities (also called mastery goals, Ames, 1992; Butler, 1993; Meece & Holt, 1993; or task goals, Middleton & Midgely, 1997; Nicholls, 1984). Entity theorists may focus more on performance goals—proving one's abilities and avoiding the showcasing of one's weaknesses (also called ego-involved or ability goals, Ames, 1992; Nicholls, 1984).

To test these ideas, researchers used electroencephalography in one study to track the brain activity of college students as they completed a test of general knowledge (Mangels, Butterfield, Lamb, Good, & Dweck, 2006). After selecting their answers to questions probing a variety of academic disciplines (literature, art, history, music, religion, geography, math, natural science, and so forth), students were given feedback in two stages. First, they were told whether their answer was correct or incorrect; second, if their answer was incorrect, they were given the correct answer. Entity theorists, compared to incremental theorists, showed more brain activity representative of attention and active processing in the first phase of feedback, whereas in the second phase of feedback—when they had the opportunity to learn new knowledge rather than just gauge their current level of knowledge—they showed less activation related to attention and deep processing than the incremental theorists. Later, when given a surprise re-test that included some of the same questions they had previously gotten wrong, the students who endorsed an incremental theory of intelligence showed fewer errors (that is, more learning of the new material) than those who endorsed an entity theory. The neuroscientific and behavioral evidence all suggests that entity theorists are mainly concerned with performance goals—proving their intelligence by scoring well on tests—whereas incremental theorists are more concerned with learning for the sake of learning, even when a re-test is not expected. The pursuit of learning goals, in turn, may lead to stronger subsequent performance, mediated by deeper processing of informative feedback following performance failure. The impact of learning goals on performance may thus be strongest when a task requires deep processing—when it is difficult, complex, and personally important (see Grant & Dweck, 2003).

Adaptive Responses to Failure and Challenge-Seeking

For an entity theorist about intelligence, easy tasks should be seen as a blessing, since

they allow a person to confirm his or her (high) abilities. Challenging tasks, on the other hand, may be avoided by the entity theorist, since negative performance feedback may be seen as a threat to the intellectual self-image. The incremental theorist, in contrast, should seek out challenge as a means to grow intellectually, and should interpret the occasional failure as critical to pushing oneself to the next level. Research has shown that incremental theorists believe that increased effort can make up for low ability or high challenge (Hong, Chiu, Dweck, Lin, & Wan, 1999) and attribute their failures to lack of effort rather than low ability (Henderson & Dweck, 1990). For these reasons, the incremental theorist should be more resilient in the face of academic failure, and self-theories of intelligence may have their strongest effects on achievement when students are facing new challenges that push them beyond their past successes.

In one large study, hundreds of college students' theories of intelligence and self-esteem were measured, and their academic experiences were tracked over time (Robins & Pals, 2002). When these students faced failure, the incremental theorists attributed their problems to lack of effort, they experienced little negative affect, and in response they increased their effort or changed their strategies in the future, whereas entity theorists tended to feel bad and decrease their efforts in the same circumstances. The entity theorists' self-esteem dropped over college, as academic challenges grew and failure increased, whereas incremental theorists maintained their self-esteem even when being pushed to their limits.

High Academic Performance

Incremental theorists' focus on learning goals combined with their adaptive responses to challenge—redoubling effort, rather than giving up in the face of failure—should lead to superior academic outcomes. Entity theorists' excessive concern with demonstrating their ability through

high performance, and their consequent avoidance of and poor response to new challenges, may ironically lead to worse actual performance, especially when students face new levels of academic difficulty, such as the beginning of junior high school. Indeed, two studies tracking incoming junior-high students found a correlation between incremental-theory endorsement and higher grades, controlling for prior grades (Blackwell, Trzesniewski, & Dweck, 2007; Henderson & Dweck, 1990). In one of these studies, 373 predominantly ethnic-minority (and largely lower-income) students, attending a relatively high-achieving New York City public school, filled out theory-of-intelligence and related scales at the beginning of seventh grade (Blackwell, Trzesniewski, & Dweck). Standardized math achievement test scores at the end of sixth grade were the same for incremental and entity theorists, yet over the course of seventh and eighth grade, the incremental theorists' math grades increased steadily, whereas entity theorists' math grades stagnated or dropped. Path analyses suggested that the incremental theory of intelligence was related to increased grades through a complex chain of causation involving learning-goal orientation, positive beliefs about effort, and adaptive responses to failure.

Like the other studies described in the earlier sections of this chapter, this study suffered one major weakness: it was entirely correlational in nature. To establish the truly *causal* role of self-theories of intelligence in producing academic outcomes, the researchers conducted a follow-up study that experimentally manipulated students' self-theories (Blackwell, Trzesniewski, & Dweck, 2007, Study 2). This study tracked a similar group of junior-high students and introduced a novel classroom intervention. Once a week, for eight weeks, at the end of seventh grade, students were given special 25-minute lessons by experimenter-employed mentors (classroom teachers thus remained blind to students' condition assignments). In both the experimental and the control groups, the mentors taught the students about the brain, study skills,

and antistereotypic thinking. In the experimental group only, however, students were also taught the incremental theory of intelligence; they were told, for example, that intelligence is malleable, that new connections are forged within the brain when efforts are made to learn new materials, and that the mind can strengthen like a muscle when intensively utilized. Subsequent to the intervention, students in the experimental condition showed an increase in incremental-theory endorsement and showed a superior academic trajectory compared to students in the control group, providing strong evidence that self-theories of intelligence have a causal impact on academic achievement.

Reduction of Stereotype Threat Effects

According to a large body of social psychological research (e.g., Steele, 1997; Steele & Aronson, 1995; see Jordan & Lovett, 2007, for a review), the academic performance of students belonging to negatively intellectually stereotyped groups may be depressed by these students' anxieties and distracting thoughts about confirming the group stereotypes. This phenomenon has been dubbed *stereotype threat*, and there is reason to think that students who subscribe to an incremental theory of intelligence may be less prone to it. Cultural stereotypes about the fixed intellectual abilities of social groups should mean less when one does not believe in fixed abilities at all; the idea that girls are bad at math should be less threatening when one believes that *everyone* can improve at math, and that learning, rather than demonstrating one's abilities (or lack thereof), is the purpose of schooling and testing.

To test the idea that students with an incremental theory of intelligence are more resilient against stereotype threat, researchers recruited African American and White college students and taught them either the incremental theory (experimental group), or Gardner's (1983; 1993) multiple intelligences theory or nothing at all (control groups; Aronson, Fried, & Good, 2002).

Students learned the theories by viewing educational videos, and then they reinforced their new knowledge by writing letters to junior high students that summarized the content of the educational videos. Controlling for SAT scores, African American students in the incremental-theory group earned better grades, enjoyed their classes more, and valued academic work more than their counterparts in the two control groups. Consistent with the notion that an incremental theory of intelligence may especially help combat stereotype threat, the White students showed smaller—but still significant—increases in grades in the incremental-theory condition, compared to the African American students. In addition, the White students did not show the increases in enjoyment and valuation of learning that the African American participants did.

In another study using participants and outcomes more relevant to school psychologists, seventh-grade students were taught either an incremental theory of intelligence (in the experimental condition) or about the dangers of drugs (in the control condition) by college-student mentors (Good, Aronson, & Inzlicht, 2003). In the incremental-theory condition, the girls scored as high as the boys on a high-stakes standardized mathematics test (part of the Texas Assessment of Academic Skills), whereas in the control condition, the girls scored lower than the boys (and lower than the girls in the experimental condition) on the same high-stakes math test. Again, although all students benefited to some degree from the incremental-theory intervention, it was especially helpful to those who were negatively stereotyped in an academic domain—girls in math, in this case. Alongside other strategies for combating stereotype threat, the inculcation of an incremental theory of intelligence in students may help to reduce longstanding achievement gaps that are reinforced by cultural stereotypes.

Where Do Self-Theories Come From?

Correlational and interventional studies have amply demonstrated the benefits of holding

an incremental theory of intelligence rather than an entity theory. But where do students' self-theories of intelligence naturally arise from, apart from explicit experimental manipulations? How do some students come to view intelligence as a fixed trait, and adopt corresponding performance goals, while other students arrive at an incremental view of intelligence and pursue learning goals instead?

Praising Effort vs. Ability

In a provocative series of studies, Mueller and Dweck (1998) found that praising children's abilities—traditionally considered beneficial to their academic motivation and success (e.g., Koestner, Zuckerman, & Koestner, 1987; Kanouse, Gumpert, & Canavan-Gumpert, 1981)—may actually lead students to adopt an entity theory of intelligence and to show the performance decrements associated with the entity theory, whereas praising students' efforts may lead to an incremental theory of intelligence and its associated benefits. Across genders, ethnicities, and environment (urban vs. rural), fifth-grade students who were praised for their ability after successes in the studies (that is, after solving Standard Progressive Matrices problems, Raven, 1976), compared to students praised for their efforts after successes, (1) more often adopted an entity theory of intelligence, (2) chose easier subsequent tasks, (3) preferred to find out about their peers' performance levels rather than about strategies for improving their own performance, (4) attributed their failures to lack of ability, rather than lack of effort, (5) performed worse on subsequent Standard Progressive Matrices problems and enjoyed the task less, and (6) lied more often about how well they did on the problems, even when score reports were anonymous. These effects were equally strong for children who scored low and children who scored high on the Matrices.

Apparently, praising children's abilities may make them see intelligence as a trait-like

entity, and may lead them to adopt more performance goals rather than learning goals, with a primary aim of continuing to prove their intelligence and receive praise via high scores. Students thus oriented toward performance are less likely to seek learning opportunities that do not guarantee success (Elliott & Dweck, 1998) and are more vulnerable to helpless response to failure (Dweck & Leggett, 1988; Elliott & Dweck, 1988). For example, entity theorists are likely to attribute their academic failures to their own stable, global low ability, in the same way that their successes are attributed to stable, global high ability. Praising students' efforts, instead of their abilities, promotes a more incremental theory of intelligence and helps the students to focus on the benefits of hard work, adopt learning goals, and attribute failures to lack of effort. All of these, in turn, lead to increased learning and academic success.

Implications and Issues for School Psychology

Self-Theories and High Stakes Tests

Students' self-theories of intelligence are especially important in light of the high-stakes standardized tests now so prevalent in schools. These tests, often given to comply with provisions of the No Child Left Behind Act (Hess & Petrilli, 2006), lead to performance goals in school officials; if these goals are communicated to students, the students may become less concerned with learning for its own sake (Thomas, 2005). Schools should therefore approach high stakes tests with an incremental theory of their students' academic skills, and promulgate this theory to students (see Blackwell, Trzesniewski, & Dweck, 2007, for implementation strategies), who will then be motivated to increase effort or alter strategies to increase their skills, leading to higher performance on the tests. As school psychologists are in a excellent position to aid schools in meeting the challenges of high stakes tests (e.g., Braden, 2002), they might be involved in educating school personnel about the determinants and consequences of students'

self-theories of ability.

Implicit theory research may be especially useful in helping schools to narrow achievement gaps between groups of students—an explicit goal of the No Child Left Behind Act (Yell, 2006). Students belonging to minority groups may benefit most from self-theory training. If students in these groups develop incremental theories of their own abilities, their performance is less likely to suffer from stereotype threat, and they may rise to meet their peers in terms of skills and achievement test scores.

Performance Feedback Interventions

Giving students information about their skill levels has long been considered an important component of instruction (e.g., Thorndike, 1931), and research suggests that students who experience problems learning basic academic skills should be given more specific feedback (for a review, see Eckert et al., 2006). Implicit theories are often shaped by the type of feedback that students receive, and school personnel conducting performance feedback interventions (which, in their broadest sense, includes all teachers) must take care to praise effort rather than ability, so as not to encourage performance goals and entity theories of ability in students receiving feedback. Unfortunately, as Dweck (2006, pp. 169-170) noted, much of the well-intentioned praise from teachers and parents communicates subtle messages that can lead to entity theories of ability. Saying to a student, "You learned that so quickly! You're so smart!" can lead the student to believe that if she doesn't learn something quickly, she is not intelligent. Similarly, a teacher who says, "You're so brilliant, you got an A without even studying!" can lead a student to think that he better not study or else people will not think he is brilliant.

A more productive strategy is for adults to praise students' specific efforts that led to high performance: study strategies, test-taking strategies, continuous practice, and so forth. It may not

be obvious to a middle school student that her choice to spend a few evenings reviewing for exams rather than hanging out with friends led to improvement in her grades; teachers and parents must point out these causal connections. School psychologists, who are often called on to help design in-service workshops and professional development activities, are in an ideal position to train teachers focus on what students have *done* rather than what students may *be* like.

Clinically Relevant Moderators and Outcomes

Before discussing self-theories research with teachers and school administrators, school psychologists will want to consider two issues. First, who are the students being served in this setting? Demographic moderators such as gender, ethnicity, and age may be important in tailoring self-theories interventions. For instance, research on the lifespan development of self-theories of ability suggests that students under 10-12 years of age have less well-formed theories of ability, whereas during adolescence inchoate beliefs about intelligence become more clearly articulated (Dweck, 2002; Nicholls & Miller, 1983; Nicholls, Patashnick, & Mettetal, 1986; Pomerantz & Ruble, 1997). The beginning of middle school, then, may be the time when intensive self-theory interventions have the greatest effect, since students at this age are beginning to develop clear ideas about ability. Prior to this period, students may still benefit from effort- and process-praise rather than ability-praise, even if more explicit instruction about theories of intelligence might be ineffective.

A second issue for school psychologists to consider involves the outcomes that schools are interested in modifying. Although it is easy to focus on the effects of self-theories on academic achievement, research suggests that incremental theories of ability are also associated with a greater sense of control over life, more positive emotions towards one's self, and more

productive coping strategies in the face of setbacks (e.g., Hong et al., 1999; Robins & Pals, 2002; Stipek & Gralinski, 1996). These are all qualities that schools seek to engender in their students, and implicit theories interventions can be tailored to emphasize qualities that a particular school feels are especially needed in its students.

Conclusion

Social psychologists' extensive research on self-theories leads naturally to practical suggestions for educators. We believe that self-theory interventions should be added to the armamentarium of school psychologists interested in raising academic achievement and improving students' socioemotional functioning. For teachers more generally, the research suggests some clear principles: Keep challenging students, and if they succeed, give them more challenge, rather than praising their intelligence and talent. Challenge *all* students, not just those who are initially best. And when teaching about intellectual giants (whether in physics, music, literature, or any other discipline), do not perpetuate the myth of ex nihilo genius, but instead highlight the years of effort and dogged persistence required for even the most gifted individuals to achieve anything of lasting significance. Through these techniques and others, we may be able to fulfill the spirit of recent laws emphasizing school accountability, truly leaving no child behind.

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