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MINDSETS AND SELF-EVALUATION
HOW BELIEFS ABOUT INTELLIGENCE CAN
CREATE A PREFERENCE FOR GROWTH OVER
DEFENSIVENESS

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Abstract

The purpose of this chapter is to demonstrate how implicit theories of intelligence (Dweck, 1999; Dweck & Leggett, 1988) invoke distinct self-evaluative motives that reflect or create a preference for growth or defensiveness—and, ultimately, whether people fully develop their competencies. An incremental theory refers to the belief that intelligence is malleable and improvable, leading to the adoption of achievement goals focused on learning and competency development (learning goal). Consequently, incremental theorists engage in self-referential self-assessment and self-improvement self-evaluations and exhibit remedial responses in the service of improving their competencies. An entity theory, in contrast, refers to the belief that intelligence is limited and fixed, leading to the adoption of goals focused on validating or demonstrating competencies relative to others (performance goal). Consequently, entity theorists engage in normative self-assessment and self-enhancement self-evaluations that serve to protect or maintain their self-image as competent individuals. Taken together, implicit theories of intelligence create meaning systems that determine growth-oriented or defensive responses in achievement contexts, thereby contributing to or impairing the development of competencies.

Keywords: *achievement goals, competence, greatness, motivation, self-evaluation, theories of intelligence*

Thomas Edison, one of history’s most prolific and important innovators, reflected on his work, saying, “None of my inventions came by accident. I see a worthwhile need to be met and I make trial after trial until it comes. What it boils down to is one percent inspiration and ninety-nine percent perspiration” (Newton, 1987, p. 24). Indeed, he developed 3000 theories about how to create a functional electric light, and only two worked (Lathrop, 1890). Michael Jordan, arguably the greatest basketball player in the sport’s history, missed over 9000 shots in his career, lost close to 300 games, and missed

the game-winning shot 26 times. In light of this, he said, “I’ve failed over and over and over again in my life. And that is why I succeed” (Goldman & Papson, 1998, p. 49). Nineteen months after her birth, Helen Keller was struck with an illness that rendered her blind, deaf, and mute. Despite her profound disabilities, she graduated *cum laude* from Radcliffe College and went on to international renown as an author and activist. She earned numerous distinctions, including the first honorary degree awarded to a woman by Harvard University, the Chevalier medal of the French Legion of Honor, and the Presidential Medal of Freedom (Herrmann, 1999; Lawlor, 2001).

These exceptional individuals rose to eminence by surmounting obstacles and persisting in the face of failure. This determination and perseverance is integral to the achievement of difficult long-term goals. But why did they choose not to give up, even when the odds were stacked against them? How and why did they interpret the obstacles they faced as mere setbacks rather than indications of inadequacy? The meaning people ascribe to these types of situations is important to answering these questions. One could interpret failure as an indictment of his or her deficient abilities and primarily be concerned with saving face. In contrast, one could consider failure as an opportunity to learn and improve. These two mindsets relate to people’s beliefs about the nature of intelligence—whether it is fixed or malleable—and have distinct and far-reaching effects on the motivation to achieve and the development of competencies (Dweck, 1986, 1999, 2006; Dweck & Leggett, 1988). For someone who believes that intelligence is fixed at some level, it may seem that effort will not yield any improvements after a certain point. For someone who believes that intelligence is malleable, it stands to reason that he or she can become smarter and more competent.

Central to this chapter, these two beliefs also result in very different coping strategies in the face of difficulty that, regardless of talent, influence the tendency to practice and develop competencies (Dweck, 1999). If intelligence is fixed, failure suggests that one’s ability is inadequate. This reflects poorly on the individual and creates an undesirable state that requires amelioration. The concern, therefore, turns to protecting or defending against the threat of incompetence. If intelligence is malleable, however, failure suggests that the appropriate effort or strategy was not employed, or that further skills need to be developed. In this case, the concern turns to remediation and a search for information that would help improve future performance.

I argue that one of the most significant precursors to achieving greatness—the attainment of extraordinary and highly influential accomplishments—is not only believing you can, but maintaining that belief in the face of difficulty and doing what is necessary to continue to develop your skills. Maintaining such a belief is essential to intrinsic motivation (Mueller & Dweck, 1998) and the passion great people have for their craft (e.g., Roe, 1952; Simonton, 1994). In the pursuit of challenging goals, people invariably encounter difficulties that test the limits of their abilities. Greatness is achieved, in part, by those who are resilient to such threats and construe setbacks as an integral part of learning and growth. They perceive setbacks as signals to seek remedies rather than to protect their self-esteem. How might history have been altered if Thomas Edison had given up after his initial failures to create the electric light? Would

Michael Jordan have risen to elite status if he had been so concerned with making mistakes? Would Helen Keller's profound social contributions never been realized had she determined that her disabilities were too difficult to overcome? The meaning system created by the belief that intelligence (or competence) is malleable fosters the development of abilities, and for some, greatness.

In this chapter, I begin with an overview of implicit theories of intelligence and the achievement goals they foster. I then turn to a discussion about how they create distinct self-evaluative preferences that either reflect or result in a disposition for growth or defensiveness. Finally, I discuss how these mindsets may lead to different beliefs about the utility of practice.

THEORIES OF INTELLIGENCE AND ACHIEVEMENT GOALS

Dweck and her colleagues (Dweck, 1986, 1999; Dweck & Leggett, 1988) have identified two distinct beliefs people tend to hold about the nature of intelligence. Those with an *entity theory* believe that intelligence is fixed and cannot be improved much. In contrast, those with an *incremental theory* believe in the plasticity of intelligence. These theories of intelligence represent chronic styles of thinking (Robins & Pals, 2002) that are largely domain-specific (Dweck, Chiu, & Hong, 1995). For example, someone believing that his artistic ability is fixed may also believe that his athletic ability can continue to improve. Each belief has its distinct downstream consequences, including the achievement goals adopted, the attributions made for failure, and the strategies pursued in the face of failure (Dweck, 1999; Dweck & Leggett, 1988).

Due to their distinctly different beliefs about the nature of intelligence, entity and incremental theorists value and pursue very different goals (Dweck, 1986, 1999; Dweck & Leggett, 1988). Believing that their capacity to develop competencies is limited, entity theorists are motivated to pursue goals that allow them to demonstrate or validate their abilities. That is, their goal is to prove to others, and perhaps to themselves, that they are competent, and to avoid appearing incompetent when negative outcomes are anticipated. Incremental theorists, however, tend to pursue goals that support their belief that intelligence can be improved and focus on learning and the development of abilities. These individuals are less concerned with demonstrating their abilities than they are with developing them. Therefore, entity theorists tend to adopt relatively more *performance goals*, and incremental theorists tend to adopt relatively more *learning goals*.

THEORIES OF INTELLIGENCE AND THE EVALUATION OF COMPETENCIES

The evaluation of competencies is integral to self-regulation (Taylor, Neter, & Wayment, 1995). People must know how they are performing with respect to their goals in order to assess whether or not their desires and needs are being met. When people evaluate their competencies, there are numerous types of information they can seek and many different ways in which that information can be interpreted. The search

and interpretation of self-evaluative information is a motivated process (Sedikides & Strube, 1997), however, and is influenced by implicit theories of intelligence and their associated achievement goals.

In this chapter, I focus on three major types of self-evaluative motives: self-assessment, self-improvement, and self-enhancement.¹ Although these motives generally refer to how the self-concept is maintained and modified (Sedikides & Strube, 1997), I discuss them here in relation to achievement-related behavior. *Self-assessment* refers to the goal of accurately diagnosing one's own ability (Sedikides & Strube, 1997; Taylor et al., 1995). Both incremental and entity theorists engage in this type of self-evaluation, but in different ways. Because incremental theorists adopt learning goals, they tend to self-assess using self-referential standards (Dweck & Elliott, 1983; Senko, Durik, & Harackiewicz, 2008). That is, they have their own personal, subjective standards of success. For example, an incremental theorist practicing her free-throw shot may use the number of baskets she scored in the past as a reference to assess the status of her current ability. Entity theorists, on the other hand, tend to pursue performance goals and consequently self-assess in order to gauge their competencies relative to others (Butler, 1993, 1995, 1996, 2000b; Dweck, 1999; Elliot, 2005). That is, they use external, normative standards (Senko et al., 2008). An entity theorist practicing free throws may be more interested in accurately assessing her performance as it compares to other basketball players, so long as she believes her performance is relatively good. Therefore, incremental theorists tend to self-assess in the service of developing abilities, whereas entity theorists tend to self-assess in the service of documenting or validating their abilities.

Self-improvement is another method of self-evaluation with the goal of improving abilities (Sedikides & Strube, 1997; Taylor et al., 1995). It is distinct from self-assessment in that it is motivated by the desire for genuine improvement rather than the accurate assessment of one's current level of ability. This motive is particularly prevalent among incremental theorists (Nussbaum & Dweck, 2008). Because their goals largely concern learning and developing abilities, they tend to seek information and evaluate their abilities in a manner that best serves those goals. For example, they may seek better strategies for accomplishing particular tasks, or they may compare their present and past performance in order to assess whether or not they have improved. Whether they perform well or poorly, incremental theorists tend to evaluate their performance in terms of how to improve because it best helps them increase their understanding of the task at hand and refine their strategies for achieving their goal.

In contrast, entity theorists are less inclined to focus on improvement due to their belief in fixed intelligence. Consequently, they often perceive evaluative situations as threatening (Elliott & Dweck, 1988). Unlike incremental theorists, who seek challenges and construe failure as an opportunity to learn, entity theorists are more concerned with what the evaluation will say about their abilities (Blackwell, Trzesniewski, & Dweck, 2007; Robins & Pals, 2002; Sorich & Dweck, 1999). This is particularly true when perceived or actual competency is low because failure could expose their deficiencies (Dweck, 1986, 1999; Dweck & Leggett, 1988). Therefore, when setbacks are encountered, entity theorists tend to engage in *self-enhancement*—a method of self-

evaluation with the goal of achieving or maintaining a positive self-view (Sedikides & Strube, 1997; Taylor et al., 1995). For example, a salesperson might attribute his poor sales record to a downturn in the economy rather than accepting blame for his lack of salesmanship. In this way, failure is attributed to an external cause, rather than an internal one. These self-enhancing responses often involve the distortion, favorable selection, or avoidance of diagnostic information (Sedikides & Strube, 1997), all of which serve the purpose of maintaining a sense or appearance of competency. In an effort to validate their competencies or to appear normatively competent, entity theorists also tend to employ a number of strategies to preemptively cope with the threat of possible or impending failure. That is, they use a variety of methods to protect their self-esteem when they believe they may fail on an upcoming task.

SELF-EVALUATION AND PREFERENCES FOR GROWTH AND DEFENSIVENESS

Taken together, the self-evaluative motives elicited by both theories of intelligence and their associated achievement goals either reflect or result in very different responses to achievement situations and have important implications for the development of abilities. Incremental theorists' tendency for self-referential self-assessment and self-improvement reflect a desire for *growth*. Even when setbacks are encountered, they exhibit behaviors that serve to remedy whatever deficiencies they may have. In contrast, entity theorists' self-evaluative motives for normative self-assessment and self-enhancement set the stage for *defensiveness* (see Dweck & Elliott-Moskwa, 2010). When competence is defined in terms of how one compares to others, a preoccupation with demonstrating or validating one's abilities dominates, particularly when setbacks or failure are encountered. For them, the focus is not growth or remediation, but rather protecting or repairing their self-esteem. In this section, I review literature demonstrating incremental theorists' preference for growth and remediation, and entity theorists' preference for defensiveness via their distinct self-evaluative motives.

GROWTH AND REMEDIATION

Decades of research has amassed a wealth of evidence suggesting that an incremental theory and its associated learning goal contribute to a preference for information that affords improvement, regardless of whether failure is anticipated or experienced (e.g., Blackwell et al., 2007; Butler, 1993, 1995; Hong, Chiu, Dweck, Lin, & Wan, 1999; Nussbaum & Dweck, 2008). Nussbaum and Dweck (2008), for example, demonstrated this notion in a series of studies. They induced participants to hold either an entity or incremental theory of intelligence and then had them engage in a challenging speed-reading task for which their comprehension would be tested. All participants were given predetermined feedback suggesting that they had performed poorly (i.e., scoring at the 37th percentile) and were then given the opportunity to compare their strategies with others who took the test. Relative to those induced with an entity theory, participants in the incremental theory condition chose to review strategies used by

people who performed better than did they. Interestingly, their results also suggested that these upward social comparisons were associated with an increase in self-esteem for those in the incremental theory condition (Study 3). That is, the threatening situation was mollified by taking action to remedy their poor performance.

Another study (Nussbaum & Dweck, 2008, Study 2) demonstrated that the remediation evinced by incremental theorists was not limited to upward social comparison. Engineering students took a test relevant to their field and scored perfectly on the first four modules and poorly on the fifth and final module, as predetermined by the experimenters. They were then given the option of reviewing one of five tutorials that covered each of the modules included in the test. Compared to entity theorists, incremental theorists overwhelmingly chose the tutorial for the module on which they had performed poorly, suggesting that their failure elicited efforts to remedy their performance.

Similarly, Mangels and Dweck (see Dweck, Mangels, & Good, 2004) examined the attention patterns of incremental and entity theorists when they were given feedback after failure. They assessed attention by recording event-related potentials (ERPs) while participants worked on a set of difficult problems. After each problem, participants reported their answer and were then told whether or not they had answered the question correctly. All participants showed increases in attention, with no significant differences between entity and incremental theorists. Shortly thereafter, they were provided with the correct answer. The researchers found that incremental theorists showed an increase in attention to the correct answer, whereas entity theorists did not. Although entity theorists were attentive to information that allowed them to evaluate their ability, they were not attentive to information that could have helped them improve. Incremental theorists, on the other hand, were interested in understanding the correct answer because, for them, it was an opportunity to learn.

Further evidence comes from research conducted at the achievement goal level. In two studies, Butler (1995) investigated the effect of learning and performance goals on information seeking. Children first engaged in a divergent-thinking task for which they used circles to create pictures. The experimenter then left the room, ostensibly to prepare materials for a subsequent task. Children were then free to explore the room to pass the time. In the room were three tables, two of which were labeled “Creative Ideas” and “Creative Ability.” The third table had magazines for them to read. The “Creative Ideas” table included pictures done by other children, which offered ideas about how the children could improve their own pictures. The “Creative Ability” table included information about how to score the quality of their work. The table with magazines was intended as an informational alternative to the other two tables. Butler found that those with a learning goal spent significantly more time at the “Creative Ideas” table, and less time than those with a performance goal at the “Creative Ability” table. Butler’s results suggested that the children with a learning goal were primarily interested in improving their own performance rather than assessing how they did compared to others or avoiding feedback altogether.

In another study examining the effects of achievement goals on requests for self-evaluative information, Butler (1993) had participants engage in a computer-

administrated problem-solving task. Their task was to fill a target container using three other containers of various sizes in the fewest number of pours. Between tasks, which got progressively more difficult, participants had the opportunity to proceed directly to the next trial or request one of three types of information regarding the task. They could choose either the best solution to the previous problem, their raw score, or their percentile score. Butler designed these types of information to reflect the desire to acquire competence, or to receive objective or normative feedback, respectively. Results suggested that those induced with a learning goal requested the best possible solution significantly more often than those induced with a performance goal because it offered information that would help them improve their strategies on future trials. This was the case even for those with a learning goal who performed poorly on the initial easy problems. In fact, those individuals made the most requests because they had the most to learn.

As demonstrated in numerous studies (e.g., Blackwell et al., 2007; Butler, 1993, 1995; Dweck et al., 2004; Hong et al., 1999; Nussbaum & Dweck, 2008), an incremental theory (and the learning goal it fosters) is associated with a focus on growth and improvement. Incremental theorists also chiefly evince remedial responses to setbacks. When developing abilities, especially the very high levels demonstrated by great people, resilience and persistence are crucial, as are self-evaluations that provide information about how to improve.

DEFENSIVENESS

In years past, most psychologists agreed that an accurate perception of reality was essential for good mental health and reflected the most adaptive pattern of perception. More recently, however, psychologists have recognized the adaptive significance of maintaining a positive self-view (Sherman & Cohen, 2006; Taylor & Brown, 1988). People wish to maintain their “adaptive adequacy,” such that they view themselves as moral, efficacious, and successful (Steele, 1988). In everyday life, however, people encounter threats to these beliefs. In the service of maintaining a positive self-view under threat, people have a “psychological immune system” (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998), which engages biased behaviors, perceptions, and cognitions. To preserve self-consistency (Aronson, 1968; Thibodeau & Aronson, 1992) or to undo the negative consequences of a behavior (Cooper & Fazio, 1984), people can alter either the cognition or the behavior to become more in line with the other. For example, a student may retrospectively argue that an exam he failed was unfair or did not accurately assess his knowledge of the material, thereby circumventing blame for his poor grade.

In this section, I discuss research demonstrating that an entity theory and the performance goal associated with it lead to the use of a number of defensive strategies either in anticipation of failure or after having experienced setbacks (e.g., Blackwell et al., 2007; Brown, 1990; Butler, 1993, 1995, 1998; Dweck et al., 2004; Hong et al., 1999; Nussbaum & Dweck, 2008). These defensive strategies are not particularly adap-

tive, however, because they can come at the cost of learning and the development of abilities.

Anticipating Failure

Entity theorists tend to employ at least two strategies for protecting their self-esteem when failure is anticipated: self-handicapping and feedback avoidance. Both strategies afford entity theorists the opportunity to maintain their sense and appearance of competency by protecting themselves from feedback that may suggest otherwise.

Self-handicapping. Self-handicapping refers to the purposeful sabotage of one's own performance in order to provide an excuse for an expected failure (Berglas & Jones, 1978). For example, a student may intentionally under-prepare for an exam or stay out late the night before in order to provide an alternative explanation for an anticipated poor grade. The rationale for self-handicapping is that one can admit to a minor flaw in order to avoid admitting to a much more threatening one, which is often incompetency. Commonly used excuses include, but are not limited to, anxiety, illness, pain, and trauma (Kowalski, 1996; Snyder & Higgins, 1988) and serve as a preemptive self-enhancing strategy. It is a particularly powerful strategy because it creates a win-win outcome for the self-handicapper; he is protected if he fails and enhanced if he succeeds.

Rhodewalt's (1994) research provides evidence for entity theorists' use of self-handicapping. In a study investigating the relation between lay beliefs about intelligence and self-handicapping, he assessed participants' implicit theories of intelligence in two ways. First, participants answered straightforward questions about the nature of ability, such as "What does it mean to be intelligent?" and "What does it mean to be unintelligent?" Second, participants read a vignette about an intelligent and accomplished college student and were asked to make judgments about the relative contribution of different factors to the student's success, such as a "privileged background," "innate intelligence," and "effort." Participants also completed a self-report of self-handicapping and their tendency to make excuses. Indeed, Rhodewalt found that the tendency to self-handicap was positively associated with an entity theory of intelligence across both measures. Shih (2009) later demonstrated a similar pattern of results with a Taiwanese sample.

Entity theorists' concern for demonstrating or validating their competence may motivate them to manipulate their circumstances in order to ensure that an excuse is prepared in case of failure. When they are successful, on the other hand, they may highlight that their success was achieved despite unfavorable circumstances. Performance goals, however, are also concerned with the avoidance of appearing incompetent, so entity theorists are particularly motivated to avoid having to demonstrate an ability for which they believe their competence is low.

Feedback avoidance. The desire to avoid feedback and evaluative situations is driven, in part, by negative reinforcement—the removal of an aversive stimulus (Skinner, 1938). In the same way an individual's fear of heights is reinforced by avoiding bridges and other high structures, and individual's fear of having his or her competencies

assessed is reinforced by avoiding evaluative situations. When entity theorists encounter achievement situations in which evaluations may suggest that their abilities are relatively poor, they may prefer to avoid those situations altogether (e.g., Butler, 1993, 1995; Dweck et al., 2004; Hong et al., 1999). The avoidance of such threatening situations and feedback helps to protect their positive self-view. In some circumstances, entity theorists may accomplish this by self-handicapping. In other circumstances, however, they may want to simply avoid situations or evaluations that may call their competencies into question.

Hong and colleagues (Hong et al., 1999) demonstrated just this in a study conducted with incoming students at a university in Hong Kong, where all courses were taught in English. Because students varied in their proficiency of the language—as evidenced by their performance on a required high school exam—it may or may not have posed a threat to their eventual success at the university. Of those whose English proficiency was low, entity theorists were significantly less likely to declare their intention to take a highly effective remedial English course as compared to incremental theorists. Although the course would have afforded an opportunity for success at the university, entity theorists preferred to avoid the course because of its potential to highlight and expose their deficiencies.

In another study, Blackwell and her colleagues (Blackwell et al., 2007) examined student reactions to their first academic failure after transitioning from elementary school to junior high. The researchers found that entity theorists were more likely than incremental theorists to say that they would avoid taking another course in that subject again. As in the Hong et al. study, taking the course would only highlight entity theorists' incompetence.

Similar results have been obtained in research examining feedback and informational preferences for those with learning and performance goals. Recall that Butler (1995) had children work on a picture task. When the experimenter left the room, the children were free to explore the “Creative Ideas” and “Creative Ability” tables, as well as one with a variety of magazines for them to read. Not only did children with a performance goal spend more time at the “Creative Ability” table, which provided them with normative scoring information (and an opportunity for normative self-assessment), but those who performed poorly also spent more time at the magazine table, avoiding feedback altogether. As a consequence of their beliefs, entity theorists have little interest in information regarding how to improve their abilities and are more attuned to feedback that allows them to compare their performance to others, which was found at the “Creative Ability” table. When unfavorable feedback is expected, however, entity theorists may prefer to avoid all forms of available feedback. Rather than confronting the certainty of their poor performance, evading feedback allows them to avoid verifying their incompetence. For entity theorists, ignorance can be bliss.

Recovering from Failure

For entity theorists, failure is an indictment of their low intelligence. In response to the threat against their sense or appearance of competency, they are motivated to repair

their self-esteem by self-enhancing (Nussbaum & Dweck, 2008). In other words, they go into damage-control mode. Those employed by entity theorists include, but are not limited to, self-serving biases and downward social comparisons.

Self-serving biases. One way people bolster their self-esteem when it is threatened is to engage in *self-serving biases*, which refers to the tendency for individuals to attribute their successes to internal, dispositional factors and to attribute their failures to external, situational factors (Miller & Ross, 1975). Consequently, self-serving biases can lead people to believe that favorable information about themselves is more credible than negative information (Shrauger, 1975; Shrauger & Rosenberg, 1970). Compared to incremental theorists, entity theorists are more likely to engage in self-serving cognitions as a means of self-enhancement. Performance goals are largely concerned with demonstrating or validating competence, so it is particularly threatening when people endorsing these goals try and fail. For example, a golfer with an entity theory who attempts to demonstrate her putting skills and performs poorly may be motivated to blame her failure on the type of putter she used or distracting noises made by spectators. Incremental theorists, on the other hand, would likely view their success or failure as diagnostic of their abilities and would value the outcome as useful information about how to improve.

Research conducted by Ehrlinger and Dweck (2011) provides initial support for the notion that entity theorists are relatively more prone to self-serving biases than incremental theorists. They had participants work on a set of 10 antonym problems from the Graduate Record Examination (GRE), half of which were particularly easy. The other half were quite difficult. Not only did entity theorists spend longer on the easy problems than the difficult ones, but they were also overconfident about their overall performance. Their heightened attention to the easier problems suggests that they had reveled in their success, while disregarding the difficulties they encountered on the challenging problems. Furthermore, their overconfidence may have resulted, in part, from the belief that their positive experience working on the easy problems was more diagnostic of their ability (Shrauger, 1975; Shrauger & Rosenberg, 1970).

Downward social comparison. When an objective standard is not available, people may compare their performance with others' in order to assess their abilities (Festinger, 1954; Suls & Fletcher, 1983; Suls & Miller, 1977). People, however, do not always seek objective comparisons. When people fail, their self-esteem is threatened and in need of bolstering. Consequently, people may prefer to compare or associate with others who are less competent (Gibbons et al., 2002; Gollwitzer & Wicklund, 1985). This type of self-enhancement is called *downward social comparison*. By making such comparisons, people are able to repair their self-esteem, making their mood more positive, as well as their outlook on the future (Aspinwall & Taylor, 1993; Gibbons & McCoy, 1991).

As previously discussed, incremental theorists tend to make upward social comparisons because they may provide insights about how to improve their competencies. Entity theorists, in contrast, are more likely to engage in downward social comparisons (Nussbaum & Dweck, 2008), regardless of their performance outcome. This occurs for two reasons. First, perceptions of success are contingent on outperforming others (Nicholls, 1984), so entity theorists would not be expected to engage in self-evaluations that would confirm their inferiority. Second, because their self-esteem is contingent on demonstrating their

competence, they are at particular risk when they fail. One way for them to bolster their self-esteem is to compare themselves to someone who performed worse.

In a series of studies previously discussed, Nussbaum and Dweck (2008) investigated the social comparison behaviors of entity and incremental theorists. After experiencing failure on the last module of a test, those induced to hold an incremental theory had sought to compare their strategies with individuals who had performed better. For them, failure suggested that they had more to learn, and making upward comparisons was a means of obtaining helpful information. Those induced to hold an entity theory, however, interpreted their failure as an unchangeable lack of competency and instead responded defensively by choosing to view strategies used by people who had performed worse. For entity theorists, making a downward comparison bolstered their damaged self-esteem because it showed that they were, at least, better than someone else.

THE MINDSET OF GREATNESS: GROWTH, NOT DEFENSIVENESS

Although it is impossible to know what theories of intelligence the great men and women of world history endorsed, it is clear that their accomplishments were, in no small part, due to their growth mindsets. Thomas Edison's mindset, for example, clearly influenced him to interpret his failures as opportunities to learn and to improve upon his inventions. Michael Jordan's nationally televised follies on the basketball court could have caused him to leave the sport in embarrassment, but instead he viewed them as opportunities to refine his skills. Helen Keller's disabilities could have thwarted her profound social contributions, but she overcame those obstacles and learned how to communicate her ideas to the world. Had any of these people primarily focused on maintaining a positive self-image over growth in their area of specialization, they would have likely never attained greatness or taken the risks necessary to achieve it. Failure is an essential part of ability development, and learning from it is far more adaptive than trying to hide it.

THE MEANING OF TALENT AND PRACTICE

Having established that theories of intelligence lead to a focus on either growth or defensiveness, what does this mean for incremental and entity theorists' construals of "talent" and "practice"? Talent implies that particular abilities are innate, whereas practice implies that abilities can be developed. Believing intelligence to be fixed, entity theorists tend to endorse the notion that success is largely the result of an existing talent. Incremental theorists' belief in malleable intelligence, however, tends to result in the belief that practice yields competency (even if they are already talented). Butler (2000a) demonstrated this notion in a series of studies designed to assess the attributions made by entity and incremental theorists for increasing or declining performance. Participants were presented with a series of scores in either a generally descending (8 9

6 7 5 6 3 4 3 3) or ascending (3 3 4 3 6 5 7 6 9 8) order that ostensibly reflected another student's performance on 10 math problems of equal difficulty over 10 days. Despite the declining scores, entity theorists interpreted the student's initial success as a sign of raw talent and perceived the increasing scores as exertions of effort that would not have been necessary if the student had already had the ability. For them, the student's initial performance was most diagnostic because it reflected a genuine test of mathematical talent. Incremental theorists, on the other hand, were more likely to infer higher ability for the student whose scores improved. Because the student's scores were getting better, incremental theorists inferred that the student was learning; his or her math abilities improved as a function of practice. Butler also found this pattern of results when attributions were made for one's own performance rather than another student's. Therefore, entity theorists tend to view their current talent as most diagnostic of their potential, whereas incremental theorists view effort to be most diagnostic, regardless of their level of talent, and practice as a viable and necessary means of improvement.

Research also suggests that there are serious consequences to using terms like "talent" and "practice." For example, Mueller and Dweck (1998) praised students for their intelligence ("You must be smart at these problems") or effort ("You must have worked hard at these problems") after performing well on a set of IQ test problems. Subsequently, the students worked on another set of problems on which everyone failed. On a third set of problems, equally as difficult as the first, the researchers observed that those praised for their intelligence suffered decrements in persistence, performance, and enjoyment and made more low-ability attributions compared to those praised for their effort. Praising students for their intelligence reinforced the notion that it was a fixed entity, whereas praising students for their effort reinforced the notion that intelligence was malleable.

When people are praised for their intelligence, it suggests that their innate talent is high. Subsequently, they tend to adopt performance goals focused on demonstrating the competencies they already have, ensuring that they continue to appear or feel intelligent. When people are praised for their effort (or practice), however, it reinforces the notion that abilities are developed and that effort plays an essential role. Subsequently, they tend to adopt learning goals because their effort is precisely what resulted in their favorable performance.

CONCLUSION

Greatness connotes extraordinary abilities. Although the origins of these abilities are largely enigmatic and complex, a fundamentally important part of understanding them resides in the meaning that people ascribe to events relating to their competence. In particular, incremental and entity theories of intelligence create distinct meaning systems for interpreting and reacting to achievement-related events that may either facilitate or disrupt the development of competencies, which is independent of prior ability (e.g., Blackwell et al., 2007). They also help explain why some people rely solely on their talent to get by or focus on practice as a means of learning and improvement. Research consistently demonstrates that an incremental theory

leads to higher levels of achievement than an entity theory (e.g., Blackwell et al., 2007; Henderson & Dweck, 1990; Robins & Pals, 2002; Sorich & Dweck, 1999), which is attributable to the belief that competencies can be developed and improved, and the remedial efforts employed to overcome setbacks—qualities essential to achieving greatness.

ACKNOWLEDGMENTS

The preparation of this chapter was supported, in part, by the Institute of Education Sciences, U.S. Department of Education, through Grant #R305B080007 to the Graduate Center and New York University. The opinions expressed are those of the authors and do not represent the views of the U.S. Department of Education.

REFERENCE NOTE

- 1 Self-verification is a fourth type of self-evaluation that refers to a motive to perceive one's self-image as consistent (Sedikides & Strube, 1997; Taylor et al., 1995). A discussion of it is omitted from this chapter due to the lacuna of research of its relation to theories of intelligence.

REFERENCES

- Aronson, E. (1968). Dissonance theory: Progress and problems. In R. P. Abelson, E. Arson, W. J. McGuire, T. M. Newcomb, M. J. Rosenberg, & P. H. Tannenbaum (Eds.), *Theories of cognitive consistency: A sourcebook* (pp. 5–27). Chicago, IL: Rand McNally.
- Aspinwall, L. G., & Taylor, S. E. (1993). Effects of social comparison direction, threat, and self-esteem on affect, self-evaluation, and expected success. *Journal of Personality and Social Psychology*, 64(5), 708–722.
- Berglas, S., & Jones, E. E. (1978). Drug choice as a self-handicapping strategy in response to noncontingent success. *Journal of Personality and Social Psychology*, 36(4), 405–417.
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, 78(1), 246–263.
- Brown, J. D. (1990). Evaluating one's abilities: Shortcuts and stumbling blocks on the road to self-knowledge. *Journal of Experimental Social Psychology*, 26(2), 149–167.
- Butler, R. (1993). Effects of task- and ego-achievement goals on information seeking during task engagement. *Journal of Personality and Social Psychology*, 65(1), 18–31.
- Butler, R. (1995). Motivational and informational functions and consequences of children's attention to peers' work. *Journal of Educational Psychology*, 87(3), 347–360.
- Butler, R. (1996). Effects of age and achievement goals on children's motives for attending to peers' work. *British Journal of Developmental Psychology*, 14(Pt 1), 1–18.
- Butler, R. (1998). Age trends in the use of social and temporal comparison for self-evaluation: Examination of a novel developmental hypothesis. *Child Development*, 69(4), 1054–1073.
- Butler, R. (2000a). Making judgments about ability: The role of implicit theories of ability in moderating inferences from temporal and social comparison information. *Journal of Personality and Social Psychology*, 78(5), 965–978.

- Butler, R. (2000b). What learners want to know: The role of achievement goals in shaping information seeking, learning, and interest. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 161–194). San Diego, CA: Academic Press.
- Cooper, J., & Fazio, R. H. (1984). A new look at dissonance theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 17, pp. 229–266). New York, NY: Academic Press.
- Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, 41(10), 1040–1048.
- Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development. Essays in social psychology*. New York, NY: Psychology Press.
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York, NY: Random House.
- Dweck, C. S., Chiu, C.-y., & Hong, Y.-y. (1995). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry*, 6(4), 267–285.
- Dweck, C. S., & Elliott, E. S. (1983). Achievement motivation. In P. Mussen (Ed.), *Handbook of child psychology: Socialization, personality, and social development* (Vol. 4, pp. 643–691). New York, NY: Wiley.
- Dweck, C. S., & Elliott-Moskwa, E. S. (2010). Self-theories: The roots of defensiveness. In J. E. Maddox & J. P. Tangney (Eds.), *Social psychological foundations of clinical psychology* (pp. 136–153). New York, NY: Guilford Press.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95(2), 256–273.
- Dweck, C. S., Mangels, J. A., & Good, C. (2004). Motivational effects on attention, cognition, and performance. In D. Y. Dai & R. J. Sternberg (Eds.), *Motivation, emotion, and cognition: Integrative perspectives on intellectual functioning and development* (pp. 41–55). Mahwah, NJ: Erlbaum.
- Ehrlinger, J., & Dweck, C. S. (2011). *If I don't see it, it must not exist: How preferential attention allocation contributes to overconfidence*. Unpublished manuscript, Florida State University.
- Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 52–72). New York, NY: Guilford Press.
- Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, 54(1), 5–12.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140.
- Gibbons, F. X., Lane, D. J., Gerrard, M., Reis-Bergan, M., Lautrup, C. L., Pexa, N. A., et al. (2002). Comparison-level preferences after performance: Is downward comparison theory still useful? *Journal of Personality and Social Psychology*, 83(4), 865–880.
- Gibbons, F. X., & McCoy, S. B. (1991). Self-esteem, similarity, and reactions to active versus passive downward comparison. *Journal of Personality and Social Psychology*, 60(3), 414–424.
- Gilbert, D. T., Pinel, E. C., Wilson, T. D., Blumberg, S. J., & Wheatley, T. P. (1998). Immune neglect: A source of durability bias in affective forecasting. *Journal of Personality and Social Psychology*, 75(3), 617–638.
- Goldman, R., & Papson, S. (1998). *Nike culture: The sign of the swoosh*. London, England: Sage.
- Gollwitzer, P. M., & Wicklund, R. A. (1985). Self-symbolizing and the neglect of others' perspectives. *Journal of Personality and Social Psychology*, 48(3), 702–715.

- Henderson, V. L., & Dweck, C. S. (1990). Motivation and achievement. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 308–329). Cambridge, MA: Harvard University Press.
- Herrmann, D. (1999). *Helen Keller: A life*. Chicago, IL: The University of Chicago Press.
- Hong, Y.-y., Chiu, C.-y., Dweck, C. S., Lin, D. M. S., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology*, 77(3), 588–599.
- Kowalski, R. M. (1996). Complaints and complaining: Functions, antecedents, and consequences. *Psychological Bulletin*, 119(2), 179–196.
- Lathrop, G. P. (1890). Talks with Edison. *Harper's New Monthly Magazine*, 80, 425–435.
- Lawlor, L. (2001). *Helen Keller: Rebellious spirit*. Holiday House.
- Miller, D. T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction? *Psychological Bulletin*, 82(2), 213–225.
- Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, 75(1), 33–52.
- Newton, J. D. (1987). *Uncommon friends: Life with Thomas Edison, Henry Ford, Harvey Firestone, Alexis Carrel and Charles Lindbergh*. Orlando, FL: Harcourt.
- Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review*, 91(3), 328.
- Nussbaum, A. D., & Dweck, C. S. (2008). Defensiveness versus remediation: Self-theories and modes of self-esteem maintenance. *Personality and Social Psychology Bulletin*, 34(5), 599–612.
- Rhodewalt, F. (1994). Conceptions of ability, achievement goals, and individual differences in self-handicapping behavior: On the application of implicit theories. *Journal of Personality*, 62(1), 67–85.
- Robins, R. W., & Pals, J. L. (2002). Implicit self-theories in the academic domain: Implications for goal orientation, attributions, affect, and self-esteem change. *Self and Identity*, 1(4), 313–336.
- Roe, A. (1952). *The making of a scientist*. New York, NY: Dodd, Mead.
- Sedikides, C., & Strube, M. J. (1997). Self-evaluation: To thine own self be good, to thine own self be sure, to thine own self be true, and to thine own self be better. *Advances in Experimental Social Psychology*, 29, 209–269.
- Senko, C., Durik, A. M., & Harackiewicz, J. M. (2008). Historical perspectives and new directions in achievement goal theory: Understanding the effects of mastery and performance-approach goals. In J. Y. Shah & W. L. Gardner (Eds.), *Handbook of motivation science* (pp. 100–113). New York, NY: Guilford Press.
- Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 38, pp. 183–242). San Diego, CA: Elsevier Academic Press.
- Shih, S.-S. (2009). An examination of factors related to Taiwanese adolescents' reports of avoidance strategies. *The Journal of Educational Research*, 102(5), 377–388.
- Shrauger, S. J. (1975). Responses to evaluation as a function of initial self-perception. *Psychological Bulletin*, 82, 581–596.
- Shrauger, S. J., & Rosenberg, S. E. (1970). Self-esteem and the effects of success and failure feedback on performance. *Journal of Personality*, 38, 404–417.
- Simonton, D. K. (1994). *Greatness: Who makes history and why*. New York, NY: Guilford Press.

- Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. Oxford, England: Appleton-Century.
- Snyder, C. R., & Higgins, R. L. (1988). Excuses: Their effective role in the negotiation of reality. *Psychological Bulletin*, *104*(1), 23–35.
- Sorich, L., & Dweck, C. S. (1999). Mastery-oriented thinking. In C. R. Snyder (Ed.), *Coping: The psychology of what works* (pp. 232–251). New York, NY: Oxford University Press.
- Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology, Vol. 21. Social psychological studies of the self: Perspectives and programs* (pp. 261–302). San Diego, CA: Academic Press.
- Suls, J. M., & Fletcher, B. (1983). Social comparison in the social and physical sciences: An archival study. *Journal of Personality and Social Psychology*, *44*(3), 575–580.
- Suls, J. M., & Miller, R. L. (1977). *Social comparison processes: Theoretical and empirical perspectives*. Oxford, England: Hemisphere.
- Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, *103*, 193–210.
- Taylor, S. E., Neter, E., & Wayment, H. A. (1995). Self-evaluation processes. *Personality and Social Psychology Bulletin*, *21*(12), 1278–1287.
- Thibodeau, R., & Aronson, E. (1992). Taking a closer look: Reasserting the role of the self-concept in dissonance theory. *Personality and Social Psychology Bulletin*, *18*(5), 591–602.