CHAPTER 13

THE ROLE OF MOTIVATION

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Motivation is generally regarded as an important component for success, in school and at work. Motivation provides the fuel to ignite abilities and transform them into achievements. Although natural talent or giftedness predicts academic and career success, motivation is the catalyst that allows ability to be harnessed to accomplish those great successes. Even when endowed with natural talent or potential, without adequate motivation, gifted students are unable to fully develop their talents. The word *motivation* comes from the Latin root *moveo*, which means "to move." In the Merriam-Webster dictionary motivation is defined as the act or process of giving someone a reason for doing something. It is also described as a force or influence that causes someone to do something. These general definitions of motivation capture the emphasis on being moved to action. Deckers (2001) defines motivation as "inducing behavior"—stimuli that motivate us to take action are those that transform potential energy into kinetic energy. This transformation is literal and figurative. In the absence of motivation, ability or potential cannot be transformed into products or performance. Therefore, ability without motivation is like wind without a windmill. The energy produced by the wind must be harnessed to produce electricity. So too must ability be coupled with motivation to produce achievement.

Often motivation and ability are pitted against each other. An admission of the importance of one of these traits is often perceived as an indictment of the other. In fact, a recent issue of *Intelligence* was devoted to answering the question "Is ability necessary to explain the development of expertise?" (Detterman, 2014, p. 1). Interestingly, the special issue treated as fact the necessity of motivation and deliberate practice on the development of expertise in a domain. Instead, the authors debated whether ability played any role in the development of expertise. We agree with Ackerman (2014) that achievement or performance in any domain requires ability and motivation: "In *any* theory of performance . . ., motivation is one of the two essential ingredients of performance (the other being the capacity to perform the behavior)" (p. 11; see also Chapter 17, this handbook).

Although academic and occupational success appear to require ability and motivation, the relationship between giftedness and motivation is less clear. Are gifted students more motivated than other students? Are gifted adults more motivated than other adults? Does motivation manifest itself differently in the gifted? Is motivation more or less essential to the success of the gifted? Do traditional motivational theories apply to the gifted? Or are different theories necessary to explain the formation and role of motivation within gifted populations? In this chapter, we explore the empirical research on motivation as it relates to giftedness.

Motivation is a key component in many theories of giftedness and talent development. Renzulli's (1978) three ring conception of giftedness includes task commitment, a construct highly related to motivation, as one of the essential elements needed to induce/produce gifted behaviors. The other two elements are above average ability

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and creativity (Renzulli, 1978). Motivation also plays a key role in Gagne's (2010) differentiated model of giftedness and talent: "Motivation, however it is specifically defined, plays a crucial role in the long process through which youth and adults attempt to reach excellence in any field of human activity" (p. 81). In Ziegler's actiotope model of giftedness, giftedness depends on an interaction between the individual and the environment, and motivation plays a pivotal role in the development of giftedness.

> Based on systems theory, the actiotope model is based around four components, including action repertoires, goals, subjective action space and the environment. The continual expansion of a person's action repertoire depends on the interactions of their goals, subjective action space and the environment. (Ziegler & Phillipson, 2012, p. 27)

Motivation also figures prominently in Subotnik, Olszewski-Kubilius, and Worrell's (2011) definition of giftedness from a talent development perspective: Motivation is a key component that influences an individual's ability to develop his or her talents in a particular domain. "The distinguishing feature of those who are gifted is the commitment and sacrifice they are willing to make in pursuit of their creative productivity" (p. 21; see also Chapter 15, this handbook). Gottfried and Gottfried (2004) proposed a construct entitled *gifted motivation*, which is evidenced by "superior persistence, attention, curiosity, enjoyment of learning, and orientation toward mastery and challenge" (p. 127). Although some might quibble with the notion that motivation represents a particular domain of giftedness, the notion that motivation is a critical component of giftedness is far less controversial and consistent across all these theorists.

Although individual differences in motivation exist (Judge & Ilies, 2002), motivation is domain and task specific. The degree to which a person feels motivated to engage in a task represents an interaction between the person and the environment. Therefore, motivation has situational and personal characteristics.

> If individual differences are a means for adapting to the environment, then a better adaptation can be achieved either by changing individual characteristics or by changing the environment. Although individual characteristics are malleable to some extent, changing the environment might be easier to realize. (Spinath, Eckert, & Steinmayr, 2014, p. 240)

RELEVANT THEORY AND PRINCIPLES

There are many theories of motivation within and outside of the field of education, even some specific to gifted education (e.g., Gottfried & Gottfried, 2004). There are many types of motivation, but in the context of gifted education, achievement motivation is most pertinent. *Achievement motivation* refers more specifically to motivation relevant to tasks where performance is judged by some standards of excellence (Wigfield, Eccles, Roeser, & Schiefele, 2008). Across all major theories of human motivation, aspects of the situation (e.g., task difficulty) and personality factors (e.g., need for achievement) play a critical role in determining motivation. Therefore, in thinking about the role of motivation in gifted education we find it helpful to consider the person and situational factors in tandem. As Kurt Lewin (1931) described, behavior is a function of the person and the situation. Indeed, these various theoretical approaches to motivation vary from their emphasis on the person or the situation, offering a different way to think about motivation and its relationship to educational outcomes. Under the broader umbrella of achievement motivation there are many theories, which focus on a variety of determinants of motivation, such as students' beliefs, values, or goals. We provide a brief overview of prominent motivation theories and empirical research applying these theories to gifted populations.

Intrinsic and Extrinsic Motivation and Self-Determination Theory

Intrinsic motivation describes the drive to pursue an activity for its own sake, rather than for external rewards. Generally, students are intrinsically

motivated to pursue activities that are moderately novel, interesting, enjoyable, exciting, and optimally challenging. *Extrinsic motivation* is instrumental: The motive to complete an activity to receive an external reward, a benefit, or positive reinforcement that is external to the activity itself (Deci, Koestner, & Ryan, 2001). Extrinsic motivators may include rewards such as stickers, praise, grades, special privileges, prizes, money, material rewards, adult attention, or peer admiration (Ryan & Deci, 2000).

Intrinsic and extrinsic motivation are often depicted as two ends of a motivation continuum representing the extent to which actions are self-determined or externally controlled. However, according to self-determination theory, extrinsically motivated behaviors can also be self-determined (Deci, Vallerand, Pelletier, & Ryan, 1991). The more a student self-initiates and self-determines his or her actions, the more self-determined he or she is considered to be. "Self-determination is the capacity to choose and to have those choices, rather than reinforcement contingencies, drives, or any other forces or pressures, be the determinants of one's actions" (Deci & Ryan, 1985, p. 38). According to Deci et al. (1991), there are four phases of the extrinsic motivation continuum that differ in the degree to which the motives are internalized: external regulation, introjected regulation, identified regulation, and integrated regulation. During the *external regulation phase*, behavior is almost completely controlled by external reinforcers or punishers. During the *introjected regulation phase*, students follow rules or engage in behaviors because they believe that they should, but they have not necessarily internalized the rules or values associated with the action. In the *identified regulation phase*, the student accepts the rule or regulation because it is personally important for goal attainment. In the *integrated regulation phase*, the student completely integrates and internalizes different self-determined values. Intrinsic motivation and integrated regulation are self-determined and involve autonomous self-regulation. "However, intrinsic motivation and integrated regulation are different. Intrinsic motivation is characterized by interest in the activity itself, whereas integrated regulation is characterized by the activity's being personally important for a valued outcome" (Deci et al., 1991, p. 330). Finally, although intrinsic and extrinsic motivation are often depicted as opposing forces, a person can engage in activities to simultaneously fulfill intrinsic and extrinsic goals. For example, when someone chooses a career that is also intrinsically rewarding, working can produce intrinsic rewards (i.e., interest and enjoyment) and extrinsic rewards (i.e., salary and prestige).

Flow Theory

Csikszentmihalyi (1975) hypothesized that the quality of a person's perceived experience is a function of two subjective variables: the perceived challenges involved in the experience and his or her perceived skills to meet those challenges. Csikszentmihalyi theorized that how these two variables align dictates one's psychological state (see Figure 13.1). As challenge increases and skill does not, one experiences anxiety. However, if challenge remains low and skills are high, one experiences boredom. The optimal subjective experience is had when the perceived challenge and skills are equal. It is during this balance between challenge and skill that one will experience a state of flow. Flow theory presents a balance between personal and situational factors, positing that the situation (high or low challenge) and the person (high or low ability) interact to create the optimal motivation experience (see Chapter 14, this handbook).

Students are more likely to become engaged with material that is optimally challenging. Ideally, teachers should deliver instruction that is just above the skill range of the students: The activity should be something that the students can master, but not without effort and appropriate strategy use

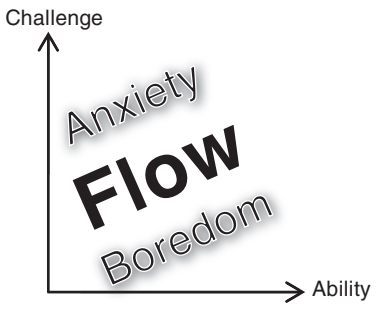

FIGURE 13.1. Factors that affect student performance.

(Morrone & Schutz, 2000). Unfortunately, the regular classroom environment can undermine, rather than support, a passion for learning (Fredricks et al., 2010), especially for gifted students. The majority of gifted students continue to spend most of their instructional time (80%) in general educational classrooms, many of which provide little or no academic or intellectual challenge (Westberg, Archambault, Dobyns, & Salvin, 1993); however, 61% of classroom teachers have not received training in meeting the needs of advanced students. Many gifted elementary school students know between 40% and 50% of the material covered in their current grade prior to the start of the school year (Reis et al., 1993). Therefore, many gifted students are likely to have mastered large portions of the grade level curriculum prior to instruction. Preassessing students is a critical component for determining the optimal instructional level. In the absence of preassessment data, the teacher is likely to be unaware that students have already mastered the instructional objectives not yet introduced.

In the field of gifted education, a great deal of focus has been placed on ensuring that gifted students are provided with adequate academic challenge. However, challenge alone is insufficient to experience flow. Flow also represents an emotional state. Therefore, Siegle and McCoach (2005) advocated that to increase students' motivation, providing greater challenge may not be sufficient; instead material should be challenging and intellectually stimulating. Intellectually stimulating material increases intrinsic motivation. Although intrinsic motivation depends in part on personal interests, the degree of interest or intrinsic motivation a person has for a given topic is also situationally dependent. Therefore, intellectually stimulating material can increase students' intrinsic motivation by providing learning opportunities that are novel, personally meaningful, and complex. Such material often involves ambiguity, uncertainty, and unanswered questions, and it is frequently taught inductively. Intellectual stimulation can be spurred either by a situational interest that is generated by certain conditions or concrete objects in the environment, or a personal interest that drives an individual to pursue knowledge and skills. Intellectually stimulating content promotes discussion, involves big ideas, does not have a content ceiling, involves higher-level cognition, includes multiple perspectives, does not have a single path to a solution, and allows for varying definitions of the problem. Of course, for intellectually stimulating material to be motivating, it also must lie within the student's zone of proximal development (McCoach & Siegle, 1999). To increase the motivation of gifted students, educators should strive to increase academic challenge and intellectual stimulation. Optimal challenge combined with intellectual stimulation produces students in a state of flow (Csikszentmihalyi, 1990, 1997; Shernoff, Csikszentmihalyi, Shneider, & Shernoff, 2003).

Expectancy–Value–Cost

Expectancy-value theory traces its roots to the work of Atkinson (1964), who described the impulse to undertake a particular achievement oriented activity as a function of one's expectations for success and their value for the task (see also Eccles & Wigfield, 2002; Maehr & Sjogren, 1971). Atkinson proposed that the value factor and the expectancy factor where dependent on one another and inversely related, such that as expectations for success increased, the value for the task would decrease. Although this inverse relationship held in game-based achievement settings, where winning was the ultimate goal, it did not hold up in educational contexts, which facilitated the development of expectancy-value models of motivation in education (Eccles et al., 1983).

According to the expectancy-value theory, motivation is the product of expectancy for success and the value of the task (Boggiano & Pittman, 1992). In other words, the value that a person places on either the task or the outcome and the perceived probability of success jointly determine the amount of effort that the person will exert in attempting to successfully complete the task. If either component is completely absent, then the model predicts that motivation for that task would also be completely absent.

Value has been generally defined as the level of importance placed on succeeding at a task. The subjective value that a person places on the task or

its outcome provides an important source of motivation for engaging in the task (Bandura, 1986), and it has been consistently linked to academic persistence and interest outcomes (Eccles et al., 1983; Wigfield & Eccles, 2000). Holding expectations for success constant, people who place greater value on the outcome are more motivated to achieve (Bandura, 1986). In fact, value may even compensate for a low probability of success. For example, some people work toward goals that are highly unlikely: becoming a Broadway star, an Olympic gold medalist, or a professional football player. Value represents a critical impetus to behavior.

Achievement values are "the incentives or purposes that individuals have for succeeding on a given task" (Wigfield, 1994, p. 102). Achievement values affect how students approach, engage in, and respond to academic tasks (Hidi & Harackiewicz, 2000; Wigfield, 1994). "When students value a task, they will be more likely to engage in it, expend more effort on it, and do better on it" (Wigfield, 1994, p. 102). A number of different types of task values were proposed, including intrinsic value ("Is the task interesting or enjoyable to engage in?"), utility value ("Does the task help me meet other short-term or long-term goals?"), attainment value ("Does the task affirm an important part of my self-concept?"), and cost value ("What do I have to sacrifice to engage in this task?").

Intrinsic value is intrinsic motivation framed in a value context. For example, one has high intrinsic value for a task when an activity produces enjoyment (Wigfield, 1994). Interests and personal relevance produce intrinsic value for a student. Generally, students are intrinsically motivated to pursue activities that are moderately novel, interesting, enjoyable, exciting, and optimally challenging. When schoolwork is too easy, students become bored. When tasks are too difficult, students become frustrated and anxious (Deci & Ryan, 1985). *Utility value* is how the task relates to present or future goals. Even though students may not enjoy an activity, they may value a later reward or outcome it produces (Wigfield, 1994). The activity must be integral to their vision of the future, or instrumental to their pursuit of other goals. *Attainment value* is the importance students attach to the task as it relates to their conception of their identity and ideals (Eccles & Wigfield, 1995). The importance individuals attach to a task relates to their broader, core values they have about themselves (Wigfield, 1994). When comparing self-determination theory and expectancy-value theory, intrinsic value corresponds to intrinsic motivation, utility value resembles identified regulation, and attainment value resembles integrated regulation.

These central values contribute to whether students view specific activities as meaningful. For instance, intervening to change student values has been firmly linked to short-term academic trajectories. In their 2009 study, Hulleman and Harackiewicz found that writing short essays relating science to everyday life or future goals caused increases in student performance and interest. Harackiewicz and colleagues have conducted numerous studies on the role of interest and intrinsic value in predicting later outcomes (Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000; Harackiewicz, Barron, Tauer, & Elliot, 2002; Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008). For example, interest in psychology at the end of the first semester of college predicts majoring in psychology up to six years later. Similarly, students' perceptions of value for the course during the semester were the strongest predictors of interest other than baseline interest. In contrast, measures of academic ability before college (e.g., high school GPA, ACT, SAT) and college GPA did not predict majoring in psychology.

A large majority of the research applying expectancy-values models of motivation has excluded the cost component (Wigfield & Cambria, 2010), and until recently there was no comprehensive measurement tool that captured cost (Flake, Barron, Hulleman, McCoach, & Welsh, 2015). However, recent studies (Chen & Liu, 2009; Conley, 2012; Perez, Cromley, & Kaplan, 2014) and the development of a full scale (Flake et al., 2015) provide evidence that cost is a separate and important factor for student motivation, predictive of student outcomes in behavior in ways that expectancy and value are not. Flake et al. (2015) defined cost separately from value, as a negative appraisal of what is invested, required, or given up to engage

in a task. Snyder and Linnenbrink-Garcia (2013) discussed cost as being particularly important for the motivation of gifted students. They proposed that insufficient academic challenges early on in a gifted students' academic career can later cause cost, such as fear of failure or anxiety when challenges increase. They also describe gifted students experiencing opportunity cost or loss of valued alternatives when they are exposed to high volume work that is low in challenge.

Goal Orientation/Achievement Goal Theory

Achievement goal theory includes a set of frameworks (e. g., Dweck & Leggett, 1988; Nicholls, 1984) that situate student motivation in the context of goal directed behavior and desire for achievement. These goals are typically described as having two main facets: mastery and performance (for an overview see Pintrich, 2003). A *mastery goal* is one in which students desire to learn, develop new skills, and grow in relation to themselves, whereas a *performance goal* is one where the goal is directed at learning and growing compared with others (i.e., be the best you can be vs. be the best your class). In some frameworks (Elliot, 1999; Elliot & Church, 1997), these goals are further broken down into two types: approach, which describes a situation where the students strives to achieve, and avoid, where the student primarily focuses on avoiding failure or demonstrating low ability.

Generally, mastery goals have been found to be adaptive and linked to positive cognitive and behavioral outcomes, whereas performance goal effects have been less consistent (Covington, 2000). Though theoretically discussed as a maladaptive motivation component, some studies on performance approach goals have found positive associations with adaptive patterns of learning, whereas other studies have noted negative effects of performance approach goals on educational outcomes. In a review of the research on the effect of performance approach goals, Midgley, Kaplan, and Middleton (2001) found that the effects of performance approach goals vary depending on the learning context and student population studied. For example, performance approach goals tended to have a positive effect on learning and achievement more so for boys, older students, and in competitive learning environments. More nuanced articulations of goal theory have since emerged, where mastery goals and performance approach goals have been found to combine to create optimal motivation (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002).

Attributions and Mindset

Students' implicit beliefs about the nature of their abilities influence their resilience in the face of challenge and predicts their eventual performance (Yeager & Dweck, 2012). Implicit theories fall on a continuum from a fixed or *entity view* of one's abilities at one extreme to a malleable or *incremental view* at the other extreme (Yeager & Dweck, 2012). Those with an entity theory of intelligence implicitly believe that people have a fixed, unchangeable amount of ability. Those who espouse an incremental theory of intelligence believe that intellectual ability can be developed over time (Yeager & Dweck, 2012). Those with entity views of intelligence tend to see struggle and effort as signals that they lack natural ability, and they are more likely to attribute their failures to lack of ability. Those with incremental views of intelligence see effort as a necessary component of growth in an area and are more likely to attribute their failure to lack of effort, rather than lack of ability (Yeager & Dweck, 2012). This sentiment is also described in the attribution theory (Weiner, 1985), where student motivation has been found to be impeded when failure is attributed to stable factors (e.g., innate ability) versus unstable factors.

The view that one's learning and success are not fixed, based on their intelligence, but are a product of hard work and effort is often referred to as a growth mindset (Dweck, 2006). Those who hold a growth mindset exhibit higher levels of achievement. In longitudinal studies with middle school students and college students, those who held the belief that intelligence was fixed (i.e., not malleable) experienced flatter achievement trajectories, and for university students, higher rates of drop out (Blackwell, Trzesniewski, & Dweck, 2007; Dai & Cromley, 2014).

Individuals who believe intelligence is fixed hold an entity view of intelligence; those who believe

intelligence can be developed hold an incremental view of intelligence or growth mindset (Dweck, 2012). But can a person's orientation or mindset be changed? Psychological interventions designed to promote growth mindset, or change student attributions of failure to unstable factors, rather than stable factors, have been found to have large and long lasting effects on student performance and persistence (Ruthig, Perry, Hall, & Hladkyj, 2004; for a review, see Yeager & Walton, 2011). In a classic study, Mueller and Dweck (1998) found that students praised for their intelligence, versus hard work, were more likely to endorse performance oriented goals and less likely to persist in the face of task failure. In fact, the students who received praise for their intelligence, the condition designed to induce entity beliefs, solved 30% fewer problems on posttest than they did on the pretest. Students who received praise for their effort and process improved across time, and they were more interested in tackling challenging problems in the future (Mueller & Dweck, 1998; Yeager & Dweck, 2012). These original findings have been replicated across a variety of experimental studies in which students participate in a short course designed to change their theory of intelligence. In one intervention, they are told that failure is a part of learning (Wilson & Linville, 1982). In another intervention, they are told that they can "get smarter" by working on challenging tasks (Blackwell et al., 2007). Consistently, the students who receive the incremental feedback were more likely to achieve and persist in the face of a difficult task. Given the promise of these interventions, educational psychologists have been invited to discuss the feasibility of taking them to scale, and how to support further research in this area (Yeager, Paunesku, Walton, & Dweck, 2013).

The implications for gifted education are clear: Praising students for their intelligence can unwittingly undermine their resilience, especially in the face of challenges. Carol Dweck discussed the negative consequences of gifted students' adhering to a fixed mindset in her book *Mindsets and Malleable Minds* (2012):

> Many students who are academically advanced for their age may coast along getting top grades for some years. They may even come to believe that the very definition of being smart is the ability not to work hard and still do well, when others have to work at it. However, inevitably, at some point hard work devoted to mastery of skills or solving problems is required, and these students may not be able to produce it. Students labeled as gifted who start to let their grades slide may do so because they equate hard work with low ability. At some level, it seems that they would rather do poorly (and still be considered smart) than apply effort and feel dumb. (pp. 11–12)

Dweck's (2012) research seems to indicate that gifted students may be more prone to a fixed theory of intelligence, which would be detrimental to their motivation. However, very little research has examined the implicit beliefs of gifted children and the effects of those beliefs on gifted students' motivation and performance. In a recent study of academically gifted adolescents, researchers measured students' implicit beliefs about giftedness and intelligence. Participants endorsed stronger entity beliefs regarding giftedness (mean = 3.27) than they did about intelligence (mean = 2.56; Makel, Snyder, Thomas, Malone, & Putallaz, 2015), suggesting that these gifted students viewed intelligence as more malleable and giftedness as more fixed. Further, although a substantial number of participants viewed intelligence as malleable and giftedness as fixed, almost no students viewed giftedness as malleable and intelligence as fixed. However, generally, students' scores on the implicit beliefs scale were fairly low, suggesting that gifted students, in general, did not tend to endorse entity beliefs about intelligence. In another study, gifted students were more likely to attribute success and failure to long term effort than ability (Assouline, Colangelo, Ihrig, & Forstadt, 2006). Almost none of the students attributed their failures to lack of ability. However, a substantial percentage of students attributed their successes to ability. The gifted students in their study appeared to hold adaptive attributions about the roles of effort and ability in their successes and failures. Clearly, more

research in this area is needed, to better understand the theories of intelligence held by gifted students and how gifted programs influence those theories. However, these studies suggest that gifted students' attributions and beliefs may not be as negatively affected as is predicted by Dweck's (2012) theory.

Dweck's (2012) work on mindsets accentuates the importance of ensuring that gifted students are appropriately challenged in school from a young age. In this way, flow theory and mindset theory highlight challenge as a critical component for motivation. However, the reasons for the importance of challenge differ across the two theories. Dweck's theory of mindsets also warns us about the potential dangers of labeling students as gifted. Traditionally, the gifted label is quite stable and entity-laden, and its very stability is likely to fan the flames of a fixed mindset. If students hold a fixed mindset, they may associate having to work hard with having a lack of ability. Therefore, the first time that they are challenged, their self-efficacy may tumble.

Siegle and Reis (1998) found that gifted students see their achievement as more related to their abilities than their effort. Although the teachers' ratings of gifted middle school students' ability ($r = .81$) and effort ($r = .80$) were similarly associated with the quality of work these students produce, gifted students' ratings of themselves were not. Overall, gifted students' responses showed a stronger relationship between their perceived ability and the quality of work they reported they did ($r = .72$) than between their perceived effort and the quality of work they reported they did ($r = .34$). The authors suggest two possible explanations for these findings: These students believed their success was more contingent on their natural ability than the effort they put forth or they were simply reporting that they were not being challenged and therefore did not need to work hard to produce quality work. Both of these explanations undermine the motivation of gifted students.

Although Dweck's (2012) work on mindsets has received considerable attention in gifted education, there is some disagreement as to whether Dweck's theory is equally applicable to gifted students. For instance, Ziegler and Stoeger (2010) asserted that an entity theory of abilities does not necessarily lead to negative consequences for students with high abilities. In contrast to Dweck, they theorized that an entity theory would prove maladaptive for those with ability deficits, but would be beneficial for high ability students. Ziegler and Stoeger have conducted multiple empirical studies to test their theory. They hypothesized that (a) entity or stable beliefs might only be negative consequences when related to deficits in one's own abilities, and (b) modification beliefs could actually be maladaptive if/when individuals fear that their existing abilities might be lost. However, they hypothesized that viewing ability deficits as modifiable could be beneficial (Ziegler & Stoeger, 2010). In other words, believing in fixed abilities could be beneficial to those with high abilities and detrimental to those with low abilities. Their preliminary empirical research generally supports their theory; however, additional research is needed in this area.

RESEARCH REVIEW

Recent empirical research on motivation in gifted education tends to focus on comparisons of gifted achievers and gifted underachievers or comparisons of gifted students and nongifted students. There is some evidence that gifted students tend to exhibit greater intrinsic motivation than nongifted students, especially for academic tasks (Gottfried & Gottfried, 1996, 2004). Curby, Rudasill, Rimm-Kaufman, and Konold (2008) examined task orientation, which they defined as "task orientation refers to the ability to do and complete work even in an environment in which teachers may not be directly supervising the work or when there are distractions present. Students with higher task orientation at the beginning of kindergarten were more likely to be identified as gifted by third grade. In fact, task orientation was a larger predictor for gifted enrollment than children's cognitive ability.

Gifted students also may have more positive views of their abilities than nongifted students. Preckel, Goetz, Pekrun, and Kleine (2008) found that gifted students exhibited higher academic self-concept than students of average ability. However, there is little evidence to suggest that gifted students and non-gifted students differ substantially in terms

of their goal orientations. Preckel and colleagues (2008) found gifted girls were similar to girls of average ability in terms of mastery and performance goal orientation, although gifted boys scored higher than boys of average ability. A recent study of German fifth grade students found that students in gifted classes and students in general education classes did not differ in terms of mastery approach, mastery avoidance, performance approach, or performance avoidance in either mathematics or language arts (Meier, Vogl, & Preckel, 2014).

There is some evidence suggesting that gifted students may have higher need for cognition than nongifted students. Need for cognition is a construct that captures individual differences in people's tendencies to engage in and enjoy effortful cognitive activity, and it represents a relatively stable but malleable intrinsic motivation which is process oriented rather than outcome oriented (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Cacioppo et al. did explicitly address the theoretical relationship between ability and need for cognition, speculating that those who are intellectually gifted are likely to receive reinforcement for and competence feedback regarding their problem solving, which would positively reinforce their engagement in effortful cognitive activity. However, need for cognition represents a cognitive motivation rather than an intellectual ability; therefore, it should be positively related to, but not redundant with, measures of ability. "In this sense, need for cognition is analogous to individual differences in people's motivation to engage in effortful physical endeavors, which is related to but not the same thing as physical ability" (Cacioppo et al., 1996, p. 199). In the Meier et al. (2014) study, the students in the gifted classes did exhibit higher need for cognition. Recent research has demonstrated a moderate positive relationship between need for cognition and intelligence (Furnham & Thorne, 2013; Hill et al., 2013). However, the Meier et al. study appears to be the first research examining the construct of need for cognition within a gifted population. The relationship between need for cognition and intelligence could explain the observed difference between gifted and nongifted students on need for cognition.

The research evidence suggests that motivation plays a pivotal role in achievement, even for gifted students. Gifted achievers tend to exhibit higher motivation than gifted underachievers, a finding that has been replicated across multiple studies (Albaili, 2003; Clinkenbeard, 2012; McCoach & Siegle, 2003; Obergriesser & Stoeger, 2015). McCoach and Siegle (2003) examined whether gifted achievers and gifted underachievers differ in their general academic self-perceptions, attitudes toward school, attitudes toward teachers, motivation and self-regulation, and goal-valuation using a sample of 56 gifted underachievers and 122 gifted achievers from 28 high schools nationwide. Motivation/self-regulation and goal valuation were the best predictors of achievement status. The two subscales correctly classified 81.8% of the sample as either gifted achievers or gifted underachievers. There was a strong relationship between a student's goal valuation and his or her motivation/self-regulation to achieve those goals. Obergriesser and Stoeger (2015) compared gifted achievers and underachievers in terms of their emotions, motivation, and learning orientation. They found that gifted achievers displayed substantially higher academic self-efficacy and enjoyment than gifted underachievers. Gifted underachievers displayed greater anxiety. Most interestingly, gifted achievers and gifted underachievers had similar learning goal orientations. Additionally, Obergriesser and Stoeger examined the effects of an intervention to increase self-regulated learning. Gifted achievers and gifted underachievers participated in the intervention, and they benefitted from the interventions designed to increase self-regulation (Obergriesser & Stoeger, 2015). Future research should continue to explore the motivational differences of achievers and underachievers as well as the most promising practices for increasing gifted students' motivation and self-regulation.

SUMMARY AND CONCLUSIONS

Ability and motivation are critical components in the development of talents and in achieving high levels of expertise in a domain. Motivation includes personal and situational components, and it is domain specific. Therefore, although situational

factors can increase (or decrease) a students' motivation, individual differences remain. Although motivation clearly plays a pivotal role in the translation of ability to achievement, there is not strong evidence that motivation as a construct functions differently within a gifted population. Therefore, general research on motivation can be applied within the field of gifted education. However, general theories of motivation have important implications for the education of gifted students. Perhaps the most important implication of motivation research for those who work with the gifted is that it clearly demonstrates the importance of providing gifted students with stimulating challenge and teaching them to persist in the face of that challenge.

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