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### Author

Holland, Davin

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Self-Efficacy and Conceptions of Ability of Intelligence, Creativity, and Sport

By

Davin Duval Holland

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Committee in charge:

Professor Frank C. Worrell, Chair

Professor Susan Holloway

Professor Susan I. Stone

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## Abstract

## Self-Efficacy and Conceptions of Ability of Intelligence, Creativity, and Sport

by

Davin Duval Holland

Doctor of Philosophy in Education

University of California, Berkeley

Dr. Frank C. Worrell, Chair

Dweck (1986) hypothesized that some students believe intelligence is a stable quantity that cannot be altered (i.e., fixed) whereas other students view intelligence as a flexible trait that can be changed with effort (i.e., malleable). Presumably, students with a malleable belief about, or a malleable conception of, intellectual ability will be more efficacious in their academic performance compared to those with a fixed conception. Little research exists on the relationships between conceptions of ability and self-efficacy. Using a sample of 151 predominately Asian and Filipino American middle school students from an urban area, I examined the relationships among domain-specific conceptions of ability and domain-specific self-efficacy in the areas of intellectual, creative, and sport abilities. Participants were recruited from a school in the San Francisco Bay Area of the United States. Results indicated that conceptions of intellectual ability did not predict a meaningful proportion of the variance in academic self-efficacy and conceptions of creative ability did not predict a meaningful proportion of the variance in creative self-efficacy. Conceptions of sport ability accounted for a meaningful proportion of the variance in sport self-efficacy. There were no associations between conceptions of intellectual ability and self-reported grades. Implications of the findings within the field, limitations of the current study, and future directions of research are discussed.

### **Self-Efficacy and Conceptions of Ability of Intelligence, Creativity, and Sport**

Dweck's theory, the social-cognitive model of motivation, posits that individuals have implicit theories about their intelligence (Cain & Dweck, 1989; Dweck, 1986, 2000; Dweck & Leggett, 1988). Implicit theories are knowledge structures, also known as conceptions of ability or mindsets, which individuals have about the world. The application of Dweck's theory of conceptions of ability to other domains outside of intelligence is a new expansion of this field; much of the literature in the field focuses on how conceptions of intelligence impact academic achievement. Two new avenues of research expanding the social-cognitive model of motivation are conceptions of ability in the areas of creativity and sport; students spend much of their time in school and may spend time outside of school pursuing creative or sport activities.

Dweck (1986) postulated that conceptions of intelligence are related to academic outcomes through motivational variables and goals. Self-efficacy, a personal judgment about one's capabilities, is a motivational construct that may be one mediator through which conceptions of ability relate to academic achievement. Additionally, it is possible that individuals with malleable conceptions of ability may have higher self-efficacy than individuals with fixed conceptions of ability. Research on how the social-cognitive model of motivation relates to other factors, such as academic achievement and self-efficacy, is imperative in order to better understand the impact of the interventions that researchers, teachers, and school officials are using to foster malleable conceptions of ability in students (e.g., Boaler, 2016; Brock & Hundley, 2016; Dweck, 2006; Gerstein, 2016; Heggart, 2015). It is vital to understand how teaching growth mindset affects students' lives, motivation, and academic outcomes.

This dissertation study was conceptualized to respond to the need for additional and replicative evidence on the link between academic achievement and conceptions of intellectual ability. It was also conceptualized to examine the impact of self-efficacy on conceptions of intellectual, creative, and sport abilities. Examining conceptions of ability in the area of creative and sport abilities is important because these are two ways in which youth choose to spend time outside of school. According to the Department of Health and Human Services (2016), youth spend about 17 hours per week involved in sport and leisure activities, such as writing, drawing, and so forth. In addition, outside of the school environment, students receive messages about their abilities in sport and creative activities from others such as peers, coaches, or instructors, which likely impact their self-efficacy and conceptions of ability.

In this study, I examined how conceptions of ability were related to self-efficacy beliefs in the areas of intellectual, creative, and sport abilities in middle school youth. In addition, I attempted to replicate previous findings in the area of academic achievement and conceptions of intellectual ability. In the following pages, the first topic discussed is the social-cognitive model of motivation. I then review research on conceptions of ability in the areas of intelligence, creativity, and sport. The subsequent section of the dissertation is focused on the intersection of self-efficacy and conceptions of intellectual, creative, and sport abilities. I then discuss methods and results. Finally, I conclude with commentary on the findings within the overall literature, limitations of the current study, and future directions for research.

### **Social-cognitive Model of Motivation**

The social-cognitive model of motivation has roots in the general motivation literature. Dweck and colleagues' (Cain & Dweck, 1989; Dweck, 1986; Dweck & Leggett, 1988) theory developed out of the attempt to answer two questions: how individuals construe achievement situations and why individuals show marked differences in performance in response to challenge. They were interested, in essence, in understanding why individuals respond a certain way in the face of challenging achievement situations. Historical roots of the social-cognitive model of motivation and the theory of the social-cognitive model of motivation are discussed.

#### **Historical underpinnings of the social-cognitive model of motivation.**

Motivation, as defined by Bandura (1994), is the process of activation to some action. Currently, there are five main theories in the field of motivation: attribution theory, expectancy-value theory, goal orientation theory, self-determination theory, and social-cognitive theory (Cook & Artino, 2016). Although a review of each of these individual theories is outside the scope of the current paper, it is beneficial to review social-cognitive theory and goal orientation theory (for a full review, see Cook & Artino, 2016), as the social-cognitive model of motivation is a blend of these two motivational theories.

Dweck's (1986) social-cognitive model of motivation is primarily social-cognitive with elements of goal orientation theory. Social-cognitive theory (e.g., Bandura, 1994; Zimmerman, 2000) describes how individuals learn through the interactions among genetics, personal characteristics, the environment, and behavior. Dweck (1986) highlighted that beliefs individuals have about their intelligence come not only from themselves (i.e., genetics), but also from the messages they get from their environments, such as a classroom, other individuals, and their experiences. Social-cognitive theory also posits that self-efficacy beliefs *lead* to the actions that individuals take. Although Dweck's (1986) social-cognitive model of motivation does not directly highlight self-efficacy as a primary construct, it is possible that beliefs about intelligence (i.e., malleable or fixed) encompass elements of self-efficacy or may even actually be self-efficacy beliefs. Self-efficacy is a subjective judgment about one's ability to learn, which is highly similar to how individuals think about their intelligence or about their ability to perform on tasks related to intelligence. It is also possible that self-efficacy may function as a mediator between conceptions of ability and academic outcomes; in the current study I examine these relationships.

Dweck's (1986) theory also has elements of goal orientation theory. Goal orientation theory (e.g., Dweck 1986; Nicholls, 1984) is consonant with Dweck's theoretical underpinnings: individuals engage in tasks with pre-existing avoidance or mastery goals, have malleable or fixed mindsets, and are concerned about mastery or performance outcomes. As discussed later in the dissertation, Dweck's (1986) social-cognitive model of motivation focuses on helpless and mastery-oriented responses, which influence students' achievement goals and then subsequently the outcomes from their beliefs, goals, and behavior.

Unfortunately, the various theories in the field of motivation literature contribute to conceptual confusion. In a review of 68 studies in the motivational literature, Murphy and Alexander (2000) noted that many theorists use vocabulary specific to each theory. This practice creates conceptual confusion because, in reality, theorists are using different words for the same concept. Murphy and Alexander reported that some authors of

research studies in the field explicitly defined terms, some authors defined terms implicitly, and some authors did not define key terms at all. Different definitions of the same construct by researchers result in conceptual confusion in the literature.

Overall, Dweck's (1986) social-cognitive model of motivation is considered a social-cognitive theory, although elements of goal orientation are also present in the social-cognitive model of motivation. The differences in the theories may be due to differences in the labeling of the constructs. Dweck is arguably the most prominent researcher in the field of the social-cognitive model of motivation and her terminology of fixed and malleable conceptions will be used in the current study. In addition, as discussed later in the dissertation, Bandura's (1986) definition of self-efficacy is used. Both of these concepts are discussed in further detail in the following sections.

**The social-cognitive model of motivation.** Dweck and colleagues (Cain & Dweck, 1989; Dweck, 1986; Dweck & Leggett, 1988) developed a social-cognitive model of motivation that focuses on how students reason about their intelligence. In this model, Dweck and colleagues hypothesized that conceptions of intellectual ability lead to goal orientations, and then goal orientations lead to a behavioral response. They postulated that no direct relationship exists between conceptions of intellectual ability and a behavioral response.

Dweck (1986) stated that there are two main conceptions of ability: fixed or entity, and malleable or incremental. For the ease of understanding in the current paper, the terms fixed and malleable are used. Conceptions of ability are also called mindsets, beliefs of ability, and implicit theories. A fixed conception of intellectual ability refers to the belief that intelligence is a stable, permanent, and uncontrollable trait (Blackwell, Trzesniewski, & Dweck, 2007; Cain & Dweck, 1989). According to this view, individual intellectual ability is a fixed quantity that cannot be altered (Robins & Pals, 2002). Individuals with this belief are concerned about looking smart to others, validating their ability, and avoiding negative judgments about their ability (Henderson & Dweck, 1990; Stipek & Gralinski, 1996). Students with this conception tend to avoid challenges and withdraw effort if they believe they may fail (Henderson & Dweck, 1990).

Dweck (e.g., Cain & Dweck, 1989) hypothesized students with a malleable belief of intellectual ability view intelligence as a flexible ability that can be increased with personal effort. Students with a malleable conception of intellectual ability focus on learning new strategies, increasing their skills, and using problem-solving methods (Cain & Dweck, 1989; Henderson & Dweck, 1990). Rather than avoiding challenges, students with this conception look for challenging situations to develop new ways to achieve mastery (Stipek & Gralinski, 1996). They attribute failure to insufficient effort rather than to a lack of intellectual ability (Robins & Pals, 2002).

Dweck's (1986) model focuses on two response patterns to challenge: adaptive and maladaptive. An adaptive response pattern promotes the establishment and attainment of personally challenging achievement goals. An individual who employs this response pattern typically displays a mastery-oriented response, which includes behaviors such as seeking challenges, persisting in the face of obstacles, and the enjoyment of exerting effort on challenging tasks. The second response pattern, maladaptive, refers to the failure to establish personally meaningful, realistic goals or the failure to pursue goals within one's reach. A maladaptive response style typically leads to a helpless pattern.

When individuals fall into a helpless pattern, they tend to avoid challenges, do not persist when obstacles arise, show negative affect, and have negative self-cognitions.

Adaptive and maladaptive response styles influence goals that individuals choose for themselves. Dweck (2000) postulated that students pursue performance or learning goals through their understanding of and beliefs about their intelligence. Children begin to conceptualize intelligence when they enter into the educational setting and they continue to develop an understanding of intellectual ability as they continue schooling (Cain & Dweck, 1989). Dweck and colleagues stated that conceptions of ability and response patterns typically lead to one of two educational goals: a performance goal or a learning goal (Cain & Dweck, 1989; Dweck, 2000; Dweck & Leggett, 1988; Henderson & Dweck, 1990). Students with a fixed view of intelligence typically pursue a performance goal. They avoid making mistakes, avoid others' judgments about their ability, and try to prove or justify their ability. On the other hand, students with a learning goal want to increase their intelligence and learn new things. They are less concerned with negative judgments about their ability compared to fixed theorists. Individuals with a malleable view of intellectual ability tend to adopt learning goals.

Research in the area of conceptions of ability has largely focused on intelligence and goal orientations with less research conducted on applying conceptions of ability to other domains, such as morality, socialability, and so forth. Dweck, Chiu, and Hong (1995) did not take a strong stance on whether or not individuals can hold opposing conceptions in different domains (i.e., fixed for morality and malleable for socialability) or if individuals hold only one, general conception (i.e., either fixed or malleable). Dweck and colleagues stated that they generally believe that fixed and malleable conceptions are mutually exclusive. However, they also stated that it is possible under certain circumstances for one theory to be more accessible to an individual and postulated that conceptions of ability can be applied to other domains because they are knowledge structures that are associated with other areas outside of intelligence. They stated that issues of fixedness versus malleability are fundamental to human life; a child must understand that some objects vary and some do not.

Bempechat, London, and Dweck (1991) examined domain-specific conceptions of ability in the areas of sociability, physical skills, and physical appearance in elementary students. Overall, results indicated that younger children (i.e., kindergarten through second grade), employed one generalized conception of ability (i.e., either fixed or malleable) whereas older children (i.e., third through fifth grade) had differentiated conceptions of ability. For example, older children endorsed malleable conceptions for physical skills and fixed conceptions for physical appearance. Additional studies need to be conducted to determine if students hold one generalized theory or domain-specific theories.

In sum, the social-cognitive model of motivation focuses on two conceptions of intellectual ability: fixed and malleable (Dweck, 1986). Dweck and colleagues (Bempechat et al., 1991; Dweck et al., 1995) hypothesized that these conceptions of intellectual ability (i.e., fixed or malleable) lead to goal orientations (i.e., performance or learning), which subsequently lead to a behavioral response. Dweck and colleagues have been unclear about whether conceptions of ability are domain-specific. In one study, Dweck and colleagues (1995) stated that individuals typically hold only one orientation. In an earlier study, Bempechat and colleagues (1991) stated that conceptions of ability



might be applicable to other domains. Research on conceptions of ability outside of the area of intellectual ability in other domains is sparse. The current study filled a gap in the literature by examining conceptions of ability in the areas of intelligence, creativity, and sport in youth. Although students spend much of their time in school, which may be why research on conceptions of ability has primarily focused on intelligence and academic achievement, the ways in which students think about their leisure time, during which they might engage in creative pursuits or playing a sport, are also important.

### **Conceptions of Ability in Domains**

**Conceptions of intelligence and academic achievement.** Dweck's (1986) social-cognitive model of motivation serves as a general model for understanding student beliefs about their achievement because Dweck hypothesized that individual differences in beliefs of ability lead to differences in academic motivation and goals (e.g., Cain & Dweck, 1989). Dweck (1986) posited that differences in conceptions of intelligence lead to differences in academic achievement. Academic achievement has been operationalized as overall grade point average (GPA), individual class grades such as math grades and reading grades, standardized test scores, and so forth. In addition to the varied ways academic achievement is measured, some researchers choose to study either fixed conceptions or malleable conceptions, or they collapse fixed and malleable conceptions into one overall conceptions of ability indicator. These measurement techniques provide only a partial picture of the relationship between conceptions of intelligence and academic achievement.

Overall, effect sizes in the field of conceptions of intelligence and academic achievement are very small and are indicative of no relationship no matter which academic indicator is used. Blackwell and colleagues (2007) examined conceptions of intelligence in incoming seventh graders and found that conceptions of intelligence had no relationship with prior sixth grade math standardized test scores ( $r^2 = .01$ ) or current seventh grade math grades ( $r^2 = .01$ ). Other research has also examined conceptions of intelligence in the context of standardized test scores and individual class grades. In a sample of third to sixth grade students, Stipek and Gralinski (1996) found that effect sizes of correlations between fixed implicit theory scores and (a) math grades ( $r^2 = .01$ ), (b) pre-test ( $r^2 = .03$ ) and post-test ( $r^2 = .02$ ) standardized mathematics test scores, and (c) pre-test ( $r^2 = .06$ ) and post-test ( $r^2 = .05$ ) standardized reading test scores indicated no associations. Similarly, Robins and Pals (2002) found that having a fixed theory of intelligence was not associated with high school SAT scores ( $r^2 = .04$ ) or college grades ( $r^2 = .001$ ).

Aronson, Fried, and Good (2002) examined the relationship between malleable beliefs of intelligence and academic achievement in undergraduate students. They measured short-term conceptions of intellectual ability at the start of their study, implemented an intervention about conceptions of ability (e.g., malleable), and then measured long-term conceptions of intellectual ability a few months later. Results indicated that short-term malleable conceptions were not associated with participants' SAT scores ( $r^2 = .06$ ) or college GPA ( $r^2 = .03$ ). Similarly, long-term conceptions were also not associated with participants' SAT scores ( $r^2 = .03$ ) or college GPA ( $r^2 = .005$ ). Cury, Elliot, Da Fonseca, and Moller (2006) took a different approach and used a measure of processing speed and executive functioning on a test of cognitive ability as their academic achievement indicator. They found that a fixed conception of intellectual

ability had a negative effect on this measure in middle and high school students,  $F(1, 90) = 33.41, p < .001, \beta = -.41$ . This finding supports Dweck's (1986) model in which she hypothesized fixed conceptions of intelligence are negatively associated with achievement; it is possible in Cury and colleagues' study that students associate a skill such as processing speed with something that cannot be changed or altered. Processing speed is a very specific skill that is not representative of academic achievement measures used consistently in this field of research, unlike grades or standardized test scores.

In the literature, some researchers claimed that evidence supports a link between lower academic achievement and a fixed conception of intelligence (Cury et al., 2006; Stipek & Gralinski, 1996) and other researchers claimed that higher academic achievement is linked to a fixed conception of intelligence (Robins & Pals, 2002). However, when examining the practical significance of the research findings, effect sizes in this area are small. Generally, research examining the links among conceptions of intelligence and academic achievement suggests that there may be no relationship among these concepts. Individuals continue to investigate this field because some researchers choose to use statistical significance over practical significance or effect sizes, thus inflating interpretation of the results. In the current study, I used self-reported academic grades as an outcome and both statistical and practical significance for interpretation.

**Conceptions of creative ability.** Research on conceptions of ability in the area of creativity is in the early stages. Many authors in this field have examined creative conceptions of ability in the context of personality (e.g., Hass, 2014; Lee, Kim, Ryu, & Song, 2015). Very few studies have used Dweck's (1986) theoretical framework, which indicates that the application of Dweck's social-cognitive model of motivation to the field of creativity is relatively new. In fact, Karwowski (2014) and Hass, Katz-Buonincontro, and Reiter-Palmon (2016) noted that analyses of conceptions of creative ability in the creative literature are rare. In addition, research that has been conducted in this area has focused on young adult and adult populations. When applying Dweck's (1986) social-cognitive model of motivation to the field of creativity, it is hypothesized that individuals have a domain-specific mindset that is linked to goals and behavior in the creative domain.

In the new field of conceptions of creative ability, O'Connor, Nemeth, and Akutsu (2013) examined the relationships among conceptions of intellectual and creative abilities in two samples: a sample of undergraduate students in the United States (U.S.) and a sample of Japanese citizens ranging from 18 to 58 years old. In the American sample, having fixed views of intelligence had a substantial association with having fixed views of creative ability ( $r^2 = .25$ ). Moreover, fixed creativity scores had moderate inverse associations with creative thinking scores ( $\beta = -.31, p < .001$ ) and subjective creativity ( $\beta = -.26, p < .001$ ) whereas fixed intelligence scores had small positive associations with creative thinking ( $\beta = .10, p > .05$ ) and creative subjectivity ( $\beta = .17, p = .05$ ), suggesting that conceptions of ability may be domain specific. The results from the Japanese sample were similar. A fixed conception of intelligence had a moderate relationship with fixed beliefs ( $r^2 = .15$ ) and fixed beliefs in creativity predicted lower creative achievement ( $\beta = -.29, p < .001$ ). Fixed beliefs about intelligence were unrelated to creative outcomes ( $\beta = .11, p = .13$ ). The similarity in findings between U.S. college students and Japanese adults provided evidence for the generalizability of results to some populations outside of the U.S.

Unfortunately, O'Connor and colleagues (2013) did not provide information on the relationships among malleable views of intelligence, malleable views of creativity, and creative outcomes for either sample. Given that the authors used the social-cognitive model of motivation by Dweck and colleagues (Cain & Dweck, 1989; Dweck, 2000; Dweck & Leggett, 1988; Henderson & Dweck, 1990) as their theoretical framework, this study would have been more theoretically sound had the authors collected information on malleable conceptions of creative ability because fixed conceptions of creative ability are only one part of the model. Hass et al. (2016) also examined creative mindsets in college students but unlike O'Connor et al. (2013)'s study, the researchers examined both malleable and fixed conceptions of creative ability. Hass et al. (2016) reported no relationship between malleable and fixed views of creativity ( $r^2 = .01$ ), providing evidence that the two constructs are distinct.

Karwowski (2014) built on existing research in the area of creative mindsets by applying Dweck's (1986) theoretical framework in the area of creative abilities to Polish individuals ranging in age from 16 to 60 years old. Karwowski developed two 5-item scales to measure fixed and malleable beliefs in creative ability. Five items focused on effort, practice, and increasing talent and five items focused on innate ability, being born a certain way, and the idea that effort does not change one's ability. Karwowski used exploratory factor analysis and showed that fixed and growth mindsets constituted two different factors. Karwowski's findings have important implications in the literature because they suggest that it is possible to hold both fixed and malleable views, rather than one or the other.

Additional research is needed on conceptions of creative ability. Research in the field to date has focused on older populations above 16 years of age (Hass et al., 2016; Karwowski, 2014; O'Connor et al., 2013). In addition, O'Connor and colleagues (2013) only studied fixed conceptions of creative ability and did not study malleable conceptions of creative ability. Research is also needed, especially in younger populations, to determine if students tend to adopt fixed or malleable conceptions of creative ability. It is possible that individuals can hold both a fixed view of intelligence and a malleable view of creativity or vice versa. Additionally, none of the research conducted on mindsets and creativity has focused on youth below the age of 16 years old. Given the gaps in the existing literature, in the current study, I examined conceptions of creative ability in middle school students.

**Conceptions of sport ability.** Much of the literature in the area of conceptions of ability about athletics has focused on physical activity or physical education and has only recently started to focus on sport ability. Conceptions of sport ability are important to study because being involved in a sport may be more personally meaningful to students; students often choose the sport that they participate in and it is often something that they find rewarding. If they do not like a certain sport, they try another sport until they find something that they enjoy. Students are often required in their schooling to participate in physical activity or physical education, regardless of their desire to do so. Students may have different conceptions of ability about something they choose to do (i.e., a sport) compared to something they are required to do (i.e., physical activity and physical education).

Correlates in the physical activity and physical education fields of research have commonly focused on behavioral outcomes such as measures of physical activity, task

performance, self-handicapping, self-regulation, effort, and reactions to success and failure. Vella, Braithewaite, Gardner, and Spray (2016) conducted a meta-analysis of 43 studies focusing on conceptions of ability in the contexts of sport, physical activity, and physical education. Only 11 studies examined sport ability specifically and of those 11 studies, only three were conducted in the U.S. In the meta-analysis both adaptive (i.e., perceived competence and intrinsic motivation) and maladaptive (i.e., ego orientation and avoidance goals) outcomes were examined. Malleable beliefs of sport and physical ability and adaptive outcomes had a moderate, positive relationship ( $r^2 = .14$ ), and fixed beliefs and adaptive outcomes had no relationship ( $r^2 = .01$ ). There was no relationship found between maladaptive outcomes and malleable beliefs ( $r^2 = .002$ ) or between maladaptive outcomes and fixed beliefs ( $r^2 = .03$ ). Results generally indicated that individuals with malleable views of physical ability performed better on adaptive outcomes such as mastery climate ( $r^2 = .16$ ), which refers to seeking out an environment of effort and cooperation rather than seeking out an environment of competition and ego, and enjoyment of the activity ( $r^2 = .17$ ). In contrast with Dweck's (2000) theorizing, individuals with fixed views did not have a higher tendency to seek out performance situations in which they seek to prove their ability compared to individuals with malleable views ( $r^2 = .03$ ).

Vella and colleagues (2016) combined analyses from studies on sport, physical activity, and physical education. Thus, it is difficult to understand the relationship between conceptions of ability and sport alone. In the meta-analysis by Vella et al. (2016), perceived competence did not have a relationship with fixed beliefs ( $r^2 = .0004$ ) or with malleable beliefs ( $r^2 = .07$ ). Additional research is needed to examine whether there is a relationship between self-efficacy and conceptions of sport ability in U.S. youth.

Only a few studies have focused solely on sport ability in the U.S. Lirgg, Chase, George, and Ferguson (1996) examined undergraduate students' beliefs about their performance on two tasks: kung fu and baton twirling. The authors experimentally manipulated students' beliefs by having them read a paragraph of information in support of either a fixed or malleable view of sport ability. Results indicated that the participants in the fixed ability condition had lower ratings in their perceived ability to complete skills in both kung fu and baton twirling when compared with participants who received the malleable intervention.

Wang, Liu, Lochbaum, and Stevenson (2009) also examined conceptions of abilities about sport in U.S. undergraduates. Using students recruited from sport classes at the gym, the authors investigated perceived competence of ability, achievement goals, and intrinsic motivation. Results differed by students' level of competence. Individuals with higher competence reported higher intrinsic motivation ( $d = 1.33$ ), mastery ( $d = 1.12$ ), and performance approach goals ( $d = 1.03$ ) than individuals with lower competence. Individuals with higher competence also endorsed higher malleable conceptions of sport ability compared to those with lower perceived competence ( $d = .37$ ).

In England and France, Sarrazin et al. (1996) examined youth between the ages of 11 and 17 years old. They reported that there were no age differences in malleable or fixed beliefs (no statistics reported). Research in the sport and mindset field has also focused on a variety of outcome variables such as self-handicapping, effort, motivation, and

enjoyment. For example, Chen et al. (2008) found a moderate association between fixed conceptions of sport abilities and self-handicapping strategies in Taiwanese college students ( $r^2 = .13$ ). In a study of youth golfers from England, Spray et al. (2006) found a moderate effect size for fixed theorists to have stronger ability attributions for failure on a golf-putting task as compared to malleable theorists ( $d = .55$ ). A fixed conception of ability has been associated with less motivation whereas a malleable conception of ability has been associated with intrinsic motivation and enjoyment of the activity (Biddle, Wang, Chatzisarantis, & Spray, 2003; Wang & Biddle, 2001). One commonality in the literature is that research has found support for Dweck's goal orientations, such that those with malleable beliefs of sport abilities are more likely to choose learning or mastery goals (Sarrazin et al., 1996; Spray et al., 2006) and those with fixed beliefs are more likely to choose performance or ego goals (Spray et al., 2006).

Clearly there is a need for additional information on conceptions of sport ability in youth, particularly in the U.S. Few studies have been conducted specifically on sport ability; the majority of research in this field has focused on the relationships between conceptions of ability, physical ability, and physical education. One outcome of interest that is noticeably absent from the literature on sport and conceptions of ability is self-efficacy. Self-efficacy likely affects variables previously studied in the physical fitness field, such as motivation, effort, and competence. Understanding how conceptions of sport ability relate to self-efficacy is a completely new line of research that deserves consideration; participating in a sport is a way students spend time outside of school. They may receive messages from coaches that practice increases their skill level, which may mean that athletes and individuals who engage in a sport may be more likely to be malleable theorists. It is possible then that these messages may translate into other domains, if students have individualized, domain-specific theories rather than one overall, generalized theory. In the current study, I examined the relationships between conceptions of sport ability and self-efficacy.

### **Self-efficacy and Conceptions of Ability**

Bandura (1986) posited a social-cognitive theory of human functioning that incorporates three factors: (a) human behavior, (b) the environment, and (c) intrapersonal aspects in the form of affective, biological, and cognitive events. In order to function effectively in different environments, domains and tasks, individuals need both the skills in the specific domain and the belief that they can apply those skills in the specific domain (Bandura, 1997). Bandura (1977, 1986, 1994) termed this self-efficacy; self-efficacy refers to beliefs that individuals hold about their abilities and about the outcome of their efforts, which influences their behavior. Self-efficacy beliefs also affect how individuals think and feel. For example, if a student believes she cannot do well on a math test, she may not study because she feels that no matter what she does the outcome will result in a low math test grade. The student has low self-efficacy in both math and math test-taking abilities, and these beliefs in turn affect her behaviors.

Bandura (1994) hypothesized that self-efficacy arises from four different sources: (a) mastery experiences, (b) vicarious experiences from observing others, (c) verbal and social persuasion, and (d) emotional and physiological states. Mastery experiences influence self-efficacy through individuals' experiences with success and failure; success promotes belief in one's efficacy whereas failure undermines belief in one's efficacy. The second way self-efficacy arises is through vicarious experiences with social models.

A ninth grade student may compare her golf skills to a twelfth grade student as she observes the student practicing. The older student could influence the younger student's perception of her skills and her self-efficacy in golf. Bandura posited that social persuasion is the third way self-efficacy forms. Individuals are persuaded by others to master activities or to sustain effort, leading to a sense of high self-efficacy. Or, individuals may be dissuaded by others and give into self-doubt and ruminate on personal deficiencies, leading to a sense of low self-efficacy. The fourth way self-efficacy is fostered is through a person's own emotional and psychological states. A positive mood could lead to high self-efficacy whereas a stressed, anxious mood could lead to reduced self-efficacy.

Bandura (1994) proposed that self-efficacy beliefs affect human functioning four different ways. The first, cognitive processes, includes skills of cognitive processing, weighing options and choices, visualizing failure or success, and so forth. If individuals have a high level of self-doubt, then they have lower self-efficacy than people who believe they have effective coping mechanisms. The second way self-efficacy affects functioning is through motivational processes. Motivation affects the goals individuals set for themselves and outcome expectancies. In the context of motivation, outcome expectancies incorporate an individual's ideas about how his or her behavior produces an outcome and the personal value of the expected outcome. The third way is through affect processes; stress, anxiety, fear, confidence, and so forth affect an individual's functioning. If an individual is overwhelmed by a sense of worry about an upcoming tennis match, her confidence in her coping mechanisms may be impaired and affect her subsequent performance. Bandura (1994) indicated that the fourth way self-efficacy beliefs affect functioning is through selection processes. Individuals' beliefs influence which environments they spend time in and which activities they choose, which ultimately influence the path their life takes. Imagine an individual who challenges himself in college by selecting hard courses, engaging in extracurricular activities, and participating in community service. This individual's experiences then influence his career choice, his social network, his future job opportunities, and so forth.

Self-efficacy beliefs have been linked to various demographic variables such as gender and socioeconomic status. Socioeconomic status incorporates elements such as income and economic status, education, and social position. Wilson (1987, 1996) noted that lower socioeconomic conditions contribute to lower self-efficacy through mechanisms such as residential segregation, social isolation, and racial segregation. Boardman and Robert (2000) found support for this idea; in their study, higher socioeconomic status was associated with higher self-efficacy in youth. In regards to gender, Soller and Jackson (2018) found that female youth have reported higher self-efficacy with greater women's neighborhood resources, such as the percentage of women who are employed and the percentage of women who have college degrees. This study reflects elements of both socioeconomic status and gender; male youth did not have higher self-efficacy when women's neighborhood resources were high. Additional research in the area of self-efficacy and gender highlights a trend for males to have higher self-efficacy than females (Huang, 2013; Luszczyska, Scholz, & Schwarzer, 2005).

In sum, Bandura (1986; 1994) postulated a social-cognitive theory about self-efficacy and how self-efficacy beliefs impact human functioning. Bandura's model is similar to Dweck's (1986) model, such that both focus on how conceptions or beliefs

affect behavioral outcomes. Self-efficacy beliefs are powerful predictors of outcomes ranging from engaging in a healthy lifestyle (e.g., Nahas, Goldfine, & Collins, 2003; Wu, Pender, & Nouredine, 2003) to academic achievement (e.g., Ferla, Valcke, & Cai, 2009; Pajares & Valiante, 2006). Self-efficacy beliefs have been linked to gender (Huang, 2013; Luszczyska et al., 2005) and socioeconomic status (Boardman & Robert, 2000; Soller & Jackson, 2018). The relationship between self-efficacy beliefs and conceptions of ability in the areas of academic, creative, and sport abilities is less clear. Self-efficacy in the context of academic, creative, and sport abilities are discussed in the following sections.

**Academic self-efficacy and conceptions of intellectual ability.** A review of the intersecting literature fields of academic self-efficacy and conceptions of intellectual ability produced a small number of studies; all of the research in this area has been conducted in the academic subject of science. Chen and Pajares (2010) examined conceptions of intelligence and their relation to epistemological beliefs, achievement, and motivation in sixth graders. The authors used an adapted version of Dweck's (2000) Theories of Intelligence Scale; they chose six items and then re-worded them to ask students specifically about their abilities in science. They found a moderate, positive association between malleable beliefs in science and self-efficacy in science ( $r = .39, p < .0001$ ) and a moderate, negative association between fixed beliefs in science and self-efficacy in science ( $r = -.31, p < .0001$ ), such that individuals with malleable beliefs had higher science self-efficacy and individuals with fixed beliefs had lower science self-efficacy. Chen (2012) also examined malleable and stable beliefs about science, in addition to self-efficacy in science, in high school students. Chen (2012) used the same adapted conceptions of science ability measure as used by Chen and Pajares (2010). Chen found smaller effect sizes between self-efficacy in science and malleable beliefs ( $r = .28, p < .001$ ) and between self-efficacy and fixed beliefs ( $r = -.25, p < .001$ ).

Taken together, data from the studies indicated self-efficacy in science likely has a small to moderate relationship with malleable and fixed beliefs; individuals with malleable beliefs had higher science self-efficacy than those with fixed beliefs (Chen, 2012; Chen & Pajares, 2010). Further research needs to be conducted to see if this relationship would be the same across school subjects, rather than focusing specifically on science. In addition, research in this area has focused on high school students; further research needs to be conducted in middle school populations.

**Creative self-efficacy and conceptions of creative ability.** Literature on self-efficacy in the field of creativity has been linked to host of different constructs ranging from creative performance (e.g., Tierney & Farmer, 2011) to personality (e.g., Hass, 2014; Karwowski & Lebuda, 2016). Creative self-efficacy is defined as a person's beliefs about his or her ability to be creative (Beghetto, 2006) and is hypothesized to be a key factor in creative outcomes (Ford, 1996). Research on the relationships between creative self-efficacy and conceptions of ability is in the beginning stages. A review of the literature identified two published studies in this field.

Effect sizes in undergraduate students and adults between malleable views of creative ability and creative self-efficacy have indicated that if a relationship exists, it is small (Hass et al., 2016; Karwowski, 2014). In a sample of college students, Hass et al. (2016) claimed that a malleable view of creative ability was linked to self-efficacy ( $r^2 = .08$ ) and a fixed view of creative ability had a smaller relationship with self-efficacy ( $r^2 =$

.003). However, effect sizes indicated no relationships existed. Karwowski (2014) found a small relationship between a malleable view of creative ability and creative self-efficacy in Polish adults ( $r^2 = .11$ ). Karwowski (2014) reported no association between a fixed view of creative ability and creative self-efficacy ( $r^2 = .006$ ).

The scant literature examining the relationship between creative self-efficacy and conceptions of creativity has indicated a small relationship between malleable views of ability and creative self-efficacy may exist (Karwowski, 2014). Research indicated that no relationship existed between a fixed view of ability and creative self-efficacy (Hass et al., 2016; Karwowski, 2014). The literature to date has focused on adult populations; a gap in the field is examining the relationships in children and adolescents, which is addressed in the current study.

**Sport self-efficacy and conceptions of sport ability.** Literature examining conceptions of ability and sport self-efficacy, an individual's belief about succeeding in a specific sport, separate from physical education is sparse and research on sport self-efficacy has typically focused on task self-efficacy. Task self-efficacy refers to a person's ideas about their ability to complete a specific sport skill successfully; this is typically measured via self-report to one item. Hepler and Chase (2008) examined task self-efficacy of a softball skill in undergraduates who had played baseball or softball for two or more years. The authors showed students a video of various infield defensive situations and asked where the ball should be thrown next. Their measure of task self-efficacy was simply asking students how certain they were that they could successfully complete the throw. Task self-efficacy had a small, positive relationship with years of experience in softball ( $r^2 = .19$ ), indicating that students felt more efficacious the longer they had played the sport. In addition, the authors measured participants' ability to throw a softball and hit a target; the relationship between task self-efficacy and the physical task was moderate ( $r^2 = .30$ ).

Lirgg and colleagues (1996) also measured task self-efficacy and had college students rate how certain they were of their abilities to perform certain skills in two tasks: baton twirling and kung fu. As noted previously, the authors also completed a manipulation of fixed and malleable conceptions of sport ability; students were assigned to one of the two conceptions of ability (i.e., fixed and malleable) and given a paragraph to read on the conception of ability. Results differed by sport. In the sport of baton twirling, there was a small effect size in self-efficacy between those in the fixed and malleable conditions ( $d = .24$ ). A moderate difference was found between the fixed and malleable intervention conditions for kung fu such that those who participated in the malleable intervention had higher self-efficacy than those in the fixed intervention ( $d = .70$ ). There were no differences in self-efficacy among the malleable interventionists on the two sport tasks. In the fixed condition, students were more efficacious in baton twirling than kung fu ( $d = 1.03$ ). It is possible that participants perceived kung fu as a harder task than baton twirling.

In the broader area of physical exercise and activity, research indicates that self-efficacy accounts for around 15% of the variance in physical exercise. In a sample of 1,634 minority and low-SES high school students, self-efficacy explained 17% of the variance in vigorous exercise outside of school in males ( $p < .001$ ) and 19% of the variance in vigorous exercise outside of school in females ( $p < .001$ ; Lirgg et al., 1996). Similarly, Trost et al. (1996) reported that self-efficacy accounted for 14% of the



variance in daily vigorous activity ( $p < .01$ ) and 13% of the variance in daily moderate to vigorous activity ( $p < .01$ ) in a sample of predominately African American fifth graders. A meta-analysis examining the relationship between sport performance and self-efficacy in 45 studies showed an average correlation of .38 ( $p < .001$ ), indicating a moderate relationship between the two (Moritz, Feltz, Fahrbach, & Mack, 2000). However, correlations ranged greatly: from .01 to .79. The participants included in studies of Moritz et al.'s (2000) meta-analysis were required to have a mean age over 15 years. Additional research is needed to examine the relationship between self-efficacy and conceptions of sport ability in younger participants.

One general trend in the field is for males to have higher self-efficacy than females (Lirgg et al., 1996; Trost et al., 1996), although findings have been mixed by sport. For example, females had higher self-efficacy than males on baton twirling, but males had higher self-efficacy on kung fu than females (Lirgg et al., 1996). Conceptions of sport ability may play a role in gender differences in self-efficacy. How students think about the sport likely impacts how confident they are in a certain sport skill; research in undergraduate students showed that females had higher self-efficacy when receiving a malleable intervention as opposed to a fixed intervention (Lirgg et al., 1996).

In sum, one recurring issue in the field of sport self-efficacy is measurement; much of the research in this area has focused on a 1-item self-efficacy measure of a specific sport rather than a general scale of overall sport self-efficacy. In addition, research on how sport self-efficacy relates to conceptions of sport ability, particularly in youth, is scarce. In examining conceptions of sport ability, rather than overall physical activity, students focus on something personally relevant to them: a sport they choose to play. The goal in the current study was to make the area of sport personally relevant and accessible to students by having them report on a sport they were involved in. In the dissertation, I addressed a gap in the field by examining how conceptions of sport ability relate to self-efficacy in youth.

### **The Current Study**

The current study fills a number of gaps in the literature. Much of the research on conceptions of ability has been done in the area of intellectual ability (e.g., Dweck, 2000). In my study, I attempt to replicate previous findings in the field (e.g., Aronson et al., 2002; Blackwell et al., 2007; Robins & Pals, 2002; Stipek & Gralinski, 1996). Research on conceptions of ability in the creative and sport literatures is sparse, especially in youth populations. Research in the field of conceptions of creative ability has typically focused on undergraduate and adult populations. In the field of conceptions of sport ability, only three studies have been conducted on youth in the U.S. I add to the literature by examining three different conceptions of ability in the same middle school sample. In addition, I fill a gap in the field by investigating the relationships among conceptions of abilities and self-efficacy. Instead of using statistical significance, which has been used by previous researchers, I used practical significance in the form of effect sizes for interpreting results.

I examined the following research questions: (a) are conceptions of intellectual ability associated with grades (i.e., malleable conceptions and grades have a positive association such that higher malleable views are associated with higher grades, and fixed conceptions and grades have a negative association such that higher fixed views are associated with lower grades), (b) do conceptions of intelligence predict a meaningful

(i.e.,  $\geq 10\%$ ) proportion of the variance in academic self-efficacy, (c) do conceptions of creative ability predict a meaningful proportion of the variance in creative self-efficacy, and (d) do conceptions of sport ability predict a meaningful proportion of the variance in sport self-efficacy. I hypothesized that neither a fixed nor a malleable implicit theory of intelligence was linked to a higher grade point average (Aronson et al., 2002; Blackwell et al., 2007; Robins & Pals, 2002; Stipek & Gralinski, 1996). I hypothesized that conceptions of intelligence would predict a small proportion of the variance in academic self-efficacy (Chen, 2012; Chen & Pajares, 2010) and that conceptions of creative ability would not predict a meaningful proportion of the variance in creative self-efficacy (Hass et al., 2014; Karwowski, 2014). The literature has not allowed for a clear hypothesis regarding conceptions of sport ability and sport self-efficacy. For the purposes of this dissertation, correlations of .10 are interpreted as small associations, correlations of .30 are interpreted as medium associations, and correlations of .50 are interpreted as large associations.

## Method

### Participants

Participants consisted of 152 students attending an urban middle school in Northern California. They ranged in age from 10 to 15 ( $M = 12.06$ ,  $SD = 1.02$ ). About 50% ( $n = 76$ ) of the sample was male. Twenty-nine percent of students reported being in sixth grade ( $n = 44$ ), 39% of students reported being in seventh grade ( $n = 59$ ), and 31% percent of students reported being in eighth grade ( $n = 47$ ). One student did not report grade. Two percent of the sample indicated they identified with African American ( $n = 3$ ), 28% identified with Asian American ( $n = 42$ ), 17% identified with Biracial ( $n = 26$ ), 3% identified with European American ( $n = 5$ ), 31% identified with Filipino American ( $n = 46$ ), 9% identified with Hispanic American ( $n = 13$ ), about 1% identified with Native American ( $n = 1$ ), and 9% identified with other ( $n = 14$ ). One participant did not report ethnicity. A participant was removed from analyses because she answered inconsistently across the majority of the scales. For example, this participant reported, 1 (*strongly agree*) to “You can change even your basic intelligence considerably” and 6 (*strongly disagree*) to “No matter who you are, you can significantly change your intelligence level.”

### Measures

The surveys included items such as age, gender, grade level, socioeconomic status, and ethnicity. These items have been linked to academic achievement (Caskie, Sutton, & Eckhardt, 2014; Crane, 1996). Participants reported their gender, age, and grade level by responding to prompts such as, “What grade are you in?” In order to assess socioeconomic status (SES), participants responded to the question, “How would you describe your family’s socioeconomic status?” For this prompt, students could choose from one of the following categories: *poor*, *lower class*, *middle class*, *upper class*, and *wealthy*. This variable was coded such that lower values represented lower class and higher values represented higher class.

Academic achievement was measured two ways: self-reported GPA and self-reported grades. Given that middle school students may not know their GPA, students were asked to indicate their range of grades in addition to their GPA. Students chose from the following options: mostly As, mostly As and Bs, mostly Bs, mostly Bs and Cs, mostly Cs, mostly Cs and Ds, mostly Ds, mostly Ds and Fs, mostly Fs. The grades

variable was translated into a GPA-like variable; earning mostly As corresponded to 4.0, earning mostly As and Bs corresponded to 3.5, earning mostly Bs corresponded to 3.0, earning mostly Bs and Cs corresponded to 2.5, and earning mostly Cs corresponded to 2.0.

Participants were also asked to report if they play a sport, if they are involved in music (i.e., playing a instrument, singing in a choir or band, and so forth), and if they are involved in creative arts (i.e., drawing, dancing, and so forth). Although being involved in music is a creative endeavor, in the current study I examined it separately from other creative arts to see if one correlated more strongly with the outcome variable, creative self-efficacy.

**Conceptions of intelligence.** Dweck's (2000) 8-item Theories of Intelligence Scale was used to measure conceptions of intelligence (see Appendix A). The reliability of scores on the subscales (i.e., fixed and malleable) have ranged from .93 to .98 with a test-retest reliability of .80 over two weeks in previous research (Dweck, 2000; Dweck et al., 1995; Levy, Stroessner, & Deck, 1998). Four items assess a fixed conception of intelligence (e.g., "Your intelligence is something about you that you can't change very much") and four items assess a malleable conception of intelligence (e.g., "You can change even your basic intelligence level considerably"). Participants respond via a 6-point Likert-scale (1 = *strongly agree*; 6 = *strongly disagree*). This scale was reverse-coded such that higher endorsement of malleable views corresponded to higher malleable values and higher endorsement of fixed views corresponded to higher fixed values (1 = *strongly disagree*; 6 = *strongly agree*). Reliability estimates for scores on the fixed subscale were slightly lower in the current study than estimates in previous research. Table 1 displays all reliability estimates.

**Conceptions of creative ability.** Karwowski's (2014) 10-item scale, the Creative Mindset Scale, was used to measure conceptions of creative ability (see Appendix B). Five items assess a fixed conception of creative ability (e.g., "Some people are creative, others aren't—and no practice can change it") and five items assess a malleable conception of creative ability (e.g., "It doesn't matter what creativity level one reveals—you can always increase it"). Participants respond via a 6-point Likert-scale (1 = *definitely yes*; 5 = *definitely not*). After data collection, respondents' answers were reverse-coded so that higher endorsement of malleable views corresponded to higher malleable values and higher endorsement of fixed views corresponded to higher fixed values (1 = *definitely not*; 5 = *definitely yes*). Reliability estimates for fixed conceptions ( $\alpha = .79$ ) were higher than for malleable conceptions ( $\alpha = .65$ ) in Karwowski's (2014) sample. In the current study, reliability estimates were lower; see Table 1 for reliability estimates.

**Conceptions of sport ability.** The Conceptions of the Nature of Athletic Ability Questionnaire-2 (CNAAQ-2) is a 12-item scale used to assess conceptions of sport ability (Biddle et al., 2003; see Appendix C). Two subscales on the CNAAQ-2 reflect fixed conceptions (stable and gift; e.g., "To be good at sport you need to be naturally gifted") and two subscales reflect malleable conceptions (improvement and learning; e.g., "If you put enough effort into it, you will *always* get better at sport"). For the current study, the overall scale was split into two subscales: one fixed (using the stable and gift subscales) and one malleable (improvement and learning). Participants respond to both subscales via a 6-point Likert-scale (1 = *strongly disagree*; 6 = *strongly agree*), indicating that

higher values correspond to higher malleable or fixed views. Biddle et al. (2003) reported an internal consistency estimate of .74 for fixed items and .80 for malleable items. Reliability estimates for scores in the current study on both the fixed and malleable scales were the same or slightly lower. Table 1 displays all reliability estimates.

**Academic self-efficacy.** The Academic Self-Efficacy Scale is composed of six items (Midgley et al., 2000; see Appendix D). Actual publishing of the scale occurred after it had already been used in research (Midgley et al., 1995); Midgley and colleagues reported no psychometric properties in 2000. Items include “I can do even the hardest school work if I try” and “even if the work in school is hard, I can learn it.” Respondents answer via a 5-point Likert-scale (1 = *not at all true of me*; 5 = *very true of me*). Roeser, Midgley, and Urdan (1996) reported an internal consistency estimate of .86 for this scale’s scores in a sample of eighth grade students. Reliability estimates were slightly lower in the current sample. Table 1 displays all reliability estimates.

**Creative self-efficacy.** Researchers have typically used three items to capture creative self-efficacy (Beghetto, 2006; Karwowski, 2011; Tierney & Farmer, 2002, 2011). The three items used by Beghetto (2006) in middle and high school populations are used in the current study. One item is, “I feel that I am good at coming up with new ideas.” Participants respond by answering 0 (*false*) or 1 (*true*). Please see Appendix E for the items. An internal consistency estimate for the three items used by Beghetto (2006) was .86. Factor analysis in the current study indicated that all items had coefficients above .46: Item 1 (.78), Item 2 (.46), and Item 3 (.76). However, reliability estimates were low for the three items ( $\alpha = .38$ ,  $\omega = .43$ ). Given the results from factor analysis and the reliability estimates, the second item was dropped and the remaining two items were used together as a composite. See Table 1 for additional details.

**Sport self-efficacy.** The sport self-efficacy scale used in this survey is a new measure in development. I was unable to find a scale that focused specifically on sport self-efficacy compared to physical self-efficacy and that was appropriate for middle school students. The scale created for this study focuses specifically on the sport the respondent reported that they played, rather than overall physical self-efficacy. It is called the Sport Self-Efficacy Scale for Youth (SESY). The SESY is a 5-item measure and includes prompts such as, “I can learn the skills needed for the sport.” Participants respond via a 6-point Likert-scale (1 = *strongly disagree*; 6 = *strongly agree*). The full scale is found in Appendix F. Factor analysis indicated that all items had coefficients above .50: item one (.60), item two (.82), item three (.90), item four (.67), and item five (.50). Reliability estimates were above .80; please see Table 1 for full details.

## **Procedure**

**Data collection.** I contacted a school district in the Bay Area about conducting research. District personnel agreed to allow research to be conducted in their district and identified a school to target for research purposes. In the fall of 2017, students were sent home with an informational letter about the research study. Active parental consent and child assent forms were sent home two weeks following the first letter. The consent forms had options to choose to participate in the study or to decline to participate in the study. A student participated in the study only if he had signed the child assent and if his parent had signed and returned the parental consent form. There were approximately 650 students in the school. One hundred and fifty two sets of forms were returned, which is a

response rate of 23%. Students completed an online survey in the fall of 2017 during the school day. School officials chose a class that all students were enrolled in and students used laptops to complete the questionnaire during that time. The online survey took approximately 15 minutes to complete. In order to ensure students' answers were kept confidential, they were encouraged to keep answers to themselves and were reminded that only the researchers would see their answers, not teachers, school staff, or administrators. Teachers and school personnel did not have access to individual surveys. Information was de-identified immediately after data collection and encrypted; student identifiers such as names were removed. The Institutional Review Board at the University of California, Berkeley approved the study.

## Results

### Descriptive Statistics

Participants reported answers on demographic prompts. No participant identified as poor, 3% of the sample identified with lower class ( $n = 5$ ), 80% of the sample identified with middle class ( $n = 121$ ), 14% of the sample identified with upper class ( $n = 21$ ), and about 1% of the sample identified with wealthy ( $n = 2$ ). Two students did not report SES. In the current analyses, 60 participants did not report their GPA whereas all participants reported their grades. Thirty-four percent of students reported earning mostly As ( $n = 52$ ), 43% of students reported earning mostly As and Bs ( $n = 65$ ), 8% of students reported earning mostly Bs ( $n = 12$ ), 13% of students reported earning mostly Bs and Cs ( $n = 20$ ), and about 1% of students reported earning mostly Cs ( $n = 2$ ) or mostly Cs and Ds ( $n = 1$ ). No students reported earning mostly Cs and Ds, mostly Ds, mostly Ds and Fs, or mostly Fs.

Seventy-two percent of the sample reported playing a sport ( $n = 109$ ), 60% reported engaging in music ( $n = 90$ ), and 56% reported being involved in the creative arts ( $n = 84$ ). Participants were also asked how long many months they had been involved in their activity and how often they practiced their activity. For those who responded that they played a sport, 28% of students reported playing the sport for 48 months or more ( $n = 42$ ), 6% reported playing the sport for about 42 months ( $n = 9$ ), 11% reported playing the sport for about 30 months ( $n = 17$ ), 10% reported playing the sport for about 24 months ( $n = 15$ ), 3% reported playing the sport for about 18 months ( $n = 5$ ) or about 12 months ( $n = 5$ ), 2% reported playing the sport for about nine months ( $n = 3$ ), and about 7% reported playing the sport for six months or less ( $n = 10$ ). Three students did not report how long they had been involved in a sport. Seventy-six percent of respondents indicated they practiced on a daily or weekly basis ( $n = 76$ ). Three students did not report how often they practiced their selected sport.

In regard to music, 14% of the overall sample indicated they had participated for 48 months or more ( $n = 21$ ), 9% indicated they had participated for about 42 months ( $n = 14$ ), 7% indicated they had participated for about 30 months ( $n = 11$ ), 8% indicated they had participated for about 24 months ( $n = 12$ ), 4% indicated they had participated for about 18 months ( $n = 6$ ), 7% reported they had participated for about 12 months ( $n = 10$ ), 3% reported they had participated for about nine months ( $n = 5$ ), and 7% reported being involved for six months or less ( $n = 11$ ). Eighty percent of respondents involved with music indicated practicing on a daily or weekly basis ( $n = 80$ ). Twenty-seven percent of participants reported being involved with the creative arts for 48 months or more ( $n = 40$ ), 5% reported being involved for about 42 months ( $n = 7$ ), 2% reported being involved

for about 30 months ( $n = 3$ ), 1% reported being involved for about 24 months ( $n = 2$ ), 5% reported being involved for about 18 months ( $n = 7$ ), 4% reported being involved for about 12 months ( $n = 6$ ), 5% reported being involved for about nine months ( $n = 7$ ), and 8% reported being involved for six months or less ( $n = 12$ ). Fifty-six percent of respondents indicated they practiced creative arts daily or weekly ( $n = 53$ ).

### **Preliminary Analyses**

Analyses were conducted using SPSS (IBM, 2016). Expectation maximization was used to account for a small amount of missing data. Table 1 includes means, standard deviations, skew and kurtosis values, the number of participants that responded to each variable, and alpha and omega statistics of all the major variables. Time spent playing a sport, participating in the creative arts, or engaging in the musical arts were similar and around 30 months. The average GPA was high, which contributes to the elevated skew and kurtosis values of this variable. However, sixty-one participants did not report their GPA. The grades variable was similar to the average GPA and indicated that most students responded they received mostly As and mostly Bs. Malleable variables of intelligence, creativity, and sport were around 4.0 or higher, indicating the average reflected students mostly agreed with malleable statements. Fixed variables of intelligence, creativity, and sport were higher than 2.0, indicating the average reflected students disagreed with fixed statements. The mean of the academic self-efficacy variable corresponded with a qualitative description falling between *very true of me* and *somewhat true of me*, the mean of the creative self-efficacy variable corresponded with a qualitative description of *true*, and the mean sports self-efficacy variable corresponded with a qualitative description falling between *strongly agree* and *agree*. Skew and kurtosis values were acceptable.

Table 2 shows the correlations among the major variables. In general, most effect sizes were below the moderate range, although there were a few exceptions to this. Moderate, positive relationships were found between time spent involved in music or creative arts and age, which indicates that the older someone was the more likely they were to have spent time pursuing music or creative activities. The relationship between sport and age was much smaller. There was also a moderate, positive association between time spent engaging in sport and time spent pursuing creative activities.

Malleable and fixed conceptions of intelligence had a large, negative relationship, such that as malleable conceptions of intellectual ability increased fixed conceptions of intellectual ability decreased. Malleable and fixed conceptions of creativity had a negative, moderate association and was smaller compared to fixed and malleable conceptions of intelligence; as creative malleable conceptions increased, fixed conceptions decreased. Malleable and fixed conceptions of sport ability had a small, negative relationship. There were moderate, positive relationships between fixed conceptions of intelligence and fixed conceptions of creative ability, and between fixed conceptions of intelligence and fixed conceptions of sport ability. There was a positive relationship between fixed conceptions of creative ability and fixed conceptions of sport ability that fell just below the large range. Among the malleable variables, there were moderate, positive relationships found between the following: malleable conceptions of intelligence and malleable conceptions of creativity, and malleable conceptions of intelligence and malleable conceptions of sport ability. There was a relationship

approaching the large range between malleable conceptions of creativity and malleable conceptions of sport ability.

Academic self-efficacy and grades had a small, positive relationship, indicating students with higher grades had higher academic self-efficacy. There were small, positive relationships between the following: academic self-efficacy and creative self-efficacy, academic self-efficacy and sport self-efficacy, and creative self-efficacy and sport self-efficacy. Academic self-efficacy had a small, negative association with fixed conceptions of intelligence and a slightly larger, positive association with malleable conceptions of intelligence. Creative self-efficacy had small, positive relationships with fixed and malleable conceptions of creative ability. Sport self-efficacy had a moderate, positive relationship with a malleable conception of sport ability and a small, negative relationship with a fixed conception of sport ability, indicating that individuals who had higher malleable conceptions of sport ability had higher sport self-efficacy.

The first research question focused on determining if conceptions of intelligence were associated with grades, such that a malleable conception of intelligence was associated positively with grades and a fixed conception of intelligence was associated negatively with grades. There were two variables to examine in relation to conceptions of intelligence: GPA and grades. GPA had a small, negative association with fixed conceptions of intelligence and a small, positive association with malleable conceptions of intelligence. For grades, there was also a small, negative association with fixed conceptions of intelligence. There was no relationship between grades and malleable conceptions of intelligence.

### **Predicting Self-efficacy Using Conceptions of Ability**

Regression equations predicting self-efficacy were conducted separately for academic self-efficacy, creative self-efficacy, and sport self-efficacy with predictors entered in either two or three blocks. In all analyses, age, gender, and SES were entered in the first block and fixed and malleable conceptions were entered in the second block. For the third and fourth research questions, which focused on creative self-efficacy and sport self-efficacy respectively, time spent involved in the activity and whether or not students practiced the activity were entered into the third block. The full results are presented in Table 3.

In the first set of analyses, which focused on the impact of conceptions of intelligence on academic self-efficacy (Research Question 2), conceptions of intelligence did not account for a meaningful proportion of the variance in academic self-efficacy. The third research question focused on conceptions of creative ability and creative self-efficacy. Conceptions of creative ability did not account for a meaningful proportion of the variance in creative ability. However, in the third block, time spent practicing the musical or creative activity and the length that the individual had been involved in the activity accounted for 10% of the variance. The final research question, which focused on the impact of conceptions of sport ability on sport self-efficacy, had two blocks which were meaningful contributors to the variance in sport self-efficacy: Blocks 2 and 3. Block 2 included conceptions of sport ability, which accounted for 14% of the variance. Block 3 accounted for an additional 14% of the variance and included the time involved in the sport and the time spent practicing the sport. For all three research questions, the first blocks including age, gender, and SES, did not contribute to a meaningful proportion of the variance in academic, creative, or sport self-efficacy.

## Discussion

In this study, I examined the relationships among self-efficacy and conceptions of ability in different domains: intelligence, creativity, and sport. Results indicated that neither GPA nor self-reported grades had a relationship with either malleable or fixed conceptions of intelligence, which is consistent with existing literature in the field and contrasts with what Dweck (1986; 2000) posited in the social-cognitive model of motivation. Although Dweck and colleagues proposed that malleable conceptions of intelligence are positively associated with academic achievement and that fixed conceptions of intelligence are negatively associated with academic achievement (e.g., Cain & Dweck, 1989; Dweck, 1986), this did not hold true in the current study. The results of the replication from the current study and the overall literature in the field suggest that conceptions of intelligence have a small, if any, relationship with academic achievement. Despite the popularization of this theory by both research and the media, empirical evidence does not support an association.

Regression analyses indicated that conceptions of intelligence did not account for a meaningful proportion of the variance in academic self-efficacy and conceptions of creative ability did not account for a meaningful proportion of the variance in creative self-efficacy. However, fixed and malleable conceptions of sport ability accounted for a meaningful proportion of the variance in sport self-efficacy. Time spent engaged in the activity and the amount an individual practiced the activity also predicted a meaningful proportion of the variance in self-efficacy; this indicates that the length of time someone has been involved in an activity, in addition to how much someone practices the activity, impacts their self-efficacy.

### Using Conceptions of Ability to Predict Self-Efficacy

Research conducted on the intersecting fields of conceptions of intelligence and self-efficacy is in the early stages. In examining how conceptions of intelligence relate to academic self-efficacy, researchers have primarily focused on self-efficacy in the field of science. Previous research has found positive, small to moderate associations between malleable conceptions of science ability and science self-efficacy and negative, small to moderate associations between fixed conceptions of science ability and science self-efficacy (Chen, 2010; Chen & Parajes, 2012). The current study showed that fixed and malleable conceptions of intellectual ability did not account for a meaningful proportion of the variance in academic self-efficacy. The current study is the first in the field to focus specifically on academic self-efficacy; further research is needed to replicate the finding of no relationship. Although conceptions of intellectual ability did not account for a meaningful proportion of the variance in academic self-efficacy, the current study added to the literature by focusing on a sample of middle school students.

The body of literature in the field of conceptions of creative ability and creative self-efficacy is similarly small and all of the research in this area has been conducted with undergraduate students and adult populations. In this field, effect sizes among fixed and malleable beliefs about creative abilities and creative self-efficacy in these populations were very small, ranging from .006 to .11 (Hass et al., 2016; Karwowski, 2014). In the current study, I found that conceptions of creative ability did not account for a meaningful proportion in the variance of creative self-efficacy. Associations in the current study between creative self-efficacy and malleable conceptions of creative ability and between creative self-efficacy and fixed conceptions of creative ability were small.



Research in the field of conceptions of sport ability and sport self-efficacy is almost non-existent; previous research has examined task self-efficacy and physical abilities. Lirgg and colleagues (1996) conducted a fixed and malleable intervention; they found that individuals who received a malleable intervention were more self-efficacious in baton twirling and kung fu than individuals who received a fixed intervention. In the current study, I showed that conceptions of sport ability contributed about 14% of the variance in sport self-efficacy. It is interesting that conceptions of sport ability predicted sport self-efficacy, but conceptions of ability in the fields of intellectual and creative abilities did not predict self-efficacy. Perhaps individuals, specifically middle school students, believe that sport skill is something that is more changeable compared to creative or intellectual ability. Although a student may play a sport alone, when a student is a part of a sport team, they are usually required to attend regular practice and they receive messages about their abilities from coaches or other team members. In addition, there may be something about the developmental period of middle school such that conceptions of intellectual and creative abilities are not important influences on self-efficacy in those areas. Different results may be found at the elementary or high school levels. Conceptions of ability could be a more important contributor to self-efficacy for high school students; high school students typically are faced with decisions about the future such as studying for college entrance exams or separating from their familial households. Overall, future research is needed at different developmental levels to see if conceptions of ability contribute to self-efficacy. It is possible that alternative variables, such as study skills, coping strategies, and so forth may be affecting the relationship and acting as mediators between conceptions of intelligence and academic self-efficacy.

Overall, literature on conceptions of ability and self-efficacy is fairly new especially when looking at domain-specific areas such as creativity and sport. All of the results taken together, including previous research and the current study, indicate that conceptions of intelligence may not be an important predictor of self-efficacy in the areas of intellectual and creative abilities. Self-efficacy may not be an important mediator between conceptions of ability and academic outcomes. Practical significance in the area of conceptions of intelligence and academic achievement has been small. The current study mirrored these results. This is surprising because one would think that the way someone reasons about their intelligence subsequently affects their self-efficacy. That is not the case with current and past research. Additional research is needed to determine the presence of mediator variables on these relationships and if different results are found at different developmental levels.

### **Conceptual and Measurement Issues in the Field**

A number of issues exist in the field of conceptions of ability. One major conceptual issue is that many different theorists in the motivational literature use different vocabulary for similar constructs, leading to theoretical confusion (Murphy & Alexander, 2000). Researchers vary in defining key terms implicitly or explicitly; some do not define terms at all. It is possible that the construct of conceptions of ability may overlap, to some degree, with other constructs such as intrinsic motivation, interest, perceived competence, and so forth. As mentioned previously, researchers examining conceptions of intelligence tend to use a variety of scales or items to measure the construct. Dweck's (2000) Theories of Intelligence Scale is composed of 8-items. Some researchers have created their own scales (e.g., Berg & Sternberg, 1992; Cury et al., 2006; Stipek &

Gralinski, 1996) and some have used adapted scales where items have been changed, added, or deleted (e.g., Blackwell et al., 2007; Hong, Chiu, Dweck, Lin, & Wan, 1999; Robins & Pals, 2002). Additionally, some researchers choose to only measure one facet of conceptions of intelligence, either malleable (Aronson et al., 2002) or fixed (Stipek & Gralinski, 1996; Robins & Pals, 2002), but not both. It is important to have consistency across measurement in the field, especially in measuring the two facets of the construct.

One measurement issue in the current study is that internal consistency estimates were lower than estimates in previous literature. For example, Dweck (2000) has reported internal consistency estimates upwards of .93 on the Theories of Intelligence Scale. Reliability estimates for the current study, although still acceptable, were much lower and fell between .71 and .78 for scores on the Theories of Intelligence Scale (Dweck, 2000). The Conceptions of the Nature of Athletic Ability Scale-2 (Biddle et al., 2003) was similar, although slightly lower with internal consistency for items on the fixed subscale falling at .67. Internal consistency estimates for the Creative Mindset Scale (Karwowski, 2014) were even lower, with values ranging from .60 to .63.

There are a few possible reasons why the previous high internal consistency estimates were not replicated in the current study. One hypothesis is that current conception of ability scales have not been tested in ethnically diverse populations. Another reason why high internal consistency estimates may not have been replicated is that the scales may be poorly designed. The creative self-efficacy scale used by Beghetto (2006) did not work well in the current study. Factor analysis coefficients showed that all three items fell below .76, with the second item falling at .46. In the current study, the second item was dropped and the other two items used as a composite score. In addition, as noted above, internal consistency estimates on the Creative Mindset Scale (Karwowski, 2014) were not as high as in previous research. Scales should be tested on diverse populations, or authors should include a caveat that the scale may not be applicable to all individuals. A third reason why scores on the Creative Mindset Scale (Karwowski, 2014) and the Conceptions of the Nature of Athletic Ability Scale-2 (Biddle et al., 2003) did not have as high reliability in the current study as in past research is that they were not designed specifically with youth in mind. It could be that youth become taxed reading similarly-worded phrases, or perhaps items are written in a way that is difficult for younger populations to understand; scales should be developed specifically for youth.

Given that it was difficult to find a sport self-efficacy scale that was appropriate to use with youth, the SESY was developed for this study. The scale showed high internal consistency estimates (see Table 1). Although this scale worked well for the current population of predominately Asian and Filipino American middle school students, it is important that additional validation in other samples, such as with primarily African American students or with high school students, is conducted before the SESY is used in additional settings. It is possible that the scale may work differently outside of an urban setting or with other populations such as elementary or high school students.

### **Limitations and Future Directions**

The current study has a number of limitations. One limitation is that data were collected from a single school. The average GPA that students reported at this school was high and unfortunately, many students did not know their GPA. Thus, the results from this study cannot be generalized to the larger population of middle school students.

A third limitation pertains to how GPA and grade information was collected. Information on both constructs was collected via self-report from students. There is a possibility that students did not report true grades; participants could have reported desired rather than actual grades, or participants could have misremembered their grades and reported them incorrectly. A second limitation is sample size. It is possible that with a larger sample size, different results might emerge. Additionally, the sample was primarily composed of Asian and Filipino Americans. Different results might emerge in studies involving students from ethnic or racial groups other than those who participated in the current study.

It is important that future research considers the role of ethnic and racial background as a context that affects how students construe these motivational constructs, as well as their role in affecting student performance. Dweck and colleagues did not hypothesize that the social-cognitive model of motivation functions differently depending on ethnic background (e.g., Dweck, 1986; Dweck & Leggett, 1988). However, it has been found by other researchers that ideas about intelligence differ among various ethnic groups (Berry, 1984; Okagaki & Sternberg, 1993; Yang & Sternberg, 1997). For example, when compared to native-born American parents, immigrant parents from Cambodia, Mexico, the Philippines, and Vietnam rated characteristics such as social skills and motivation as more indicative of an intelligent child than verbal skills or problem-solving ability (Okagaki & Sternberg, 1993). It is possible that certain ethnic groups may be more inclined to ascribe to one particular conception of intelligence (i.e., fixed or malleable). It is also possible that the model does not function in the same way for all groups of individuals and perhaps for certain groups the social-cognitive model of motivation does not work.

In addition to a more ethnically balanced sample, it is important to collect information on elementary school students and high school students. In the current study, small associations were found between conceptions of intelligence and academic self-efficacy and between conceptions of creative ability and creative self-efficacy; it is possible that relationships may be found at different developmental levels such as in high school students. As mentioned previously, future research should also be conducted with elementary and high school students to determine if conceptions ability predict self-efficacy. In addition, research needs to be conducted on whether students have one generalized conception of ability that does not differ by domain, such as having a fixed conception of intellectual, creative, and sport abilities, or if students have individual domain-specific conceptions, such as a malleable conception of sport ability and a fixed conception of creative ability. This idea is unclear and relatively untested in the literature except for work conducted by Bempechat et al. (1991), which reported younger children had one generalized conception of ability (i.e., either fixed or malleable) whereas older children had differentiated conceptions of ability; it is an important next step in this field of research as finding suggest some students may hold differentiated theories.

### **Conclusion**

In the current study, I examined conceptions of ability and self-efficacy in the domains of intellectual, creative, and sport abilities in the same sample of students. Results from regression analyses indicated that conceptions of intellectual ability and conceptions of creative ability did not account for meaningful proportions of the variance of academic self-efficacy and creative self-efficacy, respectively. Conceptions of sport

ability accounted for a meaningful proportion of the variance in sport self-efficacy. Time spent engaged in the activity and whether or not an individual practiced the activity accounted for a meaningful proportion of the variance in creative self-efficacy and in sport self-efficacy. Future studies with larger populations are needed to replicate these findings. The current study and the review of literature suggest that despite the increasingly popularity of growth mindset in both research literature and in schools, conceptions of intellectual ability generally do not have strong, consistent, and meaningful relationships with self-efficacy.

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Table 1  
Descriptive Statistics

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Skew (SE)</i>	<i>Kurtosis (SE)</i>	$\alpha$	<i>CI</i>	$\omega$
Age	151	12.07	1.02	.62 (.20)	.47 (.40)	--	--	
SES	149	2.13	.46	1.34 (.20)	3.91 (.40)	--	--	
GPA	91	3.74	.39	-2.47 (.25)	8.67 (.50)	--	--	
Grades	151	3.48	.52	-.93 (.20)	.04 (.39)	--	--	
Time sport	106	33.03	15.09	-.47 (.24)	-1.17 (.47)	--	--	
Time music	90	28.37	15.60	-.05 (.25)	-1.51 (.50)	--	--	
Time creative	84	31.96	17.93	-.41 (.26)	-1.69 (.52)	--	--	
Fixed intell	151	2.61	1.00	.72 (.20)	.22 (.40)	.78	(.72, .83)	.78
Mall intell	151	4.97	.71	-.82 (.20)	.84 (.40)	.71	(.63, .78)	.71
Academic S-E	151	4.03	.61	-.78 (.20)	.49 (.40)	.72	(.65, .78)	.73
Fixed creative	151	2.18	.68	.57 (.20)	.20 (.40)	.62	(.52, .71)	.63
Mall creative	151	4.27	.55	-1.02 (.20)	1.48 (.40)	.60	(.48, .69)	.60
Creative S-E <sup>a</sup>	151	.82	.31	-1.56 (.20)	1.28 (.40)	--	--	--
Fixed sport	151	2.12	.59	.94 (.20)	1.60 (.40)	.67	(.58, .75)	.74
Mall sport	151	4.32	.52	-.62 (.20)	-.13 (.40)	.74	(.67, .80)	.69
Sport S-E	151	4.63	.87	-1.05 (.20)	1.68 (.40)	.82	(.77, .86)	.83

Note. CI = confidence interval, SE = standard error, S-E = self-efficacy.

<sup>a</sup>The entire creative self-efficacy scale is not being used due to low internal consistency estimates; reliability estimates were unable to be calculated due to only using two items in the analysis.

Table 2  
Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	--														
2. SES	-.07	--													
3. Grades	-.03	-.09	--												
4. GPA	.05	.11	.82*	--											
5. Tm sp	.15	.02	.10	.05	--										
6. Tm m	.43*	-.10	.01	.18	-.009	--									
7. Tm cr	.37*	.06	.06	.18	.33*	.15	--								
8. Fix in	-.17	.18	-.13	-.20	-.13	-.001	.04	--							
9. Mal in	-.06	.04	.02	.13	.08	-.05	-.07	-.51*	--						
10. Ac se	.02	.09	.27*	.23	.15	.13	-.04	-.24*	.28*	--					
11. Fix c	-.09	.01	-.08	-.06	.01	.08	-.02	.35*	-.19	-.15	--				
12. Mal c	.05	.07	-.01	.06	-.09	-.03	.17	-.20	.34*	.07	-.39*	--			
13. Cr se	-.12	.03	.16	.12	-.03	-.11	.09	-.05	.05	.14	.11	.20	--		
14. Fix sp	-.05	.17	.03	.02	-.07	-.05	.15	.35*	-.17	-.10	.45*	-.21	-.07	--	
15. Mall s	.07	.03	-.09	-.08	-.01	-.02	.07	-.05	.33*	.08	-.07	.46*	.10	-.12	--
16. Sp se	.09	.12	.02	-.003	-.28*	.12	.18	.06	.16	.26*	.001	.19	.23*	-.16	.34*

Note. Tm Sp = length of time sport since beginning sport, Tm m = length of time since beginning musical activity, Tm cr = length of time since beginning creative activity, Fix in = fixed intelligence beliefs, Mal in = malleable intelligence beliefs, Ac se = academic self-efficacy, Fix c = fixed creative beliefs, Mal c = malleable creative beliefs, Cr se = creative self-efficacy, Fix sp = fixed sport beliefs, Mall s = malleable sport beliefs, Sp se = sport self-efficacy.

\* $p < .01$ .

Table 3  
Regression Equations With Domain-Specific Self-Efficacy as the Dependent Variable

Predictors	Academic Self-Efficacy				Creative Self-Efficacy				Sport Self-Efficacy				
	B	$\beta$	$sr^2$	$R^2$	B	$\beta$	$sr^2$	$R^2$	B	$\beta$	$sr^2$	$R^2$	$\Delta R^2$
<b>Block 1</b>													
Constant	3.64*				1.02				4.21*				
Age	.01	.02	<.001		-.01	-.04	-.002		.01	.02	.05		
Gender	.03	.02	<.001		-.11	-.23	-.05		-.14	-.11	-.01		
SES	.12	.09	<.001	.01	.04	.08	.006	.07	.28**	.21	.04	.07	.07
<b>Block 2</b>													
Constant	3.16*				.98				2.68				
Age	<.001	-.001	<.001		-.02	-.08	-.005		-.01	-.02	<.001		
Gender	-.001	-.001	<.001		-.09	-.19	-.03		-.18	-.14	-.02		
SES	.15	.11	.01		.04	.09	.007		.19	.14	.02		
Fix	-.10	-.16	-.02		-.06	-.15	-.02		-.03	-.03	<.001		
Mall	.17	.19	.03	.07	.06	.14	.02	.12	.48**	.39	.14	.21	.14
<b>Block 3</b>													
Constant	--	--	--		.92				2.67**				
Age	--	--	--		-.02	-.06	-.002		-.05	-.08	-.01		
Gender	--	--	--		-.08	-.17	-.02		-.16	-.13	-.02		
SES	--	--	--		.02	.05	.002		.14	.11	.01		
Fix	--	--	--		-.07	-.16	-.02		-.004	--	<.001		
Mall	--	--	--		.04	.08	.004		.47**	.38	.14		
Pract	--	--	--		.09	.18	.02		.37**	.26	.06		
Time	--	--	--		.002	.18	.02		.01	.22	.04	.35	.14
Pract m	--	--	--		.07	.11	.01		--	--	--		
Time m	--	--	--	--	-.001	-.10	-.007	.22	--	--	--		

Note.  $sr^2$  = semipartial correlation,  $R^2$  indicates the adjusted  $R^2$  value. Under creative self-efficacy; pract refers to practicing a creative activity daily or weekly, time refers to length of time since beginning creative activity, pract m refers to practicing a musical activity daily or weekly, time m refers to the length of time since beginning musical activity. Under sport self-efficacy, pract refers to practicing the sport daily or weekly and time refers length of time since beginning sport.

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

*Appendix A*

## Theories of Intelligence Scale (Dweck, 2000)

- | 1                 | 2     | 3               | 4                  | 5        | 6                    |
|-------------------|-------|-----------------|--------------------|----------|----------------------|
| Strongly<br>agree | Agree | Mostly<br>Agree | Mostly<br>Disagree | Disagree | Strongly<br>Disagree |
- 
- \_\_\_\_\_ 1. You have a certain amount of intelligence, and you can't really do much to change it.
- \_\_\_\_\_ 2. Your intelligence is something about you that you can't change very much.
- \_\_\_\_\_ 3. No matter who you are, you can significantly change your intelligence level.
- \_\_\_\_\_ 4. To be honest, you can't really change how intelligent you are.
- \_\_\_\_\_ 5. You can always substantially change how intelligent you are.
- \_\_\_\_\_ 6. You can learn new things, but you can't really change your basic intelligence.
- \_\_\_\_\_ 7. No matter how much intelligence you have, you can always change it quite a bit.
- \_\_\_\_\_ 8. You can change even your basic intelligence level considerably.

*Appendix B*

## The Creative Mindset Scale (Karwowski, 2014)

1	2	3	4	5
Definitely Yes	Yes	Maybe	No	Definitely Not

- \_\_\_\_\_ 1. Everyone can create something great at some point if he or she is given appropriate conditions.
- \_\_\_\_\_ 2. You either are creative or you are not—even trying very hard you cannot change much.
- \_\_\_\_\_ 3. Anyone can develop his or her creative abilities up to a certain level.
- \_\_\_\_\_ 4. You have to be born a creator—without innate talent you can only be a scribbler.
- \_\_\_\_\_ 5. Practice makes perfect—perseverance and trying hard are the best ways to develop and expand one’s capabilities.
- \_\_\_\_\_ 6. Creativity can be developed, but one either is or is not a truly creative person.
- \_\_\_\_\_ 7. Rome wasn’t built in a day—each creativity requires effort and work, and these two are more important than talent.
- \_\_\_\_\_ 8. Some people are creative, others aren’t—and no practice can change it.
- \_\_\_\_\_ 9. It doesn’t matter what creativity level one reveals—you can always increase it.
- \_\_\_\_\_ 10. A truly creative talent is innate and constant throughout one’s entire.

*Appendix C*

## The Conceptions of the Nature of Athletic Ability Questionnaire-2 (Biddle et al., 2003)

1	2	3	4	5
Strongly Disagree	Disagree	Mostly Agree	Agree	Strongly Agree

My beliefs about ability in sport:

\_\_\_\_\_ 1. You have a certain level of ability in sport and you cannot really do much to change that level.

\_\_\_\_\_ 2. To be successful in sport you need to learn techniques and skills, and practice them regularly.

\_\_\_\_\_ 3. Even if you try, the level you reach in sport will change very little.

\_\_\_\_\_ 4. You need to have certain 'gifts' to be good at sport.

\_\_\_\_\_ 5. You need to learn and to work hard to be good at sport.

\_\_\_\_\_ 6. In sport, if you work hard at it, you will always get better.

\_\_\_\_\_ 7. To be good at sport, you need to be born with the basic qualities, which allow you success.

\_\_\_\_\_ 8. To reach a high level of performance in sport, you must go through periods of learning and training.

\_\_\_\_\_ 9. How good you are at sport will always improve if you work at it.

\_\_\_\_\_ 10. It is difficult to change how good you are at sport.

\_\_\_\_\_ 11. To be good at sport you need to be naturally gifted.

\_\_\_\_\_ 11. If you put enough effort into it, you will always get better at sport.

*Appendix D*

## The Academic Self-Efficacy Scale by Midgley et al. (2000)

1	2	3	4	5
Not at all true of me		Somewhat True of me		Very True of Me

- \_\_\_\_\_ 1. I'm certain I can master the skills taught in school this year.  
\_\_\_\_\_ 2. I can do even the hardest school work if I try.  
\_\_\_\_\_ 3. If I have enough time, I can do a good job on all my school work.  
\_\_\_\_\_ 4. I can do almost all the work in school if I don't give up.  
\_\_\_\_\_ 5. Even if the work in school is hard, I can learn it.  
\_\_\_\_\_ 6. I'm certain I can figure out how to do the most difficult school work.



*Appendix E*

The following three items were items used in Beghetto's (2006) work to measure creative self-efficacy. Students respond either with "True" or "False."

- \_\_\_\_\_ 1. I am good at coming up with new ideas.
- \_\_\_\_\_ 2. I have a lot of good ideas.
- \_\_\_\_\_ 3. I have a good imagination.

*Appendix F*

## The Sport Self-Efficacy Scale for Youth (SESY; current study)

1	2	3	4	5	6
Strongly Disagree	Disagree	Mostly Disagree	Mostly Agree	Agree	Strongly Agree

- \_\_\_\_\_ 1. I can definitely master the skills I need for the sport, even if it is hard.  
\_\_\_\_\_ 2. I am able to perform successfully in the sport.  
\_\_\_\_\_ 3. I am good at the sport.  
\_\_\_\_\_ 4. I can learn the skills needed for the sport.  
\_\_\_\_\_ 5. It is not hard for me to do well in the sport.