ABSTRACT

CONCEPTION OF ABILITY, SELF-EFFICACY, AND GOAL DISCREPANCY IN A RUNNING TASK

by Christopher Ryan Hill

The purpose of this study was to examine the relationships between self-efficacy, conception of ability, performance goal discrepancy, and future performance goal in a half mile running task. One hundred and two undergraduate students participated in this study. The participants were identified as either having an entity or incremental conception of ability and were randomized into a goal discrepant or goal reached group in a running task creating four groups; Entity Goal Reached, Entity Goal Discrepant, Incremental Goal Reached, and Incremental Goal Discrepant. Run performance was manipulated with false performance times indicating they had met or failed to meet their run performance goal. Participants responded to pre and post self-efficacy and goal setting questions. Results indicated that individuals in the Entity Goal Discrepant group set significantly slower post-run performance goals than the other three groups. The Entity Goal Discrepant group had higher post-run self-efficacy ratings.
CONCEPTION OF ABILITY, SELF-EFFICACY, AND GOAL DISCREPANCY IN A RUNNING TASK

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Christopher Ryan Hill
Miami University
Oxford, OH
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Advisor _____________________________
Melissa A. Chase, PhD

Reader ______________________________
Karly S. Geller, PhD

Reader ______________________________
Ronald H. Cox, PhD
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Chapter 1
Introduction

Usain Bolt entered the 2011 Track and Field World Championships in Daegu, South Korea as the clear favorite in the 100 meter and 200 meter races. He vocalized before the race that his goal was to win both of the races. As he took his position for the 100-meter race, most people knew that he was the man to beat. Unfortunately for him, things didn’t go exactly as planned and he failed to reach his goal. Bolt had a false start and was subsequently disqualified from the event. Shortly after the World Championships, Bolt turned his attention to the 2012 Olympics in London. While training, Bolt had a goal to improve his start and perform at his best to ensure he didn’t make the same mistake in the 2012 Olympics. Throughout training, Bolt kept his confidence high and set a performance goal to work towards during training, even after the disappointing result in the 100 meter race in South Korea just a year earlier. That goal was to come home from London with three gold medals, one in each of the races he was going to compete. In the days leading up to the race, Bolt was said to be very confident of achieving his goal in London. Bolt dominated his events in the London Olympics, defeating the competition handily in all three events. Bolt did achieve his goal in London and even set an Olympic record in the 100-meters, the same race in which he was disqualified at the World Championships.

Bolt provides a great example of an athlete who failed to reach a self-set performance goal but rebounded even stronger in a future performance. By setting an appropriate future performance goal to strive toward and keeping his confidence high, Bolt was able to reach his performance goal in the London Olympics.

Most exercisers and athletes set goals they would like to achieve in their respective activities (Kyllo & Landers, 1995). In the sport and exercise psychology field, there has been a lot of research on the topic of goal setting and how goals affect performance (Kyllo & Landers, 1995). However, very little research has evaluated what happens to athletes’ goals after they are either met or not met and how a discrepancy might affect other important variables for sport and exercise participation, such as, conception of ability (how one views their ability) and self-efficacy. The purpose of this study is to examine the relationship between self-efficacy, conception of ability, performance goal discrepancy, and future performance goals in a running task.
This chapter will review the literature in self-efficacy, conception of ability and goal discrepancy in sport and exercise psychology. First, self-efficacy theory (Bandura, 1977) is introduced with a definition of the theory, a description of the sources of self-efficacy, a summary of the self-efficacy research in sport, and an explanation of the relationship between self-efficacy and goal setting. Next, conception of ability is defined, a brief overview of differences in incremental and entity belief systems presented, as well as research on ability conceptions in the physical domain is reviewed. The next section describes previous research on goal discrepancy. Lastly, interactions between self-efficacy, conception of ability, and goal discrepancy research are reviewed.

Self-Efficacy Theory

Self-efficacy is defined by Bandura (1977) as “the belief in one’s capabilities to organize and execute the sources of action required to manage prospective situations.” Further, self-efficacy is a situation specific confidence that replicates an individual’s belief about his/her capability to successfully perform a skill or task (Bandura, 1977). Self-efficacy theory is rooted in social cognitive theory, which suggests individuals are active agents in their behavior rather than passive reactors to activities happening around them (Bandura, 1977). Since individuals are active agents in their environment, they use self-reflection and self-regulation to determine subsequent thoughts and behaviors.

Specifically, self-efficacy theory evaluates the role of belief patterns and how they influence goal directed behavior (Feltz, Short, & Sullivan, 2008). Previous research has found that efficacy beliefs are very specific to certain situations and are not a constant trait (Feltz, et al., 2008). This means individuals can have different efficacy beliefs for different skills even within the same sport. See figure 1 for an illustration of the relationships in self-efficacy theory. For this thesis, it is important to note that efficacy expectations influence thought patterns, such as goal choice (Feltz, 1982).

Sources of Efficacy Information

Originally there were four proposed sources of efficacy information; past performance accomplishments, vicarious experiences, verbal persuasion, and physiological states (Bandura, 1977). Past performance accomplishments are the most powerful of all of the sources of efficacy information because these are based on an individual’s previous experience completing or mastering a task (Bandura, 1997). These mastery beliefs become even stronger when the mastery
experience is replicated over time. Efficacy beliefs can decrease after an event in which an individual views as a failure (Feltz, et al., 2008). However, it is important to note that complacency after easy successes can occur, as well as greater effort after multiple failures (Bandura, 1997). Also, the relationship between effort and efficacy has been shown in adults to be individualized and many factors can contribute (Bandura, 1997). Past performance accomplishment information can have more of a positive impact on efficacy information if athletes view a past failure as a learning experience, as opposed to just a failure (Feltz, et al., 2008).

Figure 1. Relationship between sources of efficacy information, efficacy expectations, and behavior/thought patterns. (Adapted from Feltz, 1994)
Another source of efficacy information is vicarious experience, which is defined as viewing others do a task or modeling, as well as comparing one’s self to others. Observing others complete a task can provide an athlete informational feedback that can help him/her better learn a skill (Bandura, 1997). Even though vicarious experience is not as strong of an efficacy source as past performance accomplishment, it can be enhanced by techniques such as using a model that is similar to the athletes (George, Feltz, & Chase, 1992). For instance, it might be better for a female client to have a female personal trainer, rather than a male personal trainer demonstrate a specific weight lifting technique.

Verbal persuasion is defined as providing verbal feedback that could have informational aspects during the act of a performance (Bandura, 1977). Even though, as previously stated, past performance accomplishments are the most important source of efficacy information, some coaches believe verbal persuasion is the most effective way to increase self-efficacy in athletes (Weinberg & Jackson, 1990). Fitness professionals should also think about the type of feedback they are giving individuals because verbal persuasion can affect how much efficacy information they derive from an exercise experience. Feedback that is given to individuals that has informational aspects and focuses on improving the skill provides an athlete with more efficacy information than feedback that focuses only on the failures of the athlete (Feltz, et al., 2008). The influence of verbal persuasion information also depends on factors such as the credibility of the person providing the information (Feltz, et al., 2008). For instance, information given by a coach who is a known expert and has credibility amongst his/her athletes will carry more weight as efficacy information than feedback from a coach who is not an expert or does not have the respect of his/her athletes.

Physiological information was the last source of efficacy information Bandura (1977) proposed in his original article on self-efficacy. Physiological information is derived from an appraisal of the physical conditions or demands to complete a task. Many times, physiological information deals with the physical limitations some athletes encounter and could include information involving an individual’s pain, fatigue, strength, and fitness (Feltz, et al., 2008). Physiological information is a more salient source of efficacy information in physical tasks than non-physical tasks (Chase, Feltz, & Lirgg, 2003).

Maddox (1995) proposed two new sources of efficacy information; emotional states and imaginal experiences. Emotional states include how an individual appraises emotions and arousal
in certain situations, as well as how they deal with those feelings (Maddox, 1995). For example, this information could include whether an athlete views their pre-competition anxiety as either being facilitative or debilitative. Imaginal experiences can increase efficacy beliefs by imagining completing a task successfully (Maddox, 1995). Sport psychologists recommend the use of imagery to help athletes increase their confidence before a performance. In order for imagery to work, an athlete must be confident in his/her ability to have successful imaginal experiences (Feltz, et al., 2008).

**Self-Efficacy Research in Sport and Physical Activity**

Shortly after Bandura (1977) outlined self-efficacy theory, researchers started to test the theory in the sport domain. Weinberg, Gould, and Jackson (1979) examined modeling as a source of self-efficacy beliefs to influence performance and persistence in a leg muscle endurance task. Some participants in a high efficacy group competed against a confederate, who the participants were told had recently injured his/her knee. Participants in the low efficacy group were told they were competing against a varsity collegiate track athlete, who had very strong leg strength. The authors manipulated the task to make it easier for the confederate, which guaranteed the confederate would win each trial. The results of the experiment showed a significant relationship between self-efficacy and performance. Participants with higher efficacy performed better than participants with lower efficacy. Participants in the high efficacy group exhibited greater persistence after they experienced failure. The low self-efficacy group showed lower levels of persistence after they experienced failure. Results of this study supported self-efficacy theory.

The results from other studies continued to show the positive relationship between self-efficacy and performance. In 2000, a meta-analysis of 45 studies was conducted in order to evaluate the relationship between self-efficacy and sport related performance (Moritz, Feltz, Fahrbach, & Mack, 2000). The researchers coded each of the 45 studies to include six variables: correlation between self-efficacy and performance, type of self-efficacy measure, type of performance measure, concordance between self-efficacy and performance measures, nature of the task, and time of self-efficacy assessment in relation to performance. The authors noted the correlation between self-efficacy and performance was moderate and significant ($r = .38$). They provided specific suggestions for future self-efficacy research such as self-efficacy measures should be specific to the task, they should assess strength of self-efficacy, and self-efficacy
measurement should occur before and after a skill performance (Moritz, et al., 2000). The current proposal follows the suggestions outlined by the meta-analysis.

Self-Efficacy, Goal Setting, and Persistence

Bandura (1977) notes efficacy beliefs have an influence on individual’s behavior and whether they approach or avoid certain tasks. Self-efficacy has an influence on how people set goals (Bandura, 1997). Bandura (1977) stated, “By making self-rewarding reactions conditional on attaining a certain level of behavior, individuals create self-inducements to persist in their efforts until their performances match self-prescribed standards. Perceived negative discrepancies between performance and standards create dissatisfactions that motivate corrective changes in behavior.” Bandura clearly states that self-efficacy has a large impact on how people set goals, their effort, and why they continue to work toward accomplishing these goals.

Previous research shows that individuals tend to set goals they believe they can achieve, while avoiding behaviors in which they expect failure (Feltz, 1982). When people have accurate judgments about their own ability levels, they choose tasks that will be challenging yet are achievable. Athletes also tend to reset their goals to make tasks more challenging when a previous goal starts to come with relative ease (Feltz, et al., 2008). This supports the notion that individuals are active agents in their environments and do not passively react to the environment. Importantly, athletes tend to set goals based on previous experiences and their efficacious beliefs. When goals are not met, individuals who have higher efficacy beliefs will put forth more effort and approach the task with more persistent behaviors than individuals with lower efficacy beliefs. Therefore, individuals who repeatedly fail to meet their goals might feel their participation in the sport or activity is a lost cause and could stop putting forth effort (Feltz, et al., 2008).

An exaggerated discrepancy between the goal and performance could potentially undermine an athlete’s self-efficacy, negatively affecting how much effort an athlete puts forward and the athlete’s future sport participation (Feltz, et al., 2008). There has been some research conducted outside the sport domain suggests when high efficacious individuals do have discrepancies between their goals and actual performance, these individuals will readjust their goals to make them more appropriate for their skill level (Bandura & Cervone, 1983). Whereas, low efficacious individuals with a negative goal and performance discrepancy will give up (Bandura & Cervone, 1983).
Previous research has shown the important connection between self-efficacy and performance, as well as how self-efficacy can influence goal behavior in sport. There is much less published research examining what happens to self-efficacy and future goals following a discrepancy between a goal and actual performance with an exercise task in adults. More research is needed to understand how a performance goal discrepancy influences future self-efficacy and subsequent performance goal in adults. Some research has been conducted with children to examine a performance goal discrepancy and future self-efficacy (Chase, Ewing, Lirgg, & George, 1994). In this study, girls and boys rated their self-efficacy to make 10 basketball shots, performed 10 basketball shots, and then took a self-efficacy questionnaire asking if they were to complete the test again, how many shots would they make. The children predicted in the future they would make 7-8 baskets out of 10 on average, despite actually making only 2-3 shots during testing. Even after this large negative goal discrepancy, the children because of their high efficacy beliefs (Chase, Ewing, Lirgg, & George, 1994), indicated they would make more baskets in the future. Bandura (1977, 1986, 1997) has suggested one’s conception of ability might also be a factor in predicting this relationship. The next section describes conception of ability.

Conception of Ability

Conception of ability is an important construct in the sport domain. Bandura (1986) and Dweck (2000) have suggested conception of ability is based on whether an individual can understand and differentiate between the effort they put forth in a task and their personal ability. Bandura (1986) defines conception of ability as an individual’s judgment of capabilities as either an incremental skill or a stable entity. Dweck (2000) describes conception of ability as different ways people understand and view their personal ability. Dweck (2006) labels the two conceptions of ability as either an incremental or entity viewpoint. She defines an incremental conception of ability as someone who views his/her most basic abilities as being changeable through effort and practice, whereas someone who has a entity conception of ability views his/her basic abilities as limited and unchangeable through effort over time (Dweck, 2006). Research has noted that however an individual views his/her conception of ability this will affect his/her perceived present ability, which affects his/her behavior (Dweck & Leggett, 1988). Research suggests whenever people think ability is unchangeable, the successful performance of a skill is important, whereas someone with an incremental view of ability focuses on learning so
an unsuccessful performance of a skill is an opportunity to improve (Dweck & Leggett, 1988). Dweck and colleagues also proposed that when children with an entity conception of ability have high perceived ability they are mastery oriented and seek out challenges; but when they have low perceived ability they tend to be learned helpless and avoid challenges (Elliott & Dweck, 1988). When an incremental conception of ability is fostered, it does not matter whether the child views present ability as high or low because the chosen behavior pattern will always be mastery oriented and children will seek challenges that foster the learning experience (Dweck & Leggett, 1988). These research studies show a direct relationship between conception of ability and how people of all ages set and strive towards goals.

Dweck (2006) describes the important differences between entity and incremental conception of ability in individuals, particularly differences in how individuals face challenges, obstacles, criticism, and the success of others. When people with an incremental conception of ability are faced with obstacles they continue to persist even when setbacks are inevitable; compared to people with an entity view of ability who tend to become defensive and give up easily on difficult tasks (Dweck, 2006). Conception of ability also has an effect on the effort given to tasks. A person with an incremental ability conception views effort as an important step in mastering a task, as opposed to someone with an entity conception of ability who views effort as fruitless and an indication they are less skilled or talented (Dweck, 2006). Individuals with different conceptions of ability also approach or avoid tasks depending on their personal view of ability. An individual with an incremental ability conception tends to choose tasks that are challenging (Elliott & Dweck, 1988). Individuals who view their ability as a stable entity tend to choose a very easy task or an extremely difficult task in order to avoid threats to their self-concept (Elliott & Dweck, 1988).

Individuals with an incremental view of ability learn from criticism and do not view mistakes as a personal attack, whereas individuals with an entity conception of ability many times will ignore useful feedback because they do not want to have feelings of being insufficient (Dweck, 2002). Lastly, differences can be seen as to how individuals with differing conceptions of ability view the success of other people. An individual with an incremental conception of ability views the success of others as a learning experience. An individual with an entity conception of ability commonly feels threatened by other people’s success (Dweck, 2002). Dweck (2006) hypothesizes that because of these consequences an individual with an
incremental conception of ability is more often going to persist in different activities and grow to his/her full potential. But, an individual with an entity conception of ability will possibly plateau in his/her field and achieve less success (Dweck, 2006).

Ability conceptions can change over time (Li & Lee, 2004). Importantly, most of the research targeting conception of ability has explored the formation of ability of conceptions over important developmental time periods in children (Dweck, 2002). Research has shown when children are seven to eight years old, they can begin to understand that ability is a stable part of who they are (Dweck, 2002). By the age of 10 to 12 years old, some children begin to view their ability as capacity instead of a trait that can change over time (Dweck, 2002). Ability conceptions can be changed if a person approaches tasks with more of a mastery mindset than an outcome mindset (Dweck & Leggett, 1988).

Research has examined how conception of ability influences complex decision-making in a simulated managerial task (Wood & Bandura, 1989). In this study, Wood and Bandura manipulated the participant’s conception of ability, with the instructions of the task, by either stating that decision-making skills can be learned over time (incremental) or that decision-making skills are innate and represent an individual's overall cognitive capacities (entity). The findings suggest that conception of ability has a large impact on the self-regulatory mechanisms that influence performance. Importantly, this study showed that after initial failures from the entity group, performance dipped dramatically (Wood & Bandura, 1989). This shows the importance of what happens when someone with an entity mindset is faced with failure, performance can decrease. The authors noted that in order for someone with an entity mindset to overcome this performance decrement, the individual would need to have a robust personal efficacy (Wood & Bandura, 1989).

Although research stresses the importance of fostering an incremental mindset during critical periods of a young child’s life, some would argue the importance of continually fostering that type of environment during one’s entire life (Dweck, 2006). In the book *Mindset* by Carol Dweck (2006), she provides copious examples of musicians, athletes, businessmen, businesswomen, and other professionals describing how and why they fostered either an incremental or an entity conception of ability. The book thoroughly explains the importance of incremental conception of ability and how approaching tasks with an entity conception of ability can be detrimental to your career. Ability conceptions are a vital topic to research because of
their known ties to development and learning during all periods of the lifespan. The next section will focus on why these ability conceptions are important in a physical activity or sport domain.

Conception of Ability in a Physical Activity and Sport Domain

Most research conducted in the physical domain has been focused on the physical aspects of skill development, or the mental aspects of skill development and acquisition (Caudill, Weinberg, & Jackson, 1983; Feltz & Landers, 1983). Factors such as mental rehearsal (Feltz & Landers, 1983) and cognitive strategies associated with psyching-up techniques (Caudill, et al., 1983) have been shown to have a positive influence on the performance of motor skills.

Many times people have stated someone has “natural talent” or someone is “naturally gifted”. However, they neglect to mention the thousands of hours of practice an athlete has put in to look like a natural (Ericsson, Krampe, & Clemens, 1993; Jourden, Bandura, & Banfield, 1991). Athletic ability has some genetic physical dimensions (e.g., height, body type, and percentages of fast or slow twitch muscle fibers) but most dominant athletes develop their skill over intensive practice (Jourden, et al., 1991). In one study, the authors manipulated conception of ability for a motor skill by telling the participants that a certain skill was either inherent (only certain people could learn the task and it was based on natural capacity) or acquirable (the skill could be learned through practice and effort) (Jourden, et al., 1991). Results of the study showed individuals who viewed the skill as acquirable, learned the task at a much faster rate. The authors concluded that conception of ability has an influence on the rate and level of learning the skill. This study is consistent with previous work that has shown the importance of conception of ability (Elliott & Dweck, 1988).

Research has found that performers, who viewed the task as learnable, had a positive change in self-efficacy for the task, whereas, individuals who regarded the task as inherent derived little self-efficacy information from the task that they completed (Jourden, et al., 1991). Another study conducted in the physical activity domain examined the effect of a sex-type task on self-efficacy and conception of ability. The study asked college males and females to rate their self-efficacy on a masculine task, as well as their self-efficacy on a feminine task (Lirgg, George, Chase, & Ferguson, 1996). The authors concluded that males had lower self-efficacy than females in the feminine task and females had lower levels of self-efficacy for the masculine task (Lirgg, et al., 1996). Importantly, the results showed that participants who viewed their
ability as unchangeable were less confident about learning the task than those who viewed their ability as changeable (Lirgg, et al., 1996).

Conception of ability research is an important variable to study in all types of physical activity. Research has shown that an incremental conception of ability can lead to quicker learning times and more persistence in a task for individuals (Jourden, et al., 1991). Also, previous research has shed light on the relationship between ability conceptions and self-efficacy (Jourden, et al., 1991). However, research has not examined whether having an incremental or entity view of ability influences self-efficacy when participants have either reached a self-set performance goal or failed to reach a self-set performance goal.

Goal Discrepancy

Goal setting has been studied a multitude of times in sport (Brobst & Ward, 2002; Burton, 1989; Kingston & Hardy, 1997). However, research has reported inconsistent results in the effectiveness of goal setting (Weinberg, 1994). Weinberg (1994) has questioned whether setting goals for motivational purposes has an impact on performance of sport and exercise participants who are motivated already. Locke and Latham (1990) found that goals could enhance focus on a task, increase effort, encourage persistence when failure arises, and enhance the development of problem solving strategies. Overall, goal setting can be a valuable tool in sport and exercise if it is used correctly and efficiently (Locke, 1996).

Past research has shown that individuals tend to set goals that they are confident they can achieve and avoid goals that are too difficult to achieve (Feltz, 1982). Bandura (1997) proposes people who have accurate efficacy judgments set reasonably difficult goals and will set progressively more challenging goals as efficacy beliefs develop. Goal setting research has spread into the exercise psychology field, most importantly, examining how goal-setting influences exercise performance (Kyllo & Landers, 1995). Kyllo and Landers (1995) conducted a meta-analysis of goal setting research in sport and exercise and found setting goals in sport and exercise improves performance by 0.34 of a standard deviation. However, the authors note that whenever moderate goals are set, the effect of goal setting was maximized as demonstrated by a larger effect size of 0.53. Researchers also reported the potential to improve goal setting by selecting outcome goals, as demonstrated by an effect size of 0.93. In the conclusion of the meta-analysis, the authors state that more research needs to be conducted in sport and exercise.
psychology to be able to better generalize to more populations. One way to advance this research would be to test goal setting with exercisers with different conceptions of ability.

Research reports noteworthy methodological issues plaguing early goal setting studies (Locke, 1991), such as setting goals that are too easy or setting non-specific goals to the task at hand. Smith, Hauenstein, and Buchanan (1996) designed an exercise-based experiment to circumvent previous methodological issues. Smith et al. (1996) had participants complete a one and one-half minute sit-up task after being randomly selected to be in one of four groups; a specific difficult long-term goal group, a group who was given specific difficult goals for the long and short term, another group was told “do your best”, and the last group which was given no goals. The results showed that both groups with the specific, difficult goal conditions performed better in the post-test sit-up task than either the “do your best” group or the no goal group. These findings suggest that goal setting can be used effectively to improve performance in an exercise task.

Conclusion:

The purpose of this research is to examine how participants set future goals and judge their self-efficacy before and after either reaching their performance goal or failing to reach their performance goal in relation to their conception of ability. Bandura (1997) argues that when individuals with higher self-efficacy beliefs are faced with a negative performance discrepancy, the individuals will heighten their level of effort and persistence in the task if they have adequate self-efficacy beliefs and an incremental view of their ability. For example, Bandura and Cervone (1983) evaluated whether self-efficacy mechanisms can influence goal systems and motivation. They had subjects perform a strenuous physical stamina test on an ergometer and were either given a goal and performance feedback, a goal alone, feedback alone, or no feedback. The findings suggested that if a large negative performance discrepancy exists between an individual’s performance and goal, the individual’s self-efficacy might be undermined, leading to lower self-efficacy. Over time, individuals with high efficacy levels might readjust their goals and avoid undermining their self-efficacy.

Previous research has theorized if a goal is reached, individuals with a high level of self-efficacy tend to set increasingly more difficult goals in the future (Feltz, et al., 2008). Bandura (1997) hypothesizes that by continually setting challenging goals and maintaining efficacy beliefs, elevated levels of effort and intensity can be found even with discrepant results. To this point,
Bandura (1997) wrote, “Efficacy beliefs influence the level at which goals are set, the strength of commitment to them, and the strategies used to reach them, the amount of effort mobilized in the endeavor, and the intensification of effort when accomplishments fall short of aspirations” (p. 136).

The few studies that have been conducted with goal setting and exercise tasks have found goal setting is effective as a motivational tool (Smith et al., 1996). However, no published study to date has evaluated how a college-aged population reset performance goals after either meeting a self-set performance goal or being goal discrepant. Also, few studies have evaluated how conception of ability and self-efficacy might affect the setting of goals and how an individual’s conception of ability affects the setting of a future goal and future self-efficacy after a goal discrepant performance. This thesis is going to evaluate how conception of ability and self-efficacy influence individuals’ performance goals before a running task and how they reset performance goals after either reaching or failing to reach their performance goal. Figure 2 depicts the hypothesized relationship between the variables.

The following hypotheses will guide this experiment:
HO1: Participants who reach their performance goal will have higher post self-efficacy than participants who did not reach their performance goal.
HO2: Participants who reach their performance goal will set a faster post-run performance goal than participants who did not reach their performance goal.
HO3: Participants with an entity conception of ability will have lower post self-efficacy and a slower post run performance goal if they do not reach their performance goal than participants with an entity conception of ability who do reach their performance goal.
HO4: Participants with an incremental conception of ability will have higher post self-efficacy and post performance goals than participants with an entity conception of ability
HO5: The Entity Goal Discrepant Group will set slower post-run performance goal time and have lower post-run self-efficacy than the Entity Goal Reached Group, Incremental Goal Reached Group, and Incremental Goal Discrepant Group.
Figure 2: Diagram of the timeline of measurement.
CHAPTER 2
METHOD

The purpose of this study is to examine the relationship between self-efficacy, conception of ability, performance goal discrepancy, and future performance goal in a half-mile running task.

Participants

One hundred and two students from a midwestern university were recruited to participate in the study. The participants range in age from 18 to 34 years and have a mean age of 20.7 years. The sample of participants is 33% female and 67% male. The range of years of running experience is 1 to 18 and a mean of 7.6 years of running experience. Ninety-three percent of the participants are Caucasian, 6% of the participants are African American, and 1% of the participants are Hispanic/Other. The participants reported previous sport experience in activities such as basketball, football, soccer, track and field, and volleyball. None of the participants reported to have any injuries that could effect their participation in this research.

Instrumentation

Physical Activity Readiness-Questionnaire. The Physical Activity Readiness Questionnaire (PAR-Q) (Thomas, Reading, & Shephard, 1992) was used to screen participants for potential risks for exercise (See Appendix A). The stem of the questionnaire reads “Please read the following questions carefully and answer each one honestly:”. Participants are asked to respond either “Yes” or “No” to each of the questions. For example, sample questions include “Has a doctor ever said that you have a heart condition and recommended only medically supervised physical activity?” and “Do you have chest pain brought on by physical activity?”. Any participant that answered “Yes” to any of the questions on the PAR-Q was excluded from the study. Previous research studies have used the PAR-Q as a tool to screen college-aged participants who may not be healthy enough to participate in physical activity (Hansen, Stevens, & Coast, 2001; Thomas, Lewis, McCaw, & Adams, 2001).

Demographic Questionnaire. Information regarding the participant’s gender, age, ethnic background, experience in running and other sports, previous experience in road running races, and any injuries that could effect their performance in this study was collected with the demographic questionnaire (See Appendix B).
**Pre-Run Performance Goal Questionnaire.** The participants were asked to record a performance goal for the half-mile running test in minutes and seconds before the running test. The stem of the question read, “You are about to run a timed half mile on a treadmill. What is your goal time for running the half mile?” (See Appendix C). For data analysis, all pre-run performance goal times were recorded in seconds.

**Post-Run Performance Goal Questionnaire:** For the Post-Run Performance Goal Questionnaire, the participants were asked to record a performance goal if they were to run another half-mile running test in minutes and seconds in the future. The stem of the question read, “In the future, if you were to run a timed half mile on a treadmill, what would your goal time be?” (See Appendix D). For data analysis, all post-run performance goal times were recorded in seconds.

**Pre Self-Efficacy Questionnaire.** Self-efficacy was measured before and after the half-mile running test with a task specific questionnaire using Bandura’s (1997) single-judgment format. The Pre Self-Efficacy Questionnaire measured participants’ self-efficacy, both the level and strength, of their ability to successfully achieve their goal for the half-mile timed run. At the top of the questionnaire, the participants were asked to record their self-set performance goal for the upcoming half-mile timed run. The stem of the question read: “How certain are you that you can successfully run the following time in the half-mile run?” The participants then rated their degree of certainty to reach each performance level in the timed run by placing an X in the box reflecting their strength of certainty. The strength of certainty scale is a 10-point Likert-type scale ranging from 0% (uncertain) to 50% (somewhat certain) to 100% (very certain). Participants rated their degree of certainty to reach their goal in time increments of 15 seconds, with their goal time listed at the fifth level. Above the fifth level, times were slower than the goal time in 15 second intervals. Below the fifth level, times were faster by 15 second intervals. Self-efficacy strength was scored by summing all the strength scores and dividing by the number of levels of performance (10). The last performance level rated above zero percent represents the participants’ level of self-efficacy (See Appendix E). For data analysis, strength of self-efficacy scores was used.

**Post Self-Efficacy Questionnaire.** The structure of the post self-efficacy questionnaire was similar to the Pre Self-Efficacy Questionnaire (See Appendix F). Participants were asked if they were to attempt another half-mile run on a treadmill, to report their goal time at the top of
the page. The stem of the Post Self-Efficacy Questionnaire read, “If you were to complete this test again, how certain are you that you can successfully run the following times for the half-mile timed run?” The levels were set up in relation to their future goal time, similar to the Pre Self-Efficacy Questionnaire at 15 second intervals, slower above the fifth level and faster below the fifth level. For data analysis, strength of self-efficacy scores was used.

**Importance Question.** In order to gauge the importance of the task to the participant, an importance question was included in the study (See Appendix G). The question stated, “How important is it to you that you can perform this running task?” Participants rated the importance of the task on a 10-point Likert-type scale with scores ranging from 0 (not important at all) to 5 (sort of important) to 10 (very important). Previous research has used an importance rating of 5 or higher (George, Feltz, & Chase, 1992) because proper incentive to complete the task must be present for significant relationships between self-efficacy and performance to be found. Five participants were excluded from the analysis because they rated the importance of the task lower than 5. Fifteen individuals rated the importance at 5, fourteen participants rated the importance 6, thirty four participants rated importance at 7, twenty two participants rated the importance 8, ten participants rated the importance at 9, and seven participants rated the importance of the task 10.

**Borg Rate of Perceived Exertion Scale.** The Borg Rate of Perceived Exertion (RPE) Scale (Borg, 1982) was used to gather a reading of perceived exertion in the running task (See Appendix H). The scale ranges from 6-20 with 7 being labeled as “Very, Very Easy” and 19 being labeled as “Very, Very Hard”. The RPE scale was on a large poster in front of the treadmill, and at the end of the running task, the participant was asked “How hard on the RPE scale were you working at the end of the run?” The mean for participants was 14.02 with a range of scores from 9-19.

**Conception of Ability.** Conception of ability was measured using the Conceptions of the Nature of Athletic Ability Questionnaire-2 (CNAQQ-2) created by Biddle, Wang, Chatzisarantis, and Spray (2003) (See Appendix I). The CNAQQ-2 is a 12-item questionnaire that evaluates whether athletes view their athletic ability as more incremental or as a fixed entity. Biddle et al. (2003) describe an entity view of athletic ability as someone who sees his/her ability as relatively stable and will not change overtime. Someone who holds an incremental view toward athletic ability will view his/her ability as changeable with work over a period of time (Biddle et al., 2003). The stem of the CNAQQ-2 states “My beliefs about ability in sport:” followed by 12
items. An example of an entity view item in the CNAAQ-2 would be, “You have a certain level of ability in sport and you cannot really do much to change that level.” An example item evaluating an incremental view of athletic ability would be, “To reach a high level of performance in sport, you must go through periods of learning and training.” The response to each item was made on a 5-point scale anchored by 1 (strongly disagree) to 5 (strongly agree).

The CNAAQ-2 was scored by averaging both the entity and incremental subscale items separately (e.g., entity items 1, 3, 4, 7, 10, and 11 and incremental items 2, 5, 6, 8, 9, and 12). These means were used to determine whether participants view their athletic ability as more entity or incremental, with a higher score indicating a stronger belief. Previous research by Biddle and colleagues (2003) has suggested any individual who scored over 4.0 on the incremental subscale of the CNAAQ-2 had an incremental conception of ability. Anyone who scored under 4.0 on the incremental subscale and over 2.5 on the entity subscale had an entity conception of ability. Biddle et al. (2003) noted that the CNAAQ-2 has acceptable factorial, convergent, and discriminate validity.

**Running Task.** The half-mile running task was completed on a treadmill in a physiology laboratory. The treadmill speed was adjustable in increments of 0.1 MPH and could range from 0.1 MPH to 12.0 MPH. Participants were able to see the speed that they are running on the treadmill. However, the participants were told that the researcher on a stopwatch would keep the official time used to measure how fast they ran because the timer on the treadmill was broken. The time display on the treadmill was covered with a piece of paper so that the participants could not view the timer. Participants were also told not to adjust the grade on the treadmill and the grade was kept at 0% throughout the duration of the half-mile timed test. While on the treadmill, the participants wore a heart rate monitor and heart rate was recorded at the end of the half-mile running task. Heart rate was used as a measure of exertion during the running task.

**Heart Rate.** Heart rate was recorded using a Polar Heart Rate monitor. Participants were instructed to place the heart rate strap under their shirt and tighten the strap so the monitor would not move during the running task. Heart rate was recorded for each of the participants five seconds before the end of the running task. Heart rate will be used to gauge the amount of effort participants put forth in the running task.

**Performance Goal Manipulation.** In order to examine what happens when participants with either a perceived entity or stronger incremental conception of ability reach their goal or
experience a goal discrepancy, the feedback (actual running time) given to the participants was manipulated. The goal reached group, were told that they surpassed their written pre-run performance goal by 16 seconds. For example, a participant in the goal reached group with a pre-run performance goal of running a 3 minute and 30 second half-mile, was her running test was completed in 3 minute and 14 seconds. In the goal discrepancy group, participants were told they were 31 seconds slower than their goal time. For example, a participant in the goal discrepancy group with a pre-run performance goal of running a 3 minute and 30 second half-mile, was told that he ran a 4 minute and 1 second half-mile. Providing false feedback to the participant allows for the participant to experience either reaching a goal or having a goal discrepancy. The times used in this study were tested and developed in a pilot study that included graduate students.

*Manipulation Check Question.* A manipulation check question was used at the end of the study to test whether the false feedback was believable. Only three participants did not believe the false feedback and these people were eliminated from the study.

*Procedures*

Participation in this study was voluntary and the investigator obtained Institutional Review Board for Human Subjects Research approval (See Appendix J). Participants were recruited to participate in the study from undergraduate courses. Potential participants were contacted via the course instructor. After hearing a general purpose of the study, participants were offered a consent form agreeing to participate in the study and informing them of their rights as participants (See Appendix K). Participants then complete the Demographic Questionnaire, Pre-Run Performance Goal Questionnaire, Pre-Run Self-Efficacy Questionnaire, and the CNAAQ-2. Before filling out the Pre-Run Self-Efficacy questionnaire, participants were given a sample single-judgment self-efficacy questionnaire in order to reduce confusion about the way the self-efficacy questionnaire is completed (See Appendix L). While each participant prepared for his/her one-mile run, the researcher scored his/her CNAAQ-2 to determine if he/she was in the entity group or incremental group. Then, participants were randomized into either the goal reached or goal discrepant group. This resulted in four groups; entity goal reached, entity goal not reached, incremental goal reached, incremental goal not reached.

Participants then began the running task. Participants warmed up for two minutes on the treadmill at their own pace before the half-mile run test began. The participants were informed
that they would not know their time while running but would be able to see the speed display on
the treadmill. During the test the participants were in control of how fast they ran so that they
were comfortable with their speed. After the warm-up, the researcher checked to be sure the
participant was comfortable on the treadmill. To start the timed test, participants began running.
When they were comfortable and ready to start, they will said “go” and the researcher started the
timer. Once the participants reached the half-mile mark on the treadmill, the researcher said
“stop”, stopped the timer, and slowed the treadmill down to 2.0 Miles Per Hour for a two minute
cool down. The participant was asked to rate his/her perceived exertion on the Borg Rate of
Perceived Exertion scale (Borg, 1983). Then heart rate was recorded from a heart rate monitor.

Participants were given false feedback after they finish the half-mile run based on the
group in which they were randomized. The goal reached group was given feedback that they
surpassed their performance goal by 16 seconds regardless of their actual running time, while the
goal discrepancy group was given false feedback that they did not reach their goal by 31 seconds
regardless of their actual running time. Participants then completed the Post-Run Performance
Goal Questionnaire and Post-Run Self-Efficacy Questionnaire. At the conclusion of the study,
participants then responded to a manipulation check question to make sure the false feedback
given was thought to be truthful. Participants were then debriefed about the purpose of the study
and asked not to share the results of their participation with other potential participants.

Data Analysis

To test whether there were preexisting self-efficacy and run performance goal differences
between the four groups, an analysis of variance was run between the four groups for pre self-
efficacy and pre run performance goals. Each hypothesis was analyzed using analysis of variance
tests. All results were tested at the .05 level of significance.
The purpose of this study is to examine the relationships between self-efficacy, conception of ability, performance goal discrepancy, and future performance goal in a half-mile running task. Specifically, this study examined if participants, classified with either an incremental conception of ability or entity conception of ability would reset their running goal and change their self-efficacy after either reaching a goal or having a negative discrepancy with the goal. The results are presented three different sections. The first section presents the factor structure of the CNAAQ-2, explains how the conception of ability groups are formed, and provides results of pre-testing for pre-run self-efficacy and pre performance goals between all groups. The second section of the chapter explains the results of testing the stated hypotheses, examining the various relationships between goal setting, conception of ability, and self-efficacy. The third section outlines some exploratory analysis to examine the relationships between self-efficacy, conception of ability, performance goal discrepancy, and future performance goal.

Demographics

One hundred and two participants from a midwestern university participated fully in the study. Ten of the potential participants were excluded based on answering “yes” to one of the questions on the PAR-Q, meaning they were not physically eligible to participate in the study. The final analysis was conducted with 64 males (62.8%) and 38 females (37.2%) with an average age of 20.7 years old (SD = 2.13). The individuals who participated averaged 7.6 years of running experience (SD = 4.49). Ethnically, this is a very homogenous sample with 93% of the sample responding they were Caucasian, 6% responded African American, while 1% responded Hispanic.

Factor Structure and Internal Consistency

The validity factor structure of the CNAAQ-2 was examined using CFA in Mplus Version 5.21 (Muthen & Muthen, 2007). The validity factor structure is examined to ensure the measurement tool items loaded with similar items as found in previous research. Factor loadings, intercepts, variances, and residual variances were examined for direction of association and magnitude. Factor determinacy coefficients are estimates of internal consistency, with values from 0 to 1, and larger values indicating enhanced measurement of the factor of the observed items. A factor determinacy coefficient of >0.80 suggests strong correlation among items with
their respective factor. The closer the factor determinacy coefficient gets to 1, the higher internal consistency is in the measurement tool. The factor determinacy coefficient for the Entity subset of questions was 0.921, whereas the factor determinacy coefficient for the Incremental subset of questions was 0.923.

For the total sample, all freely estimated unstandardized parameters were statistically significant ($p = 0.003$). The residual variances and modification indices showed no poor fitting items with the solution. The standardized parameter estimates indicated the items were strongly related to their corresponding latent factors ($R^2 = 0.155-0.660$) (See Table 1). The two latent constructs were negatively correlated ($r = -0.444$). The factor determinacy coefficients met recommended standards by Gorsuch (1983).

Table 1.

R\textsuperscript{2} Estimates for the CNAAQ-2

<table>
<thead>
<tr>
<th>CNAAQ-2 Question</th>
<th>$R^2$ Estimate</th>
<th>Standard Error</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity 1</td>
<td>0.292</td>
<td>0.089</td>
<td>0.001</td>
</tr>
<tr>
<td>Entity 2</td>
<td>0.406</td>
<td>0.092</td>
<td>0.000</td>
</tr>
<tr>
<td>Entity 3</td>
<td>0.556</td>
<td>0.085</td>
<td>0.000</td>
</tr>
<tr>
<td>Entity 4</td>
<td>0.554</td>
<td>0.087</td>
<td>0.000</td>
</tr>
<tr>
<td>Entity 5</td>
<td>0.220</td>
<td>0.082</td>
<td>0.007</td>
</tr>
<tr>
<td>Entity 6</td>
<td>0.607</td>
<td>0.085</td>
<td>0.000</td>
</tr>
<tr>
<td>Incremental 1</td>
<td>0.155</td>
<td>0.074</td>
<td>0.035</td>
</tr>
<tr>
<td>Incremental 2</td>
<td>0.185</td>
<td>0.079</td>
<td>0.019</td>
</tr>
<tr>
<td>Incremental 3</td>
<td>0.647</td>
<td>0.079</td>
<td>0.000</td>
</tr>
<tr>
<td>Incremental 4</td>
<td>0.171</td>
<td>0.077</td>
<td>0.026</td>
</tr>
<tr>
<td>Incremental 5</td>
<td>0.660</td>
<td>0.079</td>
<td>0.000</td>
</tr>
<tr>
<td>Incremental 6</td>
<td>0.539</td>
<td>0.084</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Grouping by Conception of Ability

For the purpose of comparing differences in conception of ability in the different randomization conditions, four groups were created. Any individual who scored over 4.0 on the incremental subscale of the CNAAQ-2, was placed in an Incremental Group. Anyone who scored under 4.0 on the incremental subscale and over 2.5 on the entity subscale was placed into an
Entity Group. Participants were then randomization into the goal met or goal discrepant group, this further separated the participants into four groups. The groups were labeled Entity Goal Reached Group, Entity Goal Discrepant Group, Incremental Goal Reached Group, and Incremental Goal Discrepant Group. All groups were tested for pre-experiment differences in pre-test self-efficacy and pre performance goals for the running task. For a description of these groups see Table 2.

Table 2.
Means and Standard Deviations for Age and Years of Running Experience for Each of the Randomization Groups.

<table>
<thead>
<tr>
<th></th>
<th>Entity Goal Reached</th>
<th>Entity Goal Discrepant</th>
<th>Incremental Goal Reached</th>
<th>Incremental Goal Discrepant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 18 (M, SD)</td>
<td>n = 17 (M, SD)</td>
<td>n = 33 (M, SD)</td>
<td>n = 34 (M, SD)</td>
<td>n = 102 (M, SD)</td>
</tr>
<tr>
<td>Age</td>
<td>20.94 (0.87)</td>
<td>20.29 (0.99)</td>
<td>20.79 (2.42)</td>
<td>20.94 (2.66)</td>
<td>20.7 (2.13)</td>
</tr>
<tr>
<td>Years of Running Experience</td>
<td>9.67 (4.87)</td>
<td>7.53 (4.96)</td>
<td>6.82 (3.95)</td>
<td>7.47 (4.42)</td>
<td>7.66 (4.49)</td>
</tr>
<tr>
<td>Pre-Run Self-Efficacy</td>
<td>58.67 (10.12)</td>
<td>58.47 (15.07)</td>
<td>58.00 (12.68)</td>
<td>54.65 (11.34)</td>
<td>57.08 (12.21)</td>
</tr>
<tr>
<td>Pre-Run Performance Goal</td>
<td>250.83 (63.81)</td>
<td>263.24 (72.19)</td>
<td>250.30 (77.49)</td>
<td>223.53 (51.20)</td>
<td>243.63 (67.04)</td>
</tr>
</tbody>
</table>

Pre-test for Self-Efficacy and Pre-Run Performance Goal Group Differences

Prior to conducting any statistical analyses for the hypotheses, group means were examined to ensure the groups were similar at baseline measurements for self-efficacy and pre-run performance goals. Two separate ANOVAs were conducted. Results indicated there were no significant differences between the four groups in pre self-efficacy ($F(3,101) = 0.68, p = 0.567$) or pre-run performance goals ($F (3, 101) = 1.72, p = 0.168$). See Table 2 for means and standard deviations. The next section examines the hypotheses.
Post Self-Efficacy for Goal Reached and Goal Discrepant Groups

Hypothesis One stated that participants who reach their pre-run performance goal will have higher post self-efficacy than participants who did not reach their pre-run performance goal. An independent t-test to examine group differences in post self-efficacy between the goal reached and goal discrepant groups found there were no significant differences, $t(100) = 0.38, p = .69$, two-tailed. Levene’s Test for equality of variances was used to make sure the assumptions for a t-test were met. Results of the Levene’s Test indicated the assumptions were met. The post self-efficacy scores for the goal reached group ($M = 61.84, SD = 11.90$) was only slightly higher than the goal discrepant group ($M = 61.00, SD = 9.96$). Hypothesis One was not supported. See Table 3 for t-test results.

Table 3.

Results of the Independent T-Test for Post-Run Self-Efficacy between the Goal Reached and Goal Discrepant Groups.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal Discrepant Group</td>
<td>51</td>
<td>61.00</td>
<td>9.96</td>
<td>0.38</td>
<td>0.69</td>
</tr>
<tr>
<td>Goal Reached Group</td>
<td>51</td>
<td>61.84</td>
<td>11.90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Post-Run Performance Goals for Goal Reached and Goal Discrepant Groups

Hypothesis Two proposed participants who reach their performance goal will set a faster post-run performance goal than participants who did not reach their performance goal. An independent t-test was conducted to examine differences in post-run performance goals between the goal reached and goal discrepant groups. Results of the Levene’s Test indicated the assumptions were met ($p = 0.686$). The Goal Discrepant Group in the running task set a significantly slower goal time ($M = 243.92, SD = 60.43$) than the Goal Reached Group ($M = 213.43, SD = 58.40$), $t(100) = -2.59, p = .01$, two-tailed. Hypothesis Two was supported. See Table 4 for t-test results.
Table 4.
Results of the Independent T-Test for Post Run Performance Goal Between Goal Reached and Goal Discrepant Groups

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal Discrepant Group</td>
<td>51</td>
<td>243.92</td>
<td>60.43</td>
<td>-2.59</td>
<td>0.01</td>
</tr>
<tr>
<td>Goal Reached Group</td>
<td>51</td>
<td>213.43</td>
<td>58.40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Post-Run Performance Goals and Self-Efficacy for Conception of Ability Groups

Hypothesis Three stated participants with an entity conception of ability will have lower post self-efficacy and a slower post-run performance goal when they do not meet their pre-run performance goal than participants with an entity conception of ability who do reach their pre-run performance goal. An independent t-test was conducted to examine differences between the Entity Goal Reached Group and the Entity Goal Discrepant Group in post-run performance goal. Results of the Levene’s Test indicated the assumptions were met (p = 0.667). Results of the independent t-test indicated there was a significant difference in how individuals with an entity conception of ability reset their post-run performance goal, t(33) = -2.73, p = .01. The Entity Goal Reached Group set a significantly faster post-run performance goal (M = 213.06, SD = 62.33) than individuals in the Entity Goal Discrepant Group (M = 274.12, SD = 69.62).

An independent t-test was conducted to examine differences in post self-efficacy between the Entity Goal Reached Group and the Entity Goal Discrepant Group. Results of the Levene’s Test indicated the assumptions were met (p = 0.961). Results indicated there were no differences in post self-efficacy, t (33) = -.70, p = .488. The Entity Goal Reached Group (M = 64.67, SD = 10.23) and the Entity Goal Discrepant Group (M = 67.06, SD = 9.91) had similar post-run self-efficacy. Hypothesis Three was partially supported. See Table 5 for means and standard deviations.
Table 5.
Means for Post-Run Performance Goal and Self-Efficacy between Entity Goal Reached and Entity Goal Discrepant Groups.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity Goal Discrepant Self-Efficacy</td>
<td>17</td>
<td>67.06</td>
<td>9.91</td>
<td>-0.70</td>
<td>0.48</td>
</tr>
<tr>
<td>Entity Goal Reached Self-Efficacy</td>
<td>18</td>
<td>64.67</td>
<td>10.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entity Goal Discrepant Performance Goal</td>
<td>17</td>
<td>274.12</td>
<td>69.63</td>
<td>-2.73</td>
<td>0.01</td>
</tr>
<tr>
<td>Entity Goal Reached Performance Goal</td>
<td>18</td>
<td>213.06</td>
<td>62.34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Post Self-Efficacy and Post-Run Performance Goals for Entity and Incremental Groups

Hypothesis Four stated participants with an incremental conception of ability will have higher post self-efficacy and faster post-run performance goals than participants with an entity conception of ability. This hypothesis was tested using independent t-tests to evaluate the differences between the Entity and Incremental Groups for post self-efficacy and post-run performance goal time. Levene’s Test for equality of variances was conducted to make sure the assumptions for a t-test were met. The assumptions were met for each of the analyses. The Entity Group had significantly higher post self-efficacy \( (M = 65.83, SD = 10.01) \) than the Incremental Group \( (M = 59.12, SD = 10.75) \), \( t(100) = 3.06, p = 0.003 \), two-tailed. There was not a significant difference for the post-run goal time between the Entity Group \( (M = 242.71, SD = 71.99) \) and Incremental Group \( (M = 221.34, SD = 53.67) \), \( t(100) = 1.69, p = 0.094 \), two tailed. The results are presented in Table 6. Hypothesis Four was not supported.
Table 6.

Results of the Independent T-test for Post Self-Efficacy and Post-Run Performance Goal.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity Group Self-Efficacy</td>
<td>35</td>
<td>65.83</td>
<td>10.01</td>
<td>3.06</td>
<td>0.003</td>
</tr>
<tr>
<td>Incremental Group Self-Efficacy</td>
<td>67</td>
<td>59.12</td>
<td>10.75</td>
<td></td>
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</tr>
<tr>
<td>Entity Group Post-Run Performance Goal</td>
<td>35</td>
<td>242.71</td>
<td>71.99</td>
<td>1.69</td>
<td>0.094</td>
</tr>
<tr>
<td>Incremental Group Post-Run Performance Goal</td>
<td>67</td>
<td>221.34</td>
<td>53.67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Post Self-Efficacy and Post-Run Performance Goals for Conception of Ability and Goal Reached and Goal Discrepant Groups*

Hypothesis Five stated the Entity Goal Discrepant Group will set slower post-run performance goals and have lower post-run self-efficacy than the Entity Goal Reached Group, Incremental Goal Reached Group, and Incremental Goal Discrepant Group. Two separate ANOVAs were conducted; one to examine group differences in post-run self-efficacy and the other to examine group differences between post-run performance goals. A one-way ANOVA was run to determine group differences for post-run self-efficacy. There were significant differences in post self-efficacy between the groups, $F(3, 101) = 3.52, p = .018$. Post-hoc tests showed the Entity Goal Discrepant Group ($M = 67.06, SD = 9.91$) had significantly higher post-run self-efficacy scores than the Incremental Goal Discrepant Group ($M = 57.97, SD = 8.62$) ($p = .02$).

An ANOVA was run to determine group differences for post-run performance goals. There was a significant difference between the groups in the post-run performance goal after the completion of the running task $F(3, 101)= 4.65, p = .004$. Post-hoc comparisons using Tukey’s LSD indicated individuals in the Entity Goal Reached Group ($M = 213.06, SD = 62.33$) ($p = .013$), Incremental Goal Reached Group ($M = 213.64, SD = 57.14$) ($p = .004$), and Incremental Goal Discrepant Group ($M = 228.82, SD = 49.77$) ($p = .048$) all set significantly faster post-run performance goals than individuals in the Entity Goal Discrepant Group ($M = 274.12, SD = 69.63$). Hypothesis Five was partially supported. The results can be found in Table 7.
Table 7. Pre and Post-Run Performance Goals and Self-Efficacy for Each Group

<table>
<thead>
<tr>
<th></th>
<th>Pre-Run Performance Goal</th>
<th>Post-Run Performance Goal</th>
<th>Pre-Run Self-Efficacy</th>
<th>Post-Run Self-Efficacy</th>
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<tbody>
<tr>
<td>Entity Goal Reached</td>
<td>250.83 (63.81)</td>
<td>213.06 (62.34)</td>
<td>58.67 (10.12)</td>
<td>64.67 (10.23)</td>
</tr>
<tr>
<td>(n = 18)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Entity Goal Discrepant</td>
<td>263.24 (72.20)</td>
<td>274.12 (69.63)</td>
<td>58.47 (15.06)</td>
<td>67.06 (9.91)</td>
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<td>(n = 17)</td>
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<tr>
<td>Incremental Goal</td>
<td>250.30 (77.50)</td>
<td>213.64 (57.15)</td>
<td>58.00 (12.68)</td>
<td>60.30 (12.60)</td>
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<td>Reached Group</td>
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<td>(n = 33)</td>
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<tr>
<td>Incremental Goal</td>
<td>223.53 (51.21)</td>
<td>228.82 (49.77)</td>
<td>54.65 (11.34)</td>
<td>57.97 (8.62)</td>
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<tr>
<td>Discrepant Group</td>
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<td>(n = 34)</td>
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CHAPTER 4
Conception of Ability, Self-Efficacy, And Goal Discrepancy In A Running Task

Abstract

The purpose of this study was to examine the relationships between self-efficacy, conception of ability, performance goal discrepancy, and future performance goal in a half mile running task. One hundred and two undergraduate students participated in this study. The participants were identified as either having an entity or incremental conception of ability and were randomized into being goal discrepant or reaching a goal in an exercise performance creating four groups; Entity Goal Reached, Entity Goal Discrepant, Incremental Goal Reached, and Incremental Goal Discrepant. Each participant was given false feedback about his or her time after the half-mile running task. Participants responded to self-efficacy and goal setting questions before and after the task. Individuals in the Entity Goal Discrepant group set significantly slower post-run performance goals than the other three groups. However, the Entity Goal Discrepant group had higher post-run self-efficacy ratings.

Keywords
Self-efficacy, conception of ability, goal setting, running, exercise
Conception of Ability, Self-Efficacy, And Goal Discrepancy In A Running Task

Most exercisers and athletes set goals they would like to achieve in their respective activities (Kyllo & Landers, 1995). In the sport and exercise psychology field, there has been a lot of research on the topic of goal setting and how goals affect performance (Kyllo & Landers, 1995). However, very little research has evaluated what happens to athletes’ goals after they are either met or not met and how a discrepancy might be related to other important variables for sport and exercise participation, such as, conception of ability (how one views their ability) and self-efficacy.

**Self-Efficacy**

Self-efficacy is a situation specific confidence that replicates an individual’s belief about his/her capability to successfully perform a skill or task (Bandura, 1977). The self-efficacy and performance relationship has been examined for many years and summarized in a meta-analysis (Moritz, Feltz, Fahrbach, & Mack, 2000). Although the studies showed a wide range of correlations, overall self-efficacy and performance have a strong positive relationship (Moritz, et al., 2000).

Bandura (1977) notes efficacy beliefs have an influence on individual’s behavior and whether they approach or avoid certain tasks. Self-efficacy also has an influence on how people set goals (Bandura, 1997). Previous research shows that individuals tend to set goals they believe they can achieve, while avoiding behaviors in which they expect failure (Feltz, 1982). When individuals have accurate judgments about their own ability levels, they choose tasks they know they will be challenging but have a decent chance at achieving. These individuals also tend to continually change their goals to make tasks more difficult when a previous goal starts to come with relative ease (Feltz, et al., 2008). An exaggerated discrepancy between the goal and performance could potentially undermine an individuals’ self-efficacy, negatively affecting how much effort that individual puts forward and his/her future participation (Feltz, et al., 2008).

There has been some research conducted, outside the sport domain suggesting when high efficacious individuals do have discrepancies between their goals and actual performance, these individuals will readjust their goals to make them more appropriate for their skill level (Bandura & Cervone, 1983). However, low efficacious individuals with a negative goal and performance discrepancy will give up (Bandura & Cervone, 1983).
Previous research has shown the important links between self-efficacy and performance, as well as how self-efficacy can influence goal behavior. Bandura (1977) stated, “Perceived negative discrepancies between performance and standards create dissatisfactions that motivate corrective changes in behavior.” Research in the exercise domain has yet to evaluate how an individual’s view of their personal ability influences the corrective changes in behavior. Also, there has not been any published research explaining what happens to self-efficacy after a discrepancy between a pre-performance goal and actual performance with an exercise task in adults. More research is needed to understand how a performance goal discrepancy influences future self-efficacy and subsequent performance goal in adults.

**Conception of Ability**

Dweck (2000) describes conception of ability as different ways people understand and view their personal ability. Dweck (2006) suggests the two conceptions of ability are either an incremental or entity viewpoint. She defines an incremental conception of ability as someone who views his/her most basic abilities as being changeable through effort and practice, whereas someone who has an entity conception of ability views his/her basic abilities as limited and cannot change his/her ability through effort over time (Dweck, 2006). She goes on to further explain that how an individual views his/her ability will affect his/her perceived present ability, which affects his/her behavior (Dweck & Leggett, 1988).

Physical ability has some genetic physical dimensions (e.g., height, body type, and percentages of fast or slow twitch muscle fibers) but most successful individuals develop their skill over intensive practice (Jourden, Bandura, & Banfield, 1991). In one study, the authors manipulated conception of ability for a motor skill by telling the participants that a certain skill was either inherent (only certain people could learn the task and it was based on natural capacity) or acquirable (the skill could be learned through practice and effort) (Jourden, et al., 1991). The authors concluded that conception of ability has an influence on the rate and level of learning the skill. This study is consistent with previous work that has shown the importance of conception of ability (Elliott & Dweck, 1988).

Another study asked college males and females to rate their self-efficacy on a masculine task, as well as their self-efficacy on a feminine task (Lirgg, George, Chase, & Ferguson, 1996). Results indicated that males had lower self-efficacy than females in the feminine task and females had lower levels of self-efficacy for the masculine task (Lirgg, et al., 1996). Notably, the
results showed that participants who viewed their ability as unchangeable were less confident about learning the task than those who viewed their ability as changeable (Lirgg, et al., 1996).

**Goal Discrepancy**

Goal setting has been studied a multitude of times in sport (Brobst & Ward, 2002; Burton, 1989; Kingston & Hardy, 1997). Overall, goal setting can be a valuable tool in sport and exercise if it is used correctly and efficiently (Locke, 1996). Locke and Latham (1990) found that goals could enhance focus on a task, increase effort, encourage persistence when failure arises, and enhance the development of problem solving strategies.

Goal setting research has evolved into the exercise psychology field, most importantly, how goal-setting influences exercise performance (Kyllo & Landers, 1995). Kyllo and Landers (1995) conducted a meta-analysis of goal setting research in sport and exercise and found setting goals improves performance in the task by 0.34 of a standard deviation. In the conclusion of the meta-analysis, the authors state that more research needs to be conducted in the field of sport and exercise psychology to be able to better generalize to more populations. One way to continue this research would be to test goal setting with different populations, such as people with different views of their personal ability. Researchers report noteworthy methodological issues plaguing early goal setting research, such as setting nonspecific goals and goals that are too easy (Locke, 1991). To remedy these issues Smith, Hauenstein, & Buchanan (1996) had participants complete a ninety-second sit-up task after being randomly selected to be in one of four groups. The results showed groups with the specific, difficult goals performed better in the post-test sit-up task than either the “do your best” group or the control group. These findings suggest that goal setting can be used effectively to improve performance in an exercise task.

The few studies that have been conducted with goal setting and exercise tasks have found goal setting is effective as a motivational tool (Smith et al., 1996). However, no published study to date has evaluated how a college-aged population reset performance goals after either meeting a self-set performance goal or being goal discrepant. Also, few studies have evaluated how conception of ability and self-efficacy might affect the setting of goals, especially after a goal discrepant performance. This experiment is going to evaluate how conception of ability and self-efficacy influence individuals set performance goals before a running task and how they reset performance goals after either reaching or failing to reach their performance goal. We hypothesized being in the Entity Goal Discrepant group would be maladaptive, suggesting
participants would have lower post self-efficacy and slower post run performance goal compared to the Entity Goal Reached Group, Incremental Goal Reached Group, and Incremental Goal Discrepant Group.

Methods

Participants

For the purpose of this experiment, the population studied was college-aged male and female students from an American midwestern university. One hundred and two college students (Mage = 20.7, SD = 2.12, 33% female) were recruited to participate from kinesiology courses. Students were given course credit for their participation in the experiment. Participants were required to have some experience running in order to participate. Self-efficacy theory states individuals must have previous experience in the task to more accurately judge their efficacy beliefs (Bandura, 1997). None of the participants reported any injuries that could effect their participation in the study and all participants were screened for potential health risks using the Physical Activity Readiness Questionnaire (Thomas, Reading, & Shepard, 1992).

Instrumentation

Demographic Questionnaire. Information regarding the participant’s gender, age, ethnic background, experience in running and other sports, previous experience in road running races, and any injuries that could effect their performance in this study was collected with the demographic questionnaire.

Pre-Run Performance Goal Questionnaire. The participants were asked to record a performance goal for the half-mile running test in minutes and seconds before the running test. The stem of the question read, “You are about to run a timed half mile on a treadmill. What is your goal time for running the half mile?” For data analysis, all pre-run performance goal times were recorded in seconds.

Post-Run Performance Goal Questionnaire: For the Post-Run Performance Goal Questionnaire, the participants were asked to record a performance goal if they were to run another half-mile running test in minutes and seconds in the future. The stem of the question read, “In the future, if you were to run a timed half mile on a treadmill, what would your goal time be?” For data analysis, all post-run performance goal times were recorded in seconds.

Pre Self-Efficacy Questionnaire. Self-efficacy was measured before and after the half-mile running test with a task specific questionnaire using Bandura’s (1997) single-judgment
format. The Pre Self-Efficacy Questionnaire measured participants’ self-efficacy, both the level and strength, of their ability to successfully achieve their goal for the half-mile timed run. At the top of the questionnaire, the participants were asked to record their self-set performance goal for the upcoming half-mile timed run. The stem of the question read: “How certain are you that you can successfully run the following time in the half-mile run?” The participants then rated their degree of certainty to reach each performance level in the timed run by placing an X in the box reflecting their strength of certainty. The strength of certainty scale is a 10-point Likert-type scale ranging from 0% (uncertain) to 50% (somewhat certain) to 100% (very certain). Participants rated their degree of certainty to reach their goal in time increments of 15 seconds, with their goal time listed at the fifth level. Above the fifth level, times were slower than the goal time in 15 second intervals. Below the fifth level, times were faster by 15 second intervals. Self-efficacy strength was scored by summing all the strength scores and dividing by the number of levels of performance (10). The last performance level rated above zero percent represents the participants’ level of self-efficacy. For data analysis, strength of self-efficacy scores were used.

Post Self-Efficacy Questionnaire. The structure of the post self-efficacy questionnaire was similar to the Pre Self-Efficacy Questionnaire. Participants were asked if they were to attempt another half-mile run on a treadmill, to report their goal time at the top of the page. The stem of the Post Self-Efficacy Questionnaire read, “If you were to complete this test again, how certain are you that you can successfully run the following times for the half-mile timed run?” The levels were set up in relation to their future goal time, similar to the Pre Self-Efficacy Questionnaire at 15 second intervals, slower above the fifth level and faster below the fifth level. For data analysis, strength of self-efficacy scores were used.

Importance Question. In order to gauge the importance of the task to the participant, an importance question was included in the study. The question stated, “How important is it to you that you can perform this running task?” Participants rated the importance of the task on a 10-point Likert-type scale with scores ranging from 0 (not important at all) to 5 (sort of important) to 10 (very important). Previous research has used an importance rating of 5 or higher (George, Feltz, & Chase, 1992) because proper incentive to complete the task must be present for significant relationships between self-efficacy and performance to be found. Five participants were excluded from the analysis because they rated the importance of the task lower than 5. Fifteen individuals rated the importance at 5, fourteen participants rated the importance 6, thirty
four participants rated importance at 7, twenty two participants rated the importance 8, ten participants rated the importance at 9, and seven participants rated the importance of the task 10.

**Conception of Ability.** Conception of ability was measured using the Conceptions of the Nature of Athletic Ability Questionnaire-2 (CNAAQ-2) created by Biddle, Wang, Chatzisarantis, and Spray (2003). The CNAAQ-2 is a 12-item questionnaire that evaluates whether athletes view their athletic ability as more incremental or as a fixed entity. The stem of the CNAAQ-2 states “My beliefs about ability in sport:” followed by 12 items. The response to each item is made on a 5-point scale anchored by 1 (strongly disagree) to 5 (strongly agree). Biddle et al. (2003) noted that the CNAAQ-2 has acceptable factorial, convergent, and discriminate validity.

**Running Task**
The half-mile running task was completed on a treadmill in a physiology laboratory. The treadmill speed was adjustable in increments of 0.1 MPH and could range from 0.1 MPH to 12.0 MPH. Participants were able to see the speed that they are running on the treadmill. However, the participants were told that the official time used to measure how fast they ran would be kept by the researcher on a stopwatch because the timer on the treadmill was broken. The time display on the treadmill was covered with a piece of paper so that the participants could not view the timer. Participants were also told not to adjust the grade on the treadmill and the grade was kept at 0% throughout the duration of the half-mile timed test. While on the treadmill, the participants wore a heart rate monitor and heart rate was recorded at the end of the half-mile running task. Heart rate was used as a measure of exertion during the running task. The range of heart rates for the running task was 127 to 195 beats per minute with a mean of 162 beats per minute. This is above 80% max effort for a healthy 20 year old, indicating the participants worked hard in the running task.

**Performance Goal Manipulation**
In order to examine what happens when participants with either an entity or incremental conception of ability reach their goal or experience a goal discrepancy, the feedback (actual running time) given to the participants was manipulated. The goal reached group, were told that they surpassed their written pre-run performance goal by 16 seconds. For example, a participant in the goal reached group with a pre-run performance goal of running a 3 minute and 30 second half-mile, was her running test was completed in 3 minute and 14 seconds. In the goal discrepancy group, participants were told they were 31 seconds slower than their goal time. For
example, a participant in the goal discrepancy group with a pre-run performance goal of running a 3 minute and 30 second half-mile, was told that he ran a 4 minute and 1 second half-mile. Providing false feedback to the participant allows for the participant to experience either reaching a goal or having a goal discrepancy. A manipulation check question was used at the end of the study to test whether the false feedback was believable. Only three participants did not believe the false feedback and these people were eliminated from the study.

Procedures

Participation in this study was voluntary and permission was obtained from the Institutional Review Board for Human Subjects Research approval at the Midwestern university. After hearing the purpose of the study, participants were offered a consent form agreeing to participate in the study and informing them of their rights as participants. Participants completed the Demographic Questionnaire, Pre-Run Performance Goal Questionnaire, Pre-Run Self-Efficacy Questionnaire, and the CNAAQ-2. Before filling out the Pre-Run Self-Efficacy questionnaire, the participants were given a sample single-judgment self-efficacy questionnaire in order to reduce confusion about the way the self-efficacy questionnaire is completed. While each participant prepared for his/her half-mile run, the researcher scored his/her CNAAQ-2 to determine if he/she was in the entity group or incremental group. Then, participants were randomized into either the goal reached or goal discrepant group. This resulted in four groups; entity goal reached, entity goal discrepant, incremental goal reached, incremental goal discrepant.

Participants then began the running task. The participants were allowed to warm up on the treadmill before the half-mile run test began. The participants were informed they will not know their time while running but they were able to see the speed display on the treadmill. During the test the participants were in control of how fast they run so that they are comfortable with their speed. After the warm-up, the researcher asked the participants if they are comfortable on the treadmill. To start the timed test, participants began running. Whenever they were comfortable and ready to start, they said “go” and the researcher started the timer. Once the participant reached the half-mile mark, the researcher said “stop”, stopped the timer, and slowed the treadmill down to a 2.0 Miles Per Hour for a two minute cool down. The participants were asked to rate their perceived exertion on the Borg Rate of Perceived Exertion scale (Borg, 1982)
in order to gage the effort exerted in the half-mile running task. At this time, heart rate was recorded from the heart rate monitor.

At the conclusion of the half-mile run, the participants are given false feedback based on the group in which they were randomized. Participants then completed the Post-Run Performance Goal Questionnaire and Post Run Self-Efficacy Questionnaire. A manipulation check question was used at the end of the study to test whether the false feedback was believable. Only three participants did not believe the false feedback and these people were eliminated from the study. The participants were debriefed about the purpose of the study and asked not to share the results of their participation with other potential participants.

Grouping by Conception of Ability
For the purpose of comparing differences in conception of ability in the different randomized conditions, four groups were created. Any individual who scored over 4.0 on the incremental subscale of the CNAAQ-2, was placed in a Incremental Group. Anyone who scored under 4.0 on the incremental subscale and over 2.5 on the entity subscale was placed into an Entity Group. Participants were then randomized into the goal met or goal discrepant group, this further separated the participants into four groups. The groups were labeled Entity Goal Reached Group, Entity Goal Discrepant Group, Incremental Goal Reached Group, and Incremental Goal Discrepant Group. All groups were tested for pre-experiment differences in pre-test self-efficacy and pre run performance goals for the running task.

Preliminary Analyses
Prior to conducting any statistical analyses for the study, group means were examined to ensure the groups were similar at baseline measurements for self-efficacy and pre-run performance goals. Two separate ANOVAs were conducted. Results indicated there were no significant differences between the four groups in pre self-efficacy \( F(3,101) = 0.68, p = 0.567 \) or pre-run performance goals \( F (3, 101) = 1.72, p = 0.168 \). See Table 1 for means and standard deviations.

Results
Our hypothesis stated the Entity Goal Discrepant Group will set slower post-run performance goals and have lower post-run self-efficacy than the Entity Goal Reached Group, Incremental Goal Reached Group, and Incremental Goal discrepant Group. Two separate ANOVAs were conducted; one to examine group differences in post-run self-efficacy and the
other to examine group differences between post-run performance goals. A one-way ANOVA was run to determine group differences for post-run self-efficacy. There were significant differences in post self-efficacy between the groups, $F(3, 101) = 3.52, p = .018$. Tukey’s LSD post-hoc test showed the Entity Goal Discrepant Group ($M = 67.06, SD = 9.91$) had significantly higher post-run self-efficacy scores than the Incremental Goal Discrepant Group ($M = 57.97, SD = 8.62$) ($p = .02$). There were no other significant between group differences.

An ANOVA was run to determine group differences for post-run performance goals. There was a significant difference between the groups in the post-run performance goal after the completion of the running task $F(3, 101) = 4.65, p = .004$. Post-hoc comparisons using Tukey’s LSD indicated individuals in the Entity Goal Reached Group ($M = 213.06, SD = 62.33$) ($p = .013$), Incremental Goal Reached Group ($M = 213.64, SD = 57.14$) ($p = .004$), and Incremental Goal Discrepant Group ($M = 228.82, SD = 49.77$) ($p = .048$) all set significantly faster post-run performance goals than individuals in the Entity Goal Discrepant Group ($M = 274.12, SD = 69.63$). This hypothesis was supported for post-run performance goal but it was not supported for post-run self-efficacy.

Table 1. Performance goals and self-efficacy for each group pre and post.

<table>
<thead>
<tr>
<th></th>
<th>Pre-Run Performance Goal</th>
<th>Post-Run Performance Goal</th>
<th>Pre-Run Self-Efficacy</th>
<th>Post-Run Self-Efficacy</th>
</tr>
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<tbody>
<tr>
<td>Entity Goal Reached Group</td>
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</table>
**Discussion**

The primary aim of our study was to examine the relationship between self-efficacy, conception of ability, performance goal discrepancy, and setting of a future performance goal in a half-mile running task. This study found support for the hypothesis having an entity conception of ability and failing at an exercise task would lead to setting a much slower future goal time in running the half-mile. However, the same differences between groups were not found for self-efficacy as predicted.

The findings of this study suggest having an entity conception of ability could be a maladaptive psychological characteristic for individuals in an exercise domain. Most individuals encounter adversity with regards to not reaching performance goals while participating in an exercise regimen. Encountering this adversity with an entity conception of ability might lead to lower expectations as well as potential dropout, leading to worse physical outcomes. Previous research has discovered an incremental view of ability can lead to higher resilience in an academic setting (Yeager & Dweck, 2012). However, with regards to goal setting, having an incremental conception of ability seems to play an important role after experiencing failure and not reaching a performance goal. The incremental goal discrepant group set a significantly faster future performance goals after failure than individuals with an entity conception of ability.

The entity goal discrepant group set had the highest post-run self-efficacy compared to all the groups. This finding while unexpected can be explained because the entity goal discrepant group set a significantly slower post-run performance goal. The post-run performance goal was used as the mid-point of the post-run self-efficacy questionnaire, which explains why these individuals had the highest efficacy rating. The highest ratings of efficacy came from the group that set the slowest goals, therefore, they were more confident they could reach a much slower time. All groups had higher post-run self-efficacy ratings compared to pre-run self-efficacy ratings, even after failure. Since the other three groups set faster post-run performance goals, their efficacy ratings did not improve as much as the entity goal discrepant group.

Overall, conception of ability plays an important role how individuals bounce back from a discrepant exercise performance. It appears, having an incremental view of exercise ability is adaptive to engaging in future exercise behaviors. When considering the psychological characteristics that are vital to continued exercise, fitness and exercise professionals should value...
fostering an incremental conception of ability. Notably, individual’s ability concepts are changeable over time. Therefore, if an exercise professional works with a client who has more of an entity view of their physical ability, the exercise professional should work to change these ability conceptions. Also, physical education teachers should work to teach children and adolescent students to view their physical ability as incremental. Research in educational psychology has shown incremental beliefs can be taught to young children successfully and can make the student more resilient, leading to enhanced learning (Yeager & Dweck, 2012). Research in other fields has shown the impact of conception of ability in children in academic settings and these belief systems have strong effects when confronted with adversity (Dweck, Chiu, & Hong, 1995). Teaching youth the importance of always being able to improve athletic ability would be beneficial for their long-term health and well-being. Having entity beliefs could lead to negative outcomes as bad as learned helplessness (Dweck, et al., 1995).

Like all research, this study had its limitations. First, the participants had a wide variety of experience in running, which would contribute to their self-efficacy and performance goals in the running task. Also, a few individuals stated they felt more comfortable running outdoors. If the running task could have been completed on a track, this would have lead to better external validity for individuals who mainly participate in running outdoors. The number of participants, especially in the entity conception of ability groups, could have been larger.

**Future Research**

Future research should examine the optimal way to foster an incremental mindset in the physical activity domain. Research has been conducted in the educational psychology literature examining how teachers foster ability conceptions (Yeager & Dweck, 2012), but it has yet to be fully tested in the physical activity literature. Also, research should further examine the relationship between self-efficacy and conception of ability and the influence both of the variables have on exercise compliance and adherence, especially the longitudinal effects of conception of ability on exercise compliance.
References


List of References for Entire Thesis


Appendix A

Please read the following questions carefully and answer each one honestly:

<table>
<thead>
<tr>
<th>Physical Activity Readiness Questionnaire</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Has a doctor ever said that you have a heart condition and recommended only medically supervised physical activity?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2. Do you have chest pain brought on by physical activity?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3. Have you developed chest pain within the last month?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4. Do you tend to lose consciousness, or fall, as a result of dizziness?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5. Do you have a bone or joint problem that could be aggravated by the proposed physical activity?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>6. Has a doctor ever recommended medication for your blood pressure or a heart condition?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>7. Are you aware, through your own experience or a doctor’s advice, of any other physical reason against your exercising without medical supervision?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Appendix B

Demographic Questionnaire

Please answer the following questions by putting an X next to the appropriate answer or writing out your response.

1. Gender: _____ Female _____ Male
2. Age: _____
3. Years of Experience in Running: _____
4. List any other types of sports that you have participated in:

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

5. Ethnicity: _____ Caucasian _____ African American _____ Hispanic/Other

6. What is your average time for the following running distances?
   • One Mile Run: ___________
   • 5 Kilometers (3.1 Miles): ________________
   • 10 Kilometers (6.2 Miles): ________________

7. Have you ever completed the following races?
   • 10 Kilometer Race (6.2 Miles): ______
   • Half-Marathon (13.1 Miles): ________
   • Marathon (26.2 Miles): ________

8. Do you currently have an injury that would affect your running performance:
   Yes: _____
   No: ____
   If yes, what is the injury: ________________________________________________________________
Appendix C

Pre-Run Performance Goal Questionnaire:

You are about to run a timed half-mile on a treadmill. What is your goal time for running the half-mile?

_________________________
Appendix D

Post-Run Performance Goal Questionnaire

In the future, if you were to run a timed mile, what would your goal time be?

_______________
Appendix E

Pre Self-Efficacy Questionnaire

How certain are you that you can successfully run the following times in the one-mile run? Put in X in the box that reflects your degree of certainty.

Your Goal Time: ______________

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Appendix F

Post Self-Efficacy Questionnaire
If you were to complete this test again, how certain are you that you can successfully run the following times for the one-mile timed run? Put an X in the box that reflects your degree of certainty.
Your Future Goal Time: ________________

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Appendix G

Importance Questionnaire

How important is it to you that you can perform this running task?

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Appendix H

Borg RPE Scale

6
7- Very, Very Light
8
9- Very Light
10
11- Fairly Light
12
13- Somewhat Hard
14
15- Hard
16
17- Very Hard
18
19- Very, Very Hard
20
Appendix I

Responses are made on a 5-point scale anchored by 1 (strongly disagree) and 5 (strongly agree). Circle the number that corresponds to belief about your sport ability.

<table>
<thead>
<tr>
<th>My beliefs about ability in sport:</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. You have a certain level of ability in sport and you cannot really do much to change that level.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>2. To be successful in sport you need to learn techniques and skills, and practice them regularly.</td>
<td>1 2 3 4 5</td>
<td></td>
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<tr>
<td>3. Even if you try, the level you reach in sport will change very little.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>4. You need to have certain “gifts” to be good a sport.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>5. You need to learn and to work hard to be good at sport</td>
<td>1 2 3 4 5</td>
<td></td>
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<tr>
<td>6. In sport, if you work hard at it, you will <em>always</em> get better.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>7. To be good at sport, you need to be born with the basic qualities which allow you success.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>8. To reach a high level of performance in sport, you must go through periods of learning and training.</td>
<td>1 2 3 4 5</td>
<td></td>
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<tr>
<td>9. How good you are at sport will <em>always</em> improve if you work at it.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>10. It is difficult to change how good you are at sport.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>11. To be good at sport you need to be naturally gifted.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>12. If you put enough effort into it, you will <em>always</em> get better at sport.</td>
<td>1 2 3 4 5</td>
<td></td>
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</table>
OFFICE FOR THE ADVANCEMENT OF
RESEARCH AND SCHOLARSHIP (OARS)
Institutional Review Board for
Human Subjects Research
102 Rousdebush Hall
Oxford, OH 45056
513-529-3600

Date: August 13, 2013

To: Mr. Christopher Hill & Dr. Melissa Chase

From: Dr. L. James Smart, Jr., Chair
Institutional Review Board for Human Subjects Research

RE: Conception of ability, self-efficacy, and goal discrepancy in a one-mile running task

Thank you for submitting the application referenced above to the Institutional Review Board (IRB).

The board has reviewed and approved your proposal through the regulatory Expedited Review procedure.

Your protocol approval number is: 00542r

Approval of this project is in effect until: August 12, 2014

If you complete your project before the date listed above, please send an email message indicating so to humansubjects@miamioh.edu and we will close your file.

Regulations require periodic review of all ongoing human subjects research projects. If your project will continue beyond the approval date shown above, you will need to submit an Application for Continuing Review and status update for review before the expiration date.

Please submit your next application for continuing review by: July 12, 2014

Should you wish to change your procedures relating to the use of human subjects or personnel having access to the data, you must obtain approval from the IRB prior to instituting any changes.

On behalf of the committee and the University, I thank you for your efforts to conduct your research in compliance with the federal regulations that have been established for the protection of human subjects. Thank you for your attention to this matter, and best wishes for the success of your project.
Appendix K

Informed Consent Form

**Title of Research Project**: Conception of Ability, Self-efficacy, and goal discrepancy in a running task

**Principal Investigators**: Chris Hill, Department of Kinesiology and Health.

This is to certify that I, ____________________________, hereby agree to participate as a volunteer in a scientific investigation as an authorized part of the education and research program of Miami University under the supervision of Dr. Melissa Chase, Ph.D.

The investigation and my part in the investigation have been defined and fully explained to me and I understand the explanation. A copy of the procedures of this investigation has been provided to me and has been discussed in detail with me.

*I am above the legally required 18 years of age necessary to participate in this study*

I have been given the opportunity to ask questions and all such questions and inquiries have been answered to my satisfaction.

I understand that I am free to deny answers to specific questions in interviews or questionnaires.

I understand that health information will be collected and will be kept in Chris Hill’s office and will not be available for others.

I understand that in the event of physical injury resulting from the research procedures, financial compensation is not available and medical treatment is not provided free of charge.

*I further understand that I am free to withdraw my consent and terminate participation at any time during the study.*

______________  ______________
Date                Date of Birth (optional)

______________________________
Participant's Signature

I, the undersigned have defined and fully explained the investigation to the above participant.

______________  ________________________
Date                Investigator's Signature (or that of official representative)

*Participants will be provided a copy of this form to keep.*
Appendix L
Sample Self-Efficacy Questionnaire

How certain are you that you can throw a football the following distances? Put an X in the box that reflects your degree of certainty.

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