

A META-ANALYTIC REVIEW AND INVESTIGATION OF THE  
RELATIONSHIPS BETWEEN IMPLICIT THEORIES, PERCEIVED  
COMPETENCE, AND THE 2 x 2 ACHIEVEMENT GOALS IN  
EXERCISE AND SPORT SETTINGS

by

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A Dissertation

In Educational Psychology

Submitted to the Graduate Faculty  
of Texas Tech University in  
Partial Fulfillment of  
the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

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May, 2015

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## **Acknowledgements**

I am extremely grateful for all of the support, encouragement, advice, and assistance that many people have provided me throughout this process. I am very appreciative of my co-chair, mentor, and friend, Dr. Marc Lochbaum, for his support and guidance throughout the entire process. I owe more to him than words can express. I would like to thank my other co-chair, Dr. Tara Stevens, for her help in guiding me to stay focused and not losing sight of the ultimate goal of completing the dissertation process. I would also like to thank her for helping me run my data analysis and taking the time to help me learn about structural modeling. I would like to thank Dr. Melanie Hart for her patience and positive attitude over the years to keep pushing me towards finishing and for being a part of this entire process. I am thankful for my colleagues, friends, family, and many other doctoral students who continued to push me at times when it seemed very easy to be lazy and throw in the towel. There are not enough words to express how much the love and support from my friends and family have meant to me over the years. I would also like to thank all of the undergraduate students that helped with data collection and the monitoring of the students during the putting competition. I am beyond grateful for the love, support, and motivation that my parents, Kevin and Cindy, and my sister, Hayley, have provided throughout my life and especially over these last few years. I would not be where I am today without them and my motivation to make them proud and reach the potential they always knew I had. Finally, I would like to thank my loving and supportive wife, Dr. Shena Smith, for being my rock throughout this entire process and for continuously taking the time to proofread my paper. She always found ways to keep me positive and focused and I am forever grateful.

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### **Abstract**

The purpose of the current meta-analytic review and investigation was to examine the implicit theories, perceived competence, and 2 x 2 achievement goals in exercise and sport settings. Specifically, to examine the revised social-cognitive model of achievement motivation and its effectiveness in these particular settings. The hypotheses for the meta-analytic review were supported as incremental beliefs predicted adoption of both mastery goals, entity beliefs predicted adoption of both performance goals, and perceived competence predicted adoption of both approach goals. The review also showed that research in exercise and sport had yet to examine these variables (implicit theories, perceived competence, and 2 x 2 achievement goals) in a competitive sport setting with a true performance outcome. The investigation was then created based on this finding.

In the investigation, 455 university golf class students completed measures to assess the revised social-cognitive model constructs with a true performance measure (golf putting score). Structural modeling was employed to examine the revised social-cognitive model's fit in the competitive sport setting. The results showed that the model was an acceptable fit and most of the hypotheses based on the meta-analytic review findings were supported. Specifically, findings from the investigation showed the importance of incremental beliefs, high perceived competence, and approach goal adoption on performance in a competitive sport setting. Since this was the first study to examine the revised social-cognitive model in a competitive sport setting with a true performance measure, directions for future research are discussed.

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## **Chapter 1**

### **Meta-Analysis**

#### **Introduction**

When performing a task in physical education, exercise, or a sport, people often consider the most important aspect to be the outcome or quality of the performance, especially in today's overly competitive society. This focus on the outcome or performance on a specified task may also, at times, drive the participant's motivation and/or goals. Due to the importance placed on outcome and task performances in these areas, researchers consistently investigate which variables may negatively or positively impact one's performance. Over the last two decades, physical education, exercise, and sporting researchers have examined a number of variables (e.g., implicit theories, assertiveness, achievement striving, fear of failure) to better understand, explain, and predict performance in their respective areas.

Among the most commonly researched variables related to performance is that of achievement goals. According to Dweck and Leggett (1988), goals may be either learning (mastery) or performance focused. Individuals adopting mastery goals are concerned with increasing their competence for a task, while individuals adopting performance goals are less focused on enhancing competence and instead concern themselves with obtaining favorable judgments about their competence for a task. Research by Dweck and colleagues, as well as Nicholls (as cited in Elliot, 1999), set the foundation for the achievement goal framework and its importance in understanding goal adoption. While this research was necessary and important in creating the achievement goal approach, Dweck and colleagues were also aware that it was just the beginning. According to Elliot

(1999), “Dweck and colleagues have explicitly stated that the performance-mastery goal dichotomy represents a rudimentary, simplified conceptual framework that will need to evolve toward greater complexity to more comprehensively account for motivated achievement behavior (p. 170).” In stating this, Dweck and colleagues were aware that the achievement goal approach worked, but also had the potential to provide even more accurate details in individual adoption of achievement goals. Elliot and colleagues looked at doing exactly what Dweck and colleagues had suggested by adding a construct of valence (i.e., approach-avoidance goal dimensions) to the performance goal, creating a trichotomous framework with the one mastery goal (Elliot & Church, 1997) and later added the valences to the mastery goal to create a 2 x 2 framework (Elliot & McGregor, 2001). This addition of the valence construct to the mastery and performance goals had briefly been discussed by both Dweck and Nicholls to some extent, but neither fully discussed adding these dimensions to the framework (Elliot, 1999).

According to Elliot (1999), the approach valence is a behavior that is initiated by a positive or desirable event or possibility, while the avoidance valence is a behavior that is initiated by a negative or undesirable event or possibility. The resulting framework creates the following four achievement goals: mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance. A mastery-approach goal is defined by focus on task-based attainment or intrapersonal competence (e.g., bettering one’s personal best golf score), while a mastery-avoidance goal is defined by focus on avoiding task-based or intrapersonal incompetence (e.g., not improving one’s personal best golf score). A performance-approach goal is defined by a focus on attaining normative competence (e.g., a starting pitcher focusing on getting more strikeouts than the opposing

team's starting pitcher), while a performance-avoidance goal is defined by focus on avoiding normative incompetence (e.g., a starting pitcher not getting as many strikeouts as the opposing team's starting pitcher) (Cury, Elliot, Da Fonseca, & Moller, 2006; Wang, Biddle, & Elliot, 2007). This updated achievement goal framework by Elliot and McGregor (2001) is now the dominant model used in achievement motivation research.

A review of previous research of achievement goals in physical education, exercise, and sport, indicates implicit theories, sport/perceived competence, and performance variables (e.g., actual sport/competition performances, timed sport tasks, self-rated sport/exercise performance) are several of the more frequently investigated variables. There are two types of implicit theories, entity and incremental (Dweck & Leggett, 1988). Individuals may perceive their ability for a certain task as one that is fixed or relatively stable (i.e., entity belief). Alternatively, they may perceive their ability as somewhat malleable or able to be developed (i.e., incremental belief). Perceived competence is defined as the amount of confidence an individual has in his/her ability to successfully complete the task at hand (Cury et al., 2006).

The implicit theories and perceived competence in addition to the original achievement goal framework (mastery and performance) make up the social-cognitive model of achievement motivation (Dweck & Leggett, 1988) (See Figure 1).

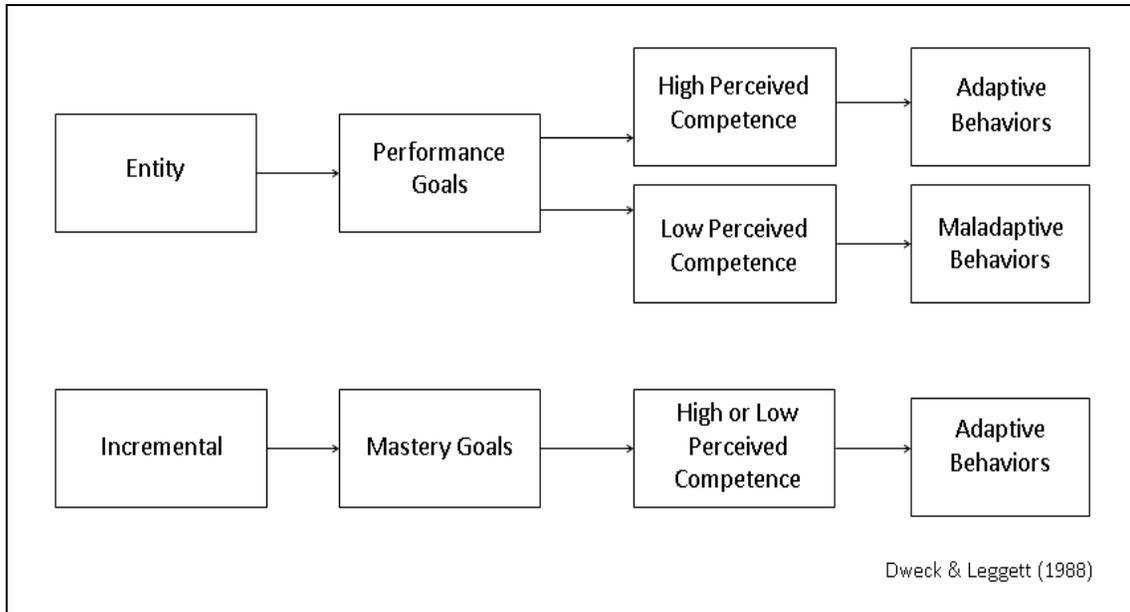


Figure 1 - *Social-Cognitive Model of Achievement Motivation*

“The social-cognitive model of achievement motivation differentiates between the way an individual interprets ability and success” (Stevenson & Lochbaum, 2008, p.390). In the social-cognitive model, both entity and incremental theories are hypothesized to systematically predict outcomes/behavior patterns in achievement settings. Entity theory and performance goals are posited to predict maladaptive behavior (e.g., low levels of persistence, avoidance of challenging situations, low enjoyment, performance orientation), whereas incremental theory and mastery goals are posited to predict adaptive behavior (e.g., high levels of persistence, challenge seeking, exerted effort, task mastery). Perceived competence is believed to moderate the influence of the implicit theories and achievement goals on the outcome variable. Entity theory and performance goals are posited to predict maladaptive behaviors when perceived competence is low, but are posited to predict adaptive behaviors when perceived competence is high. Incremental

theory and mastery goals are posited to predict adaptive behaviors when perceived competence is high or low (Cury et al., 2006; Dweck & Legett, 1988).

According to Cury et al. (2006), research only partially supports the social-cognitive model. Research examining the social-cognitive model has only validated the suggestion that entity theory positively predicts performance goal adoption, while incremental theory positively predicts mastery goal adoption. Cury et al. also states that there is mixed support for the model's proposal that performance goals lead to negative outcomes and mastery goals lead to positive outcomes. Previous research has shown no support for achievement goals accounting for the direct relationship between implicit theories and achievement-relevant outcomes. For perceived competence, research has shown little support for perceived competence moderating the impact of implicit theories on achievement-relevant outcomes. There has also been mixed support for perceived competence moderating the impact of achievement goals on outcomes (Cury et al., 2006). Along with these findings, a number of researchers have provided several suggested modifications in order to enhance the model.

Observing the need for changes to the social-cognitive model, Cury et al. (2006) created the revised social-cognitive model of achievement motivation by adding Elliot and McGregor's (2001) 2 x 2 achievement goals to create the revised social-cognitive model of achievement motivation (See Figure 2).

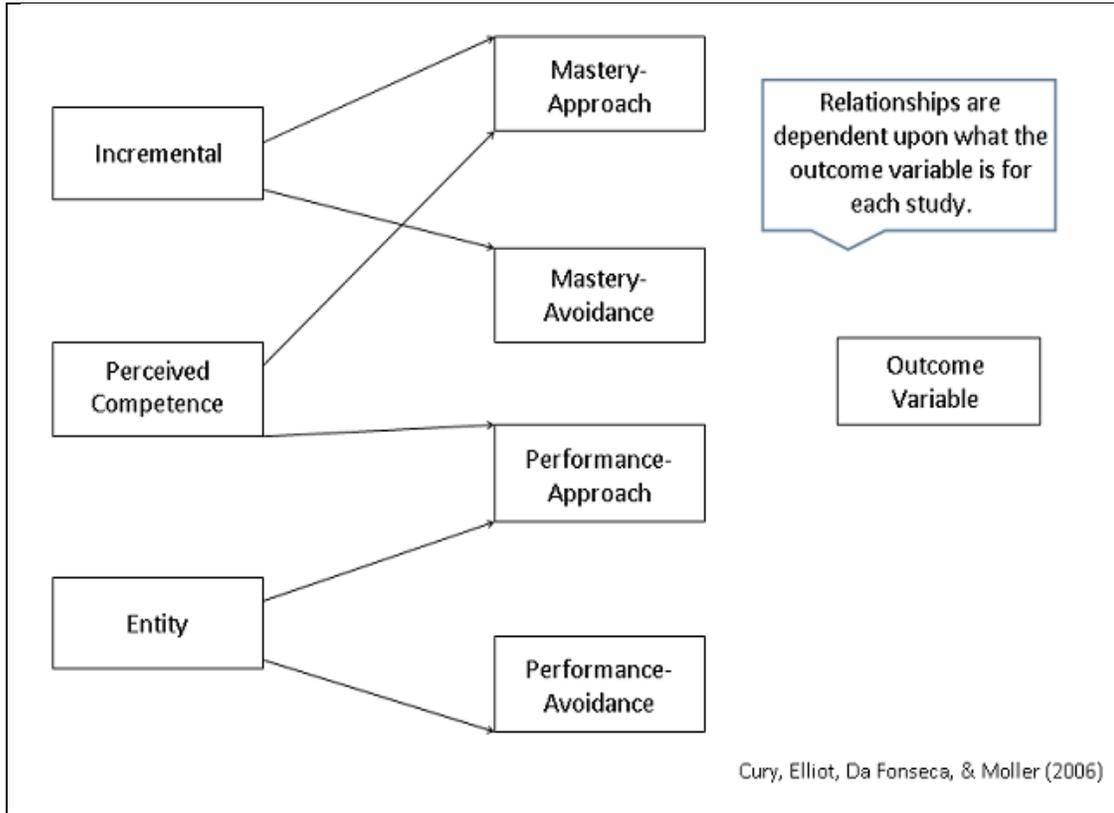


Figure 2 - Revised Social-Cognitive Model of Achievement Motivation

Although the mediating role of achievement goals was still thought to work well, Cury et al. believed adding the approach-avoidance valences would enhance achievement goals intermediary role between implicit theories and achievement-related outcomes. As was proposed by Elliot and Church (1997), Cury et al. (2006) also thought perceived competence worked better as a predictor of the achievement goals rather than as a moderator of the implicit theories or achievement goal effects, as suggested in the social-cognitive model. Both the social- and revised social-cognitive models have been used in education, physical education, exercise, and sport research. Because of the relative newness of the revised model and the examining of both models in such different disciplines, a consensus has yet to be reached on the relationships between implicit

theories, perceived competence, and the 2 x 2 achievement goals.

### *Purpose and hypotheses*

The purpose of the present research was to conduct a meta-analytic review to summarize the literature on the relationships between implicit theories, perceived competence, and the 2 x 2 achievement goals in exercise and sport settings. Previous research demonstrates that adopting incremental beliefs leads to choosing mastery achievement goals, while adopting entity beliefs leads to choosing performance (approach and avoidance) achievement goals (Cury, Da Fonseca, Rufo, & Sarrazin, 2002; Dweck & Leggett, 1998; Ommundsen, 2001; Wang & Biddle, 2003). Perceived competence has shown to be positively associated with mastery and performance-approach goals and negatively associated with performance-avoidance goals (Cury et al., 2002; Elliot & Church, 1997; Ommundsen, 2004; Skjesol & Halvari, 2005; Wang et al., 2007). Based on previous research, the following hypotheses were proposed for the current review: incremental beliefs will predict adoption of both mastery goals, entity beliefs will predict adoption of both performance goals, and perceived competence will positively predict both approach goals.

### **Materials and Method**

#### *Literature search and inclusion criteria*

All studies relevant to the topic were identified through a computer database search using EBSCO, including all individual databases (e.g., SPORTDiscus, ERIC, PsychINFO). The following keywords were used, independently and together, in the search: *achievement motivation, 2 x 2 achievement goals, achievement goals, implicit theories, entity beliefs, incremental beliefs, exercise, physical education, sport, and*

*sport/perceived competence*. Articles for the current meta-analysis were selected and used based on the following inclusion criteria: (a) Published literature in the English language between January 2002 (after the creation of Elliot and McGregor's 2 x 2 achievement goals) and January 2014; (b) used the Achievement Goal Questionnaire (AGQ; Elliot and McGregor, 2001), the Achievement Goal Questionnaire for Sport (AGQ-S; Conroy, Elliot, & Hofer, 2003), or a variation of either of these to assess one or all of the 2 x 2 achievement goals; (c) examined implicit theories and/or sport/perceived competence in an exercise, physical education, or sport setting; and (d) articles that reported sufficient quantitative statistical information from which an effect size could be calculated.

Because of the popularity of examining achievement goals within each of the respective disciplines, the initial literature search identified hundreds of studies across a number of disciplines. A quick examination of these studies' abstracts narrowed the list down to less than 50 and fewer than 20 after a more thorough screening. Finally, the search concluded with a total of 13 published studies (one including 2 studies). Because there are more than one type of achievement goal as well as numerous variables included in the study of achievement goals, multiple effect sizes could be calculated for each of the achievement goals within each study. Therefore, from the 13 published studies, with one providing two data sets, a total of 93 samples were recorded.

It should be noted that Cury et al. (2002), Ommundsen (2004), and Skjesol and Halvari (2005) used the trichotomous framework of achievement motivation. By using this framework, correlations from these studies were reported for the mastery domain, which does not include the approach or avoidance valence. Therefore, the mastery

domain data for these studies were not included in the analysis, while the performance-approach and avoidance data were included.

All studies meeting the inclusion criteria identified previously were then entered into a Microsoft 2010 Excel spreadsheet and coded for easier organization and analyzing. All eligible studies were coded by the researcher using a detailed coding scheme that included all necessary characteristics from each study, including: number and type of subjects/participants; domain in which the study was conducted; the achievement goal(s) measured; and the antecedents measured (i.e., implicit theories (entity and incremental beliefs) and perceived competence). A trained research assistant examined all data extraction to ensure that there were no discrepancies or recording errors. The descriptions of all included studies and their correlations are presented in Table 1 (See Appendix A).

#### *Data analysis*

According to Field (2001), there are two general approaches to a meta-analysis: fixed- and random-effects. The fixed-effect approach assumes that the sample within the population has a fixed effect size or is constant for all of the included studies. The random-effects approach assumes that the effect sizes are different for all studies. The current study utilized a specific type of random-effects, the Hunter and Schmidt random-effects method of meta-analysis. According to Field (2001), the Hunter and Schmidt method demonstrates less bias when calculating weighted average effect size and corrects for sources of sampling error and reliability of measurement scales. This method uses an unchanged effect size to calculate the weighted average effect size.

For the current study, all data were analyzed in Microsoft Excel 2010 using a downloaded computation program created by Dr. Marc Diener, which was downloaded

from <http://www.informaworld.com/mpp/uploads/metaanalysisprogramv34.xls>. Diener's program was used to calculate the average weighted  $R$ , 95% confidence intervals,  $z$ -scores, test of homogeneity, and the file drawer analysis for each of the variables of interest. When zero is not included within the confidence interval, the null hypothesis can be rejected at the level of  $p = .05$ . The null hypothesis for this meta-analytic review would be that the relationship between the achievement goals and their antecedents (implicit theories and perceived competence) is equal to zero. The test of homogeneity for this program is represented by a chi-square statistic. A significant chi-square statistic means that it can be assumed that there is more variability in the effect size values than would normally be expected. The file drawer analysis is calculated to determine the number of missing studies averaging null results that are needed to bring the weighted average effect size to a certain level (Diener, Hilsenroth, & Weinberger, 2009). Missing studies could include studies not published due to non-significant results or data that has not been published.

## **Results**

Table 2 contains the correlations between the 2 x 2 achievement goals, implicit theories, and perceived competence from Diener's meta-analysis program discussed above. Cohen's (1988) criterion was used to interpret the summarized effect sizes as follows:  $r = .10$  are considered low magnitude,  $r = .25$  are considered moderate/average magnitude, and  $r = .40$  are considered high magnitude. If the effect sizes are positive, it should be interpreted as the achievement goal having a facilitative effect on the implicit theories and/or perceived competence, while a negative effect size should be interpreted

as the achievement goal having a debilitating effect on the implicit theories and/or perceived competence (Lochbaum & Gottardy, 2014).

Table 2

*Meta-analysis of Achievement Goals, Implicit Theories, and Perceived Competence*

Variables	<i>r</i>	95% CI	<i>k</i>	<i>Sample</i>	<i>Z</i>	<i>X</i> <sup>2</sup>	File Drawer
MaP – Entity	-.10	-.14 ,-.06	5	2250	-5.06	4.33	-10
MaV – Entity	.03	-.05 ,.11	5	2250	.81	18.04**	-3
PaP – Entity	.23	.16, .3	6	2932	6.52	24.32**	8
PaV – Entity	.25	.17, .34	6	2932	6.02	35.75	9
MaP – Incremental	.39	.33, .46	5	2250	11.81**	17.78**	15
MaV – Incremental	.15	.09, .2	5	2250	5.49	8.25	2
PaP – Incremental	.05	-.05, .15	6	2932	.93	44.53	-3
PaV – Incremental	-.08	-.21, .05	6	2932	-1.18	82.4	-11
MaP – PC	.37	.32, .42	9	4182	14.11**	34	24
MaV – PC	.06	-.01, -.03	8	3732	1.64	44.31	-3
PaP – PC	.27	.19, .35	12	5325	6.42	129.35	20
PaV – PC	-.05	-.17, .07	11	4875	-.81	191.35	-16

Note: MaP = mastery-approach, MaV = mastery-avoidance, PaP = performance-approach, PaV = performance-avoidance. PC = perceived competence. *r* = correlation coefficients, CI = confidence intervals, *k* = number of effect sizes, *Sample* = number of participants, *Z* = z-score, *Q* = chi-square/goodness-of-fit statistics. File Drawer = *x* when lowest *r* is set to .10. \* = *p* < .05 \*\* = *p* < .01

As presented in Table 2, the mastery-approach goal had a small, negative association with entity beliefs ( $r = -.10$ ,  $Z = -5.06$ ) while both the performance-approach ( $r = .23$ ,  $Z = 6.52$ ) and performance-avoidance ( $r = .25$ ,  $Z = 6.02$ ) goals had moderate, positive associations with entity beliefs. Both mastery goals had positive associations with incremental beliefs with the mastery-approach goal having a high effect ( $r = .39$ ,  $Z = 11.81$ ) and the mastery-avoidance goal having a small effect ( $r = .15$ ,  $Z = 5.49$ ). In relation to perceived competence, both approach goals had positive associations with the mastery-approach goal having a moderate-high effect ( $r = .37$ ,  $Z = 14.11$ ) and the performance-approach goal having a moderate effect ( $r = .27$ ,  $Z = 6.42$ ). The mastery-avoidance goal had a small effect on perceived competence as well ( $r = .06$ ,  $Z = 1.64$ ). Significant relationships as they relate to the revised social-cognitive model are portrayed in Figure 3.

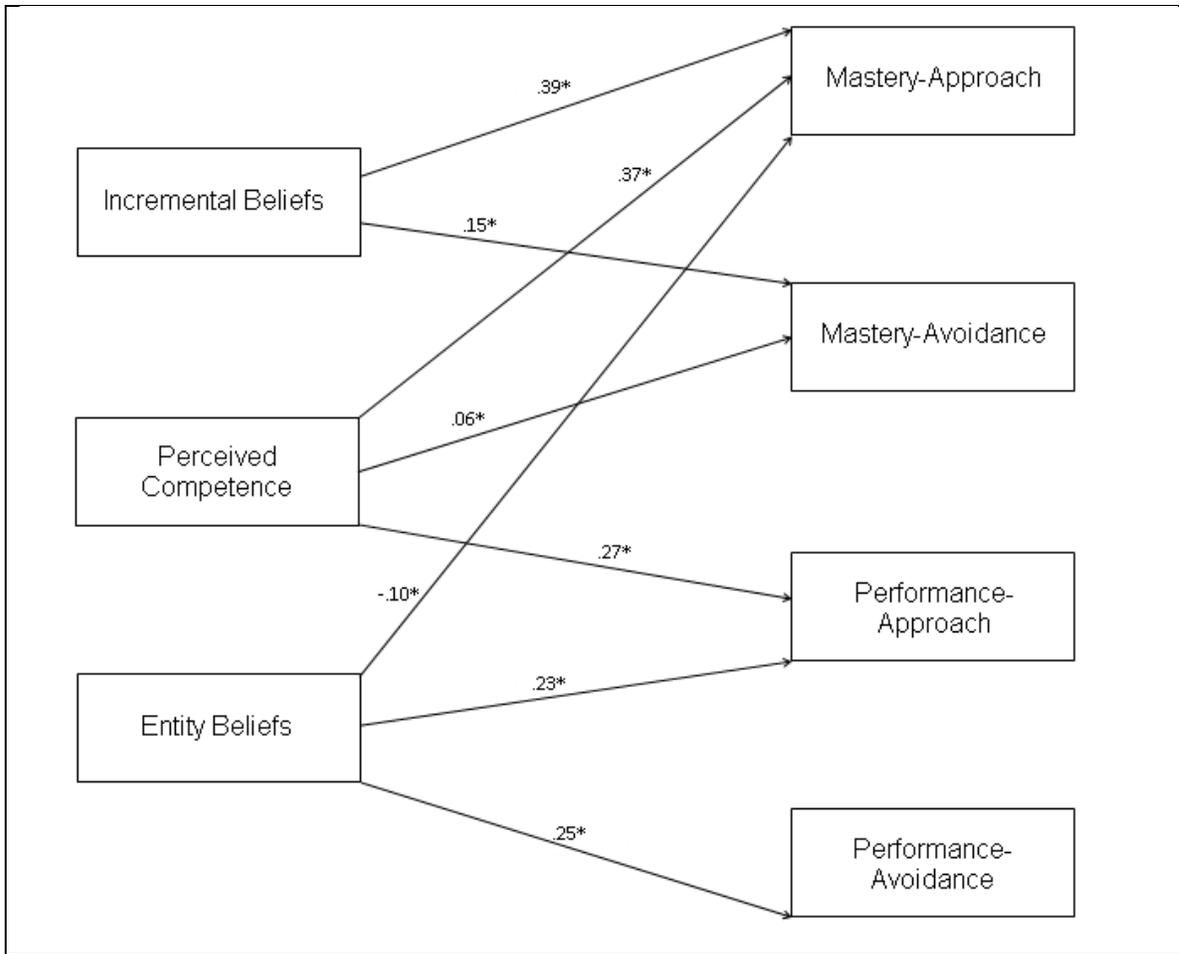


Figure 3 – Final revised social-cognitive model including all significant paths. \*=  $p < 0.05$

Only three relationships produced significant chi-square values, including the relationships between mastery-avoidance and entity beliefs ( $X^2 = 18.04, p < .01$ ), performance-approach and entity beliefs ( $X^2 = 24.32, p < .01$ ), and mastery-approach and incremental beliefs ( $X^2 = 17.78, p < .01$ ; see Table 2). These chi-square statistics could be affected by the small number of studies examined in this review. In examining the 95% confidence intervals, several of the relationships did contain zero, meaning the average weighted effect sizes are not significantly different from zero. This included the average weighted effect sizes for mastery-avoidance and entity beliefs (-.05, .11), performance-approach and incremental beliefs (-.05, .15), performance-avoidance and

incremental beliefs (-.21, .05) and performance-avoidance and perceived competence (-.17, .07).

## **Discussion**

The purpose of the current investigation was to conduct a meta-analytic review of the literature examining the relationships between implicit theories, sport/perceived competence, and approach-avoidance achievement goals in exercise and sport settings. As expected, the hypotheses for this review were supported. There were no unexpected findings in analyzing the data in the reviewed literature.

As hypothesized, incremental beliefs predicted the mastery-approach and mastery-avoidance goals, with the effects being high and small, respectively. This indicates that individuals who believe their ability for a task can be learned or developed are more likely to adopt a goal focused on mastering the task. Also hypothesized, the performance-approach and avoidance goals were predicted by entity beliefs and the relationship was moderate. This finding indicates that individuals who believe their ability for a task is relatively stable or fixed are more likely to adopt a goal that is focused on the amount of competence they have for that task. Finally, the last hypothesis predicted the relationship between perceived competence and both approach goals. The current review demonstrates perceived competence positively predicted the mastery-approach (high effect) and performance-approach (moderate effect) goals. This finding suggests that individuals with high perceived competence for a task are more likely to choose a goal focused on a positive possibility. Although not hypothesized, the relationships between the mastery-approach goal and entity beliefs and the performance-avoidance goal and incremental beliefs were in the right direction (negative) with both

goals having a small effect on the respective belief. These negative relationships are important because research would suggest that no positive relationship should exist between these variables (i.e., entity-mastery and incremental-performance) and these findings support those beliefs.

The file drawer statistic estimates the number of missing studies with null results that may not have been located because of non-significant results or data that has just not been published. The findings in Table 2 indicate that several of the relationships examined would need several other studies with non-significant or null results to provide a change in the data. The largest, positive correlation shown in Table 2 is between the mastery-approach goal and incremental beliefs. According to the file drawer analysis, to make this relationship non-significant, a total of 15 studies with null results or unpublished data would need to be located. Although the number of studies necessary may seem low at 15, it is significant in this case as it is three times as many studies as were used to explore the relationship in the meta-analysis ( $k=5$ ).

The current review lends support of the revised social-cognitive model of achievement motivation in future exercise and sport research as a means to better understand or predict performance or the outcome of the task. Because the social- and revised social-cognitive models of achievement motivation were originally established in education, it was important to summarize the data in the exercise and sport settings to determine how well the hypothesized relationships between implicit theories, perceived competence, and the 2 x 2 achievement goals transferred. Because little research has been conducted in a sport setting, future research should focus on this area, paying particular attention to the revised social-cognitive model with a sport performance outcome.

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*References marked with an asterisk (\*) indicate studies included in the meta-analysis.*

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## **Chapter 2**

### **Investigation**

Over the last two decades, physical education, exercise, and sport researchers have examined a variety of antecedents and consequences (e.g., implicit theories, assertiveness, achievement striving, fear of failure, performance) along with achievement goals in their respective areas. A meta-analytic review conducted by the author demonstrated implicit theories (entity and incremental) and perceived competence are two of the most commonly investigated variables in the exercise and sport domains. Implicit theories and perceived competence, along with achievement goals (mastery and performance), form the social-cognitive model of achievement motivation (Dweck & Leggett, 1988).

According to Stevenson and Lochbaum (2008), “the social-cognitive model of achievement motivation differentiates between the way an individual interprets ability and success” (p.390). Because there is a lack of support for the social-cognitive model, Cury, Elliot, Da Fonseca, and Moller (2006) created the revised social-cognitive model of achievement motivation by adding Elliot and McGregor’s (2001) 2x2 achievement goals (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance) to the premise of the social-cognitive model. A mastery-approach goal is defined by focus on task-based attainment or intrapersonal competence (e.g., bettering one’s personal best mile run time), while a mastery-avoidance goal is defined by focus on avoiding task-based or intrapersonal incompetence (e.g., not improving one’s personal mile run time). According to Cury et al. (2006) and Wang, Biddle, and Elliot (2007), a performance-approach goal is defined by a focus on attaining normative competence

(e.g., a starting pitcher focusing on getting more strikeouts than the opposing team's starting pitcher), while a performance-avoidance goal is defined by focus on avoiding normative incompetence (e.g., a starting pitcher not getting as many strikeouts as the opposing team's starting pitcher). Since the creation of the 2x2 achievement goal framework, research in the physical education, exercise, and sport areas have centered around this more recent framework.

Perceived competence is the amount of confidence individuals have in their ability to successfully complete the task at hand. Cury et al. (2006) believed perceived competence worked better as a predictor of the achievement goals rather than as a moderator of the implicit theories or achievement goal effects, as suggested in the social-cognitive model. So, perceived competence was moved in the revised social-cognitive model to further examine Cury et al.'s speculation.

Both the social- and revised social-cognitive models have been used in education, physical education, and exercise, but have been less prevalent in the area of competitive sport. The purpose of the present research was to examine the revised social-cognitive model of achievement motivation in competitive sport with a true performance measure, neither of which has been done to date. By examining these variables in a competitive sport setting, the researcher expected similar findings to those found in related settings, such as education, physical education, and exercise. Therefore, the hypotheses for the current study were: incremental beliefs will predict adoption of both mastery goals, entity beliefs will predict adoption of both performance goals, and sport competence will positively predict both approach goals. Because the revised social-cognitive model has

not been used in competitive sport, the findings from the current study will provide important information on the model's usefulness in this particular area.

*Social-Cognitive Model of Achievement Motivation*

The social-cognitive model of achievement motivation examines interactions among implicit theories (incremental and entity), two achievement goals (performance and mastery), and the perceived competence variable to better understand the ways in which individuals interpret their own ability and success (see Figure 1).

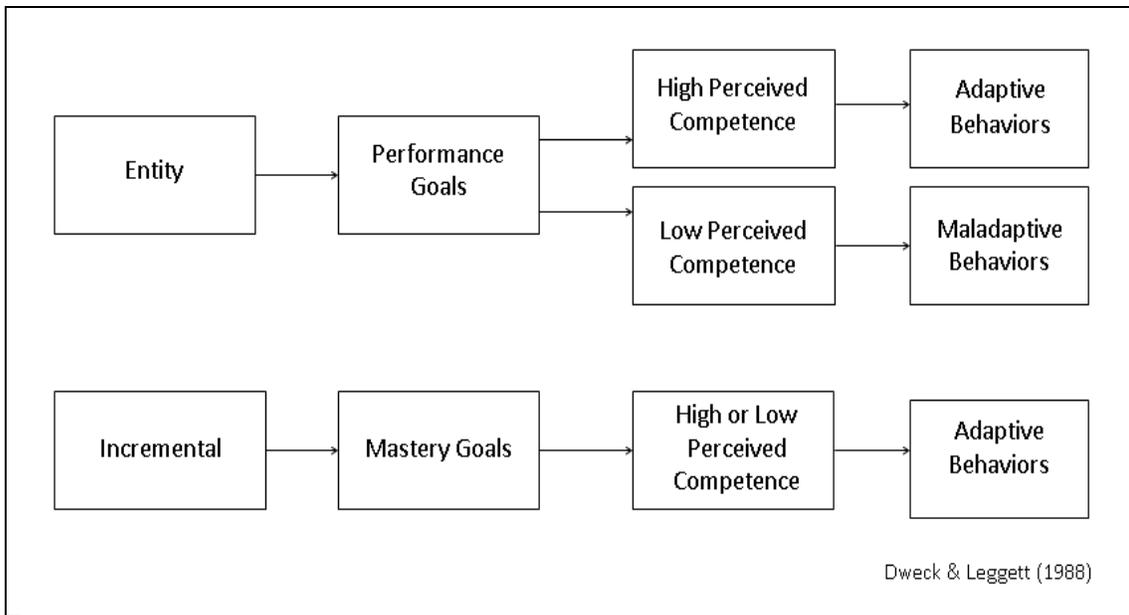


Figure 1 - *Social-Cognitive Model of Achievement Motivation*

Individuals may differ in their implicit theory beliefs based on whether or not they perceive their ability for a certain task as one that is fixed or relatively stable (entity) or if they perceive their ability as somewhat malleable or able to be developed (incremental).

The two achievement goals differ on the type of outcome the individual expects.

Individuals choosing a performance goal focus on showing the amount of competence they have in a certain area, whereas individuals choosing a mastery goal focus on enhancing the amount of competence in an area and mastery of the task. Finally,

perceived competence involves the amount of confidence individuals have in their ability to successfully complete the task at hand (Dweck & Legett, 1988).

Dweck (1986) and Dweck and Legett (1988) hypothesized that interactions of the implicit theories, achievement goals, and perceived competence may be used to predict behavior patterns and/or motivational outcomes. The hypotheses from these studies have been supported in most settings (e.g., education, physical activity, sport). Individuals with an entity theory belief are more likely to adopt a performance goal, as it fits with their beliefs of ability as fixed, thus wanting to display their competence for a given task. Individuals with an incremental theory belief are more likely to adopt a mastery goal because they believe their abilities are malleable and can learn ways to solve the problem or succeed at the task at hand. Adopting the entity theory with high perceived competence or adopting the incremental theory, with high or low perceived competence, are believed to predict adaptive behaviors. Such behaviors may include seeking challenges, high levels of persistence, or high levels of intrinsic motivation. However, adopting the entity theory with low perceived competence is believed to predict maladaptive patterns such as avoiding challenges and having low levels of persistence (Cury et al., 2006; Dweck & Legett, 1988; Stevenson & Lochbaum, 2008). Although Dweck's early work using the social-cognitive model focused on children's learning and performance on cognitive tasks (Dweck, 1986; Dweck & Legett, 1988), researchers have since applied the model to a number of areas, including education (Cury et al., 2006), physical education (Ommundsen, 2001), exercise (Lochbaum, Bixby, Lutz, Parsons, & Akerhielm, 2006), and physical activity (Wang & Biddle, 2003) in an attempt to predict motivational outcomes in their respective areas.

Other researchers (Chen et al., 2008; Ommundsen, Haugen, & Lund, 2005) have examined implicit self-theories outside of the social-cognitive model. Chen et al. (2008) investigated implicit self-theories and self-handicapping (maladaptive behavior) in college-aged students enrolled in physical education courses. The researchers found that students adopting an entity theory belief showed a decline in effort and an increase in the number of excuses that were made when facing failure, while students adopting an incremental theory belief did not show a decline in effort when facing failure. Moreover, students with entity beliefs provided self-reported and behavioral self-handicapping strategies in defense of a poor performance, while no relationship was found between students with incremental beliefs and self-handicapping. Ommundsen et al. (2005) found similar results while examining implicit self-theories and self-regulation strategies in 228 college-aged sport and physical education students. The researchers found adopting an entity theory belief was negatively related to concentration, but positively related to self-handicapping. These students tended to concentrate on the task less and were more likely to create self-handicapping strategies when faced with a challenging task or failure. Students adopting an incremental theory belief had a positive relationship with concentration and tended to be persistent while working on their tasks. It appears, then, that incremental beliefs lead to more positive outcomes, such as persistence in working toward a task, better concentration, and consistent effort, while entity beliefs lead to more negative outcomes such as less concentration, a decline in effort, and the development of self-handicapping strategies.

There has been inconsistent support for Dweck's social cognitive model of achievement motivation. Supporting Dweck's model, Biddle, Soos, and Chatzisarantis

(1999), Ommundsen (2001), Sarrazin et al. (1996), and Wang and Biddle (2003) found entity theory beliefs to be related to an ego goal orientation and also found support for the notion that incremental theory beliefs are related to a task/mastery goal orientation. Wang and Biddle (2003) examined the relationships of the social-cognitive model variables among Singaporean university students. They found incremental beliefs to be associated with intrinsic motivation and the task (mastery) goal orientation. The task (mastery) goal orientation was also associated with intrinsic motivation, both directly and indirectly through perceived competence. Neither an ego goal orientation nor entity beliefs were associated with intrinsic motivation. Wang and Biddle's findings add support to the social-cognitive model. Results suggest that holding an incremental belief towards sport or physical activity ability may enhance an individual's intrinsic motivation as well as his/her perceived competence for that sport or physical activity.

Although the findings from Sarrazin et al. (1996) and Dweck and Leggett (1988) were similar, Sarrazin et al. found that the methods used by Dweck and Leggett in an educational setting were not completely applicable in a sport setting. To address this issue, Sarrazin et al. created the Conceptions of the Nature of Athletic Ability Questionnaire (CNAAQ) to better measure an individual's ability conceptions (implicit theories) in a sport setting. Study two by Sarrazin et al. employed the CNAAQ while investigating sport ability conceptions and goal orientations among French secondary school students. Sarrazin et al. found a significant, positive relationship between the social comparison (performance) goal and conceptions of sport ability as stable and a natural gift. Further, there was a significant, positive relationship between the mastery goal and incremental and learning conceptions of sport ability.

In further support of Dweck's model, Ommundsen (2001) examined the role of implicit theories and achievement goals on self-handicapping strategies in Norwegian physical education students. Ommundsen found that an entity theory belief may lead to maladaptive behaviors (i.e., self-handicapping and excuse making), while an incremental/learning theory belief does not appear to lead to these types of behaviors. Moreover, incremental/learning theory belief may help to protect one from maladaptive behaviors. Specifically, Ommundsen found a significant relationship between a stable (entity) theory belief and low perceived competence on self-handicapping strategies. However, against Dweck's model, Ommundsen found that an ego goal orientation did not predict the use of self-handicapping strategies. Surprisingly, Ommundsen also found that an incremental/learning theory belief was positively related to an ego goal orientation. This finding is similar to that of Sarrazin et al. (1996) and Biddle et al. (1999), who found that individuals can score the same (high or low) on both social comparison/ego and task orientations.

According to Cury et al.(2006) there is mixed support for the model's proposal that performance goals lead to negative outcomes and mastery goals lead to positive outcomes. Previous research has shown no support for achievement goals accounting for the direct relationship between implicit theories and achievement-relevant outcomes. Further, research has shown little support for perceived competence moderating the impact of implicit theories on achievement-relevant outcomes. Based on these and similar findings, Cury and his colleagues (2006) believed it was necessary to modify the only partially supported social-cognitive model in order to better explain how achievement motivation, perceived competence, and implicit theories interact.

*Revised Social-Cognitive Model of Achievement Motivation*

Cury et al. (2006) modified the social-cognitive model of achievement motivation by incorporating Elliot and McGregor’s (2001) 2 x 2 achievement goal framework. The resulting model includes a definition of valence (approach and avoidance) in addition to the definition of competence (mastery and performance), forming four achievement goals (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance). Aside from the addition to the achievement goals, the main difference in the social- and revised social-cognitive model is the use of perceived competence as a predictor of achievement goals, instead of as a moderator of the outcome (see Figure 2).

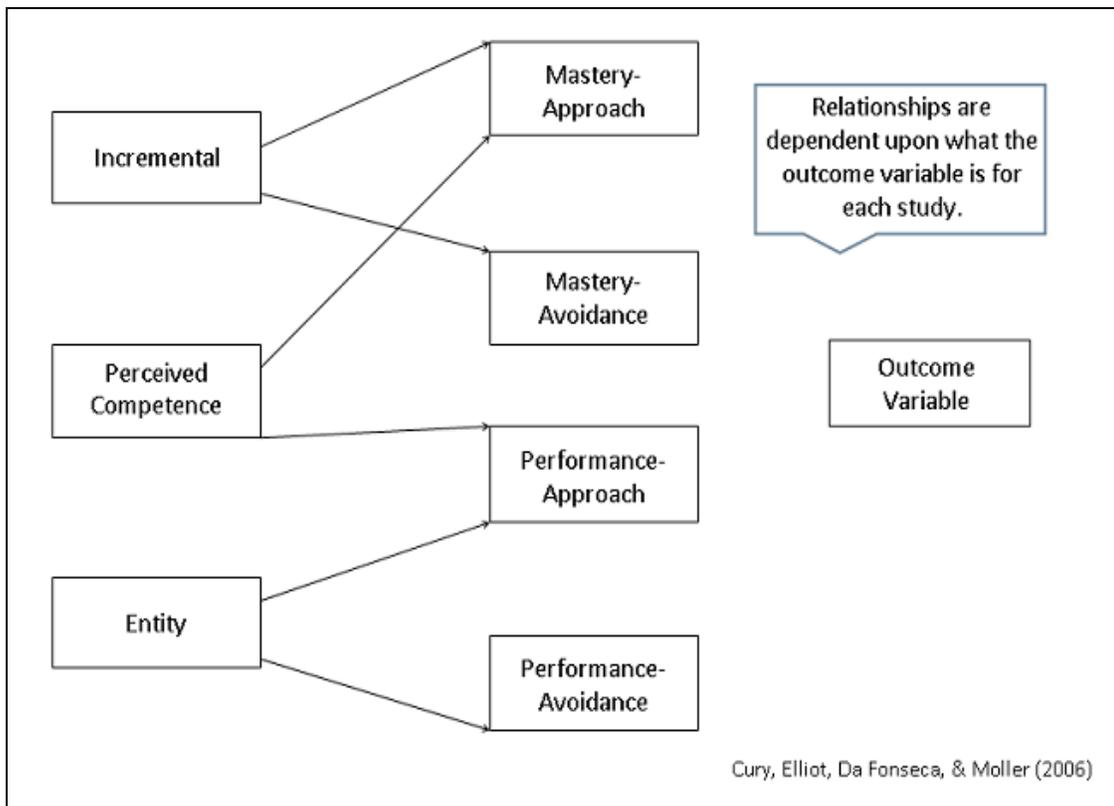


Figure 2 - *Revised Social-Cognitive Model of Achievement Motivation*

Cury et al. (2006) conducted two studies in an educational setting to examine the social-cognitive model with the added 2 x 2 achievement goal framework. Study one investigated math performance in a classroom setting with 463 students between 12 and

14 years of age. No relationship was found using perceived competence as a moderator between achievement goals and math performance. Instead, perceived competence was found to increase participant performance-approach goal adoption and decrease participant performance-avoidance goal adoption. As hypothesized, entity beliefs negatively predicted math performance, while incremental beliefs positively predicted math performance. Also as hypothesized, entity theory positively predicted both performance goals (approach and avoidance), while incremental theory positively predicted both mastery goals (approach and avoidance). Finally, perceived competence was found to significantly predict all four achievement goals, as well as math performance, but did not moderate the influence of implicit theories or achievement goals on math performance.

The second study conducted by Cury et al. (2006) was a replication of study one using an IQ test as the performance measure, instead of math performance, in a laboratory setting instead of the classroom setting. The researchers also added intrinsic motivation as a second outcome variable. In comparison to incremental beliefs, entity beliefs had a negative effect on IQ test performance and led to increased adoption of both performance goals and decreased adoption of both mastery goals. Entity beliefs also had a negative effect on intrinsic motivation. Similar to study one, perceived competence was not found to be a moderator between achievement goals or implicit theory beliefs and IQ test performance and intrinsic motivation. However, perceived competence was found to predict all four achievement goals, IQ test performance, and intrinsic motivation. Both performance goals were shown to mediate the direct relationship between perceived competence and IQ test performance, while both mastery goals and

the performance-avoidance goal were shown to mediate the direct relationship between perceived competence and intrinsic motivation (Cury et al., 2006). These results for perceived competence support the notion that perceived competence works better as a predictor of achievement goals instead of a moderator of implicit theory and achievement goals, as it is in the social-cognitive model. According to Cury et al., “perceived competence appears to influence the valence of the goal that is adopted, but once adopted, the goal itself evokes powerful perceptual-cognitive processes that guide how competence-relevant information is attended to and interpreted” (p. 677). The results from both Cury et al.’s (2006) studies lend support for the modification to the social-cognitive model and have since led to research using the revised social-cognitive model of achievement motivation.

Stevenson and Lochbaum (2008), Wang, Liu, Lochbaum, and Stevenson (2009), and Corrion et al. (2010) examined the revised social-cognitive model with different groups (i.e., community and university volunteers, university students in physical activity classes, and French middle-school physical education students, respectively). Stevenson and Lochbaum (2008) conducted two studies examining the revised social-cognitive model with volunteer participants’ leisure time exercise motivation. The second study was conducted to determine whether or not the findings from study one could be replicated. Stevenson and Lochbaum were unable to show support for the original social-cognitive model in their second study. However, the relationship between entity beliefs and the performance-avoidance goal was significant. Results of the relationship between entity beliefs and the performance-approach goals were inconsistent between the two studies. Corrion et al. (2010) used 477 middle-school student volunteers to examine the

revised social-cognitive model with the judgment of cheating acceptability in a physical education setting. Corrion et al. found entity beliefs positively predicted the judgment of cheating acceptability, but these beliefs were only partially mediated by the two performance goals. Wang et al. (2009) used 309 university students to examine the moderating role of perceived competence on achievement goals, implicit theories, and intrinsic motivation in university physical activity classes. Results differed based on the individual's competence level. When competence was high, entity beliefs predicted performance-approach goals, but did not predict performance-avoidance goals. When competence was low, entity beliefs predicted both performance goals.

In examining the mastery goals, Stevenson and Lochbaum (2008) and Corrion et al. (2010) found the mastery-approach goal served as a mediator between incremental beliefs and the outcome (i.e., leisure-time exercise motivation and the judgment of cheating acceptability, respectively). Corrion et al. also found the mastery-avoidance goal to be a positive mediator. Wang et al. (2009) found mastery-approach goals and intrinsic motivation to both be positively predicted by incremental beliefs with high and low perceived competence and the high perceived competence group participants had higher mastery-approach goals. The study also positively predicted mastery-avoidance goals when perceived competence was moderate.

#### *Outcome variables*

There are numerous possible outcome variables available for study in all areas of research, as well as varying age groups that can be examined. For these reasons, it can be difficult to generalize or set hypotheses based on the findings of a study's outcome variable and the participants used. For the current study, no hypotheses were made based

on the outcome variable as research has yet to be conducted on the revised social-cognitive model with a competitive sport outcome. Previous research in education (Cury et al., 2006), exercise (Stevenson & Lochbaum, 2008), physical activity (Ntoumanis, Thøgersen, Ntoumani, & Smith, 2009), and physical education (Wang et al., 2007) have yielded similar results on the relationships between the 2x2 achievement goals and their study's respective outcomes (i.e., math performance, IQ test performance, relative autonomy index for leisure-time exercise, dart-throwing performance, physical activity participation, respectively).

Prior research suggests a positive, significant relationship between mastery-approach goals and the outcome variables (Cury et al., 2006; Ntoumanis et al., 2009; Stevenson & Lochbaum, 2008; Wang et al., 2007), a negative, significant relationship between mastery-avoidance goals and math performance (Cury et al., 2006), a positive, significant relationship between performance-approach goals and the outcome variable (Cury et al., 2006; Ntoumanis et al., 2009; Stevenson & Lochbaum, 2008; Wang et al., 2007), a negative, significant relationship between performance-avoidance goals and the outcome variable (Cury et al., 2006; Stevenson & Lochbaum, 2008; Wang et al., 2007), and a positive, significant relationship between sport competence and the outcome variable (Cury et al., 2006; Ntoumanis et al., 2009; Stevenson & Lochbaum, 2008; Wang et al., 2007). Because there is no prior research upon which to base a hypothesis for the current study, the following research question was examined: how does research in a competitive sport setting with a performance-based outcome compare to the outcome relationships in other areas (i.e., education, exercise, physical activity, physical education)?

The findings discussed above provide a wealth of information on the use of the newer revised social-cognitive model in exercise and sport related areas. To date, no research has been conducted using the revised social-cognitive model with an actual performance-based outcome in a competitive sport setting. Therefore, the purpose of the present research was to examine the relationship between the revised social-cognitive model with a true performance measure within a competitive sport setting to determine the similarities and differences in comparison to exercise, education, and other similar settings that have been previously examined.

### **Chapter 3**

#### **Method**

##### ***Participants***

A total of 689 undergraduate golf class students from a large southwestern United States university were recruited to participate in the study. From those classes, 455 students (403 male, 52 female) were in attendance for and completed all required questionnaires. The students ranged from freshman to senior undergraduate students.

##### ***Instrumentation***

###### ***Achievement Goals***

The Achievement Goal Questionnaire for Sport (AGQ-S; Conroy, Elliot, & Hofer, 2003) is a 12-item measure examining participant's goal adoption in the sport domain. Three items assessed each of the four achievement goals. Sample items include: 'I want to perform as well as it is possible for me to perform' (mastery-approach), 'Sometimes I'm afraid that I may not perform as well as I'd like' (mastery-avoidance), 'It is important for me to perform better than others' (performance-approach), and 'My goal

is to avoid performing worse than everyone else' (performance-avoidance). Participants responded to each question on a seven-point Likert scale, ranging from 1 (not at all like me) to 7 (completely like me).

Several studies within the sport domain (e.g., Adie, Duda, & Ntoumanis, 2008; Conroy et al., 2003; Nien & Duda, 2008) found support for factorial invariance (i.e., whether or not members of different groups ascribe the same meanings to survey items), predictive validity, and internal reliability for the AGQ-S. Conroy et al. also provided evidence of temporal stability and external validity for the AGQ-S. Stoeber, Stoll, Pescheck, and Otto (2008) found satisfactory Cronbach alpha coefficients for all four motivation scales: mastery-approach (.74), mastery-avoidance (.85), performance-approach (.85), and performance-avoidance (.77). Chalabaev, Sarrazin, Stone, and Cury (2008) also found good internal consistency for the two goals they measured: performance-avoidance (.86) and performance-approach (.89).

### *Sport Ability Beliefs*

The Conceptions of the Nature of Athletic Ability Questionnaire, Version 2 (CNAAQ-2; Biddle et al., 2003) is a 12-item measure examining incremental and entity beliefs in the participants' sport abilities. Incremental beliefs were measured via two subscales, learning (e.g., 'To reach a high level of performance in sport, you must go through periods of learning and training') and improvement (e.g., 'If you put enough effort into it, you will always get better at sport'). Entity beliefs were also measured via two subscales, stable (e.g., 'Even if you try, the level you reach by practicing will change very little') and gift (e.g., 'You need to have certain 'gifts' to be good at sport'). Each subscale is composed of three items. Participants responded to each question on a five-

point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). For the current study, only the higher order constructs of incremental and entity beliefs were examined.

For the CNAAQ-2, Biddle et al. (2003) found good factorial, convergent, and discriminant validity, as well as internal consistency (.74 for entity and .80 for incremental). Moreno, Gonzalez-Cutre, Sicilia, and Spray (2010) created a Spanish version of the CNAAQ-2 and found respectable Cronbach coefficients of .72 for incremental beliefs and .70 for entity beliefs. These findings in a translated version of the CNAAQ-2 are important in showing the good reliability and validity of the overall measure.

### *Sport Competence*

The Physical Self-Description Questionnaire (PSDQ; Marsh, Richards, Johnson, Roche, & Tremayne, 1994) measures 11 factors or scales specific to physical self-concept, of which only the sport competence scale was used for the current study. The sport scale contains six-items (e.g., 'Other people think I am good at sports') to measure the participant's perceived sports competence. Participants responded to each question on a six-point Likert scale, ranging from 1 (false) to 6 (true).

Marsh (1996a) found evidence of convergent and discriminant validity for the PSDQ. Also, Marsh (1996b) found the PSDQ to have good test-retest reliability ( $r = .83$ ) over a short term (3 months) and provides support for the PSDQ's scales with high alpha coefficients having been found for all 11 scales. Marsh et al. (1994) provided support for the PSDQ's generalizability between genders.

### *Procedures*

Undergraduate golf classes took place on the university's golf course. Students were informed of the guidelines and goals of the putting competition as well as the general purpose of the study, which was to examine each student's perceptions of his/her own abilities to perform well in a putting competition. Students were identified by a professional golfer name of their choice to ensure participant confidentiality. Students from each individual class chose from a list of 50 male and female golfers provided by the researcher, with only one individual able to be identified by that golfer's name per class. After selecting a name, students completed a set of questionnaires consisting of the AGQ-S (Conroy et al., 2003), CNAAQ-2 (Biddle et al., 2003), and PSDQ (Marsh et al., 1994). Students were informed that this study had no effect on their grade for the golf classes and that they could withdraw from the study at any point. After completion of the questionnaire, golf instructors then demonstrated putting, and allowed students to practice putting for two class periods. A practice round was then set up on the putting green in order for students to gain an understanding of the process that would be followed during the putting competitions. A total of three rounds were then played during the putting competition with a cut being implemented after the second round based on the total score of the first two rounds. The cut included the top 1/3 of every class, including any ties, to participate in a final championship round. The first two rounds consisted of students putting a 12-hole course, with the final round extended to 18 holes. Each competition was played against all other students in the golf classes (3-5 per day) for that entire day,

not just within their own individual classes. Only the combined scores of rounds one and two were used in the current study.

### ***Data Analyses***

Descriptive statistics and bivariate correlations among the study variables were calculated using the statistical package SPSS 21.0. Next, Mplus 7.11 was employed to test the goodness of fit of the hypothesized model. Because the goal of the study was to test the revised social-cognitive model in a sporting context, no modifications were made to the model. Goodness of fit was measured by several indices based on the recommendations by Wang and Wang (2012). In the present study the comparative fit index (CFI) and Tucker-Lewis index (TLI) were used to compare the specified model (revised social-cognitive model) with the null model. A reasonable cut-off for both indices is higher or equal to 0.90. The root mean square error of approximation (RMSEA) was used to examine the lack of fit of the specified model to the population and has a suggested cut-off of equal to or lower than 0.06 for a good model fit. Finally, the standardized root mean square residual (SRMR) was used to measure the residual-based model fit index. A SRMR less than 0.08 is considered a good fit and less than 0.10 is considered acceptable (Wang & Wang, 2012).

## **Chapter 4**

### **Results**

#### ***Descriptive statistics***

Table 1 contains the correlations between the 2x2 achievement goals, implicit theories, and perceived competence. Cohen's (1988) criterion was used to interpret the summarized correlations as follows:  $r = .10$  are considered low magnitude,  $r = .25$  are

considered moderate/average magnitude, and  $r = .40$  are considered high magnitude. A positive correlation should be interpreted as the achievement goal having a facilitative effect on the implicit theories and/or perceived competence, while a negative correlation should be interpreted as the achievement goal having a debilitating effect on the implicit theories and/or perceived competence (Lochbaum & Gottardy, 2014) The opposite can be said for the relationships with the outcome, golf putting score, as a lower putting score is wanted by the participant since, in the competition, a higher score is a worse score. Therefore, a negative effect size should be interpreted as sport competence or the achievement goal having a facilitative effect on performance and a positive effect size should be interpreted as having a debilitating effect on performance.

Table 1  
Descriptive statistics and bivariate correlations among all variables.

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. MaP	6.21	0.74	--						
2. MaV	4.51	1.41	0.18**	--					
3. PaP	5.17	1.24	0.44**	0.25**	--				
4. PaV	4.36	1.57	0.08	0.40**	0.41**	--			
5. Sport Competence	4.58	1.00	0.42**	-0.06	0.30**	-0.08	--		
6. Entity	2.45	0.63	-0.20**	-0.06	0.01	0.07	-0.08	--	
7. Incremental	4.19	0.53	0.36**	0.08	0.19**	0.02	0.21**	-0.30**	--
8. ZRound 1 & 2 Total	0.09	1.70	-0.16**	0.11*	-0.08	0.16**	-0.35**	-0.01	-0.02

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

As presented in Table 1, mastery-approach and performance-approach goal means were significantly higher than the median ( $M = 6.21$  and  $5.17$ , respectively), as well as sport competence and incremental beliefs ( $M = 4.58$  and  $4.19$ , respectively). Entity beliefs mean was below the median ( $M = 2.45$ ) which shows that few students had these beliefs. The mastery-approach goal had a moderate-high, positive association with incremental beliefs ( $r = .36$ ,  $p < .01$ ) and sport competence ( $r = .42$ ,  $p < .01$ ) and a

moderate, negative association with entity beliefs ( $r = -.20, p < .01$ ). The performance-approach goal had a low-moderate, positive association with incremental beliefs ( $r = .19, p < .01$ ) and a moderate, positive association with sport competence ( $r = .30, p < .01$ ). None of the antecedents were significantly related to either of the avoidance goals. In relation to golf putting score, the mastery-approach goal had a low, negative association ( $r = -.16, p < .01$ ), while the mastery-avoidance and performance-avoidance goals had low, positive associations ( $r = .11, p < .05; r = .16, p < .01$ , respectively). Finally, sport competence had a moderate-high, negative association with the golf putting score ( $r = -.35, p < .01$ ).

### ***Structural model***

The Mplus 7.11 program was employed to evaluate the proposed model's goodness of fit. Goodness of fit indices revealed an acceptable fit for the proposed model (CFI = 0.90, TLI = 0.89, RMSEA = .06, and SRMR = 0.09;  $X^2 = 1127(421), p < .01$ ). The parameter estimates between incremental beliefs and sport competence to the mastery-approach goal were significant (.29 and .42, respectively), while the parameter estimates between entity beliefs and sport competence to the performance-approach goal were significant as well (.12 and .32, respectively). None of the parameter estimates between the antecedents and either of the avoidance goals were significant. The performance-avoidance goal was the only goal that had a statistically significant direct effect on the golf putting score (ZR1R2 in Figure 3; parameter estimate = .14), while sport competence had a significant, negative effect on the golf putting score (parameter estimate = -.32). Figure 3 shows the hypothesized structural model with all significant parameter estimates.

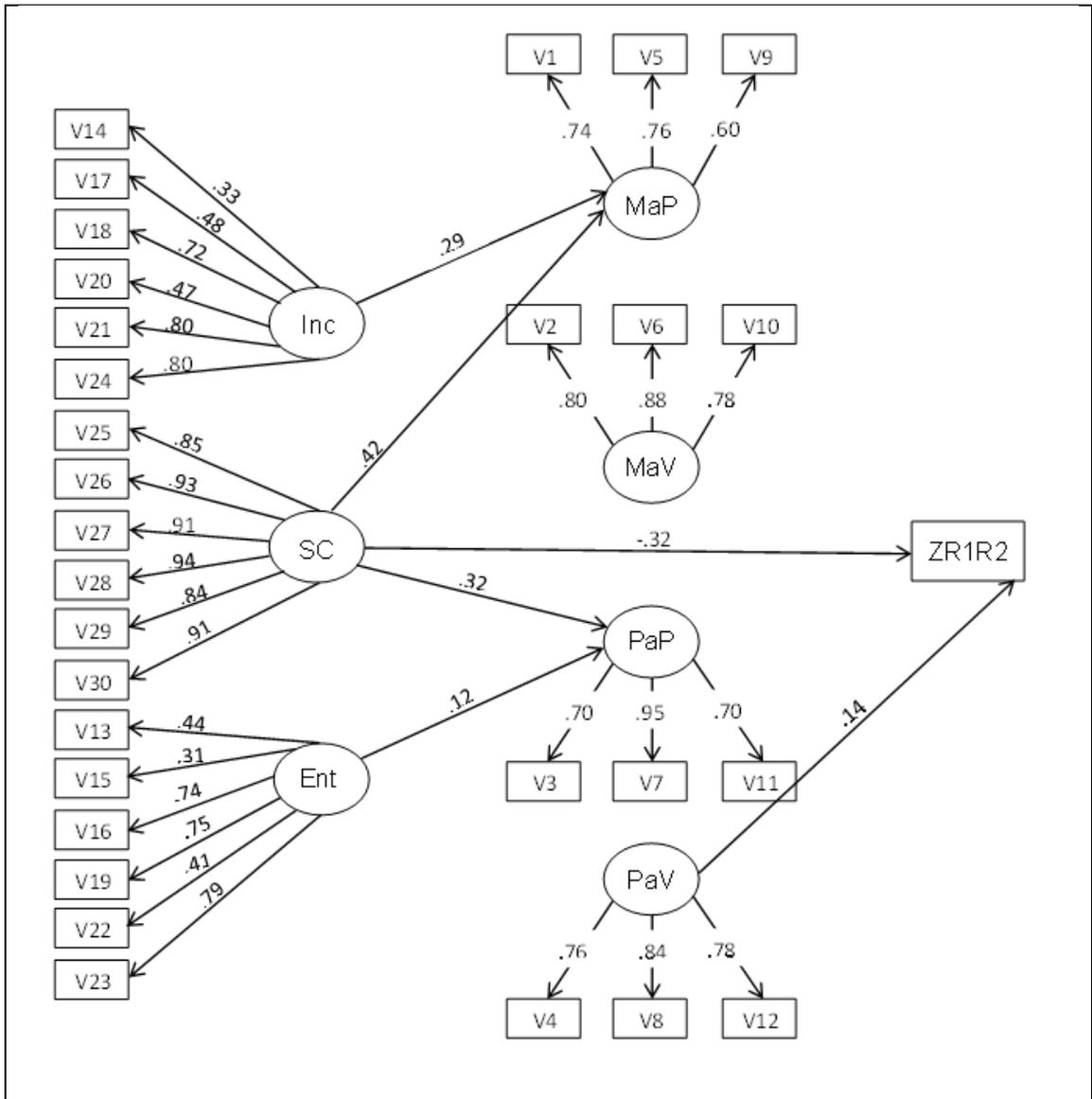


Figure 3 – Hypothesized model (revised social-cognitive model of achievement motivation) including all significant parameter estimates. Note: MaP = mastery-approach, MaV = mastery-avoidance, PaP = performance-approach, PaV = performance-avoidance, Inc = Incremental beliefs, SC = sport competence, Ent = Entity beliefs, ZR1R2 = golf putting score. Significance =  $p < .05$ .

## Chapter 5

### Discussion

The purpose of the present research was to examine the relationship between the revised social-cognitive model with a true performance measure within a competitive

sport setting to determine the similarities and differences in comparison to exercise, education, and other similar settings that have been previously examined. Most of the hypotheses for the study were supported. The results offer partial support for the revised social-cognitive model of achievement motivation in a competitive sport setting and provide important information for future research.

Analysis of correlations indicated the first hypothesis was only partially supported. Specifically, the mastery-approach goals were predicted by incremental beliefs (high and positive relationship), while the mastery-avoidance goals were not. This finding indicates that individuals who believe their ability for a task can be learned or developed were more likely to adopt a goal focused on mastering the task. The next hypothesis on entity beliefs was not supported, as no significant relationship was found between entity beliefs and performance goals adoption. Finally, the last hypothesis involving sport competence was supported as sport competence positively predicted both approach goals. The effect between sport competence and the performance-approach goal was moderate-high and positive, while the relationship with the mastery-approach goal was high and positive, respectively. This finding suggests that individuals with high perceived competence for the task were more likely to choose a goal focused on a positive possibility.

Structural model parameter estimates supported the correlations noted above. The relationship between incremental beliefs and the mastery-approach goal was significant with a moderate-high and positive relationship. The parameter estimates for sport competence and both approach goals were almost identical to the SPSS correlations with a high, positive relationship for the mastery-approach goal and a moderate-high, positive

relationship for the performance-approach goal, respectively. However, contrary to the correlation findings, the hypothesis for entity beliefs was partially supported. The parameter estimate between entity beliefs and the performance-approach goal was significant, with a low and positive relationship. This finding indicates that individuals who believe their ability for the task was relatively stable or fixed were more likely to adopt a goal that focused on the amount of competence they had for the task. Similar to the correlations above, no support was found for the relationships between incremental beliefs and the mastery-avoidance goal or entity beliefs and the performance-avoidance goal.

Because there is no prior research in a competitive sport setting with a true performance measure, it is difficult to know whether or not these findings would be expected in this setting. As discussed above, most of the hypotheses for the current study were supported, but neither of the avoidance goals were predicted by the implicit theories or sport competence. Because the participants were informed of the purpose of the study and the format of the putting competition prior to completing the questionnaires, the participants may have focused on the competitive aspect of competition. This means that the participants may have been more likely to choose an approach goal, mastery or performance, because they wanted to perform well in the putting competition and/or were more focused on beating the other participants more so than they were trying to avoid doing worse than the other participants. Also, it is reasonable to believe that in a competitive sport setting individuals with high sport competence would be more likely to choose an approach goal because they believe in their sport abilities and their ability to perform well in competition.

No hypotheses were made based on the outcome variable (golf putting score), as research has yet to be conducted on the revised social-cognitive model with a true performance measure in a competitive sport setting. However, the researcher chose to focus on answering the research question: how does research in a competitive sport setting with a performance-based outcome compare to the outcome relationships in other areas (i.e., education, exercise, physical activity, physical education)? Correlations and structural model parameter estimates between sport competence, the 2x2 achievement goals, and the golf putting score both showed a negative, significant relationship between sport competence and the golf putting score and a positive, significant relationship between performance-avoidance goals and the golf putting score. This means that the higher the participant's sport competence, the lower (better) their golf putting score. Participants choosing a performance-avoidance goal had a higher (worse) golf putting score. A negative, significant correlation was also found between mastery-approach goals and the golf putting score, while a positive, significant relationship was found between mastery-avoidance goals and the golf putting score. These findings suggest that participants employing a mastery-approach goal had lower golf putting scores, while those using a mastery-avoidance goal had higher golf putting scores. While only one goal to outcome parameter estimate was significant in the structural model (performance-avoidance), the performance-approach goal was the only goal that did not have a significant correlation with the golf putting score. From the correlations, both avoidance goals were significant, positive predictors of the golf putting score, meaning that individuals adopting these goals had higher golf putting scores.

The outcome-related findings from the current study are similar to that of previous research in other areas, although the positive and negative effects have differing meanings. Previous research (Cury et al., 2006; Ntoumanis et al., 2009; Stevenson & Lochbaum, 2008; Wang et al., 2007) found a positive, significant relationship between mastery-approach goals, perceived competence, and the outcome variable, which corresponds with findings from the current study. Stevenson and Lochbaum, Cury et al., and Wang et al. found a negative, significant relationship between performance-avoidance goals and the outcome variable, which corresponds with the current study as well. In comparing the results from previous research in other areas (Cury et al., 2006; Ntoumanis et al., 2009; Stevenson & Lochbaum, 2008; Wang et al., 2007) with those of the current study, significant or not, the relationships in the current study are in the expected direction (positive or negative). These findings are important in showing that the relationships between the achievement goals and outcome variables may be generalizable amongst areas like education, exercise, physical activity, physical education, and, now, competitive sport.

The revised social-cognitive model of achievement motivation was not fully supported in the competitive sport setting. The results from the goodness of fit indices showed that the model was not a good fit for the population measured, which could have been affected by the competitive setting of the study. There could be a number of reasons for the findings in the current study, namely, the effect that a competitive situation may have on an individual's implicit theory beliefs, competence level, goal adoption, and, in turn, their performance. The correlations and structural model results clearly indicated that sport competence was the best predictor of goal adoption and the outcome variable in

the current competitive sport setting. Research in other areas (e.g., Cury et al., 2006; Ntoumanis et al., 2009; Stevenson & Lochbaum, 2008; Wang et al., 2007) has shown significant correlations between these variables, but rarely with sport/perceived competence as the best overall predictor.

***Limitations, future directions, and summary***

As with most research, there were limitations to the current study. The participants and the study's generalizability to other types of competition could be considered limitations for this study. While the putting competition was a competitive event, it was conducted in a university golf class and was not an actual sporting event; therefore, some participants may have cared more about the results and/or tried harder than other participants devoid of tangible rewards. Future research could examine the revised social-cognitive model in an actual sporting event (e.g., professional golf tournament, tennis tournament, basketball games) to determine if and/or to what extent the revised social-cognitive model works in that type of competitive sport setting and whether or not the findings would be comparable to those of the current study. Future research could also examine the model in a competitive sport setting at different levels of competition (e.g., recreational, high school, college, professional) to determine what, if any, effect competition level has on implicit theory beliefs, goal adoption, and performance outcomes.

Because no participants were excluded from the data set, another limitation could be outliers in the data that were not removed. Several participants with mastery-approach or performance-approach goals could have had poor (high) outlying putting scores, which would have affected the relationships between these goals and the putting score. A meta-

analytic review by Lochbaum and Gottardy (2014) showed that the relationships between the performance outcome measure and mastery-approach and performance-approach goal adoption should be significantly higher than was found in the current study. However, in the sport of golf, as with most sports, it is easy for one bad shot or missed putt to lead to another, and another, and things just continue to go bad. In a competition in a golf class with no tangible rewards, if a participant misses a few putts, it could be easy for them to go from caring and wanting to perform well, to not caring as much and not caring about his/her performance, somewhat quickly. By taking any outliers out of the data set, the goals to outcome relationships could have been more significant and possibly provided a slightly different picture of the sample's goal adoption and golf putting score.

In summary, the current study was the first to test the revised social-cognitive model of achievement motivation in a competitive sport setting with a true performance measure. Several of the hypotheses for this study were supported, but the results also demonstrated that the implicit theories may not be related to the avoidance goals in a competitive sport setting. This study also demonstrated the importance of one's level of sport competence and the importance of the goals an individual chooses for his/her sport performance. The importance of incremental beliefs, high perceived competence, and approach goal adoption in a competitive sport setting are extended in this study and should be promoted to, hopefully, enhance sport performance in competition.

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APPENDIX:

Table 1 - Summary of the relations between achievement goals,  
implicit theories, and perceived competence for studies  
included in the meta-analysis

Table 1 - Summary of the relations between achievement goals, implicit theories, and perceived competence for studies included in the meta-analysis

Study	Sample	Goal Type	Domain	Entity	Incremental	PC
Corrion, D'Arripe-Longueville, Chalabaev, Schiano-Lomoriello, Roussel, & Cury (2010)	477 French middle-school students	MaP	Physical Education	-0.07	0.26**	N/A
		MaV		-0.07	0.23**	N/A
		PaP		0.24**	-0.03	N/A
		PaV		0.36**	-0.18**	N/A
Cury, Da Fonseca, Rufo & Sarrazin (2002)	682 French high school boys	PaP	Physical Education	0.30**	-0.13**	0.22**
		PaV		0.31**	-0.34**	-0.37**
Moreno, Gonzalez-Cutre, Sicilia, & Spray (2010)	727 Spanish exercisers	MaP	Exercise	-0.06	0.47**	0.31**
		MaV		0.15**	0.12**	-0.03
		PaP		0.27**	0.1**	0.15**
		PaV		0.16**	0.06	0.04
Morris & Kavussanu (2008)	230 British athletes	MaP	Sport	N/A	N/A	0.31**
		MaV		N/A	N/A	-0.05
		PaP		N/A	N/A	0.25**
		PaV		N/A	N/A	-0.08

Table 1 - Continued

Study	Sample	Goal Type	Domain	Entity	Incremental	PC
Murcia, Camacho, & Rodriguez (2008)	727 Spanish exercisers	MaP	Exercise	N/A	N/A	0.31**
		MaV		N/A	N/A	-0.03
		PaP		N/A	N/A	0.15**
Nien & Duda (2008)	450 British university and sports club athletes	PaV		N/A	N/A	0.04
		MaP	Sport	N/A	N/A	0.31
		MaV		N/A	N/A	<i>ns</i>
Ntoumanis, Thøgersen-Ntoumani, & Smith (2009)	138 British university students	PaP		N/A	N/A	0.41
		PaV		N/A	N/A	<i>ns</i>
		MaP	Physical Activity	N/A	N/A	0.25**
Ommundsen (2004)	273 Norwegian 10 <sup>th</sup> Grade PE students	MaV		N/A	N/A	0.05
		PaP		N/A	N/A	0.28**
		PaV		N/A	N/A	-0.02
		PaP	Physical Education	N/A	N/A	0.42**
		PaV		N/A	N/A	-0.25**

Table 1 - Continued

Study	Sample	Goal Type	Domain	Entity	Incremental	PC
Skjesol & Halvari (2005)	188 Norwegian secondary school (university) PE students	PaP	Physical Activity	N/A	N/A	0.44**
Spray, Warburton, & Stebbings (2013)	491 British primary school students PE students	PaV		N/A	N/A	-0.15*
		MaP	Physical Education	N/A	N/A	0.39**
		MaV		N/A	N/A	0.16**
Stevenson & Lochbaum (2008): Study 1	386 American university students, church goers, & fitness center members	PaP		N/A	N/A	0.48**
		PaV		N/A	N/A	0.22**
		MaP	Exercise	-0.17*	0.41*	0.39**
Stevenson & Lochbaum (2008): Study 2	386 American university students, church goers, & fitness center members	MaV		0.03	0.05	0.20
		PaP		0.07	0.18*	0.10
		PaV		0.24*	-0.01	-0.2*
Stevenson & Lochbaum (2008): Study 2	386 American university students, church goers, & fitness center members	MaP	Exercise	-0.09	0.42*	0.42*
		MaV		-0.06	0.19*	-0.02*
		PaP		0.29*	0.22*	0.06
		PaV		0.38*	-0.00	-0.22*

Table 1 - Continued

Study	Sample	Goal Type	Domain	Entity	Incremental	PC
Wang, Biddle, & Elliot (2007): Study 2	647 Singapore PE students	MaP	Physical Education	N/A	N/A	0.52**
		MaV		N/A	N/A	-0.21**
		PaP		N/A	N/A	0.44**
		PaV		N/A	N/A	0.20**
Wang, Liu, Lochbaum, & Stevenson (2009)	309 American university physical activity students	MaP	Physical Activity	-0.15*	0.37**	0.59**
		MaV		0.02	0.15**	-0.13**
		PaP		0.09	0.04	0.54**
		PaV		0.06	0.12	-0.02

N/A = Not applicable (not measured)      \*\* = <.01  
 ns = not significant, correlation not reported      \* = <.05