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The effects of competiton on adult circumstantial efficacy

Matthew Aaron Bender

THE EFFECTS OF COMPETITION ON ADULT CIRCUMSTANTIAL EFFICACY

A Thesis

Presented to the

Faculty of

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San Bernardino

In Partial Fulfillment

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Master of Science

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ABSTRACT

The purpose of the current study was to expand the knowledge and understanding of circumstantial efficacy. The researcher expanded the previous definition of circumstantial efficacy posed by Ganzach, Stirin, Pazy, and Eden (2008), which provided examples of the effects circumstantial efficacy could have on individual performance. The focus of the current study was to replicate and expand on the findings of Ganzach et al. (2008) by further examining how the size of a win or loss moderates the effects performance has on circumstantial and internal efficacy beliefs. Using a computer dice game designed specifically for use in the study, participants engaged in competition against an illusory opponent whom they were told was real. In the game, participants were placed into conditions where they were told either they or their opponent was at a disadvantage based on the directions for scoring points. Participants played the game experiencing wins and/or losses of different magnitudes set by the researcher per condition. These wins and losses of different magnitudes were used to create different impacts of performance on participants' ratings of measures created for both circumstantial and internal efficacy. The ratings

of circumstantial and internal efficacy were collected before and after the first of three games in a sequence of four, with manipulation check questions asked after game four. The findings of the current study lead to partial support of previous findings and expanded on the previous knowledge of circumstantial efficacy. Implications and future research were also discussed in conjunctions with the findings.

ACKNOWLEDGEMENTS

The thesis was not an easy accomplishment to obtain without the help and support of those around me. As such, I would like to provide much thanks to my thesis committee members, Dr. Donna Garcia and Dr. Matt Riggs for their individual contributions to the success of my thesis. I would also like to acknowledge the constant help and support of my awesome thesis advisor Dr. Janet Kottke for the motivation she was able to provide and the jokes here and there to help me relax during tougher times in the process. I would also like to recognize Chris Ballinger for his hard work in programming the "Let's Get Rollin" game I used in the research, and the willingness to make changes in short order when they were needed. Lastly, I would like to acknowledge my girlfriend Shallymar Robinson and my family for the support that they provided me at many times along the way, as well as being willing to review many drafts of my thesis. At this point, you are all probably just as knowledgeable as I am on circumstantial efficacy.

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CHAPTER ONE

INTRODUCTION, DEFINITIONS, LITERATURE REVIEW, AND HYPOTHESES

Efficacy expectations or beliefs, which are defined as "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, Adams, & Beyer, 1977, p. 126), have been researched and applied continually. However, most of this research focuses specifically on self-efficacy. Instead of focusing on a single dimension of efficacy, more recently, researchers like Ganzach, Stirin, Pazy, and Eden (2008) have suggested that a theoretical framework that distinguishes between internal and external efficacies should be embraced. Using this newer framework of efficacy allows for a better understanding and the ability to differentiate between internal and external efficacy's specific and separate relationships with outcomes. Within this bi-dimensional framework, the impacts of each of the two forms of efficacy, internal and external, will be discussed. Furthermore, the purpose of the current study, following that of Ganzach et al. (2008), is to demonstrate that internal and external measures of efficacy are

qualitatively different. More specifically the purpose of this study is to explain and promote the understanding of the external belief of circumstantial efficacy (referred to as position efficacy in Ganzach, et al., 2008).

Internal Efficacy

Internal efficacy, or self-efficacy, is often thought of as being similar to Bandura's (1977) definition of efficacy expectations, focusing specifically on the internal aspects of the individual such as knowledge, skills, abilities, talent, and other characteristics that are needed to perform a given task successfully. Of the two forms of efficacy, internal efficacy is the most studied (for reviews and meta-analyses, see Moritz, Feltz, Fahrbach, & Mack, 2000; Sadri & Robertson, 1993; Stajkovic & Luthans, 1998; as cited in Ganzach et al., 2008; Luszczynska, Benight, & Cieslak, 2009; Rodgers, Conner, & Murray, 2008). As can be seen in reviews and meta-analyses, self-efficacy has been shown to be affected by and has an effect on performance outcomes, hence, the great interest by Industrial Organizational Psychologists.

External Efficacy

Contrasted with internal efficacy, external efficacy is an individual's belief that the tools, equipment, techniques, working conditions, and other contextual forces that are available, or present, will help in achieving a successful performance on a task. Currently, there are two external efficacy concepts: means efficacy and circumstantial (position) efficacy. Means efficacy is typically described as an individual belief in the tools, equipment, and techniques that are available for use in completing a task (Ganzach et al., 2008). This author's definition of circumstantial efficacy is an individual belief that contextual forces and conditions (such as an advantage or disadvantage) will aid in (i.e., high efficacy) or hinder (i.e., low efficacy) the successful completion of a task. Previously, Ganzach et al. (2008) described circumstantial (position) efficacy as "the belief about the effectiveness of one's initial position in a competitive situation *vis-à-vis* other competitors" (p. 5). The current study's definition can be seen as more encompassing than the definition of Ganzach et al. (2008) as their definition restricts circumstantial efficacy to only competitive situations in comparison to external

competitors. The reason I have expanded the current definition is because I believe that circumstantial efficacy can also be evaluated in non-competitive situations including making comparisons to an individual's own prior experiences. Although I have expanded the definition, the current study will continue to use a competitive situation to evaluate circumstantial efficacy, so my results can be compare to those of Ganzach et al. (2008).

In addition, other than defining means efficacy and circumstantial efficacy, Ganzach et al. (2008) did not seem to discuss the differences or overlap between the two forms of external efficacy. It would seem then, that since circumstantial efficacy is dependent on the context, an individual's impressions about his knowledge, skills, and abilities (self efficacy) as well as tools and techniques (means efficacy) are inherently subsumed as part (but not all) of the context for which an individual makes assumptions of his circumstantial efficacy. Simply put, circumstantial efficacy is an individual's comparative belief about her current circumstances compared to another individual's circumstances, or to her prior circumstances. I believe this to be the case as having either, or both, a

higher self efficacy or means efficacy in comparison to another individual should mean that the individual will have higher beliefs about her circumstantial efficacy. However, because both self and means efficacy are part of the context, feelings of low self efficacy, means efficacy, or other negative feelings about the situation or context can dramatically reduce an individual's belief about her circumstantial efficacy.

To better understand the concept of circumstantial efficacy, let us look at a couple of scenarios. Let us say that you have just taken out a hand full of money from an ATM at a local bank and you are walking back to your car. Suddenly, a large man you have never seen approaches you and tells you to give him all of your money. Although you are only of average height and stature, you think you are very good at martial arts, so you can subdue him and keep your money (high self efficacy). But what you quickly find out by looking around is that the man is not alone and has two others walking up from other directions to surround you in a confined space. At this point, you feel that you are at a disadvantage (low circumstantial efficacy) and will likely not be leaving with your hard earned money. Regardless of your high self efficacy in martial arts, this

disadvantaging circumstance is likely to cause you to hand over the money without any attempt at using your knowledge of martial arts. This scenario shows the impact a low circumstantial efficacy belief can have on an individual with even high self efficacy. The next scenario can explain the empowering effect of circumstantial efficacy. In this scenario, you are placed in a running race against your sister at your family reunion; she is a track star and you, well you are not (low self efficacy). So, because the family knows this, they give you a ten second head start, which will give you a sizable lead to the finish line (high circumstantial efficacy). Even though you are not a good runner, because of this advantage in circumstances, you are likely to take on your sister in this race, even though you would never have agreed to the race otherwise.

Of these two types of external efficacy, means efficacy and circumstantial efficacy, to date, means efficacy has been the most studied. The studies of means efficacy have focused on the impact of means efficacy on performance or other outcomes, but not the impact of performance on means efficacy (such as Eden, 2001; Eden & Sulimani, 2002; as cited in Ganzach et al., 2008). Circumstantial efficacy, in contrast to means efficacy, is

a new concept that has received attention in only one study conducted by Ganzach et al. (2008).

In the study by Ganzach et al. (2008), both the impact of circumstantial and internal (self) efficacy on performance and the impact of performance on both circumstantial and internal efficacy were studied and the results for the two types of efficacy were compared. Ganzach et al. (2008) used a game of Abalone[1], a strategy based board game similar to chess or checkers that is played one-on-one. Participants in their study were randomly assigned into pairs, were told that one of the participants had an advantage (advantage frame) or a disadvantage (disadvantage frame), then completed two games of Abalone providing both their ratings of internal (self) and external (circumstantial) efficacy. What was found in this study was that the correlations between internal and external efficacy were weak and non-significant, suggesting that they are two different constructs. External (circumstantial) efficacy was also shown to have a significant impact on participant performance, as 68% of the players told that they had an advantage (but actually did not) won the first game and 60% won the second game. There were a higher percentage of advantaged players

winning in the disadvantaged frame than in the advantaged frame. This finding falls in line with Prospect theory, which is a theory that describes how individuals evaluate potential losses and gains, where losses (disadvantages) appear stronger than gains (advantages) (Kahneman & Tversky, 1979). Performance also was shown to have some significant effects on both self and circumstantial efficacy. In the current study, I am seeking to reproduce these findings with a different game and an adult sample, as well as provide an additional exploration of circumstantial efficacy and the effects that possible moderators can play in how circumstantial efficacy changes while in competitive situations. As such, the effects of performance on internal (self) and external (circumstantial) efficacy found by Ganzach et al. (2008) will be discussed in relation to the hypotheses of the current study.

Efficacy Beliefs and Outcomes

As the literature on the two types of external efficacy (means and circumstantial) have focused heavily on the impact of efficacy on performance, in the current study I plan to focus solely on the inverse, the effect of

performance on circumstantial efficacy. Efficacy beliefs are often expected to relate to changes in performance. According to Bandura's original conception of efficacy, performance outcomes reciprocate with changing efficacy beliefs because it is a source individuals use to create our expectations of efficacy (Bandura, 1977). Ganzach et al. (2008), conducted research that viewed both relationships, efficacy to performance and performance to efficacy. However, I believe that due to the less often explored effects of performance on internal and circumstantial efficacy, it is necessary to further examine these effects. I also felt that there were areas that could use further exploration, which are the bases of some of the hypotheses in the current study.

With the interesting findings of Ganzach et al. (2008) and an interest in further exploration of circumstantial efficacy, I have fashioned the current study in a way to examine purely the impact of performance on circumstantial and internal (self) efficacy.

Performance Expectations and Efficacy

As part of this study, individuals will be primed with the idea that they either have an advantage or a

disadvantage compared to their opponents. To solidify the priming, participants at multiple times during the study will be able to read statements that re-affirm that they have an advantage or disadvantage. Also, the first game that all individuals play will be won or lost in the direction of their advantage or disadvantage by a standard moderate amount. Because of this priming, individuals are expected to create expectations or assessments about their subsequent performance outcomes. If the participant perceives himself as being the disadvantaged participant, the participant is likely to make the assumption that he will lose all, or most of the games played, with the opposite occurring if the participant perceives himself as being the advantaged player. This approach brings up an interesting question previously posed by Ganzach et al. (2008): Are changes in efficacy beliefs (internal and external) stronger when the participants' expectations are consistent with the actual performance outcome or when they are inconsistent with the performance outcome? What was found by Ganzach et al. (2008) was that unexpected outcomes had a larger impact on efficacy beliefs than expected outcomes as participants felt the need to reassess the situation and make possible changes to their beliefs and

expectations before playing another game. Due to their finding, my hypothesis will remain congruent with the hypothesis of Ganzach et al. (2008).

Hypothesis 1A: An unexpected outcome (i.e. when the player perceived as disadvantaged wins and the perceived advantaged player loses) will have a larger effect on efficacy beliefs than an expected outcome (the advantaged player wins and disadvantaged player loses).

Unlike Ganzach et al. (2008), probably simply due to being overlooked because of the type of game they used, I propose a secondary hypothesis based on the tendency of individuals to engage in counterfactual thinking. Counterfactual thinking can be defined as "mentally changing some aspect of the past as a way of imagining what might have been (Gilovich & Medvec, 1995b; Kahneman & Miller, 1986; Roese, 1997; Tetlock, 2002)" (Aronson, Wilson, & Akert, 2005). When it comes to counterfactual thinking, people tend to engage in more counterfactual thinking for *controllable* outcomes as compared to *uncontrollable* outcomes, but they tend to engage in similar amounts of counterfactual thinking whether the outcome was expected or unexpected (McEleney & Byrne, 2006).

Uncontrollable outcomes in the current study, are likely to be those that create large differences in the scores between players and their opponents, because it is likely harder for the individual to determine what aspect, skill or circumstances, that created the large differences experienced. Thus, large differences will more likely to simply be accepted, while the small differences will allow individuals to engage in more counterfactual thinking since the individuals will likely feel that they may have more control over the outcomes. Medvec, Madey, and Gilovich (1995) state that the "proximity to a better [or worse] outcome caused one to lose sight of what is and focus on what might have been" (p. 69). The point here seems to be that the closer the proximity to a better or worse outcome the more the individual will be able to engage in a mental undoing of the outcome and visualize other possible outcomes that almost occurred (i.e., close counterfactuals in Kahneman & Varey, 1990). Based on this idea that the narrower the win (or loss) the more counterfactual thinking will occur, I expect participants who experience an unexpected win or loss by a small amount will engage in counterfactual thinking rather than engaging in a complete reassessment of their beliefs that would occur because of a

larger win (or loss). The counterfactual thinking will help to create a perseverance effect such that even though a person has experienced a small unexpected outcome that could discredit the primed circumstances, she will be more likely to sustain her beliefs, reducing the effect the win (or loss) has on her efficacy beliefs. Simply, it is easier to discredit a small unexpected win (or loss) as random chance than a larger win (or loss), because mentally, we can see how it easily could have been an expected outcome if things had gone only a bit differently. Due to the nature of counterfactual thinking, I hypothesize that:

> *Hypothesis 1B: For those who experienced an unexpected outcome, the advantaged individuals who lose by a large number of points will lower their efficacy beliefs more than those who lose by a small number of points. On the other hand, the disadvantaged individuals who win by a large number of points will increase their efficacy belief more than those who win by a small number of points.*

Attributions and Efficacy

On a daily basis, people make attributions to try to understand and explain the behaviors of themselves and

other people. The two basic types of attributions we make are internal, related to the person, or external, related to the situation or circumstances. Competitive environments, such as those in the current study, and in the Ganzach et al. (2008) study allow for the ability to study these attributions while providing an interesting experience for participants in which they are likely to forget about being in an experiment (and thus present biases without inhibition). Particularly, this sort of game (i.e., a game with dice that is relatively faced paced) is a good way to study individual's self-serving attributions or biases. Self-serving attributions are defined by Aronson, Wilson, and Akert (2005) as: "explanations for one's successes that credit internal, dispositional factors and explanations of one's failures that blame external, situational factors" (p. 119). Consistent with the notion of self serving attributions, and the hypotheses of Ganzach et al. (2008), I predict:

> *Hypothesis 2A: A different effect will be expected for internal efficacy (IE) and circumstantial efficacy (CE), such that a win (success) in any game will result in a large positive change in IE and a small positive change in CE, while a failure to win will*

result in a large negative change in CE and a small negative change in IE.

Likely because of the type of game that they used, Ganzach et al. (2008) overlooked an additional hypothesis that I feel is necessary to examine in competitive games. It is my understanding from personal experience that big wins and losses can be exhilarating or strenuous to a person's emotional state of mind. In competitive situations the size of a win or loss can be considered a performance marker and how much one wins or losses by can be taken as a indicator of one's performance in relation to her opponent (Feltz & Magyar, 2006). The emotional response to a win or loss over an opponent, I believe is also similar to the idea of gaining momentum over a series of games in competitive situations (for a recent example of momentum in sports psychology, see Mack, Miller, Smith, Monaghan, & German, 2008). These changes to a person's emotional state can create drastic changes in his beliefs about his abilities and the environment. For instance, he may experience feelings of invincibility after a large win with the mentality that no conditions could have kept him from winning. On the other hand, after suffering a large defeat, he could have feelings of extreme vulnerability with the

resulting mentality that with those conditions, there was nothing he could have done to win and that someone with less skill could have beat him because of the conditions. When our emotions run high because of an exciting large win or a large crushing defeat, I believe those emotions can alter with a person's ability to make accurate assessments of his skill and the circumstances and thus, can be exaggerated. As an extreme example, winners of the lottery often feel and are even told that they are extremely lucky, when a more accurate frame is that they were randomly chosen and had the same probability as every other person who purchased a lottery ticket. As such, I hypothesize that:

> *Hypothesis 2B: Individuals who win by a large amount of points will increase their ratings of IE and CE more than those who win by a small amount. On the other hand, individuals who lose by a large amount of points will decrease their ratings of IE and CE more than those who lose by a small amount. The direction of the increases or decreases will be in the direction described in Hypothesis 2A (wins create large positive change in IE and a small positive change in CE, while*

loses create a large negative change in CE and a small negative change in IE).

In the study by Ganzach et al. (2008), somewhat paradoxical findings were discovered which they described as "the advantage of disadvantage" and "the disadvantage of advantage." The first finding, "the advantage of disadvantage," demonstrates the idea that to win (or barely lose) despite having a disadvantage perceptually would suggest that you must be especially good at the specific behavior you have to exhibit in the competition. The second finding, "the disadvantage of advantage," demonstrates the idea that to lose (or barely win) despite having an advantage, perceptually would suggest that you must be especially lacking at the specific behavior. Ganzach et al. (2008) suggested that this effect is similar to effort exertion. Covington and Omelich (1979) explain that through attributions, we make ability estimates about failure and success such that "to have tried hard and still do poorly is evidence of low ability, and conversely, that without significant effort expenditure ability estimates will remain largely unaffected by failure" (p. 170). What Covington and Omelich (1979) suggest in their article is that when an individual in a competition tries hard and

fails, the individual will likely blame external factors through the use of excuses (i.e. self-serving attribution). However, if there are a lack of external excuses that can be used, only a lack of ability is left as a sufficient explanation when one has the knowledge or perception of being at an advantage; conversely, when at a disadvantage, only a high level of ability remains as a plausible explanation for winning. The paradoxical findings of the internal efficacy changes found by Ganzach et al. (2008) would suggest an additional hypothesis in competitive situations. Thus, I add a new hypothesis beyond that of Ganzach et al., such that:

> *Hypothesis 2C: Specifically in regards to IE, the strength of the moderation in hypothesis 2B will also be larger for individuals who experience an unexpected outcome such as when individuals who believe they are advantaged and barely win or experience a failure, and those who believe they are disadvantaged and barely lose or experience a success (similar to Hypothesis 1A).*

Purpose of the Study

Consistent with the previous research on circumstantial (position) efficacy by Ganzach et al. (2008), I seek to further the promotion and understanding of perceived and actual circumstances and their effects on individuals' efficacy beliefs. Several of the hypotheses used in the current study anticipate replication of the findings of Ganzach et al.(2008), while the additional hypotheses in the current study seek to further improve understanding through the use of a moderator (size of win or loss), a larger repetition of games, and the use of additional conditions. For a table based summary of all of the hypotheses and associated theoretical reasoning, see Appendix A.

CHAPTER TWO

METHODS

Participants

A total of 209 undergraduate and graduate students from California State University, San Bernardino participated in the research. All students who participated in the study received extra credit that they could use towards a psychology course of their choice and were treated in accordance with the "Ethical Principles of Psychologists and Code of Conduct" (American Psychological Association, 2002). These participants were predominately female (84.2%) with the average age of 24 years; ages ranged from 18 to 52. The students were distributed in level of education as there were 15.3% Freshmen, 12% Sophomores, 28.7% Juniors, 41.6% Seniors and 2.4% Graduates. For ethnicity, the participants were 36.8% Latino Americans, 26.3% Caucasian, 20.6% African American, 7.7% Asian American, and 8.6% rated themselves as Other. The median participant rated herself as having more than average computer knowledge (a rating of 5 on 1-7 Likert scale), and as having played computer games less than average (a rating of 3 on 1-7 Likert scale).

Measures

Internal Efficacy

Internal Efficacy was measured before each game using a 7-point Likert scale ranging from (1) strongly disagree to (7) strongly agree, with (4) as neither agree nor disagree. Using this scale, participants rated a series of four statements. Statement 1: "I feel that I am good at playing computer games." Statement 2: "I feel that I tend to be good at games that require luck." Statements 3 and 4 were the negative version of statements 1 and 2 replacing "good" with "not so good", and were reverse coded for the analyses. The measure of internal efficacy appeared to have good internal consistency over the course of the games, $\alpha = .919$.

Circumstantial Efficacy

Like internal efficacy, circumstantial efficacy was measured before each game through the use of a 7-point Likert scale with anchors of (1) strongly disagree to (7) strongly agree, with (4) as neither agree nor disagree. Using the scale, participants rated a series of four statements. Statement 1: "Due to the circumstances, I feel that I am more likely than my opponent to win the following game." Statement 2: I feel that I am at an advantage,

because of the circumstances." Statements 3 and 4 were the negative versions of statements 1 and 2 replacing "more" or "advantage" with "less" or "disadvantage." The measure of circumstantial efficacy appeared to have good internal consistency over the course of the games, $\alpha = .925$.

Condition Based Manipulation Checks

After the final game, participants rated a series of three statements in which the participant filled in the blank by choosing a Likert based response. The first two statements were rated using a 7-point Likert scale with a range from (1) strong disadvantage to (7) strongly advantage, with (4) neither an advantage nor a disadvantage. These statements were: 1. "The player that I was told had a disadvantage actually had a(n) _____." and 2. "I feel that with my circumstances (the number of dice and directions provided for scoring points), I had a(n) _____ compared to my opponent." The third statement was, "When I think of overall scores for me and my opponent (encompassing all 4 games), I believe I _____." This statement was rated using a 7-point Likert scale with a range from (1) Lost by a lot, to (7) Won by a lot, with (4) Broke even. These final questions were examined as condition based manipulation checks, to

see if participants accurately perceived the condition that they were placed within.

Performance Outcomes

Participant performance outcomes were allowed to vary for the scores they earned each game, using the probability based on the directions that the participant was told would be used to score points. Regardless of the number of dice and directions provided (as both sets had equal probabilities for scoring points), the number of points possible in each game for all participants after completing 25 rolls ranged from -25 points to 75 points. The distribution of scores was set up in such a way that individuals would score a point about 44.44% of the time, a mean of 11.111 point per game. With the chances of an individual scoring a positive three points or negative two points being equal (each occurring only 2.78% of the time), the distribution created although having a large range makes it is extremely unlikely that any given participant would score lower than 1 point or higher than 25 points in any given game. The opponent's score for each game was set by the researcher using an algorithm such that depending on the participant's condition; an "opponent's score" would reflect a difference in points that was chosen by the

researcher. For example, in the first game, all individuals would experience a win or a loss consistent with their advantage or disadvantage by a total of 5 points. Thus an advantaged participant who scored 12 points after his 25 rolls would be told that his opponent's score was a 7 (5 points less) making the participant the winner for that game. For the remainder of the games individuals would experience consistent small wins or losses (using a 1, a 3, then a 2 for the differences in subsequent games) or consistent large wins or losses (using a 7, a 9, then an 8 for the differences in subsequent games) depending on the participant's condition. For example, a participant placed in a condition were she is at a disadvantage and will experience unexpected small wins, the individual would lose the first game by 5 points, win the second game by 1 point, the third by 3 points and the last game by 2 points.

Procedure

Participants were solicited through SONA and announcements in classes. Participants registered through SONA for a specific time and day (e.g. timeslots). Each timeslot contained 1 to 3 participants and lasted roughly 30 minutes. Before participants arrived, testing rooms with

computers were set up. For set up, the computer dice game called "Let's Get Rollin"[2] was opened on each computer and the condition (i.e., advantage, large win) that the game would be used for was chosen and imputed into the administrator page of the game (see the administrator page in Appendix B). Once imputed the administrator page could no longer be viewed until the game was completely closed down leaving only the opening page of the game visible to participants.

After participants entered the testing rooms at their scheduled timeslot, the researcher first directed them to read the informed consent. Participants marked that they had read and understood the volunteer informed consent form (see Appendix C). This informed consent provided a brief overview of what the participants could expect while participating in the study. The informed consent also informed the participants that they would be playing against another player at either the same or another location through the use of an online web server. If participants asked before the game if they were playing another player in the testing room, they were told by the experimenter: "You will be connected to an online web server that randomly links you to another player either

here or at another location, because it randomly links you to another person I do not know if you will be playing a person here or at another location." Once all participants had read and marked their informed consent forms, they were asked to take a seat in front of a computer with each participant in a different testing room.

In each testing room, and available next to the participant's computer was a supplemental sheet. This sheet contained the directions the participant would use for scoring points, her opponent's directions for scoring points, as well as two notes. The first note was: "The computer will keep track of the number of points you receive throughout each game, as you roll, to determine a winner. Points will reset at the end of each game." The second note told the participant that either the player using two dice or three dice was at a disadvantage and a standard reason why that player was at a disadvantage, followed with a statement regarding probabilities and chance. This sheet was provided so the participants could see and read these directions at the beginning of the computer game. However, it was provided additionally in physical form for two reasons: first, at any point the participant could check to see how the points were scored,

and second, because it gave an additional opportunity for the participants to read the statement regarding who the disadvantaged player was, to support the participants priming.

Once all participants had been seated at the computers, the experimenter would provide directions through the first few screens of the game. For an example progression of what participants viewed as part of the computer game, see Screens 1 thru 15 in Appendix B, and Appendix D for a representation of the sequence of the game from start to finish. To begin, the experimenter would explain the supplemental sheet and let the participant know that he would see an identical set of directions and information during the game (see Screen 5 in Appendix B) but that the sheet was provided so that at any point the participant can review it to see how well he was doing in scoring points. The participants would then be asked to click the start button for the game. Participants were directed to create a name to use that was not their own name but that would be used by the web server as their player name. Once the players submitted their player names, they filled out demographic information; the experimenter reminded the participants to use their actual personal

information. The research gave a minute for the participants to fill out the information and then directed them to the next page. At this page, the experimenter would tell the participants:

> The page you are on is general information about the game and the second page of directions is what you will use to score points in the game, and matches the sheet next to your computer. If you have any other questions or concerns as you work your way through the rest of the game, please feel free to let me know. I will peek in to check on each of you as you progress through the game. I will also be closing the doors most of the way to reduce noise.

The participants then worked their way through the game screens (see Appendix B) choosing the color of their dice, completing three cycles of rating their internal and circumstantial efficacy, playing games by clicking to roll their dice, and experiencing wins or loses depending on their condition. After playing their fourth game the participants would answer three condition based manipulation check questions. For the final questions of the game, the participants were asked to respond first to a question that asked: "Over the course of the games, how

many players do you feel that you played against?"(rated from 0 to 4). This question was used as a manipulation check for believability, to determine if participants believed they were playing against another person, as it was thought by the researcher that individuals who did not believe they were playing against another person may not have rated their internal and circumstantial efficacy genuinely in the same way. The last question was an optional question which asked participants: "What do you believe I am testing?" with typed answers of no more than 150 characters.

While the participants worked their way through the game, the researcher would monitor their progress through the game. When the participants reached and read through the final page of the game, the researcher would quietly enter the room and hand each participant a debriefing statement (See Appendix E). While handing over the debriefing statement to the participant, the researcher would ask the participant to read through the debriefing statement and remain quiet in the testing room until dismissed. Once all participants had completed the game and were provided with a debriefing statement, which usually occurred within about 2 to 5 minutes of the first finisher,

all doors were opened. The researcher then asked if participants had any questions about the debriefing statement or the study in general. Any questions from participants were answered by the researcher and all participants were reminded not to discuss the study with any other students.

CHAPTER THREE

RESULTS

Reduction of Participants for Hypothesis Testing

Using the answer to the question of how many players the participant felt she was playing against, the 209 participants were split into two distinct groups. This question originally stated "Do you believe you were playing another player?" (answered with a Yes or No), but after the first 47 participants' data were collected, the researcher noticed that 60% of the participants marked that they did not believe they were playing another player. When asked by the researcher, participants often stated that they believed they were playing another person until that question, but the question caused them to second guess this belief and thus they marked that they were not playing another player. Because of this, the question was revised, and the remaining participants were asked how many other players were participating with the participant. Once the revised version was in place, only about 20% of participants rated that they did not believe they were playing another person, with all conditions experiencing

similar amounts of "believers" and "non believers", $\chi 2(7, N= 163) = 1.29$, $p>.05$. The two distinct groups for which all the participants were split into were "believers" (those who believed they were playing at least one other individual, a rating of 1 to 4, or a rating of Yes using the original form of the question) with a total of 146 participants, and "non-believers" (those who did not believe they were playing another individual, a rating of a 0, or a rating of No using the original form of the question) with a total of 63 participants.

For participants who participated in the same type of condition (e.g., advantaged and experienced all large wins) independent sample t-tests were conducted using SPSS to determine if there were significant differences in the ratings of believers and non-believers in each efficacy scale (internal and circumstantial) of their ratings before and after each game. Using a two tailed test and $p<.05$ as a cut off, in all cases except one, there were no significant differences. For those who experienced all small losses, there was a significant difference, $t(34)= -3.465$, $p<.01$ between believers ($M= 3.667$, $SD= .723$) and non-believers ($M= 2.597$, $SD= 1.092$), with believers rating higher than non-believers in their ratings of circumstantial efficacy

after the second game. Due to this unexpected significant difference and to remain consistent throughout the analyses only individuals who believed that they played against another player were used in testing the hypotheses of the study.

Of the 209 participants, 146 participants believed they had played another player. Of these 146, two additional participants were excluded from the analyses. The data from these two participants were deemed not useable. One individual came in tired and fell asleep multiple times during the study; the other experienced a glitch in the game in which he/she never saw the dice roll during each of the games he/she played.

The data were then examined using the three condition based manipulation checks. All ratings were within normal bounds with no outliers. All three manipulation checks if rated correctly should have been correlated at high levels with the conditions. Because of the way the first question was designed, it was expected that those in opposite conditions would rate similarly as the disadvantaged player (whether it was the player or the opponent) would have experienced the exact same amount of wins and losses by the same amounts each game played (see the table of means and

frequencies for Question 1 in Appendix F). Thus, the individuals who were told that they were disadvantaged would be rating based on how much they won or lost, while the individuals who were told their opponent was at a disadvantage would rate based on how their opponent won or lost. The correlation between the conditions, organized by expected scores on question 1, and the scores that observed overall was r = .330. Since this was not as large of a correlation as was expected, the researcher reviewed the mean scores and frequencies by the conditions. In doing so, it was discovered that the disadvantaged individuals were not completely moving in the same pattern expected, as the advantaged individuals. Checking the correlations of the conditions with only the advantaged or disadvantaged players' ratings on question 1, the correlations were: a expected large r= .629, $p<.001$ for advantaged players and an unexpected and non-significant r= .063 for disadvantaged players. By looking at the frequencies of ratings, it seemed that some of the disadvantaged individuals had trouble answering this question and were likely using the wrong side of the manipulation scale as the frequencies show similar usage from both sides of the scales. The second and third manipulation check questions did not have

issues like those of the first. These two manipulation check questions were set up so that individuals in opposite conditions should rate similarly on the opposite side of the scale. To test the correlations of each of these two questions with the conditions, the conditions were ordered by the overall score difference they would create over the four games (see questions 2 and 3 in Appendix F).
For example, an individual who was in a condition in which he was at a disadvantage and experienced an expected loss in all four games would have lost by a sum total of 29 points over the 4 games. These two questions since using the same pattern and measuring the same concept with slight differences, should have been highly correlated each other as well as in addition to the conditions. Checking the correlations, the second and third manipulation check questions were strongly correlated r=.618, p<.05, as well as the second question and the third being strongly correlated with the conditions (r=.681, p<.05 and r=.842, p<.05, respectively). Because these second and third checks were consistent, no data were removed on the basis of the first, ambiguous check.

Since no additional outliers were removed based on the condition based manipulation check questions, for

hypotheses testing, a total of 144 of the original 209 participants were used. These participants were predominately female (84%) with the average age of 23.88 years. The students were split in level of education as there were 16% Freshmen, 14.6% Sophomores, 27.8% Juniors, 39.6% Seniors and 2.1% Graduates. In ethnicity the participants were 34% Latino Americans, 24.3% Caucasian, 22.2% African American, 9% Asian American, and 10.4% rated themselves as Other. The median participant rated herself as having more than average computer knowledge (a rating of 5 on 1-7 Likert scale), and rated herself as playing computer games less than average (a rating of 3 on 1-7 Likert scale). These proportions of the group of 144 believers used for hypotheses testing were comparable to the overall sample of all 209 participants.

Hypothesis Testing

For the testing each of the hypotheses, separate mixed measure ANOVAs were conducted using SPSS repeated measures. In all tests, the within group variable was the change in the average ratings of IE and CE from before experiencing a win or loss (ratings from after game 1 and 2 combined) to the ratings after experiencing a win or loss (ratings from

after game 2 and 3 combined). The combinations of the ratings for the before (games 1 and 2) and after (games 2 and 3) within subjects variables were utilized to capture the average change from before a win or loss to after a win or loss that were created by games 2 and 3 together. The before and after ratings of game 1 were not utilized as no comparisons could be made for this game as all individuals experienced an expected outcome that was the same in score difference for all participants. Thus, only the before and after for games 2 and 3 were used in combination, as these game allowed for differences in scores that were either small or large, and outcomes that were either expected or unexpected.

Due to each test's focus on different interactions, a different ANOVA was used for each hypothesis and the data were examined for outliers at the cell level for that interaction. In all cases for all AVOVAs, no outliers were found using a cut-off of $Z=|3.3|$ $p<.001$ (Tabachnick & Fidell, 2007). The assumptions for each ANOVA were met as in all cases there was independence of error, the within cell distributions were normally distributed, and homogeneity of sphericity was not needed as each interaction was examined using a $df = 1$. For the purposes

of this research, mean differences will be discussed as: slight, a difference of less than .15 units; moderate, a difference of less than .30 units but equal to or greater than .15 units; and large, a difference of greater than .30 units; these descriptions do not imply significance or effect sizes. The results of the hypothesized interactions in each subsequent ANOVA will be presented in order of the hypotheses. As a reminder, the table based summary of all of the hypotheses and associated theoretical reasoning is contained in Appendix A.

Hypothesis 1A

For hypothesis 1A, the interaction that was examined for each IE and CE, was the interaction of the change in scores from before to after experiencing a win or loss, depending on if an individual experienced a win or a loss, and whether outcome was expected or unexpected. This interaction was significant for IE, $F(1,140) = 4.448$, $p<.05$, $\eta^2 = .032$; but was not significant for CE. Specifically for IE, those who experienced a unexpected win increased their ratings from a mean of 4.253 before the win to 4.444 after (difference of .191 units) which was a larger increase than those who experience expected wins (difference of .027 units, $M_{Before} = 4.542$ to $M_{After} = 4.569$). While on the other

hand, those who experienced an unexpected loss decreased their ratings of IE (difference of -.271 units, M_{Before} = 4.167 to M_{After} = 3.896,) more than those who experienced an expected loss (difference of -.149 units, M_{Before} = 3.774 to M_{After} = 3.625). For CE, although it was not significant, the direction of the changes for those who experienced a loss were in the direction hypothesized with those who experienced a unexpected loss decreasing their ratings of CE more than those who experienced an expected outcome. However the direction of changes for those who experienced a win was not in the predicted direction with those who experienced expected wins increasing their scores slightly more than those who experienced unexpected wins. For purposes of comparisons, the observed means and mean differences of hypothesis 1A are contained in Table 1, and a graphical representation of the mean differences in IE and CE based on wins or losses and the outcome being expected or unexpected is presented in Appendix G.

Hypothesis 1B

For hypothesis 1B, the interaction that was examined for each IE and CE, was the interaction of the change in scores from before to after experiencing an unexpected win or loss, depending on if an individual experienced a win or

Table 1
Observed Mean Ratings and Differences in Ratings of Internal Efficacy (IE) and Circumstantial Efficacy (CE) Between Those Who Experienced Wins or Losses That Were Either Expected or Unexpected (Hypothesis 1A)

Measures:	Last 3 Games Experienced	Outcome	Time of Mean Rating		Mean Differences Observed
			Before	After	
IE	Wins	Expected	4.542	4.569	.027
		Unexpected	4.253	4.444	.191
	Losses	Expected	3.774	3.625	-.149
		Unexpected	4.167	3.896	-.271
CE	Wins	Expected	5.191	5.309	.118
		Unexpected	3.653	3.764	.111
	Losses	Expected	3.309	2.962	-.347
		Unexpected	4.563	4.094	-.469

a loss, and whether the difference in scores were small or large. This interaction was not significant for IE; but was significant for CE, $F(1,68) = 9.289$ $p<.05$, $\eta^2 = .137$. Specifically for CE, those who experienced an unexpected large win increased their ratings from a mean of 3.618 before the win to 3.938 after (difference of .32 units), which was more than those who experienced an unexpected small win (difference of -.097 units, $M_{Before} = 3.687$ to M_{After}

= 3.590). On the other hand, those who experienced an unexpected large loss decreased their ratings of CE (difference of -.653 units, M_{Before} = 4.660 to M_{After} = 4.007) more than those who experienced an expected loss (difference of -.284 units, M_{Before} = 4.465 to M_{After} = 4.181). Although not significant, the changes in IE were in the hypothesized direction, such that those who experienced large score differences changed their scores more dramatically than those who experienced small score differences, for both wins and losses. For purposes of comparisons, the observed means and mean differences of hypothesis 1A are contained in Table 2, and a graphical representation of the mean differences in IE and CE for those who experienced unexpected outcomes, based on wins or losses and the size of the win or loss, is presented in Appendix H.

Hypothesis 2A

For hypothesis 2A, there were different effects for each IE and CE in the means from before experiencing a win or loss to after for those who experienced wins versus those who experienced losses. For IE, those who experienced a win slightly increased their scores from a mean of 4.398 before the game to a mean of 4.507 after the game (a

Table 2
Observed Mean Ratings and Differences in Ratings of Internal Efficacy (IE) and Circumstantial Efficacy (CE) Between Those Who Experienced Unexpected Wins or Losses That Were Either Small or Large (Hypothesis 1B)

Measures:	Last 3 Games Experienced	Size of Difference	Time of Mean Rating		Mean Differences Observed
			Before	After	
IE	Wins	Small	4.417	4.535	.118
		Large	4.090	4.354	.264
	Losses	Small	3.965	3.743	-.222
		Large	4.368	4.049	-.319
CE	Wins	Small	3.687	3.590	-.097
		Large	3.618	3.938	.320
	Losses	Small	4.465	4.181	-.284
		Large	4.660	4.007	-.653

difference of .109 units), while those who experienced a loss dropped their scores a moderate amount (a difference of -.210 units) from a mean of 3.970 before experiencing the loss to a mean of 3.760, $F(1,142)= 22.000$, $p<.05$, $\eta^2 = .155$. Of the variance in the change in mean scores in IE between before and after, 13.40% of the variance can be explained by whether the individual experienced a win or loss. On the other hand, for CE, those who experienced a

win also slightly increased their scores from a mean of 4.422 before the game to a mean of 4.536 after the game (a difference of .114 units), while those who experienced a loss dropped their scores a large amount (a difference of -.408 units) from a mean of 3.936 before experiencing the loss to a mean of 3.528, $F(1,142)=31.464$, $p<.05$, $\eta^2 = .222$. Of the variance in the change in mean scores in CE between before and after, 18.10% of the variance can be explained by whether the individual experienced a win or loss. For purposes of comparisons, the observed means and mean differences of hypothesis 2A are contained in Table 3, and a graphical representation of the mean differences in IE and CE based on wins or losses is presented in Appendix I.

Table 3
Observed Mean Ratings and Differences in Ratings of Internal Efficacy (IE) and Circumstantial Efficacy (CE) Between Those Who Experienced Wins or Losses (Hypothesis 2A)

Measures:	Last 3 Games Experienced	Time of Mean Rating		Mean Differences Observed
		Before	After	
IE	Wins	4.398	4.507	.109
	Losses	3.970	3.760	-.210
CE	Wins	4.422	4.536	.114
	Losses	3.936	3.528	-.408

Hypothesis 2B

For hypothesis 2B, it was found that there was no significant interaction for IE but there was a significant three-way interaction for CE in the before and after game ratings, whether the individual won or lost, and the size of the difference in scores (small or large). For IE, although it was not significant, for those who experienced wins, the changes were in the predicted direction and the full interaction is still worth reporting for future researchers to explore. Thus, for IE, individuals who experienced small wins very slightly decreased their scores (difference of -.042 units) from a mean of 4.507 before to 4.549 after experiencing the small win, while individuals who experienced large wins moderately increased their scores (difference of .177 units) from a mean of 4.288 before to 4.465 after experiencing the large win. On the other hand, those who experienced small losses nearly had the same moderate reduction in ratings of IE (difference of .208 units, M_{Before} = 3.906 to M_{After} = 3.698) as those who experienced large losses (difference of .212 units, M_{Before} = 4.035 to M_{After} = 3.823). For CE, there was a significant interaction between the before and after ratings based on whether the individual won or lost and the size of the win

or loss, $F(1, 140) = 10.248$, $p<.05$, $\eta^2 = .073$. Of the variance in the change in mean scores in CE between before and after, 6.80% of the variance can be explained by the interaction of whether the individual experienced a win or a loss and the size of the win or loss. Specifically, for individuals who experienced a small win their ratings of CE dropped very little (difference of -.031 units) from a mean of 4.455 before to a 4.424 after experiencing the small win, while individuals who experienced the large win increased their ratings moderately (difference of .260 units) from a mean of 4.389 before to a 4.649 after the large win. On the other hand, individuals who experienced a small loss dropped their ratings of CE moderately (difference of .264) with a mean of 4.052 before and a 3.788 after the small loss, while individuals who experienced a large loss dropped their ratings by a large amount (difference of .552 units) from a mean of 3.819 before to a mean of 3.267 after experiencing the large loss. For purposes of comparisons, the observed means and mean differences of hypothesis 2B are contained in Table 4, and a graphical representation of the mean differences in IE and CE based on wins or losses and the size of the win or loss are presented in Appendix J and K, respectively.

Table 4
Observed Mean Ratings and Differences in Ratings of Internal Efficacy (IE) and Circumstantial Efficacy (CE) Between Those Who Experienced Wins or Losses That Were Either Small or Large (Hypothesis 2B)

Measures:	Last 3 Games Experienced	Size of difference	Time of Mean Rating		Mean Differences Observed
			Before	After	
IE	Wins	Small	4.507	4.549	.042
		Large	4.288	4.465	.177
	Losses	Small	3.906	3.698	-.208
		Large	4.035	3.823	-.212
CE	Wins	Small	4.455	4.424	-.031
		Large	4.389	4.649	.260
	Losses	Small	4.052	3.788	-.264
		Large	3.819	3.267	-.552

Hypothesis 2C

For hypothesis 2C that focused specifically on IE, no significant four-way interaction was found between ratings before and after the game, whether the individual won or lost, the size of the difference in scores (small or large), or whether the individual experienced an expected or unexpected outcome. Like hypothesis 2B, although the

observed changes in IE are not significant, the interaction was in the hypothesized direction for both small and large wins as well as for large losses, but not for small losses. For purposes of comparisons, the observed means and mean differences of hypothesis 2C are contained in Table 5, and a graphical representation of the mean differences in IE based on wins or losses, the size of the win or loss, and the outcome being expected or unexpected is presented in Appendix L.

Table 5
Observed Mean Ratings and Differences in Ratings of Internal Efficacy (IE) Between Those Who Experienced Wins or Losses That Were Either Small or Large, and Had Outcomes That Were Either Expected or Unexpected (Hypothesis 2C)

Last 3 Games Experienced	Size of Difference	Outcome	Time of Mean Rating		Mean Differences
			Before	After	Observed
Wins	Small	Expected	4.597	4.563	-.034
		Unexpected	4.417	4.535	.118
	Large	Expected	4.486	4.576	.090
		Unexpected	4.090	4.354	.264
Losses	Small	Expected	3.847	3.653	-.194
		Unexpected	3.965	3.743	-.222
	Large	Expected	3.701	3.597	-.104
		Unexpected	4.368	4.049	-.319

CHAPTER FOUR

DISCUSSION AND IMPLICATIONS FOR RESEARCH AND PRACTICE

Discussion of Findings

The results of this study were quite mixed as the hypotheses in most cases were only partially confirmed, with few completely confirmed and others not confirmed. However, considering that very little information is currently known about circumstantial efficacy (with only one prior study by Ganzach et al., 2008), this study's results are still important. Both the results that were and those that weren't as predicted, may lead to new understandings, discoveries, and ultimately new hypotheses regarding circumstantial efficacy. With this thought in mind, I will discuss the findings of the study, both those that came out as expected and those that did not, and will provide insights as to why or why not things may have occurred the way that they did, and areas that should be further researched.

Performance Expectations and Efficacy

The first two hypotheses (1A and 1B) focused around the idea of creating performance expectations. Individuals

in the current study were primed using reading materials and a first game that was staged to support the priming. This priming was used to elicit the setting of performance expectations for subsequent games that the participants would experience. Since we set our performance expectations by both using our prior experiences and our beliefs about how well we believe we can perform in relation to our skills and the circumstances of the situation (Locke & Latham, 2002), our beliefs are likely to change along with each performance outcome we experience. Based on previous findings of Ganzach et al. (2008), hypothesis 1A focused on comparing the strength of changes in efficacy beliefs between individuals who experienced a performance outcome that was either expected or unexpected based on how the participants were primed. The goal of hypothesis 1B was to expand these findings by further comparing the effects of experiencing an unexpected outcome with either small (1-3 points) or large (7-9 points) wins. Those who experienced unexpected outcomes with differences that were small were expected to engage in more counterfactual thinking (Medvec, Madey, & Gilovich, 1995) and thus make smaller changes to their scores of internal and circumstantial efficacy than

those who experienced unexpected outcomes with large differences in scores.

Hypothesis 1A. Congruent with the hypothesis of Ganzach et al. (2008), for hypothesis 1A, it was anticipated that unexpected wins and losses (e.g. a disadvantaged player wins and an advantaged player loses) would have a larger effect on efficacy beliefs than expected outcomes (e.g. an advantaged player wins and a disadvantaged player loses). Previously, although not directly tested in Ganzach et al. (2008), the means reported in their tables of mean changes in internal and circumstantial efficacy, tended to suggest that unexpected outcomes did have larger impacts than expected outcomes. Making observations from their reported means, it seems that this was true for changes in internal efficacy for both those who won and those who lost. For circumstantial efficacy, however, it seems that this would have only been true for those who experienced a loss, as the differences for those who experienced a win were in the opposite direction of the hypothesis. In the current study, the differences in ratings of internal and circumstantial efficacy were directly tested using a mixed measure ANOVA to compare the effects of expected and unexpected wins and

losses. The results in the current study support the same tendencies that were found in the Ganzach et al. (2008) studies such that the differences in ratings of internal efficacy between individuals who experienced expected and unexpected wins were significant and as hypothesized. Individuals who experienced an unexpected win or loss demonstrated more dramatic changes in their ratings of internal efficacy than those who experienced an expected win or loss. For circumstantial efficacy, there were no significant differences between the changes in ratings between those who experienced unexpected and expected outcomes. However, it is important to point out that as seen in Ganzach et al. (2008), the change for those who experienced unexpected losses did tend to be more extreme than those who experienced expected losses, as predicted. The change for those who won, however, were in the opposite direction predicted by the hypothesis as seen in Ganzach et al. (2008) which caused the entire interaction (change in ratings, by win or loss, by unexpected or expected outcome) for circumstantial efficacy to not be significant. The differences in circumstantial efficacy ratings between those who experienced expected and unexpected wins, although seen in Ganzach et al. (2008), was counter

intuitive for the hypothesis. This counter intuitive finding will be discussed further in relation to hypothesis 1B.

Hypothesis 1B. Hypothesis 1B, on the other hand, anticipated that for those who experienced unexpected outcomes, the individuals who experienced larger wins would increase their ratings of internal and circumstantial efficacy more than those who experienced smaller wins; similarly, it was expected that a larger decrease in ratings would occur for those who experienced large losses compared to those who experienced small losses. This effect was expected, as individuals who experienced the small unexpected wins or losses were expected to engage in counterfactual thinking, allowing them to hold on to their primed schema that they were at a disadvantage or advantage, while those who experienced the large unexpected wins or losses would engage in a reassessment of their schema allowing for larger changes in ratings. This hypothesis, my suggestion that counterfactual thinking is the reason why individuals would hold on to their primed schema, is not typical of the counterfactual research but does fit the notions of automatic counterfactual thinking. Typically, counterfactual thinking occurs in competition

with multiple participants, such as those competing in the Olympics (Medvec, Madey, & Gilovich, 1995). In the current study however, the competition existed in a one-on-one based scenario, and since most participants believed they were playing against one other player, the social comparison that was available for them was in relation to their opponents. This type of competition and the priming of individuals to believe they had an advantage or a disadvantage should have allowed individuals to engage in more counterfactual thinking, as they would be able to think of the other player's result after every outcome they experienced. Considering that the proximity to a counterfactual outcome leads individuals to think about it more often (Medvec, Madey, & Gilovich, 1995; Kahneman & Miller, 1986), individuals in the current study should have engaged in more counterfactual thinking when the differences between the player scores and their opponent scores were closer. In counterfactual research, "downward comparisons (i.e, thinking about a worse outcome) are thought to provide comfort, whereas upward comparisons (i.e., thinking about a better outcome) are thought to improve future performance" (Medvec, Madey, & Gilovich, 1995, p.608). In the current study, however, it seems that

because most participants believed they had only one person to compare themselves to after each game's outcome, individuals engaged in automatic upward or downward counterfactual thinking. Participants seemed to engage in the upward and downward counterfactual thinking even when it did not provide them with comfort about their position as is typically found in counterfactual research (Medvec, Madey, & Gilovich, 1995).

Since counterfactual thinking affected individuals in situations in which they experienced wins or losses with small differences in scores, these individuals tended to hold onto their primed beliefs, while individuals who experienced large wins or losses reassessed their situation resulting in larger changes in scores. Since there were larger changes in scores for individuals who experienced large wins or losses as compared to those who experienced small wins or losses, the hypothesis was generally supported. Specifically, the hypothesis was fully supported for differences in circumstantial efficacy but not fully supported for differences in internal efficacy. The differences in overall change in internal efficacy between those who experienced small wins or losses and those who experienced large wins or losses, although not significant,

were still in the directions predicted by the hypothesis and thus I believe are consistent with hypothesis 1B. On the other hand, the differences in overall change in circumstantial efficacy between participants who experienced unexpected small outcomes and unexpected large outcomes were significant, as predicted. In addition, the counter intuitive decrease in circumstantial efficacy for individuals who experienced small wins that led to nonsignificant results for hypothesis 1A, created even larger mean differences between those who experienced small unexpected wins and those who experienced large unexpected wins than were expected to be found in the testing of hypothesis 1B.

To explore the counter intuitive changes in circumstantial efficacy, I inspected the means for the data of hypothesis 1B. It seems that what played a part in the unpredicted result for hypothesis 1A and the enhanced result for circumstantial efficacy between those who experienced unexpected small or large wins, was a slight drop in ratings of circumstantial efficacy for individuals who experienced an unexpected small win. In hypothesis 1A, the slight drop in this group reduced the mean for individuals experiencing an unexpected win (as the amount

of change measured was a combination of the mean differences experienced in both small and large unexpected wins). This same, counter intuitive finding was also evident, but not discussed, in Ganzach et al. (2008). In their study, the circumstantial efficacy of individuals who experienced an unexpected win slightly decreased as well. From the means observed in hypothesis 1B in the current study, it seems that this decrease is located in those who win by a small amount. My thought on why this slight drop in ratings of circumstantial efficacy seems to occur, both in Ganzach et al. (2008) and in the means of hypothesis 1B, is that because participants' strong beliefs in the circumstances may cause them to believe that although they won a game (by a small amount), they are still at a disadvantage and that the win was only a fluke (counterfactual thinking). In the example of the current study, participants may have engaged in counterfactual thinking over the course of the games such that, since they could not make up the difference of the first loss with their small wins, they continued to feel that they were at a small disadvantage compared to their opponent. This effect seems only to plague individuals' circumstantial efficacy for those who believe that they are at a

disadvantage. The mean differences for those who believe they are at an advantage does not show this same effect, as the mean differences for advantaged players are in the direction that would be predicted by hypothesis 1A and hypothesis 1B. Although it was not discussed by Ganzach et al. (2008), but because it was replicated in the current study, it seems that this area should be explored further to see if these results can be replicated. Simply put, the effect being seen here seems to demonstrate that individuals who believe they are at a disadvantage are more likely than those who believe they are at an advantage to sustain their previous performance expectations about their circumstances after experiencing a small unexpected outcome.

From both the significant and non significant findings that were in the predicted directions, it seems that individuals' performance expectations for future performances seem to change based on whether the expected outcomes result. Further, when individuals experience outcomes that do not match their performance expectations, the more disparate the difference is in the unexpected direction, the more circumstantial efficacy is altered.

Attributions and Efficacy

The second set of hypotheses (2A, 2B, and 2C) was focused on how individual's efficacy beliefs, both internal and circumstantial, are shaped by self-serving attributions we make about winning and losing. Similar to Ganzach et al. (2008), hypothesis 2A focused specifically on testing whether the changes in internal and circumstantial efficacy reflect the way individuals make self-serving attributions. Specifically, individuals tend to credit their wins to internal factors and blame their failures on circumstances (Green, Lightfoot, Bandy, and Buchanan, 1985). Hypothesis 2B expanded this further to examine if the size of the wins or losses would impact the amount of self-serving attributions participants would make. Hypothesis 2C focused on internal efficacy to examine the effects that expected and unexpected outcomes would have on further enhancing our self-serving attributions. This hypothesis (2C) was also used to examine the paradoxical effects discovered by Ganzach et al. (2008) that were described as "the advantage to the disadvantage" and "the disadvantage to the advantage." For ease of understanding, I will discuss this set of hypotheses in reverse (2C, 2B, then 2A) as I believe

effects in later hypotheses can more effectively explain effects found in the earlier hypotheses.

Hypothesis 2C. Hypothesis 2C predicted that specifically in regard to internal efficacy, there would be a four way interaction. This four way interaction consisted of the ratings of internal efficacy from before to after, depending on whether the individual experienced a win or a loss, a small or a large difference in that win or loss, and whether the win or loss was expected. No significant interaction was found, likely due to a lack of power from the small within cell sample sizes, and to an unexpected moderate decline in internal efficacy after a small loss (based on the "advantage of the disadvantage", a small increase to a very small decrease was to be expected). Although not significant, the observed mean changes in internal efficacy were in the direction hypothesized except as discussed above, and, as such, I would argue are suggestive enough for discussion. When looking at the mean differences in internal efficacy, the "disadvantage to the advantage" is evident as the average of those who experienced expected small wins and those who experienced unexpected small losses created a slight drop in ratings of internal efficacy instead of creating a small increase in

internal efficacy. This effect would be expected based on a self-serving bias in our attributions. As to experiencing small wins or losses when one has the knowledge of an advantage, one may feel as if he was less skilled than his opponent. The "advantage to the disadvantage," however, was not evident as the average ratings of those who experienced expected small losses and those who experienced unexpected small wins did not increase their ratings of internal efficacy; instead, their ratings matched the slight decrease in scores that would be expected based on self-serving attributions alone.

Hypothesis 2B. In Hypothesis 2B, I predicted that individuals who won by a large amount would increase their ratings of internal and circumstantial efficacy more than those who won by a small amount, while individuals who lost by a large amount would decrease their ratings more than those who lost by a small amount. This prediction was made as it was believed that the amount of a win or loss would be used by participants as performance markers to gauge how well they performed in comparison to their opponents (Feltz & Magyar, 2006). For those who experienced large losses or wins, more movement in ratings of internal and circumstantial efficacy was expected. In addition to the

prior effect, larger differences were expected to create larger increases and decreases in ratings of internal and circumstantial efficacy. Larger wins and losses were expected to be more exhilarating or strenuous to participant's emotional state of mind and could create a possible feeling of momentum (Mack et al., 2008). In testing this assertion, it was found that for internal efficacy, the hypothesis was not fully supported as no significant interaction was found, while it was fully supported by the significant interaction found in circumstantial efficacy. When looking at the differences in the means, the change in internal efficacy was as expected for those who experienced wins but it did not change as expected for those who experienced losses. The differences here were caused by the same reason the "advantage to the disadvantage" was not evident in hypothesis 2C. The reason was an unexpected moderate decrease in ratings of participants who experienced expected small losses instead of the expected slight decrease to slight increase. This unexpected moderate decrease for those who experienced small losses, found in the data examined for hypothesis 2C, strongly reduced the overall mean difference in internal efficacy between small and large losses. Thus, the mean

difference found for hypothesis 2B was only ever so slightly in the direction predicted.

Hypothesis 2A. In Hypothesis 2A, I predicted that a different effect would occur for internal and circumstantial efficacy, such that self-serving attributions would cause a large positive change in internal efficacy after wins and a large negative change in circumstantial efficacy after losses. Based on common findings for efficacy (Bandura, 1977) that "successes raise mastery expectations; repeated failures lower them" (p. 195), and because both constructs are efficacy, I expected that both circumstantial and internal efficacy would rise after a win and drop after loss. Thus, even though the changes in ratings are not predicted by self-serving attributions, based on the common findings for efficacy, circumstantial efficacy was expected to increase slightly after a win and internal efficacy drop slightly after a loss. What was found in the current study was that there were significant mean differences in the changes in ratings of internal and circumstantial efficacy after experiencing a win or a loss. Specifically, internal and circumstantial efficacy increased after a win and decreased after a loss. Although it was significant and the change in internal

efficacy was in the direction hypothesized, it was not exactly what would be expected by a hypothesis created to match individual's self-serving attributions alone. For those who won, the change in internal efficacy that was observed was exactly what would be expected when the effect of individual's self-serving attributions are taken in conjunction with the knowledge of the effect of "the advantage to the disadvantage" (Ganzach et al., 2008). The increase in internal efficacy that was expected by self serving attributions was probably reduced because of "advantage to the disadvantage" effect, which created a slight increase in internal efficacy ratings instead of the large increase that was expected. On the other hand, for those who lost, because "the disadvantage to the advantage" was not evident, the change in internal efficacy declined more than was expected which led to a moderate decrease instead of a slight increase that was expected. Since circumstantial efficacy is not affected by "the advantage to the disadvantage" or "the disadvantage to the advantage" as is internal efficacy, the circumstantial efficacy results were as predicted; a slight increase after a win and a large decrease after a loss. Based on these findings, it seems that our self-serving attributions are reflected

in how we rate our internal and circumstantial efficacy. In future studies, however, the effects of the "the advantage to the disadvantage" and "the disadvantage to the advantage" need to be teased apart, most likely through experimental manipulation, to better test these musings.

Differential Effects of Internal and Circumstantial Efficacy

One of the goals of this study was to demonstrate the differential effects of internal and circumstantial efficacy. For some hypotheses, effects for only internal efficacy or circumstantial efficacy were significant; in others, both yielded significant results, and in one hypothesis (hypothesis 2C), only internal efficacy was examined for expected effects but was not significant.

The large differential effect is in relation to the attribution processes that create different impacts on both internal and external efficacy. As seen by the results of hypothesis 2A and 2B, the self-serving attributions that individuals make are different for internal efficacy than they are for circumstantial efficacy. The results in the current study suggest that internal efficacy and circumstantial efficacy have different influences. Expected and unexpected outcomes influence our internal and

circumstantial efficacy in different ways. The smaller the differences by which we win or lose tend to exacerbate these influences while the larger differences tend to reduce these influences. In expected outcomes, internal efficacy is plagued by "the disadvantage to the advantage" and "the advantage to the disadvantage." In contrast, circumstantial reactions as expected based on our self-serving attributions. When large differences occur in expected outcomes, however, the effects of "the disadvantage to the advantage" and "the advantage to the disadvantage" seem to be non-existent allowing internal efficacy to resume functioning as attributions would expect them to. Specifically, this possibility can be seen in the supportive results for wins in hypothesis 2C, with non supportive results for losses as "the advantage to the disadvantage" was not evident in the current study. With large expected differences, circumstantial efficacy continues to be in line with self-serving attributions. On the other hand, with unexpected small outcomes, internal efficacy acts in conjunction with self serving attributions, while circumstantial efficacy seems to be plagued by the newly discussed finding that disadvantaged individuals tend to hold onto their belief when they

experience a win more than advantaged individuals who experience a loss. With large unexpected results, however, internal efficacy continues to operate as expected by self-serving attributions, while circumstantial efficacy is relieved of such hold and allows individuals to react in conjunction with their self serving attributions (as can be seen in the significant results of hypothesis 1B for circumstantial efficacy). The effects just described are seen in the results for hypothesis 1A, where there were significant differences in the ratings of internal efficacy for those who experienced expected and unexpected outcomes and non significant changes in circumstantial efficacy. This large difference between internal and circumstantial efficacy I believe is an important distinction to make, and I believe as such, it deserves to be further tested in new studies to differentiate the effects of internal and circumstantial efficacy.

General Discussion and Implications

Overall, my goal in conducting this study, was to further the promotion and understanding of the unique effects evident in internal and circumstantial efficacy. The findings in this study were consonant with the findings

of Ganzach et al. (2008). The results of the current study also expanded on the Ganzach et al. study by adding the effects that win or loss size can have on the attributions that we make and the influences those differentials have on both internal and circumstantial efficacy. Finally, I believe the findings of the current study have implications for work and non-work situations.

Implications for Research

Study Specific Implications for Research

This study has specific implications for research. From this study and congruent with Ganzach et al. (2008), there is support towards the new framework for efficacy beliefs that distinguish between internal and external efficacy posed by Ganzach et al. (2008). Ganzach et al. (2008) point out that Bandura's (1997) conception of self-efficacy tries to encompass both internal and external efficacy but as such does not allow for the different possible relationships that internal and external efficacies can have with other variables like performance. Thus, Ganzach et al. (2008) point out that the conceptualization of self efficacy may be seen as global efficacy in the new framework. Ganzach et al. (2008) also state that "although self-efficacy was originally defined and measured as encompassing internal as

well as external resources, researchers have gravitated toward treating self-efficacy solely as an individual, or internal, attribute" (p. 6). The research that I and Ganzach et al. (2008) have conducted in regard to circumstantial efficacy has demonstrated that there are and can be differences between internal and external efficacies that are worth researching. The differences that have been found between internal and external efficacies (circumstantial and means) in more recent research, like those in the current study between internal and circumstantial efficacy, suggest that the newer framework should be utilized. This newer framework, if utilized, can allow for further distinctions of internal and external efficacies and allow for additional examination of each type of efficacies unique relationships with other variables in a variety of settings and scenarios.

Another implication for future research is that the current study added support to Ganzach et al. (2008) by solidifying the understanding of the different effects that expected and unexpected can have on individuals beliefs. As seen in the results of hypothesis 1A, unexpected outcomes have a larger impact on our internal efficacy and similarly on our circumstantial efficacy when we lose. What this

means is that it may be best in some cases to remind ourselves that an unexpected outcome may be just a random incident and not necessarily worth making large changes to our beliefs. Unexpected outcomes instead should be taken in stride with our past and future outcomes to look for a pattern. When we obtain unexpected results, it may be good to look over the situation and see what aided or hindered the ability to complete the task that we have performed, to determine what we can modify in our future performance to sustain the unexpected higher performance or to better avoid the pitfalls that created our unexpected lower performance. In conjunction with hypothesis 1B, unexpected outcomes should be further evaluated by the proximity of the outcome from the usual or expected outcomes. The findings suggest that we tend to do this when the proximity of the unexpected outcome is small as we seem to engage in more counterfactual thinking. However, it also points out that we may be too quick at times to simply accept and be more greatly affected by unexpected outcomes that are far from the usual, expected, outcome.

A newly discovered finding that impacted the findings of hypotheses 1A and 1B, and was evident but not discussed in Ganzach et al. (2008) was that disadvantaged individuals

tend to hold on to their beliefs longer in the face of experiencing unexpected outcomes, while advantaged individuals tend to let go of their beliefs sooner. This may simply demonstrate a propensity of individuals to want to avoid facing failure and exemplify their successes. Individuals with an advantage tend to downplay the advantage so in case they lose, they will not feel as impacted, and, when they win, they can explain their win as a result of skill rather than just an advantage of circumstance. Those who are at a disadvantage want to draw attention to their disadvantage so that if they lose they are even less affected and they are seen as even better when they do win.

With hypotheses 2A and B, the results of the current study point out that we tend to increase our efficacy beliefs after a win and decrease them after a loss, in line with attribution theory (Green, Lightfoot, Bandy, and Buchanan, 1985) and efficacy theory (Bandura, 1977). The proximity by which we experience our success (win) or failure (loss) in our attempt to complete a task can exacerbate these increases and decreases as well, especially for circumstantial efficacy. What is not evident, however, is whether the intensity of change in

individuals' beliefs after a large success or failure is better for them then the intensity of change after a small success or failure. In my impression, I believe that it is better for individuals to experience small to moderate successes and failures as it allows us to engage in more counterfactual thinking and causes us to further examine our outcomes. These circumstances, I believe, result in more accurate depictions of the individual's skills and do not tend to create unnecessary overconfidence or severe drops in efficacy beliefs and performance like large successes (wins) or failures (losses).

Although not completely supported as in Ganzach et al. (2008), "the advantage of the disadvantage" and "the disadvantage to the advantage" was examined in hypothesis 2C. "The disadvantage to the advantage" was evident in the mean differences observed and did seem to impact the results of hypotheses 2A and 2C by reducing the amount of positive increase after wins as those that experienced small wins rated slightly negative. These advantages and disadvantages are simply caused by the mobility of the participant in their possible scores such that advantaged individuals are disadvantaged because they have potential for greater loss and smaller wins, while disadvantaged

players are advantaged because they have potential for greater wins and smaller losses.

General Implications for Future Research. In general, for research purposes, I believe that knowledge and understanding of circumstantial efficacy can be further improved. To start, I would suggest that researchers examine the effects performance can have on circumstantial efficacy and the effects circumstantial efficacy can have on performance in non-competitive situations. One possibility is to make within subject comparisons on task performance, prior to and after competition. These types of comparisons in circumstantial efficacy and internal efficacy, I believe can be especially fruitful when comparing performance as an individual is learning new skills or expanding on known skills as he grows developmentally, both personally and in the workplace. I believe that for learning, we often focus our efforts on improving self efficacy but only within the same setting. By doing so, individuals will often improve their skills and their circumstantial efficacy for that situation as they become more comfortable and experienced in that area. Where circumstantial efficacy can make a difference is by focusing on being able to comfortably use those skills in a

variety of situations. I believe that this is often one fault in education as individuals often learn and refine their skills only in a school or training setting. When they are then placed in new circumstances like work, they often do not feel capable to perform at the same level (they experience low circumstantial efficacy because the performance situation is different from the learning situation) even though they are confident in the skills that they posses (high internal efficacy). Although they have not used it explicitly, the effects of circumstantial efficacy have become more and more implicit, and have drawn in the use of educational and training based programs that combine work and education. I believe studying the effects of circumstantial efficacy may lead to new directions and improved learning. Also to improve our knowledge, research that includes both internal efficacy and the two forms of external efficacy (means and circumstantial efficacy), should be conducted to further examine the similarities and differences between their effects. The findings in the current study and those of Ganzach et al. (2008) demonstrate the importance and effects that circumstantial efficacy, and internal efficacy, can play in competitive

situations and could be recommended for future research in Sports Psychology.

In addition to these implications, a limitation in the current study would be that the majority of the individuals who participated were female. It has been found previously that there are gender differences in ratings of internal efficacy, especially in regards to computer gaming (Busch, 1995). As there was not a sufficient sample of males in the current study to examine gender differences, I would suggest that future studies should examine gender differences in relation to the current studies hypotheses. Nevertheless, it is my impression that individuals both male and female utilize circumstantial information in the same manner and thus would likely demonstrate similar ratings and changes in circumstantial efficacy. Of course, this should be examined in future research.

Implications for Practice

For practice, I believe a general understanding of the effects that prior performance can have on circumstantial efficacy and internal efficacy (as seen in the current study and Ganzach et al., 2008), as well as the effects that circumstantial efficacy can have on performance (as seen in Ganzach et al., 2008) should be added to managers'

toolboxes in the workplace. The knowledge of circumstantial efficacy alone, can help managers improve their employees skills by requiring managers to create more accurate expectations for their workers in placing individuals in different situations. As can be generalized from the results of the current study and that of Ganzach et al. (2008), circumstantial efficacy is a variable that can be controlled by managers by modifying the circumstances of the situation or by influencing how individuals think about the circumstances of the situation. Doing so, however, managers can create large changes in circumstantial efficacy, but will likely influence their employees' internal efficacy as well. The reason that circumstantial efficacy may seem to influence internal efficacy is because circumstances that are either much easier or much more difficult may seem to require more or less skill to be able to successfully complete the task. For example, if unrealistic goals are set for individuals and the situation is discussed by the manager as being very favorable (increasing employees' circumstantial efficacy), employees may be persuaded by their manager to slightly increase their internal efficacy beliefs. However, if employees feel it should be easy for them to succeed, and they do not

reach the goal (or barely do), then they are likely to feel that it is because they are not skilled workers, causing further reductions in their internal efficacy and their circumstantial efficacy than what would have occurred otherwise (i.e., "the disadvantage to the advantage"). Just dramatically increasing an individual's circumstances may cause them to become overconfident and lead to reduced pleasure in completing tasks (McGraw, Mellers, & Ritov, 2004) On the other hand, if goals are set and described as very difficult to achieve and the person fails, the individual may excuse his own responsibility and place total blame on the circumstances, resulting in inaccurate ideas about his skill level (believing he is better than he is) and thus may make less effort to improve his skills (i.e., the advantage to the disadvantage"). In conjunction with the understanding of the more researched internal and means efficacies, the understanding of circumstantial efficacy can help to improve managers' ability to develop and guide their staff. Managers who understand each of the forms of efficacy, including circumstantial, can have better understandings of why individuals even though capable, are afraid to take on more difficult work or the same work in circumstances that are difficult. This

knowledge would also allow managers to better assign more challenging tasks and goals that are difficult enough in skill, tools, or in circumstances to stretch and develop their employees but not too difficult to reduce their beliefs (internal, means, and circumstantial) that they can be successful. All in all, the implications of the findings on circumstantial efficacy can be beneficial to those who seek to understand it, and there is much room still available to those who would like to expand the current knowledge of circumstantial efficacy.

APPENDIX A

SUMMARY OF THE HYPOTHESES AND THEIR ASSOCIATED THEORETICAL REASONING'S

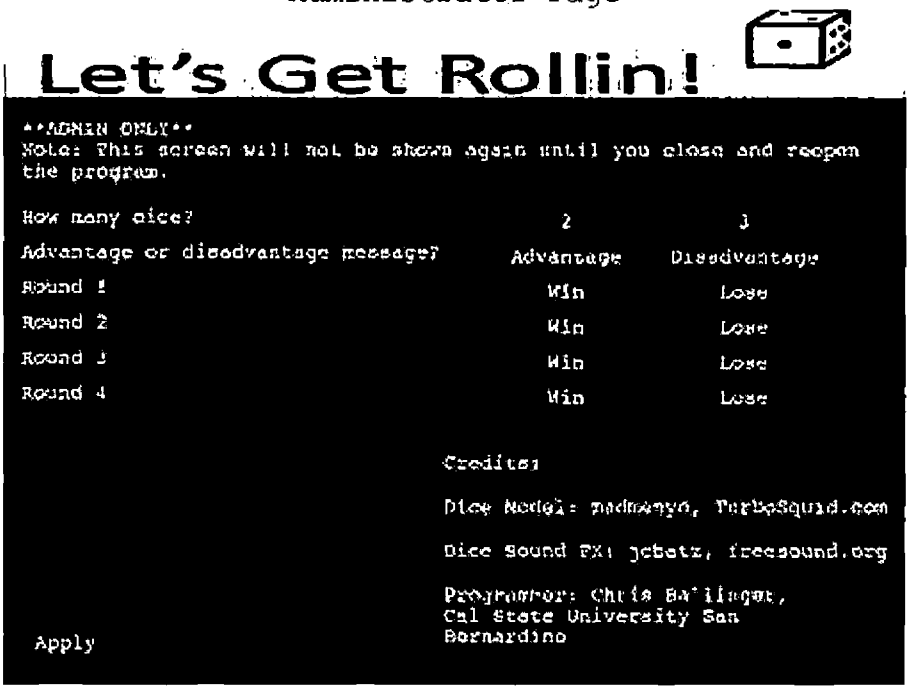
Hypothesis:	Theoretical Reasoning:
H1A: An unexpected outcome (i.e. when the player perceived as disadvantaged wins and the perceived advantaged player loses) will have a larger effect on efficacy beliefs than an expected outcome (the advantaged player wins and disadvantaged player loses).	Attribution of expected vs. unexpected outcomes
H1B: For those that experienced an unexpected outcome, the advantaged individuals who lose by a large number of points will lower their efficacy beliefs more than those who lose by a small number of points. On the other hand, the disadvantaged individuals who win by a large number of points will increase their efficacy belief more than those who win by a small number of points.	Counterfactual thinking and Saliency or strength of event.
H2A: A different effect will be expected for IE and CE, such that a win (success) in any game will result in a large positive change in IE and a small positive change in CE, while a failure to win will result in a large negative change in CE and a small negative change in IE.	Attribution of successes vs. failures.
H2B: Individuals who win by a large amount of points will increase their ratings of IE and CE more than those who win by a small amount. On the other hand, individuals who lose by a large amount of points will decrease their ratings of IE and CE more than those who lose by a small amount. The direction of the increases or decreases will be in the direction described in Hypothesis 2A.	Saliency or strength of event.
H2C: Specifically In regards to IE, the strength of the moderation in H2B will also be larger for individuals who experience an unexpected outcome such as when individuals who believe they are advantaged and barely win or experience a failure, and those that believe they are disadvantaged and barely lose or experience a success.	"The advantage to being disadvantaged" and "the disadvantage to being advantaged"

Note: Internal efficacy is represented as IE and circumstantial efficacy is represented as CE.

APPENDIX B

EXAMPLE SCREEN SHOTS AND RELATED DESCRIPTIONS OF THE COMPUTER DICE GAME

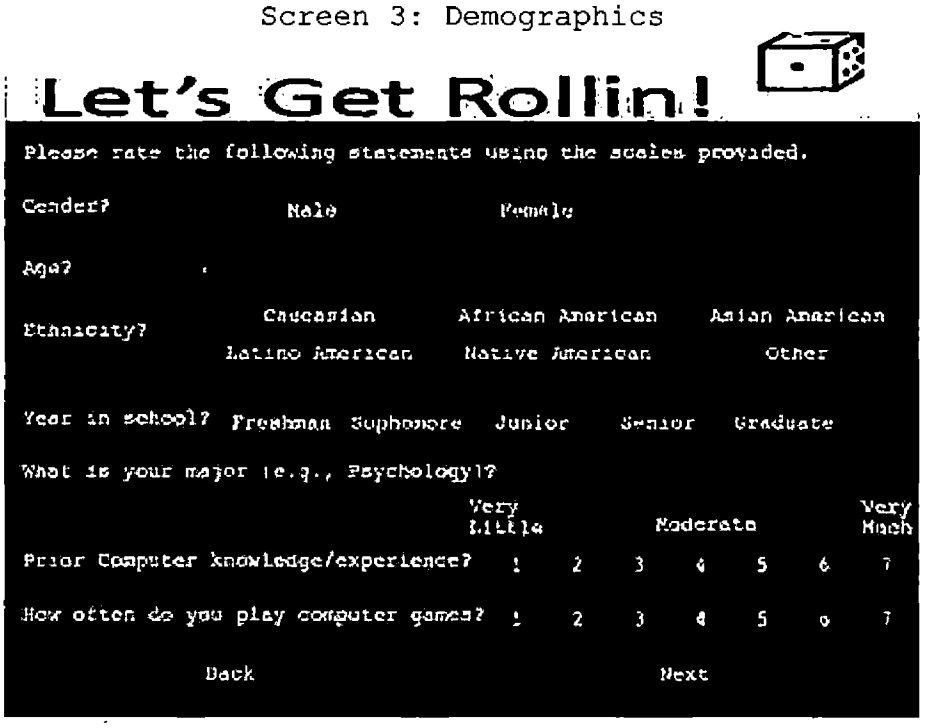
Administrator Page



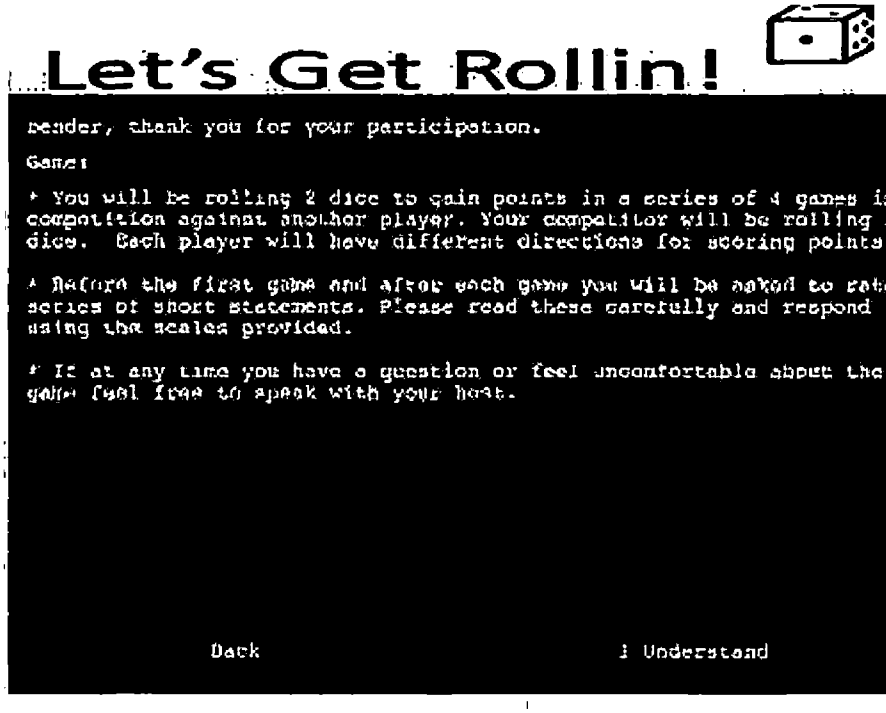
Screen 1: Opening

Screen 2: Name Entry

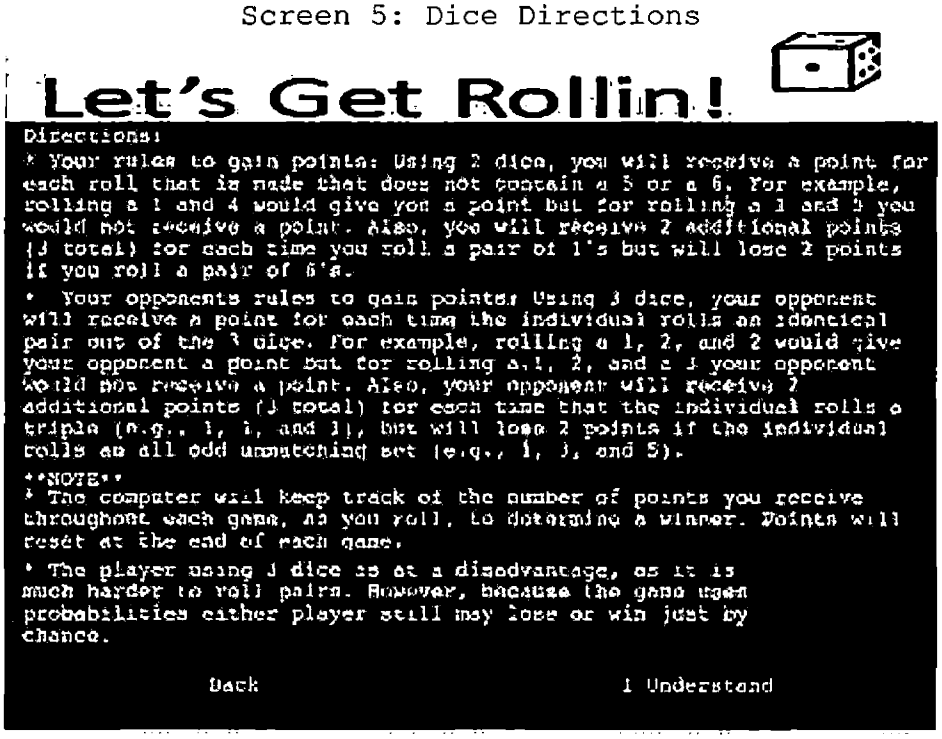
Screen 3: Demographics



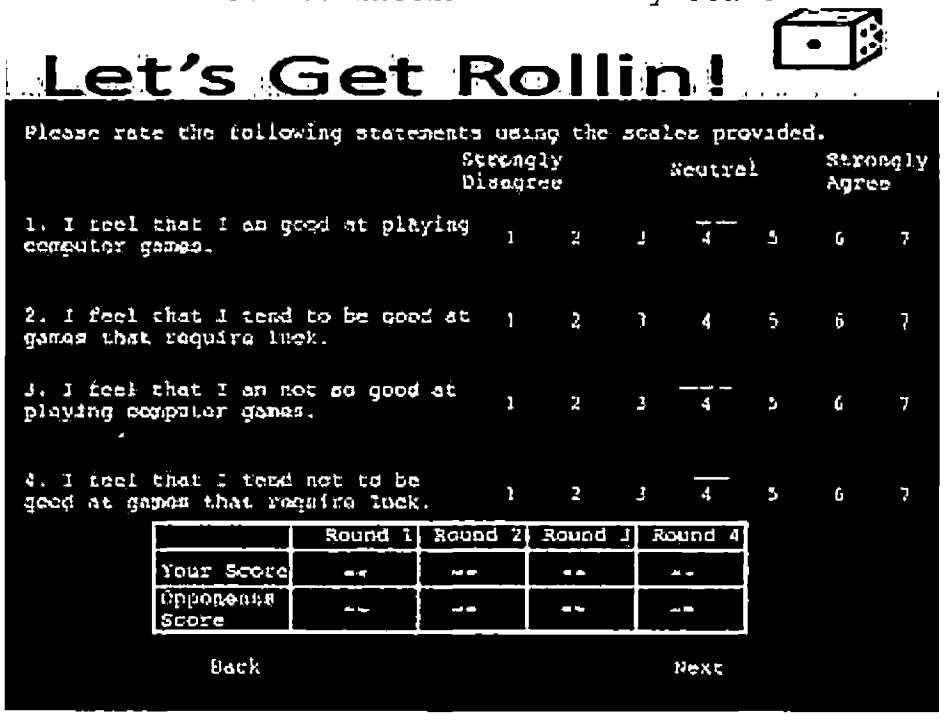
Screen 4: General Game Information



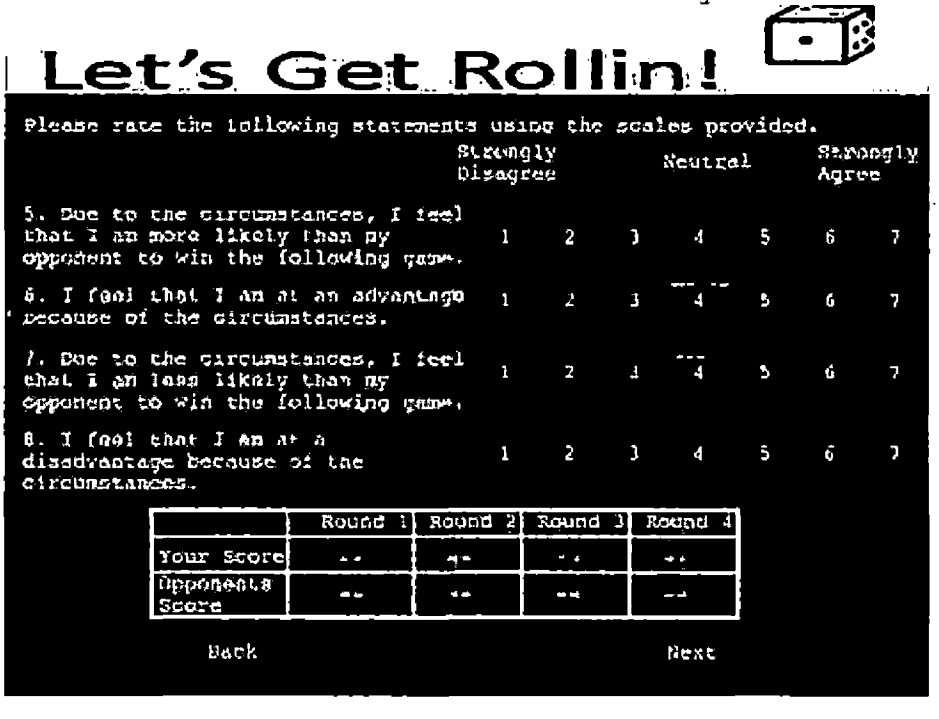
Screen 5: Dice Directions



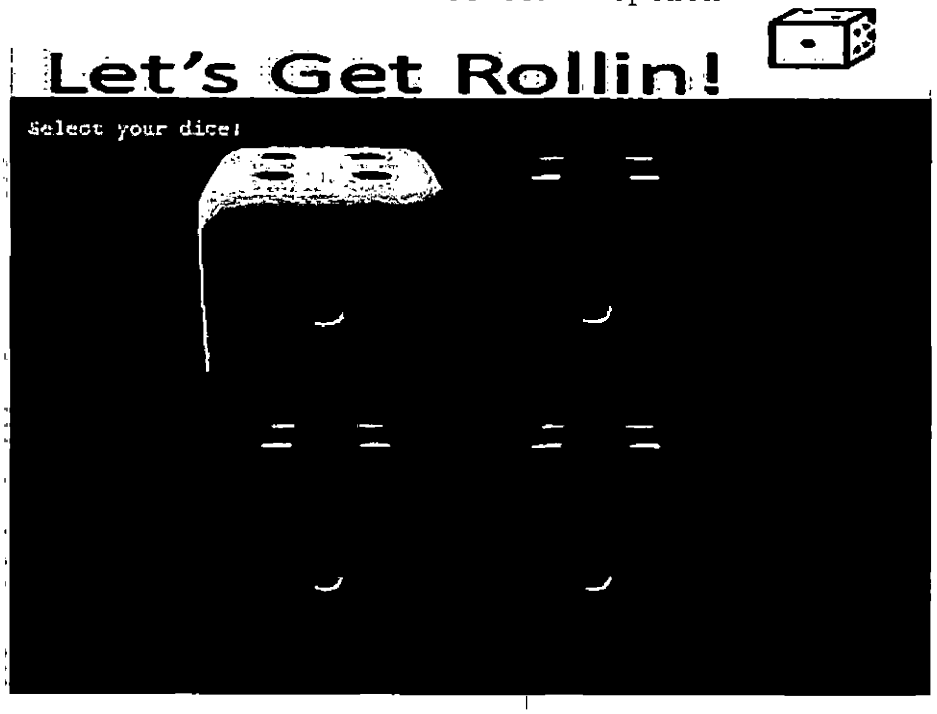
Screen 6: Internal Efficacy Scale



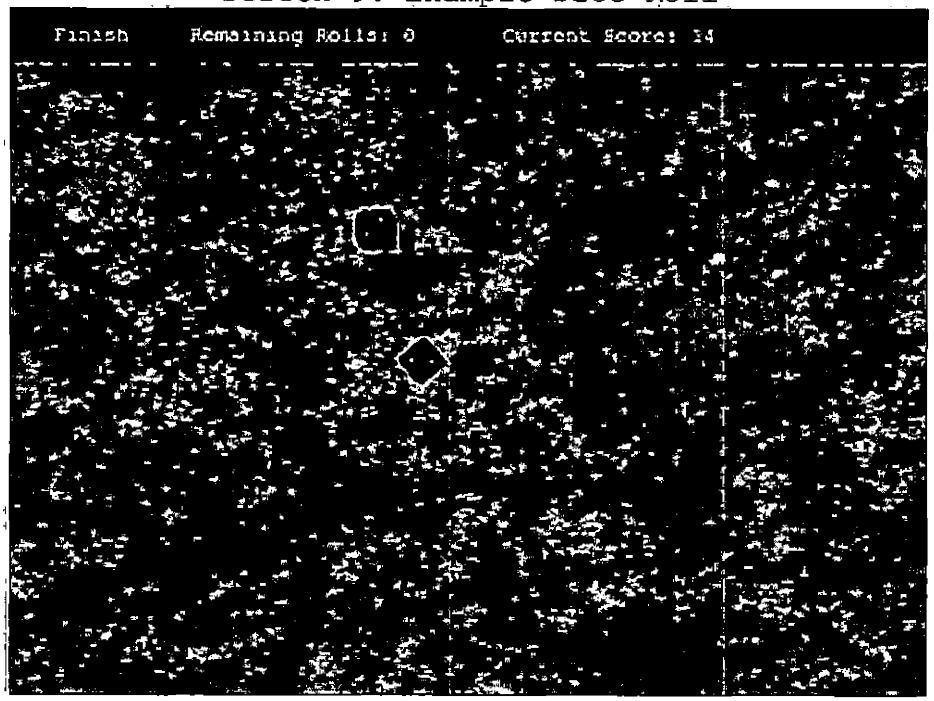
Screen 7: Circumstantial Efficacy Scale



Screen 8: Dice Color Option



Screen 9: Example Dice Roll

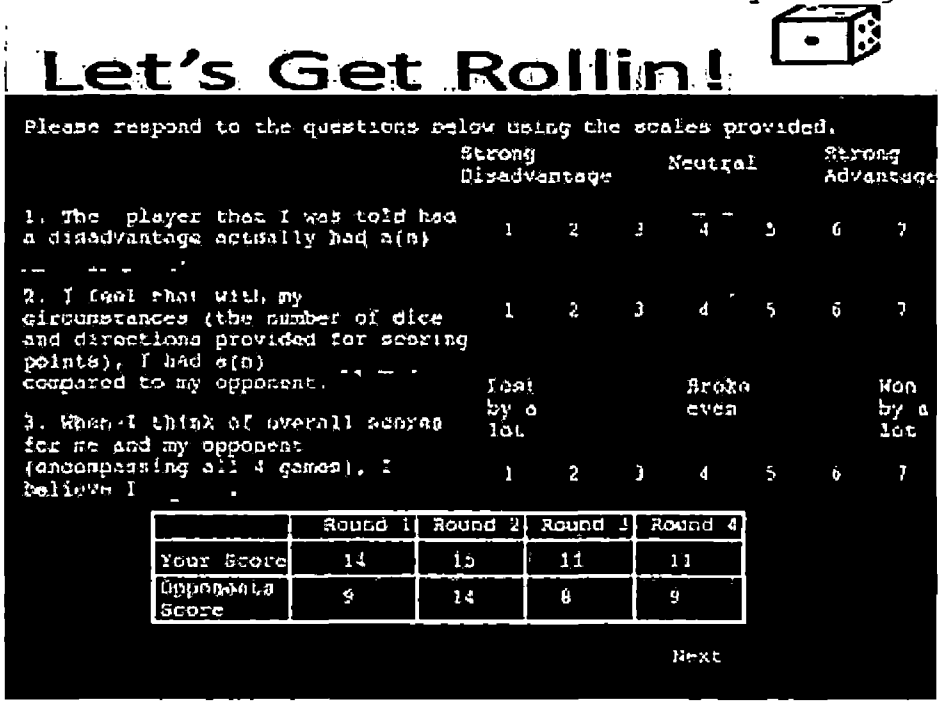


Screen 10: Example Loading Page

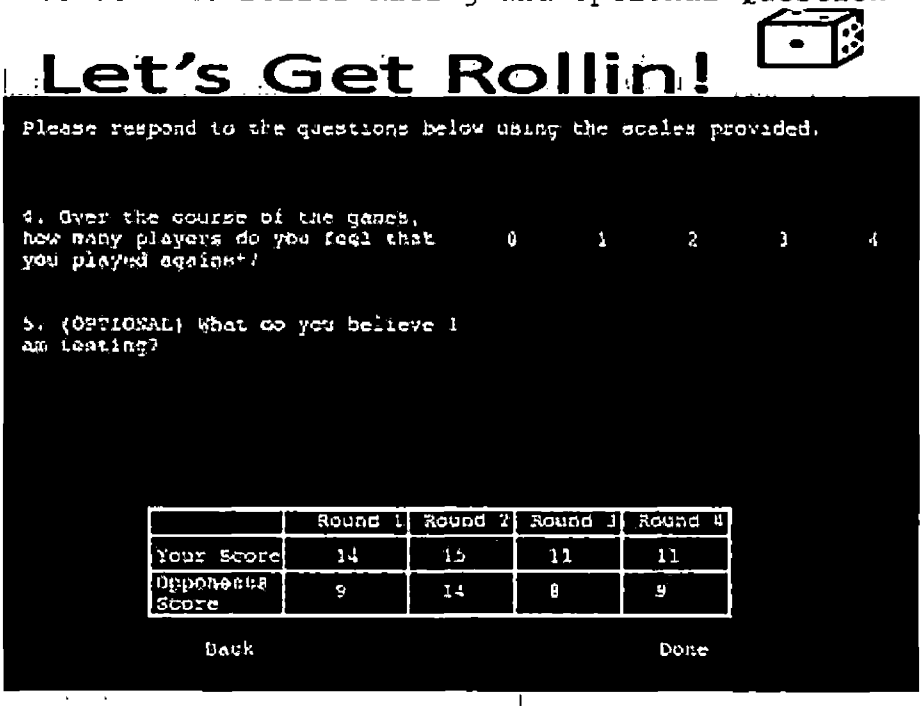
Screen 11: Example Win

Screen 12: Example Loss

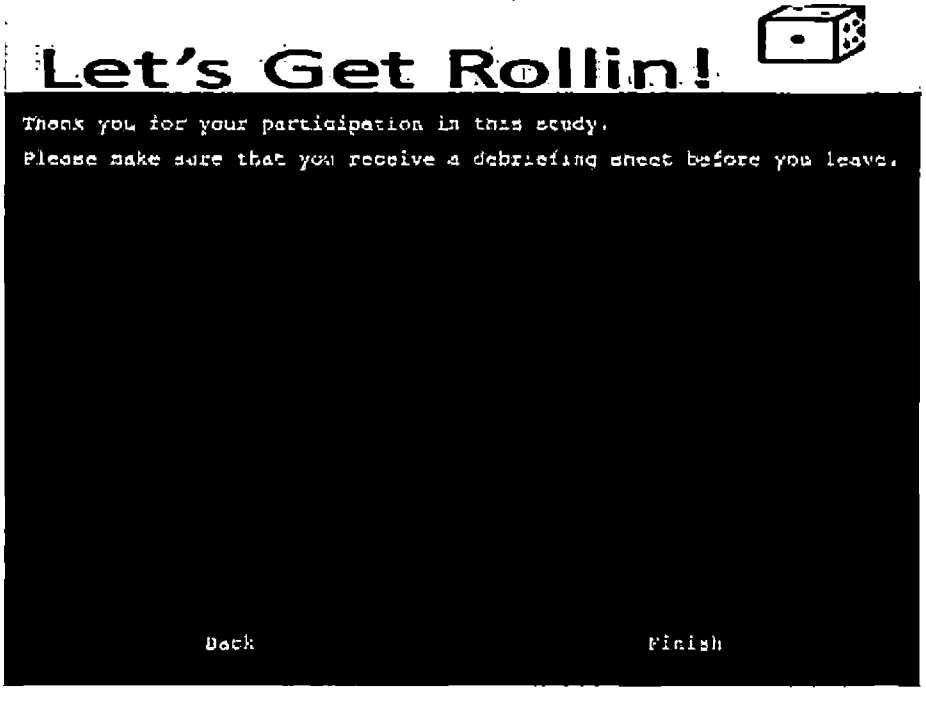
Screen 13: Final Circumstantial Efficacy Ratings



Screen 14: Belief Rating and Optional Question



Screen 15: Thank You and Debriefing Reminder (Final Game Screen)



APPENDIX C

PARTICIPANT INFORMED CONSENT SHEET

Informed Consent

You are invited to participate in a study designed to assess your confidence in playing a computer game against an opponent. This study is being conducted by Matthew Bender, Graduate Student in Psychology at the California State University, San Bernardino (CSUSB), under the direction of Dr. Janet Kottke. The study has been approved by the Department of Psychology Institutional Review Board Sub-Committee of the California State University, San Bernardino, and a copy of the official Psychology IRB stamp of approval should appear on this consent form.

In this study, you will play a computer game against another player at the same or a different location through the use of an online web server. This game will require that you play four separate rounds of a dice game and answer questions before and after each round. You will also be asked questions about your demographic characteristics such as gender, age, and your prior experience with computer games. All together, playing the game and responding to questions should take about 45 minutes to complete. All of your responses will be anonymous. At no time will your actual name be requested or recorded during your participation. If you are a CSUSB student, you will be asked to provide your name and SONA ID for points that at your instructor's discretion you may apply to course credit. This information will be stored separately from your responses, to protect the anonymity of your responses.

Presentation of the results will be reported in a group format only. Your participation in this study is entirely voluntary. You are free to withdraw your participation at any time during the study without penalty, or to refuse to answer any question that makes you uncomfortable. The researcher does not foresee any risks to you participating in this study, but it is possible that you may feel slight psychological discomfort if you experience a loss in the game. If you experience any distress as a result of your participation in this research, you may contact the researcher for assistance, counseling referrals, or resources. Additionally, this study does not provide any direct benefits to individual participants other than extra credit for one of your psychology courses. The present study is worth 4 units of extra credit, to be assigned to a psychology class of your choice at your instructor's discretion.

If you have any questions concerning this survey, the results, or your participation in this research please feel free to contact Matthew Bender at Bendm300@csusb.edu. You may also contact the Human Subjects office at California State University, San Bernardino (909) 537-7588 if you have any questions or concerns about this study.

By placing an X in the space below, I acknowledge that I have been informed of, and that I understand, the nature and purpose of this study, and I freely consent to participate. I also acknowledge that I am at least 18 years of age.

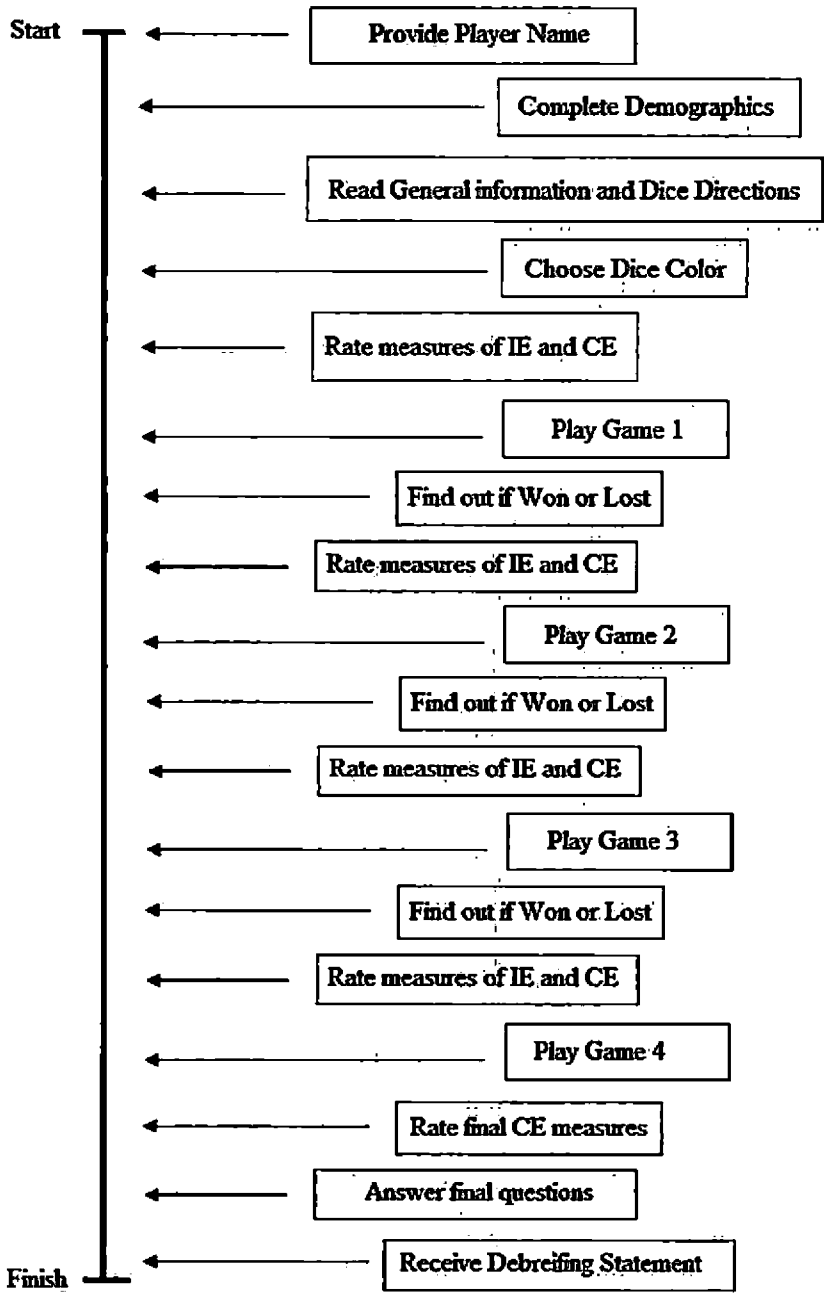
Participant's X _____

Date: _____

CALIFORNIA STATE UNIVERSITY, SAN BERNARDINO
PSYCHOLOGY INSTITUTIONAL REVIEW BOARD SUB-COMMITTEE
APPROVED 04 / 08 / 10 VOID AFTER 04 / 08 / 11
IRB# H-10WI-22 CHAIR

APPENDIX D

SEQUENCE OF THE GAME FROM START TO FINISH



Note: IE indicates internal efficacy, CE indicates circumstantial efficacy.

APPENDIX E

PARTICIPANT DEBRIEFING STATEMENT

Debriefing Statement

Thank you very much for your participation in this study and for not discussing the contents of the study with other students. I am interested in the effects of how perceived circumstances (such as previous performance outcomes) affect individuals' beliefs of how well they will perform on a given task. I am also interested in the moderating effects of the amount by which an individual wins or losses and the compounding effects of multiple wins or losses. To create the circumstances needed to evaluate changes in efficacy, you have played a series of games against a computer generated (not actual) opponent. This deception was used to create perceptions of actual competition to allow participants to make personal evaluations in a simulated real life scenario. Your time is very much appreciated.

Again, thank you very much for your participation in this study and for not discussing the contents of the study with other students. If you have any questions, comments, or concerns regarding the survey, please contact either Matthew Bender at bendm300@csusb.edu, or Dr. Janet Kottke, at (909) 537-5585 or jkottke@csusb.edu.

APPENDIX F

Means and Frequencies of Ratings of the Condition Based Manipulation Check Questions Organized By the Conditions

Question 1: The person I was told had a disadvantage actually had a(n) _____.

		Frequencies (%) of Participants by Ratings						
		Disadvantage			Neutral	Advantage		
Condition	Mean (SD)	Strong (1)	Moderate (2)	Slight (3)	(4)	Slight (5)	Moderate (6)	Strong (7)
DBL4	3.83 (2.66)			5.6	0	5.6	22.2	22.2
DSL4	4.00 (2.03)					11.1	0	22.2
DSL1W3	4.61 (1.24)	0	5.6					5.6
DBL1W3	4.00 (1.78)	5.6	22.2	11.1				
ABW4	2.39 (1.38)			16.7	11.1	11.1	0	0
ASW4	2.83 (1.72)					11.1	0	5.6
ASW1L3	4.78 (1.11)	0	0					5.6
ABW1L3	5.06 (1.16)	0	0	5.6				

Question 2: I feel that with my circumstances (the number of dice and directions provided for scoring points), I had a(n) _____ compared to my opponent.

		Frequencies (%) of Participants by Ratings						
		Disadvantage			Neutral	Advantage		
Condition	Mean (SD)	Strong (1)	Moderate (2)	Slight (3)	(4)	Slight (5)	Moderate (6)	Strong (7)
DBL4	1.94 (1.06)			16.7	11.1	0	0	0
ABW1L3	3.22 (.88)				44.4	0	0	0
DSL4	3.11 (1.08)	11.1				5.6	0	0
ASW1L3	4.00 (1.50)	0					16.7	5.6
DSL1W3	3.78 (1.35)	11.1	5.6					0
ASW4	5.17 (1.76)	5.6	5.6	0				27.8
DBL1W3	5.06 (.87)	0	0	0	33.3			
ABW4	5.83 (1.10)	0	0	0	16.7	16.7		

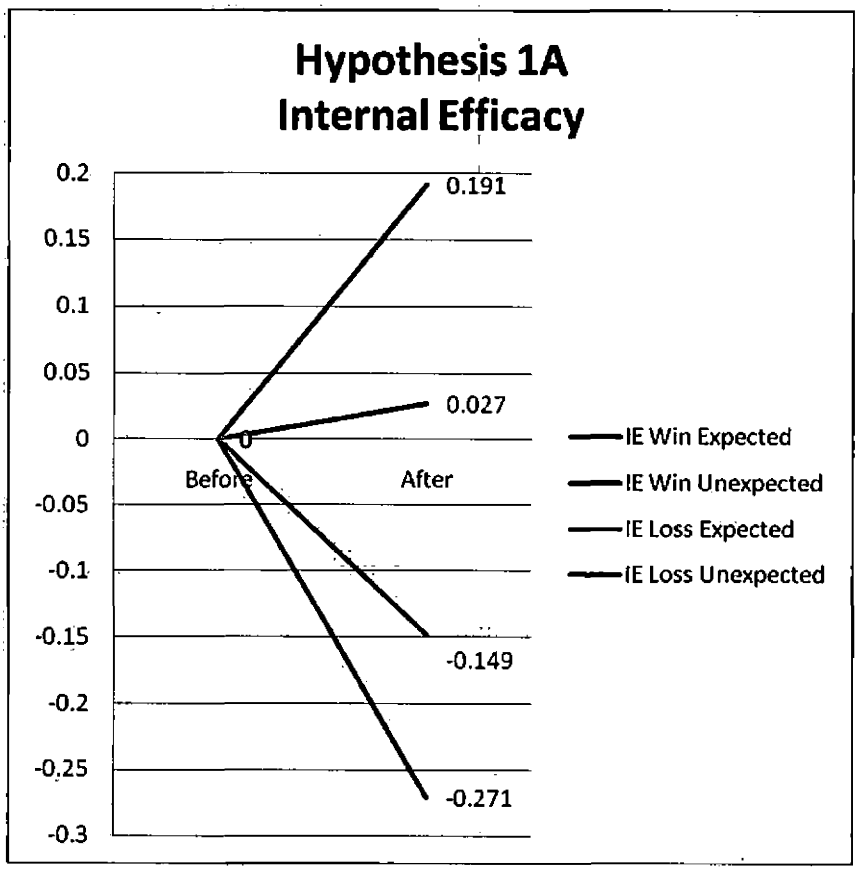
Question 3: When I think of overall scores for me and my opponent (encompassing all 4 games), I believe I _____.								
		Frequencies (%) of Participants by Ratings						
		Lost by a			Broke	Won by a		
Condition	Mean (SD)	Lot (1)	Moderate Amount (2)	Little (3)	Even (4)	Little (5)	Moderate Amount (6)	Lot (7)
DBL4	1.67 (.60)			5.6	0	0	0	0
ABW1L3	2.33 (1.46)				11.1	0	0	5.6
DSL4	3.06 (1.16)	5.6				0	5.6	0
ASW1L3	3.11 (.90)	0					0	0
DSL1W3	5.06 (.80)	0	0					0
ASW4	5.61 (.92)	0	0	0				22.2
DBL1W3	6.33 (.77)	0	0	0	5.6	0		
ABW4	6.11 (1.18)	0	0	0	16.7	11.1		

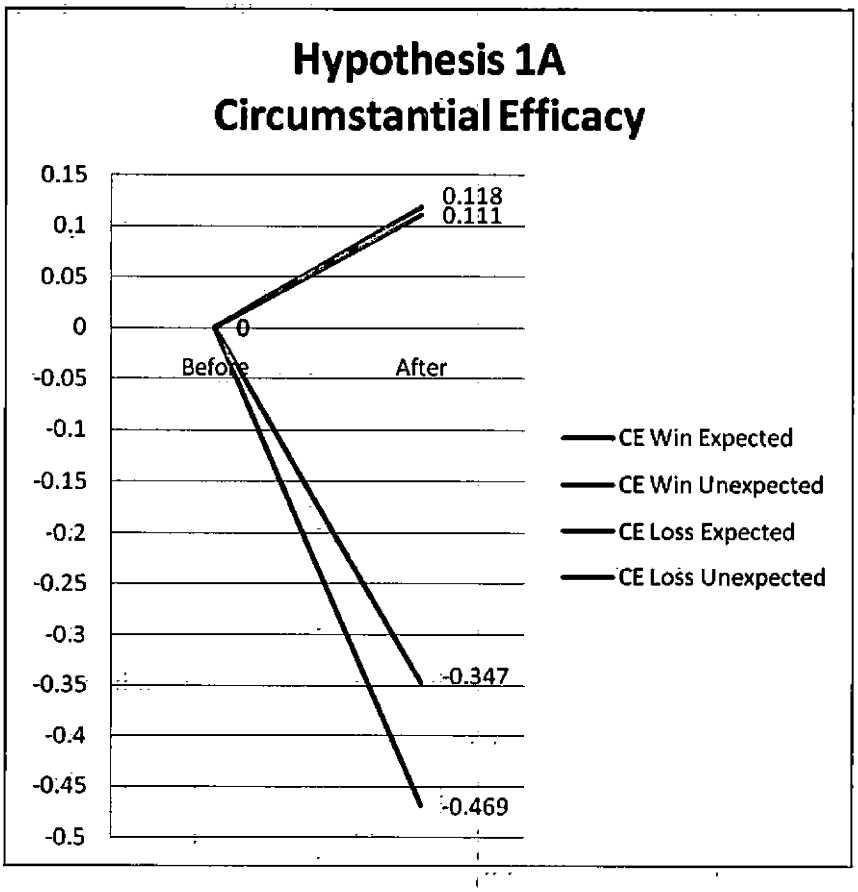
*Notes for conditions: A – Advantage, D – Disadvantage, S – Small difference in scores, B – Large difference in scores, W# or L# – Win or Loss followed by number of wins or loss in a row

Notes for colors: The colors red, orange, yellow, and color are used to represent the expected frequency distributions with red representing the cells that expected to contain the highest frequencies down to no color which would have no (or very few cases).

APPENDIX G

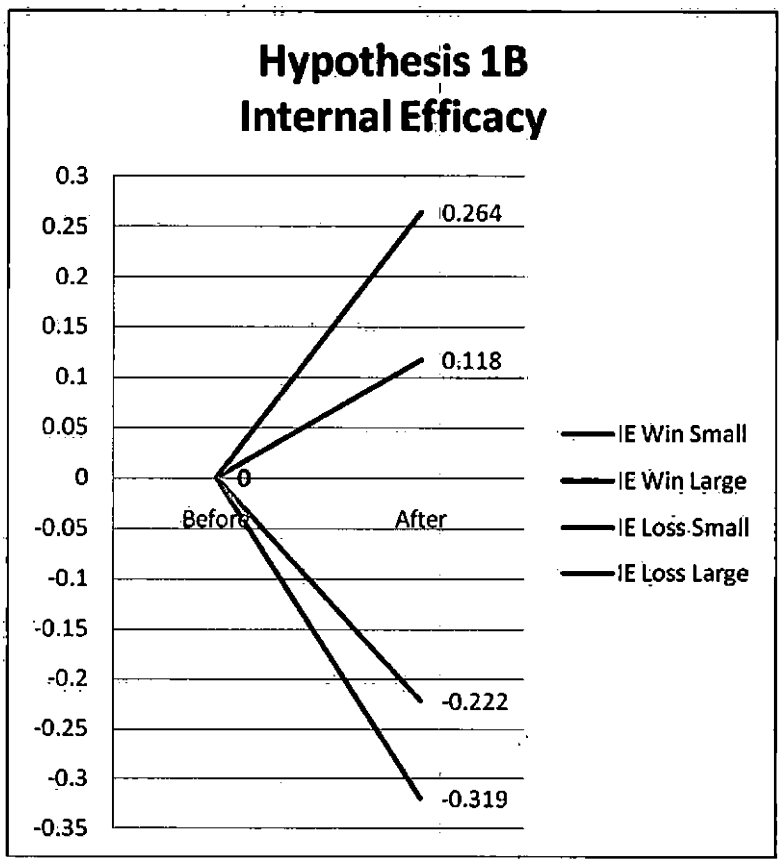
GRAPHICAL REPRESENTATION OF MEAN DIFFERENCES IN INTERNAL AND CIRCUMSTANTIAL EFFICACY FOR HYPOTHESIS 1A

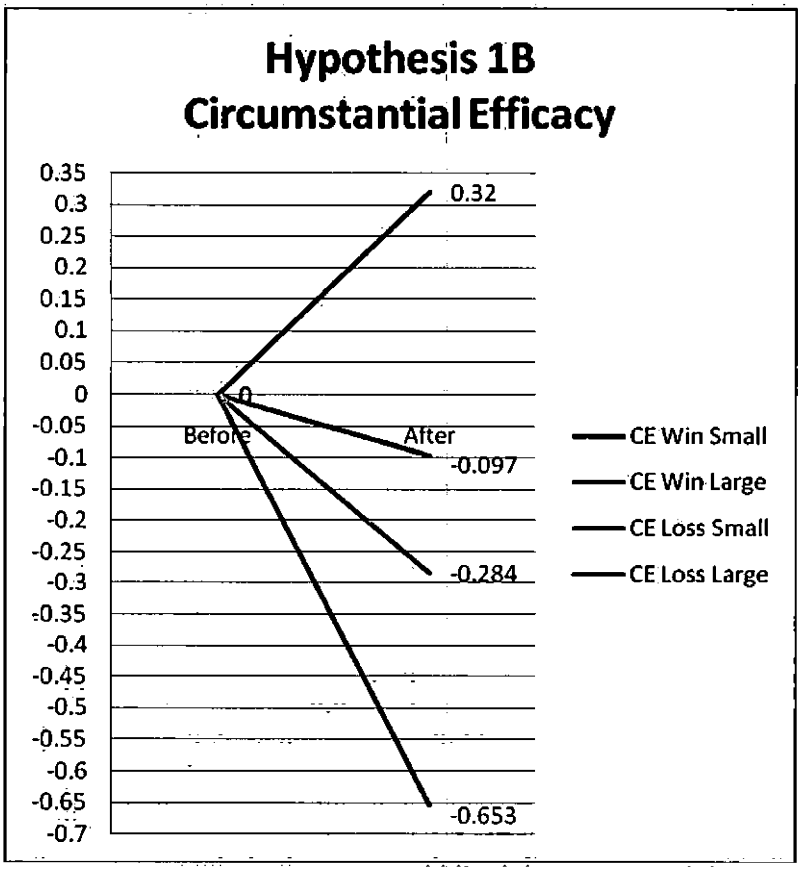

Hypothesis 1A
Internal Efficacy
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
0.191
0.027
0
Before
After
-0.149
-0.271
IE Win Expected
IE Win Unexpected
IE Loss Expected
IE Loss Unexpected


Hypothesis 1A
Circumstantial Efficacy
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
-0.4
-0.45
-0.5
0.118
0.111
0
Before
After
-0.347
-0.469
CE Win Expected
CE Win Unexpected
CE Loss Expected
CE Loss Unexpected

APPENDIX H

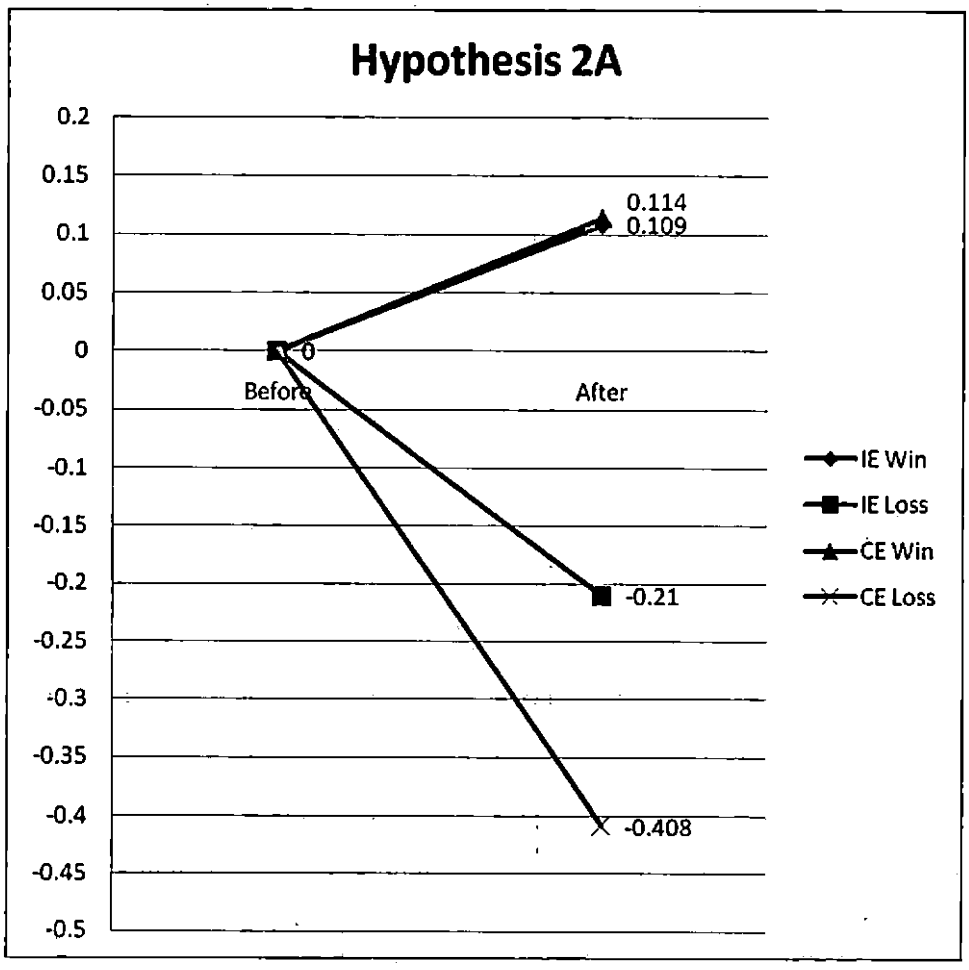
GRAPHICAL REPRESENTATION OF MEAN DIFFERENCES IN INTERNAL AND CIRCUMSTANTIAL EFFICACY FOR HYPOTHESIS 1B


Hypothesis 1B
Internal Efficacy
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
0.264
0.118
0
Before
After
-0.222
-0.319
IE Win Small
IE Win Large
IE Loss Small
IE Loss Large


Hypothesis 1B
Circumstantial Efficacy
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
-0.4
-0.45
-0.5
-0.55
-0.6
-0.65
-0.7
0.32
0
Before
After
-0.097
-0.284
-0.653
CE Win Small
CE Win Large
CE Loss Small
CE Loss Large

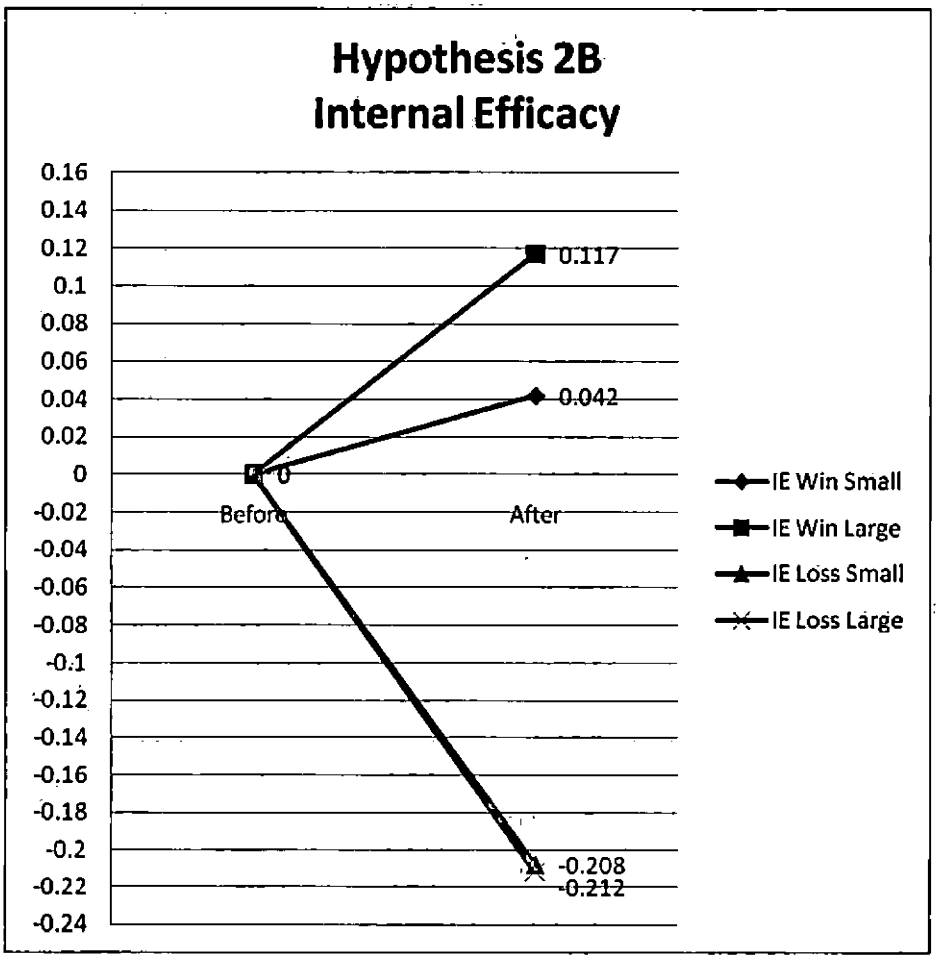
APPENDIX I

GRAPHICAL REPRESENTATION OF MEAN DIFFERENCES IN INTERNAL AND CIRCUMSTANTIAL EFFICACY FOR HYPOTHESIS 2A


Hypothesis 2A
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
-0.4
-0.45
-0.5
0.114
0.109
0
Before
After
-0.21
-0.408
IE Win
IE Loss
CE Win
CE Loss

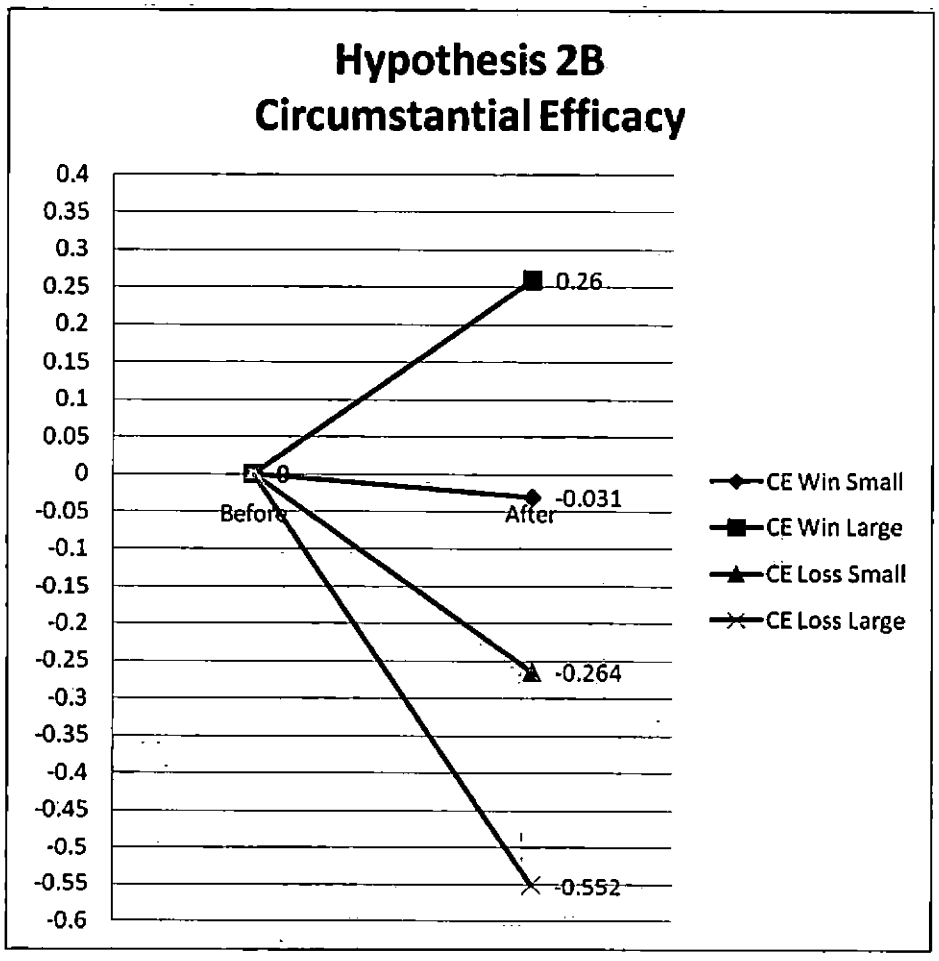
APPENDIX J

GRAPHICAL REPRESENTATION OF MEAN DIFFERENCES IN INTERNAL EFFICACY FOR HYPOTHESIS 2B


Hypothesis 2B
Internal Efficacy
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
-0.02
-0.04
-0.06
-0.08
-0.1
-0.12
-0.14
-0.16
-0.18
-0.2
-0.22
-0.24
0.117
0.042
0
-0.208
-0.212
Before
After
IE Win Small
IE Win Large
IE Loss Small
IE Loss Large

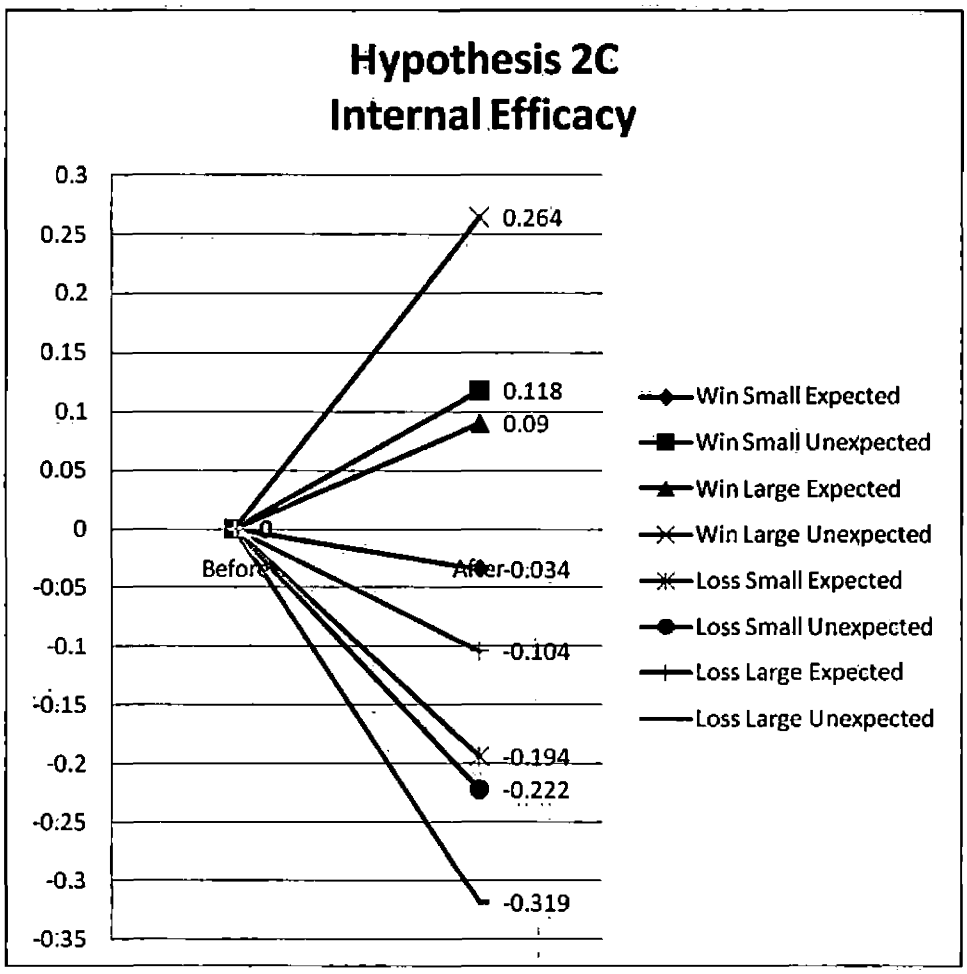
APPENDIX K

GRAPHICAL REPRESENTATION OF MEAN DIFFERENCES IN CIRCUMSTANTIAL EFFICACY FOR HYPOTHESIS 2B


Hypothesis 2B
Circumstantial Efficacy
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
-0.4
-0.45
-0.5
-0.55
-0.6
0.26
0
-0.031
-0.264
-0.552
Before
After
CE Win Small
CE Win Large
CE Loss Small
CE Loss Large

APPENDIX L

GRAPHICAL REPRESENTATION OF MEAN DIFFERENCES IN INTERNAL EFFICACY FOR HYPOTHESIS 2C


Hypothesis 2C
Internal Efficacy
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
0.264
0.118
0.09
0
-0.034
-0.104
-0.194
-0.222
-0.319
Win Small Expected
Win Small Unexpected
Win Large Expected
Win Large Unexpected
Loss Small Expected
Loss Small Unexpected
Loss Large Expected
Loss Large Unexpected

FOOTNOTES

[1]For a video that provides directions on how to play Abalone, I suggest visiting the website: http://www.ehow.com/video_4414545_rules-game-abalone.html.

[2]The computer dice game "Let's Get Rollin" was created specifically to be used for this study. The game was designed by the author (Matthew Bender) and was programmed by Chris Ballinger, California State University, San Bernardino.

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