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Analyzation and Performance of Pre-performance Imagery and Other Strategies on a Golf Putting Task

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Abstract

The purpose of the present study was to analyze the use of pre-performance imagery by novice golfers. Additionally, this study compared the use of different strategies on the performance of a golf putting task. 40 participants performed the basal measure and were assigned to one of four groups, a no practice control group (NPC), a practice control group (PC), a pre-performance positive imagery group (PI), and a pre-performance positive self-talk group (PST). Following the completion of the experiment imagery participants were asked to describe their imagery experience. Also, the mental preparation strategy groups were assessed to determine if they believed in the strategy they were using. Results of the study revealed that participants in the imagery group may have not been imaging what they were instructed. Also, the PI and PST groups may not have truly believed in the efficacy of the strategies taught. Additionally, quantitative results of the study revealed the imagery, self-talk, and a practice control group were effective in enhancing performance over a no practice control group.

Analyzation and Performance of Pre-performance Imagery and Other Strategies on a Golf Putting Task

Athletes often allude to using mental preparation in order to excel in athletics (Murphy, 1996a). However, only recently have an increasing number of sport psychologists systematically begun researching mental preparation techniques in sport and physical activity (Weinberg & Gould, 1995). Two specific pre-performance cognitive strategies that have been researched are mental imagery and positive self-talk (Drake, 1996; Van Raalte, Brewer, Lewis, Linder, Wildman, & Kozimor, 1995). Available research on pre-performance imagery and pre-performance positive self-talk has been equivocal. Recent research has shown pre-performance cognitive strategies to enhance performance of a motor skill (Dagrou, Gavin, & Halliwell, 1992; Woolfolk, Parrish, & Murphy, 1985; Van Raalte et al. 1985) while other research has not shown this effect (Gould, Weinberg, & Jackson, 1980; Woolfolk, Murphy, Gottesfeld, & Aitken, 1985).

Woolfolk, Parrish and Murphy (1985) assessed the effects of positive imagery instructions on golf putting. It was found that the positive imagery instruction group improved performance while the negative imagery instruction group showed a performance decrement. Woolfolk, Murphy, Gottesfeld, and Aitken (1985) conducted a methodologically similar investigation and found comparable results. Thus, the authors suggested that future research should try to establish the conditions in which positive imagery instructions may show increased performance. One variable thought to be important is whether or not the participant is imaging what they are instructed to image.

Assessing the Imagery Experiences of Participants

Cote (1996) suggested that little sport psychology research has been conducted which asks participants to describe their imagery experiences. Further, Murphy (1994) suggested that a major problem in sport psychology research is that participants are not asked to describe their experiences. For example, are the participants in the study all imaging what they are being asked to image? Murphy suggested, “researchers must check to see if the reported experience of the subjects is similar to the intended intervention proposed by the researcher (p. 492)”. If this is not done then researchers may not

be correctly manipulating the independent variable (Murphy, 1990). In fact, Woolfolk et al., 1985 found that when asking participants to image a negative imagery experience a few of the subjects actually imaged a positive experience. Also, it may be possible that the guided imagery experience may focus on kinesthetic, external or internal imagery. If the participants in the study are using an internal image rather than an external image then it may be difficult to interpret the quantitative results of the investigation. Unfortunately, very few pre-performance imagery studies adequately check to determine if the participants are using imagery as the researcher had instructed.

Belief in the Mental Preparation Strategy

Another condition that may have an influence on performance may be whether or not the participant believes that the strategy will help them (Vealey & Walter, 1993). Vealey and Walter have suggested that imagery and mental preparation strategies have a better chance to be successful if the participant or athlete believe that these strategies will help them. Van Raalte, Brewer, Rivera and Petitpas (1994) found that tennis players who believed that a self-talk intervention would help them, won significantly more points than players who believed the self-talk was not helpful. Thus, Van Raalte et al. (1994) suggested that future research assess the relationship between believing in the use of a mental preparation strategy and performance. In order to test the suggestions of Vealey and Walter (1993) and Van Raalte et al. 1994 and educational treatment was given to the experimental participants persuading them to believe in the efficacy of the mental preparation strategy.

The belief in a mental imagery strategy may be related to the meaning and emotion an athlete gives to the image. One model that is related to belief in mental preparation strategy is Ahsen's (1984) ISM model. Ahsen's (1984) model is composed of three parts (Weinberg & Gould, 1999). First, there is an image. Secondly, imaging the sport skill or task produces psychophysiological sensations. Thirdly, the image will be meaningful to the individual. Weinberg and Gould (1999) suggested that the meaning that the image produced is usually ignored by other mental imagery models which focus on sport performance.

Ahsen (1997) explained that dynamic imagery is superior to simplistic imagery. Dynamic imagery refers to imagery which is multidimensional. Thus, dynamic imagery creates a somatic response that

includes a variety of physiological senses and emotions. This is opposed to simplistic imagery which only focuses on a visual component. Ahsen has suggested that dynamic imagery is superior to simplistic imagery and is much more likely to improve performance.

Ahsen's paired arrows experiment (Ahsen, 1995) has important applications to understanding how the somatic component and meaning are important in one's belief of the imagery being helpful to performance. In the paired arrow experiment the participants are told to imagine mentally practicing arrows directed toward a target. In one condition participants only visually practice, and in the other condition they use both visual and olfactory images when mentally practicing. The participant was then asked to determine which condition led to better cooridination and which arrow led to better kinesthetic feel of the target. Ahsen's study revealed that when the participant was using visual and olfactory imagery they felt they were much more cooridinated. Thus, the use of dynamic imagery allowed the participants to bring in the somatic components of the imagery. For example, the dynamic imagery may have led participants to more of a feeling state, both physically and emotionally. Thus they felt better prepared and believed more in this type of imagery.

Other imagery researchers also suggested that believing in the efficacy of the imagery strategy is important. For example Katz (1992) suggested that to actually use imagery in a task, the person must believe that 1) imagery will be helpful for the task, and 2) the person must believe that they are skillful in the use of imagery. Thus, the use of dynamic imagery in the paired arrows experiment may have helped the participants believe that this type of imagery was more helpful because the felt more cooridinated and skillful.

Thus, the present study combined both qualitative and quantitative methodology to begin to gain a deeper understanding of mental imagery. The purpose of the present study was to address the methodological concerns of previous studies as well as to continue to gain an understanding of persuading one to believe in a mental preparation strategy. Specifically this study checked to determine if belief in the mental preparation strategy plus the strategy would enhance performance and also if the participants were imaging what they were instructed to image. In order to follow the suggestions of Murphy (1994), the researchers in the present study asked the participants to describe their imagery

experiences. Also, this study included a detailed description of the imagery treatment. Many studies do not include complete descriptions of the imagery used. Murphy (1994) suggested that in order to understand imagery and make comparisons, a detailed description of the imagery treatment is needed.

The methods of the Woolfolk, Parrish and Murphy (1985) study and the Woolfolk, Murphy, Gottesfled, and Aitken (1985) studies were used to frame the current investigation. The aspects replicated were: (a) the use of a golf putting task, and (b) the use of the same positive performance outcome imagery instructions. Additionally, this study included training and educational phases for the experimental groups.

Method

Participants

Participants were 40 university students who signed formal consents before participating in the experiment (31 males and 9 females, mean age of 19.55). Twenty participants described themselves as novices, and 20 described themselves as intermediate. Only participants who indicated on the pre-experimental questionnaire that they were either beginners or of intermediate skill level, and who made between 30 to 70 percent of the baseline putting task from their assigned distance were used in the analyses. Twenty participants were assigned to putt from 5 feet, 18 participants putted from 7 feet and 2 subjects putted from 8 feet.

Questionnaire

Immediately following the final trial participants in the experimental groups were asked questions pertaining to the experiment. The first question asked was a manipulation check to decipher how often and whether or not the participant used the strategy they were instructed to use. The remaining questions were asked to explore whether the technique was effective. The imagery participants were also evaluated to determine their imagery ability. Participants completed the golf imagery questionnaire modeled after Martens (1982). Following the written questionnaire, verbal assessments of the imagery group were asked on the last day of the investigation. The imagery group was asked in an exploratory nature to explain what they saw directly before performance.

Design

Preperformance Imagery

The design for this study was a 4X2 (Group X Test) design. Participants were randomly assigned to one of four conditions: preperformance imagery group (PI), preperformance positive self-talk group (PST), practice control (PC) or no practice control (NPC). The experiment was divided into three phases: the initial baseline phase, the educational phase and the experimental phase. For initial baseline phase and experimental phase the number of putts was recorded.

Equipment

The apparatus for the golf putting task was a knight putting cup. The putters were a knight 35-inch putter, model number 300 or a 33 inch knight model putter 300 putter. The golf balls were 432 Matrix surlyn Wilson 90 compression golf balls.

Procedure

Participants reported to the center for the study of human performance where the requirements for participation were explained and an informed consent was signed. They completed a brief background questionnaire. After completing the questionnaire, each participant was given a putter and golf balls. He/she was asked to putt a golf ball across a putting surface a total of ten times from a distance of six feet, and given three practice putts before each block in order to become familiar with the task. How a participant performed on the first ten putts determined the final distance form which he/she putted for the remainder of the experiment. Participants who made between 8-10 putts were assigned to putt from eight feet; participants who made between 4-7 putts were assigned to putt from a distance of seven feet. Participants who only made between zero and three shots from six feet were assigned to putt from a distance of five feet (this method of assignment is similar to the procedures of Woolfolk, Parrish and Murphy, 1985). After assignment to the appropriate putting distance, each participant performed a basal measure of twenty putts from their assigned distances. They were then randomly assigned to either the PI group, PST group, PC group or the NPC group. Following random assignment, experimental treatment was given to participants. The second through fifth day consisted of the imagery and self-talk training for the experimental condition. They then performed two blocks of ten putts each. The PC putted twenty more times on days 2-5 and the NPC group putted only on the last day. Upon completion of the experiment on each data collection day, the experimental subjects completed a post-

experimental questionnaire which addressed whether or not they actually used the mental preparation strategy before they putted the golf ball. On the last day, experimental participants were given a post-experimental questionnaire. Imagery participants were also administered the golf imagery questionnaire.

Experimental Phase. After the educational sessions, participants in the PI group were told to imagine themselves before each shot making a "gentle but firm back swing" and stroking the putt straight towards the hole. Then they were told to imagine the ball "rolling, rolling, right into the cup." They were told to employ their strategy before each subsequent putt. The PST group was told to tell themselves before every putt that they are a good putter and could succeed at this putting task. They were then told to employ their strategy before every putt. Participants completed three practice putts and ten performance putts. They were given on minute to rest, and then the sequence was repeated. This identical experimental session was conducted on the second through fifth days.

Control Phase. The identical procedure was used with the control group. However, subjects were not instructed to use a mental preparation strategy before each putt. Subjects in the control condition were instructed to try and sink each putt. They were also informed that they were participating in the study to examine the effects of repeated practice on performance.

Imagery Training. The imagery group received an educational introduction to imagery, which lasted a total of thirty minutes. This educational session included reading a persuasive imagery belief paper. On the second through the fifth day of the experiment the PI group reread the persuasive imagery belief paper. Then the imagery participants spent about two minutes practicing the imagery of a golf putt while being guided through specific mental imagery (See Appendix A).

Self-Talk Training. The PST group received an educational session introducing them to the skill of positive self-talk, which lasted a total of thirty minutes. This session included reading a persuasive paper on the benefits of self-talk. On the second through fifth day of putting the PST group reread the persuasive paper on the benefits of self-talk on performance.

Results

Preperformance Imagery

A one way analysis of variance was conducted to test if the group performance means on the basal measure differed by a significant amount. Results of the analysis of variance were not significant, $F(3,36) = .8015$, $p<.5012$.

To test performance results a 4X2 groups by pre-post analysis of variance with repeated measures on the factor was conducted. Results revealed a significant main effect, $F(3,36) = 7.5$ $p< .001$. Therefore, a one-way ANOVA using the Newman Keuls post-hoc analysis was conducted. Results revealed a significant effect, p , .001, with the PI group, PST group and PC group all significantly different from the NPC group. Results did not reveal a significant group by prr/post interaction effect, $F(3,36) = 2.36$, $p< .088$. The means and standard deviations for the pre/post scores for the PI, PST, PC and NPC are presented in table 1.

Insert Table 1 about here

Post-Experimental Manipulation Check for Strategy Use

Two manipulation questions were asked of the experimental groups at the end of each experimental session. Question one asked the participant how often they used the mental preparation strategy presented to them, and question two asked the subjects if they believed in the ability of this mental preparation strategy to improve performance. It was discovered that 90 percent of participants in the PST group answered that the strategy was helpful in improving performance, as compared to 100% of the participants in the PI group. On the second through the fifth day of putting 100% of the participants in both groups answered that the strategy was helpful in improving performance. In order to determine if the participants believed if the mental preparation strategy was working, they were asked the question, “When you missed a putt, how often did you think that the mental preparation strategy taught to you was not working.” Six imagery participants indicated never, while four participants indicated that they sometimes felt that the strategy was not working. Four self-talk participants

indicated that they “never” thought that the strategy was not working, five indicated “sometimes” and one indicated “often”.

Post-Evaluation of Imagery Ability

The imagery participants were evaluated to determine their imagery ability. Participants completed the golf imagery questionnaire modeled after Martens (1982). Participants were asked to rate their imagery on a scale of 1-5. Two imagery participants indicated that they had a moderately clear images, six indicated that they had a clear and vivid image and two participants indicated that they were able to achieve extremely clear and vivid images.

Responses to the Imagery Probe

As Martin and Hall (1995) point out, a limitation of previous imagery studies is that adequate manipulation checks were not used. Thus, subjects in this study answered open-ended questions about how they used imagery. Table 2 is a summary of their responses.

Insert Table 2 about here

Self-Confidence**.** Participants in the study reported feelings of confidence while putting the golf ball. The statement by one participant portrays the image of confidence, “It helped me concentrate, know what I was planning, it helps me to relax, and it helped my confidence.” Another said, “I thought I could get myself into a zone, and just keep doing it even if I missed.”

Kinesthetic Imagery**.** Participants reported feeling oriented imagery. One stated, sometimes if I closed my eyes I could see myself do the actual putting. If I didn’t it was more of feeling the motion. That seemed to work best.” Others stated, “I didn’t see myself, I felt the motion.” “I basically tried to get a feel of how I did it in my mind and then just let go and did it without thinking.”

Visual Imagery**.** Participants reported seeing the ball roll into the hole. For example, one stated, “I could really hear the two sounds like the ball hitting the putter and, and I heard the metal when the ball went into the hole.”

Preperformance Imagery

External Imagery. A few participants seemed to experience the imagery from a perspective of seeing their own body perform the putting task. This is best exemplified by the following quote, "I saw myself taking the back-swing, hitting the ball and seeing the ball roll into the hole. The images were vivid, I could see it clear. I saw it from outside of my body."

Internal Imagery. A few participants seemed to experience the imagery from a perspective internally, as if they were seeing the putting task as if it were actually happening. This is best exemplified by the following quote, "I first imagined what I saw in front of my face, which was that aluminum cup and the ball below me, and the putter looking down, but in my mind it was like the putt was in progress."

Discussion

The purposes of this study were three-fold: a) to qualitatively analyze the use of pre-performance imagery by a group of novice golfers, b) descriptively determine if the participants in the experimental groups believed in the effectiveness of the mental preparation strategy taught to them, and c) determine if pre-performance positive imagery, and pre-performance positive affirmations were helpful in improving golf putting performance over a no practice control group and practice control group.

Responses to Imagery Probe

Se1f- Confidence. Many authors have suggested that self-confidence is one of the most important aspects of excellence in sport (Feltz, 1988; Highlen & Bennett, 1979, 1983). Only a few golfers reported associating the imagery strategy with self-confidence. However, of importance in Bandura's (1977) Self-Efficacy Theory is whether imagery strategies can vicariously create heightened confidence. Future research should carefully decipher if confidence is heightened by using imagery as a pre-performance mental preparation strategy. The results of imagery probe in this study would suggest that imagery may heighten confidence for some individuals and not for others.

Kinesthetic Imagery. Many of the participants reported that they used more of a feeling oriented imagery instead of visualizing or seeing anything. The imagery literature documents the benefits of using this type of imagery (Orlick, 1990). Future studies should ask participants about feeling oriented imagery so that we can begin to understand the processes or this type of imagery.

Positive Imagery**.** Participants all seemed to be able to use imagery either kinesthetically or visually. Also, their focus seemed to be on the ball rolling into the hole. This shows that they focused on what they were persuaded to focus on. This finding is in accordance with Martin and Hall (1995) who found that subjects visualized what they were told to visualize. However, future studies should decipher if the individuals would focus on the ball rolling into the hole if they were not told to do this.

Imagery Perspective**.** Both perspectives were used by the participants. They seemed to choose a perspective based on personal preference. Studies have been equivocal on whether one perspective is better than another (Murphy & Jowdy, 1992).

Belief in the Mental Preparation Strategy

The present study was unique from other studies in that it included an educational phase for the PI and PST groups to persuade subjects to believe that this strategy could help them improve their performance. Before each experimental session participants read an informative two page persuasive essay suggesting that the mental preparation strategy improves performance. The present investigation found that the participants stated that they believed in the mental preparation strategies ability to help improve performance. However, when further analyzing the results of the post-experimental questionnaire four imagery participants indicated that they sometimes felt that the strategy was not working, as did six self-talk participants. Thus, the participants in the present study may not have truly believed that the strategy would be effective in helping them improve their performance. One reason for the findings that four of the imagery group participants did not believe that the strategy was always effective may have been because of the meaning that they attached to the imagery perspective. For example we know from our qualitative assessment that not all of the participants had similar imagery experiences. Although they all read the persuasive essay, the meaning attached to the imagery may have led them to believe that the imagery intervention was not effective. Also, because the dynamic imagery used in the imagery script was limited, this too may have not persuaded the participants to believe in the imagery intervention.

One weakness of the present study was that belief in the pre-performance strategy was not compared to an imagery or self-talk group that was not persuaded to believe in a pre-performance

strategy. Future pre-performance imagery research should use belief in the mental preparation strategy as an independent variable to determine how important this variable is in improving performance.

Results of the present study showed that the PI group and the PST group did not improve significantly when compared to a practice control group who was not given a strategy to use. As expected, both mental preparation groups did improve performance significantly when compared to a no practice control group who only putted on the first and last days.

Based on previous literature it was predicted that there would be a statistically significant difference between pre and post performance scores for the PI, PST, and the PC groups. After examining the results, the analysis did not support this hypothesis. These results are not consistent with past research (Caudill & Weinberg, 1983; Weinberg, Smith, Jackson, & Gould, 1984; Weinberg, Jackson, Seabourne 1985 Wilkes & Summers, 1984; Woolfolk, Parrish, & Murphy, 1985) in which the imagery or positive affirmation group improved their performance from pre to post test. However, these results are in accordance with past research (Epstein, 1980; Weinberg, Gould, Jackson, & Barnes, 1980; Woolfolk, Parrish, Gottsfeld, & Aitken,1985) that has found imagery or affirmations to not lead to statistically significant differences between pre and post performance scores.

One possible explanation for the differences in results of the imagery groups in this study compared to the Woolfolk et al. 1985 may be that participants did not image as told. For example, the imagery directions asked the participants to image from an internal perspective as if they were actually making the putt. However, participants indicated using both internal and external images in this study. Another reason for the imagery group not improving over the control group may have been that their were differences in the imagery groups ability to use imagery. For example, the scores of the golf imagery questionnaire indicated that there may have been differences between imagery participants in their ability to produce vivid images. A possible way to improve on this methodological concern is to use either a longer training period to improve the clarity of imagery or to try and create guided imagery directions for both external and internal imagers. Thus, the different directions may be used as an independent variable. Tests such as the VVIQ could be used to separate the groups.

Preperformance Imagery

Another possible explanation for the quantitative results may be that the imagery group and positive self-talk groups were not assigned to their preferred processing style (Fogerty & Burton, 1995). For example, it may be that the use of imagery may have inhibited some of the participants. Jowdy, Murphy, and Durtschi (1989) as cited in Murphy (1996b) cite that 35 percent of the Olympic athletes could cite times when using imagery was not helpful. Also, the same may be true of the positive self-talk group as well. Thus, a suggestion for future research is to use an instrument such as Richardson's (1977) verbalizer-visualizer questionnaire (VVQ) to determine the individual's preference for verbal of visual coding. Based on the verbalizer-visualizer questionnaire researchers may want to assign participants to groups. This research may lead to clues on what type of interventions may be helpful in applied sport psychology.

Along these same lines future researchers may want to determine the conditions in which performance effects are more likely to occur when using the imagery or self-talk intervention. For example, investigators may want to examine the performance effects for only those who followed directions. Also, they may want to examine performance effects for those with strong belief or who were vivid imagers. A limitation of the present study was that the small sample size did not allow the researchers to analyze if performance effects were evident for those who had a strong belief in the imagery or for those who were vivid imagers.

A possible limitation of the present study limitation of the present study was the performance task may have been too simple and the length of the study may not have been long enough. For example, because there was not enough time allotted for the baseline the participants may not have felt confident in their ability to perform the task. Thus, five days may have helped the participants become confident and helped them become proficient at the skill of putting. Because it may have taken time to learn the skill, some of those in the intervention may not have been confident that intervention could help because they were still trying to learn the task. Thus future researchers should try and use a more naturalistic task over an extended period of time in order to control for a possible learning effect. Thus the researchers may use putting on real greens and having the groups putt over an extended time period in order to become proficient at the task. After the participants become proficient, the researchers could

have the participants putt on a real golf putting green on the course. In this natural setting the golfer would have to judge the speed and the break of the putt very closely. Thus, the speed, break and the smell, and feel of the course may make everything much more realistic. Also, in a more naturalistic setting the imagery may be more dynamic because of all the cues that are available to the golfer. Based on Ahsen's triple code model the imagery intervention may be more performance enhancing because there may be more chance that the golfer will be able to have a dynamic imagery experience in which they have a somatic psychophysiological sensation and the imagery then becomes meaningful to the participant.

The overall purpose of this study was to analyze the imagery experiences of participants in the study and descriptively determine if they believed in the strategy assigned to them. Additionally this study compared the effectiveness of using pre-performance mental preparation strategies in order to enhance performance over a practice control group and a no practice control group in a closed motor skill. An experiment using the golf putting task was used. The data analysis helped add to an understanding of the utilization of imagery strategies by novice performers.

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Table 1
Means and Standard Deviations for the Pre/Post Performance Scores for the PI, PST, PC, and NPC

	Pretest		Post-test	
	M	D	M	D
PI	8.9	2.2	13.7	2.6
PA	8.9	1.9	13.4	3.2
PC	10.1	2.1	13.4	2.4
NPC	8.2	1.8	9.0	3.2

Table 2

Responses to the Imagery Questions

It helped me concentrate, know what I was planning, it helps to relax, I saw myself and it helped my confidence. The images were clear.

Basically I kind of thought with my breathing. When I inhaled it was like I was going back, and when I exhaled it was like I was going forward. That's what I saw and I did that and then visualized it going toward the thing. It was not hard to visualize.

Sometimes if I closed my eyes I could see myself do the actual putting. If I didn't it was more of feeling the motion. That seemed to work best, and I could hear it always hitting the little metal thing. So I thought it kind of helped me. It wasn't necessarily seeing it but more of feeling it. The hands went straight back. It works if you concentrate on it.

Well when I walked up I actually pictured myself actually playing my friends, pictured myself on the green like when we play for money, and I pictured myself beating them. I could really hear the two sounds like the ball hitting the putter, and the I heard the metal when the ball went into the hole. I wasn't really aware of anything around me and seemed really focused.

I saw myself bringing the putter back, not to firm and holding the putter nice and gentle in my hands. If I pushed or pulled the previous one I would always try to see the ball going straight, I could always hear the ball hitting the aluminum cup.

I saw myself holding the putter and taking it back and hitting the shot and once I actually did it I thought I could get myself into a zone and just keep doing it even if I missed, I would try to erase this shot and keep trying until I found the perfect shot. I didn't have to do it every time. Doing it once or twice, once if I made it I would keep going like if I made three in a row, but if I missed I would replay it.

I mainly concentrated on bringing the putter straight back and hitting the back of the ball.

I saw myself taking the backswing hitting the ball, and seeing the ball roll into the hole. The images were vivid, I could see it clear. I saw myself from outside my body.

I saw myself putting the ball, more I saw the putter going back and imagined the ball rolling straight toward the target. I didn't see myself, I felt the motion, and I saw the ball and concentrated on the ball.

I first imagined what I saw in front of my face, which was that aluminum cup and the ball below me, and the putter looking down but in my mind it was like the putt in progress. The wing contacted the ball and

the ball rolling into the cup regardless if I made or missed the shot before. I basically tried to get a feel of how I did it in my mind, and then just let go and did it without thinking.

Appendix A

The imagery group received the following training prior to each session similar to Epstein (1980). This following was read to each subject. I will now ask you to form images that are related to the task of golf putting. As previously indicated this technique is called mental imagery, and it has been used by great athletes such as Jack Nicklaus, Fran Tarkenton, and Greg Lougainis, to enhance performance in sport skills. First I will describe to you a scene, and I want you to try and imagine it as clearly as possible. If you are experiencing trouble in imaging the description, relax, and remember it is time to become familiar with the task. When imaging try to stay inside your body as if you are actually performing the putting technique. Try and see things through your own eyes. Try to pretend you are making the putt. It is only important now that you understand that your goal is to try and mentally image as clearly as possible. Now I want you to imagine seeing yourself walking up to the golf ball. Try and see the line of the putt. Try to visualize yourself holding the putter in your hand. Now visualize making a gentle but firm backswing and stroking the putt smoothly down the target line seeing the ball rolling, rolling right into the cup. Let's putt the golf ball again. Visualize another golf ball lying on the putting surface below you. This time really concentrate on taking the club straight back and try to see the ball rolling, rolling straight into the cup. Now let's do it in slow motion. Visualize the ball before you. This time really concentrate on seeing the ball rolling, rolling right into the cup. For about 5 or 10 more times I would like you to practice in your mind seeing the ball and then taking the putter back and striking the back of the ball, as the ball is rolling, rolling, right into the hole. While you are practicing really focus on seeing the ball roll into the hole. Practice as many putts in your mind as you want but remember to try and see the ball rolling, rolling into the hole. Like many other sports, imaging the golf putt in your mind will become easier with time. Go ahead and start practicing putting until I tell you to stop.