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Practice in mind: Help to improve golf putting from the Hardest Distance

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Abstract: Psychological Skills Training (PST) particularly imagery is a strategy that can improve the performance of golfers. Additionally, golfers had a problem when putting from a 6-feet distance compared to other distances (3, 12, and 24 feet). The objective of this study was to investigate the effectiveness of PETTLEP imagery on putting performance of the golfers from the 6-feet distance. Forty-two male golfers aged 18 to 25 years with 1 to 3 year playing experiences participated in this study. After screening of imagery ability, all participants were randomly assigned into two different groups (i.e., PETTLEP imagery group and physical practice only (control group). All participants in PETTLEP imagery completed 10 imagery practices together with 10 physical practices. Meanwhile, the control group only performed 10 putting strokes and read a guideline on stretching to improve flexibility in a 6-week programme. Pre and post putting test was conducted from a 6-feet distance. An independent sample t-test results revealed that PETTLEP imagery group improved on putting scores compared to the control group. The finding supports the idea of using PETTLEP imagery to improve golf performance. Research still needs to be conducted particularly in the mediating role of self-efficacy of PETTLEP imagery in golf putting from the 6-feet distance.

Key words: golf putting, pettlep imagery, hardest distance.

Introduction

The importance of imagery research for improving sports performance has been emphasized by many authors and considered as one of the most popular techniques used by the athletes. Information regarding the effectiveness of imagery practice has been explained by previous studies. For example athletes must consciously be aware of the actual environment particularly in a competitive setting (Holmes & Collins, 2001). Therefore, the actual experiences occur and help the performance during practice (Ramsey, Cumming, & Edwards, 2008; Garza, & Feltz, 1998; McKenzie, & Howe, 1997). On the other hand, the term controllability refers to the production of the desired outcome and manipulation in images. In fact, both awareness and vividness need to be combined for a similar condition (Morris, Spittle, & Watt, 2005). Generally, in imagery, you will always get from what have you seen and they should imagine what should be imagined in order to see the result (Short, Monsma, Short, & Harris, 2004; Moritz, Hall, Martin, & Vadocz, 1996).

In response to perceived problems in implementing programmes involving motor imagery, the previous researcher proposed the seven 'P.E.T.T.L.E.P' components which model derives from functional equivalence between imagery and physical performance of a motor task (Holmes & Collins, 2001). According to this model the 'Physical' component considers the physical condition of imagery reflected during the actual performance, for instance when mentally practicing a putting skill a golfer should assume a body position, grip and stance image. The physical responses would then occur in real performance of the skill. The 'Environment' component is described as the physical environment in which the imagery is performed being similar to the actual performance environment. For example, putting skills should ideally be performed at the real putting grass or on the real course. The 'Task' component refers to the imaged task as closely as the actual task in terms of the thoughts, feelings and actions while the 'Timing' component explains as the same pace as actual performance imagined being performed (i.e., real time). For instance, when performing a successful putting task the timing begins from standing on the green putting surface. Later this is followed by replacing of their marker until finally they can hear people applauding from the successful task. The 'Learning' component describes the imagination when what a person imagines should match the current stage of learning. For example, in golf putting skill, a golfer firstly has to think about the correct movement as in the actual performance. Next, imagery may focus heavily upon the correct technique with elements such as grip positioning and body alignment. Finally, as the skill becomes more familiar, a golfer can make some changes on the scripts as rehearsed in their mind so that the movement becomes more effective. The 'Emotion' component refers to all the emotions and arousal experienced during the imagery as well as in actual performance. Meanwhile, the final component is 'Perspective' which refers to how imagery should be performed from a visual perspective that most closely reflects the view taken by the athlete when actually performing the task (i.e., internal or external).

The previous studies indicate that PETTLEP imagery is helpful to improve athletes' performances (Ramsey, Cumming, Edwards, Williams, & Brunning, 2010; Wright, & Smith, 2009; Smith, Wright, Allsopp, & Westhead, 2007). For instance,

Ramsey and colleague attempted to make comparison between components of PETTLEP imagery (i.e., skill-based vs. emotion-based). Thirty three participants were divided into three different groups; (a) two- PETTLEP imagery groups, and (b) control group, each consisting 11 participants each groups. Both imagery groups in this study were asked to listen to the imagery guideline and mentally practice 10 successful penalties in soccer. They performed the imagery in full dress and stood facing the goal just beyond the penalty spot. Besides, the stimulus proposition script was given to the skill-based imagery group whereas the emotion-based group received the stimulus-response proposition script. However, the control group in this study practiced a series of stretching. The post-test results showed that both imagery groups improved their performance compared to the control group.

Previous studies imply that Psychological Skills Training (PST) particularly imagery is a strategy that can improve the performance of golfers and it is popularly used by researchers (i.e., Ramsey et al., 2008; Hall et al., 2009; Memmert, Blanco, & Merkle, 2009; Bell, & Thompson, 2007; Ploszay, Gentner, Skinner, & Wrisberg,, 2006; Smith & Holmes, 2004; Beauchamp, Bray, & Albinson, 2002; Taylor & Shaw, 2002; Short et al., 2002). For instance, Ramsey and colleague modified the concept of imagery direction on golf putting performance. Seventy – five participants were divided into three different conditions group (i.e., facilitative imagery, suppressive imagery, and control group). The post-test results showed that imagery group performed better than the suppressive imagery group. These findings support the effectiveness of facilitative imagery direction while performing the task. The study summarized that the debilitative imagery need not be persuasive to influence motor skill performance.

The effectiveness to use PETTLEP imagery in golf performance is also considered as one of the strategies that have been investigated by researchers (Ploszay et al., 2006; Smith, Wright, & Cantwell, 2008). As Smith et al applied the PETTLEP imagery and it helped to improve the performance of golfers when taking shot from the bunker. Thirty-two male golfers with different level of skills were assigned into PETTLEP imagery, physical practice, PETTLEP and physical practice, and control group. The imagery groups in this study received the response proposition script (bio-informational theory). In a session, the participants in PETTLEP imagery group had to imagine 15 bunker shots and incorporate PETTLEP components twice a week. The participants were asked to perform by standing and holding the iron (sand wedge) in a tray of sand and wearing the actual golf clothes. They were also reminded not to perform any actual movement except to correct their body position. Furthermore, the participants in PETTLEP imagery group performed at the real time and were asked to feel the emotion based on the script given. They were also advised to make changes on the script given if they felt the scripts were no longer suitable with their technique. The PETTLEP and physical practice group practiced PETTLEP imagery once a week, using the same procedure as the PETTLEP group. They needed to complete 15 bunker shots once a week on a different day from the time they performed the imagery, using the same procedure as the physical practice group (Smith et al., 2008). However, the control group only read the performance book by a golf champion. Pre- and post-tests consisting of 15 bunker shots were assessed in this study. Points were awarded according to the ball being closer to the pin. Post-test results showed significant improvement particularly for the PETTLEP imagery when combined with physical practice. However, there was no significant difference between the physical practice and PETTLEP imagery. The study summarized that this finding significantly supported the effectiveness of PETTLEP imagery in enhancing golf performance, especially when combined with physical practice. However, the effectiveness of PETTLEP imagery more specifically the study on golf putting performance still is limit in the literature.

The previous researchers also found that golfers had a problem when putting from a 6-feet distance compared to other distances (i.e., 3, 12, and 24 feet) (Mazlan, 2014). The performance was measured from the number of strokes taken until a ball sank into a hole. Additionally, qualitative results disclosed that most of the participants described their psychological states (i.e., anxiety and self-belief) played a big role in influencing their ability to putt. Meanwhile, technically such as the position of the grip and stance alignments are other reasons that make putting in certain distances hardest to execute. The findings were consistent with the objective to reveal the specific distance considered hardest to putt and discovering the causal factors from the golfers' personal opinion. However, is PETTLEP imagery improve golfers' performance when putting from this distance also need to be investigated. Therefore, the main objective of this study is to investigate the effectiveness of PETTLEP imagery on putting performance of the golfers from the 6-feet distance.

There is a need for interested coaches to provide the idea and really understand how to teach this strategy. On top of that, explains the arguments on why some coaches and golfers show little interest in using a psychological technique while practicing putting. Furthermore, coaches also can become involved in exploring the specific hardest distance rather than emphasizing more on the swing techniques for use. So, they understand that imagery is not simply a psychological practice but it also helps to obtain valuable results particularly when putting from a specific distance.

Method

Participants: Forty-two male golfers aged between 18 to 25 years old (M=20.83, SD=1.94) participated in this study. The sample size is based on the number population of golfers at the selected golf club (i.e., golf academy). Male golfers were investigated in this study since the previous researchers only used male golfers as participants in golf putting and found

males were better putters than the female golfers (Roberts, & Turnbull, 2010; Smith et al., 2008; Smith & Holmes, 2004; Taylor & Shaw, 2002; Short et al., 2002) All participants had between 1 to 3 years of playing experiences (M=1.40, SD= 0.58) and were considered less skilled golfers as supported by the previous studies (Hayslip, Petrie, MacIntire, & Jones, 2010; Beilock & Gonso, 2008).

Instrument

PETTLEP Imagery intervention guides: The researcher developed an imagery script related to facilitative with stimulus–response proposition (Lang's Bio-informational, 1979). Most importantly, the script explored the functions of the seven PETTLEP components (i.e., Physical, Environment, Task, Timing, learning, Emotion, and Perspectives) (Holmes & Collins, 2001). The seven components of PETTLEP imagery were used in this study such as the proper golf clothing (Physical component). As in the script, they were instructed to imagine the full routine cognitively and kinesthetically together with stimulus and response propositions to make a successful putting stroke (i.e., from walking to the green until to get a birdie) in real time (Emotion and Timing components). They performed on the artificial putting mat in a standing position by holding the putter 10 meters from the actual green (Environment component). Next, the task should be associated or closely match the actual task consistent with (Task components). The participants listened to their own imagery scripts recorded from the voice recorder (Perspective component). They were also encouraged to do some changes to the general script every each after the imagery sessions (Learning component).

The script also established the cognitive and motivational functions as well as visual and kinesthetic as suggested by previous studies (Ploszay et al., 2006; Morris et al., 2005; Short et al., 2002). In the present study, a digital voice recorder model by Sony ICD-P620 was used since audio aid is an easy tool to bring during the imagery practice (Smith et al., 2008). The script was approved by the University of Malaya internal research committee and three professional golfers with Professional Golfers' Association (PGA) teaching certification and who have more than 12 years of competitive experiences.

Putting task performance and scoring: The participants used their own putter in order to make them feel comfortable and be consistent with their own technique during the actual competition and test. Five standard competition balls (Titleist DT) were provided by the researcher. The artificial grass putting mat (25.4x198cm) with a 10 cm diameter hole at the end of the mat was used in this study. The same putting surfaces have been used to investigate the effectiveness of the imagery program on putting performance by the previous studies (Ramsey et al., 2008; Smith & Holmes, 2004).

The participants' were asked to perform 10 putting tasks and the scoring was categorized as 5 points for each ball holed in, 3 points for each ball that did not hole in but stay at the lip of the hole, 2 points for each ball that went over the high side of the hole and 1 point for each ball that did not reach the hole or pull up short. Thus, each participant was awarded a total score out of the maximum of 50 points.

Procedures: For the purpose of gathering data in this study, the ethical approval letters were obtained from the internal research committee of University of Malaya Sports Centre before personally contacting the person in charge at the selected golf club. During the initial meeting with the golfers and club manager, an informed consent was obtained before explaining the objectives of the study. For the selection of participants, the imagery ability was assessed in this study. The Movement Imagery Questionnaire – Revised (MIQ-R) was used as a screening in this study (Hall & Martin, 1997). This questionnaire was used to assess individual differences in both kinesthetic and visual imagery ability before being engaged with imagery intervention programme. The MIQ-R is an eight-item questionnaire asking participants to first physically perform, and then visually or kinaesthetically imagine four simple movements such as "Raise your right knee as high as possible so that you are standing on your left leg with your right leg flexed (bent) at the knee. Now lower your right leg so that you are again standing on two feet". Following imagery performance, participants rated their ability to visually or kinaesthetically image the movement on a 7-point likert scale ranging from 1 (very hard to see/feel) to 7 (very easy to see/feel). The items were then averaged to form visual and kinaesthetic subscales. According to Smith et al. (2008), the Cronbach alpha coefficient for the scale was reported to be .87. In the present study, the Cronbach alpha coefficient was .79 and all participants had acceptable levels of movement imagery ability (i.e., scores 16 or higher). Therefore, nobody was omitted from the experiment besides meeting the following criteria; (a) has been playing golf for a period of more than one year (b) has not been involved in any form of imagery training in golf putting. An independent-samples t-test was conducted to compare the imagery ability scores between the groups. There was no significant difference in scores for imagery ability PETTLEP group (M = 41.52, SD = 2.25) and control group (M=42.05, SD=3.82; t (40) = -.54, p = .06, two tailed). The magnitude of the differences in the means (mean difference =-.52, 95% CI: - 2.48 to 1.43) was very small (.007). It indicated that all participants had equal imagery ability before the intervention programme. They were randomly divided into two different groups (i.e., PETTLEP imagery group (PI) and control group (only physical practice) with 21 participants for each group.

Before intervention, all participants performed the 10 putts from a 6-feet distance. The putting test was performed on an artificial putting mat 10 meters from the actual green to obtain the similar environment as the actual putting surface. Participants in PETTLEP imagery group were asked to rate the scale on easiness to visualize; 1=very hard to imagine and feel, 7 = very easy to imagine and on clarity to visualize; 1= extremely unclear, 7=extremely vivid for the first time.

During the intervention, all participants were instructed to complete the practices three times a week during the 6-week intervention programme. The participants in PETTLEP imagery group performed 10 imagery practices together with 10 physical practices (actual putting stroke) at the artificial putting mat 10 meter from the actual green. Finally, they were reminded not to be involved in any tournament or practice during the entire program.

The imagery intervention sessions took place on three alternate days for the PETTLEP imagery group. Each participant in this group received the script developed by the researcher. They were asked to make some changes on the script in each of the sessions based on their own skill to putt. They listened to their personal imagery script from a voice recorder. Overall, the present study covered 24 minutes for the whole sessions including physical practice or approximately 12 minutes was taken for 10 imagery practice. The participants in the control group also performed 10 physical practices (actual putting strokes) at home or putting green and read stretching guideline to improve flexibility for 3 times a week in 6-week of program. They were asked to report the detail of the programme in a diary other than monitored by the coaches. The researcher also visited all participants in this group at the golf club in order to pay equal attention as to the imagery group.

After 6 weeks of intervention programme, a post- test was conducted and all participants completed the 10 putting tasks from a 6-feet distance for the second time. Besides that the easiness and clarity rating scale was also assessed for the second time in the PETTLEP imagery group. For the purpose of data analysis, an Independent Samples t-Test was used to compare the mean scores on the dependent variable (6-feet putting performance) and an independent variable (golf putting practice method) PETTLEP imagery and physical practice only (control group) (Pallant, 2011). In addition, a Wilcoxan Signed Rank Test (non parametric) was employed to investigate if there was a change in the scores on the easiness and clarity ability to image the script before and after intervention by the participants in PETTLEP imagery group.

Results

Preliminary assumption testing was conducted and the scores are reasonably normally distributed, with most scores occurring in the centre and Levene's test for equality of variances indicated no violation. A pre and post-test was conducted to compare the putting performance from the 6-feet distance scores for PETTLEP imagery group and control group (physical practice alone). An independent –samples t-test post-test showed that there was a significant difference in scores for PETTLEP imagery group (M = 34.52, SD = 4.42) and control group (M=24.95, SD = 2.85); t (40) = 8.33, p =.001, two-tailed). The magnitude of the differences in the means (mean difference = 9.57, 95% CI: 7.25 to 11.89) was very large (eta squared = .55). Summary of the descriptive statistics for pre and post-test on putting performance is given in Table 1.

A non parametric analysis, a Wilcoxan Signed Rank Test revealed a statistically significant increment in easiness ability to image scores following participation in the PETTLEP imagery intervention program, z = -3.90, p < .001, with a small effect size (r=.19). The median score on the easiness ability to image increased from before program (Md = 5) to after program (Md = 7). Meanwhile, a non parametric analysis, a Wilcoxan Signed Rank Test revealed a statistically significant increment in clarity ability to image scores following participation in the intervention program, z = -3.60, p < .001, with a small effect size (r=.17). The median score on the clarity ability to image increased from before program (Md = 5) to after program (Md = 6).

Discussion

As outlined previously, the present study supports the idea of using the PETTLEP imagery to improve golf performance. Indeed, effectiveness of PETTLEP imagery in golf putting performance from the hardest distance (6-feet) is confirmed when there was no improvement in performance by control group (physical practice alone). The finding was consistent with previous studies that indicated physical practice alone did not improve their putting performance except when combined with the PETTLEP imagery (Wright, & Smith, 2009; Smith et al., 2007). Similar finding also highlighted by the previous golf studies the PETTLEP imagery helped to improve the performance of golfers from the bunker shot (Smith et al., 2008). It is shown that the procedure used in this study was effective for participants in the PETTLEP imagery group. Instead of using video or practicing at the real putting green, standing closer to the actual putting green by holding the putter can also make them feel like the actual environment. However, further investigation may be needed on the environment aspect for practicing imagery such as to compare between performing imagery at the actual putting green vs. practicing imagery at the artificial putting mat closer to the actual putting green (as proposed in this study). The results also supported the effectiveness of using audio aid to practice imagery as to get the similar perspective (internal perspective) other than easy to excess during practice session.

The effectiveness of PETTLEP imagery in the present study may be related to the sessions that were being monitored personally besides listening to their own imagery scripts (internal perspective). Additionally, the kinesthetic imagery used by the participants in the PETTLEP imagery was consistent with the previous study which was found effective in enhancing closed skills performance (Hall, Rodgers, & Barr, 1990). Non-parametric results in the present study clearly explained the usefulness to practice PETTLEP imagery for golfers. The manipulation checks results showed the participants in PETTLEP imagery performs better from time to time in easiness and clarity to visualize. As supported by Holmes and Collins (2001), imagination should match the current stage of learning. However, the results obtained and the conclusions drawn from this study cannot be taken to represent female golfers. In fact, maybe researchers ought to focus on skilled golfers of different age groups.

Finally, the present study contributes to the golf putting literature through the use of PETTLEP imagery to improve putting performance from the specific hardest distance. It warrants that future research needs to be carried out on the efficacy of golfers prior to putting task particularly from the 6-feet distance.

Author note

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References

[1]. Beauchamp, M.R., Bray, S.R., & Albinson, J.G. (2002). Pre competition imagery, self- efficacy and performance in college golfers. Journal of Sports Science, 20, 697-705
[2]. Beilock, S.L., & Gonso, S. (2008). Putting in the mind versus putting on the green: expertise, performance time, and the linking of imagery and action. The Quarterly Journal of Experimental Psychology, 1-13. doi: 10/1080/17470210701625626
[3]. Bell, R.J., & Thompson, C.L. (2007). Solution-focused guide imagery for a golfer experiencing the yips: a case study. The Online Journal of Sport Psychology, 1, 52-66
[4]. Garza, D.L., & Feltz, D.L. (1998). Effects of selected mental practice on performance, self efficacy, and competition confidence of figure skaters. The Sport Psychologist, 12, 1-15.
[5]. Hall, C.R., Munroe-Chandler, K.J., Cumming, J., law, B., Ramsey, R., & Murphy, L. (2009). Imagery and observational learning use and their relationship to sport. Journal of Sport Science, 27,327-337. doi: 10.1080/02640410802549769.
[6]. Hall, C.R., & Martin, K.A. (1997). Measuring movement imagery abilities: a revision of the movement imagery questionnaire. Journal of Mental Imagery, 21, 143-154 .
[7]. Hall, C.R., Rodgers, W.M., & Barr, K.A. (1990). The use of imagery by athletes in selected sports. The sport psychologist, 4, 1-10 .
[8]. Hayslip , B., Petrie, T.A., MacIntire, M.M, & Jones, G.M. (2010). The influences of skill level, anxiety, and psychological skills use on amateur golfers' performance. Journal of Applied Sport Psychology,22,123-133.doi: 10.1080/10413200903554281.
[9]. Holmes, P.S., & Collins, D.J. (2001). The PETTLEP approach to motor imagery: a functional equivalence model for sport psychologists. Journal of Applied Sport Psychology, 13, 60-83 .
[10]. Kendall, G., Hrycaiko, D., Martin, G.L., & Kendall, T. (1990). The effects of an imagery rehearsal, relaxation, and self-talk package on basketball game performance. Journal of Sport & Exercise Psychology, 12, 157-166.
[11]. Mazlan B. Ismail. (2014). Golf putting: shorter putts are easier, is this really true? International Journal of Enhanced Research in Educational Development, 2, 22-27.
[12]. McKenzie, A.D., & Howe, B.L. (1997). The effect of imagery on self efficacy for a motor skill. International Journal of Sport Psychology, 28,196-210.
[13]. Memmert, D., Blanco, M., & Merkle, V. (2009). The effects of effort, performance, and expertise on apparent size perception in golf. International Journal Sport Psychology, 40, 270-283 .
[14]. Moritz, S.E., Hall, C.R., Martin, K.A., & Vadocz, E.A. (1996). What are the confident athletes imaging? An examination of image content. The Sport Psychologist, 10,171-179.
[15]. Morris, T., Spittle, M., & Watt, AP. (2005). Imagery in sport. United States: Human Kinetic.
[16]. Pallant, J. (2011). SPSS survival manual: A step by step guide to data analysis using SPSS. Crows Nest, Australia: Allen & Unwin.
[17]. Ploszay, A.J., Gentner, N.B., Skinner, C.H., & Wrisberg, C.A. (2006). The effects of multisensory imagery in conjunction with physical movement rehearsal on golf putting performance. Journal Behavior Education. 15, 249-257. doi: 10.1007/s10864-006-9034-6.

[18]. Ramsey, R., Cumming, J., Edwards, M.G., Williams, S., & Brunning, C. (2010). Examining the emotion aspect of PETTLEP-based imagery with penalty taking in soccer. Journal of Sport Behavior, 33, 295-314.
[19]. Ramsey, R., Cumming, J., & Edwards, M.G. (2008). Exploring a modified conceptualization of imagery direction and golf putting performance. International Journal of Sport and Exercise Psychology, 6, 207-223.
[20]. Roberts, R., & Turnbull, O.H. (2010). Putts that get missed on the right: investigating lateralized attentional biases and the nature of putting errors in golf. Journal of Sport Science, 28,369-374. doi: 10.1080/02640410903536467.
[21]. Short, S.E., Monsma, E.V., Short, M.W. & Harris, A.C. (2004). Is what you see really what you get? Athletes' perceptions of imagery's functions. The Sport Psychologist, 18,341-349.
[22]. Short, S.E., Bruggeman, J.M., Engel, S.G., Marback, T.L., Wang, A.W., & Short, M.W. (2002). The effect of imagery function and imagery direction on self-efficacy and performance on a golf putting task. The Sports Psychologists, 16, 48-67
[23]. Smith, D., Wright, C.J., & Cantwell, C. (2008). Beating the bunker: the effect of PETTLEP imagery on golf bunker shot performance. Research Quarterly for Exercise and Sport, 79, 385-391.
[24]. Smith, D., Wright, C., Allsopp, A., & Westhead. (2007). it's all in the mind: PETTLEP-based imagery and sports performance. Journal of Applied Sport Psychology, 19, 80-92.
[25]. Smith, D., & Holmes, P. (2004). The effect of imagery modality on golf putting performance. Journal of Sport and Exercise Psychology, 26, 385-39.
[26]. Taylor, J. A., & Shaw, D.F. (2002). The effects of outcome imagery on golf –putting performance. Journal of Sports Science, 20, 607-613.
[27]. Wright, C.J., & Smith, D. (2009). The effect of PETTLEP imagery on strength performance. International Journal of Sport & Exercise Psychology, 7, 18-31.

Table 1: Descriptive Statistics for Putting Performance in Pre and Post-Test on PETTLEP group and Control Group

Groups	Pre-test		Post-test	
	Mean	SD	Mean	SD
PETTLEP group	28.86	3.25	34.52	4.42
Control group	27.38	4.31	24.95	2.85

Notes: control group (physical practice only)