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REVIEW ARTICLE

IMAGERY AND CONCENTRATION AS PREDICTORS OF PENALTY KICK SUCCESS AMONG UNIVERSITY OF CAPE COAST YOUNGSTERS FOOTBALL PLAYERS

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ABSTRACT

The purpose of this study was to investigate the influence of imagery, concentration, level of experience and playing position on penalty kick performance success among the players of the University of Cape Coast (UCC) Youngsters Football Club (FC). Thirty registered players of UCC Youngsters FC for the 2022/2023 season participated in the study. The players were subjected to the taking of kicks from the penalty spot after imagery and concentration intervention programs. The study revealed that imagery ($\beta = .032, p > .05$), concentration ($\beta = .232, p > .05$), level of experience ($\beta = -.086, p > .05$), and playing position ($\beta = -.269, p > .05$) are not significant predictors of penalty kick performance success among the players of UCC Youngsters FC. Thus, success in penalty kick among the players is not associated with imagery, concentration, level of experience and playing position.

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INTRODUCTION

Penalty kicks are tough, unique and frequently repeated motor movements (Patel, Shah, & Shah, 2020). Despite its status as an "unfair" event, the penalty shootout in soccer provides an excellent platform for exploring and analyzing real-world successive performances and choices amid uncertainties (Tuyls et al., 2021). According to the International Football Association Board [IFAB] (2023), a penalty shootout is a series of multiple penalty kicks that ensue until one team has a higher number of goals after each team has taken five kicks or one team has a goal advantage over the other team after both teams have taken the same number of kicks during the sudden-death period. The penalty kick results determine whether a team progresses or is eliminated from competitions. In addition, it determines a club's ultimate ranking such as winning the championship or coming in second or third position (Arrondel, Duhautois, & Laslier, 2019). During penalty kicks, penalty kickers can use either the keeper-independent or the keeper-dependent aiming tactics (Kuhn, 1988). The keeper-independent strategy involves pre-programming the entire kicking operation. The strategy requires the kicker to disregard the goalkeeper and instead focus on the shooting action. Players who use this strategy are

primarily concerned with power. On the other hand, the keeper-dependent strategy, occurs when the kicker plays a reactive role and bases his or her choice on the keeper's actions. This approach involves a delayed kicking phase in which the kicker purposely slows their body cues in order to evaluate the goalkeeper's body cues and position. This strategy is dependent on the goalkeeper acting anticipatorily quickly to provide the kicker with the opportunity to obtain useful features needed to generate an appropriate reaction to change their striking technique. Penalty kicks are essentially a targeting task. The kicker must shoot the ball past the defending goalkeeper. Kicks struck to the upper corner of the goal are hard to stop, whereas goalkeepers are able to save 12.6 % of kicks in the middle part and 19.8% in the bottom corner (Bar-Eli & Azar, 2009). But, the most common penalty kicking strategy is aiming the penalty kicks at the lower section of the goal (56.6 % of shots hit the zone); however, going for the top corner of the goal is the least employed strategy yet results in more successful penalty attempts. It seems to sense that a shot placed far away from the goalkeeper has a higher chance of outwitting the goalkeeper, leading to a successful attempt. This instinctual assumption is valid because the goalkeeper's reaction time is relatively short,

making it more challenging to save every well-placed ball struck to that location (Ferraresi & Gucciardi, 2021).

In modern soccer contests, one thing is clear: the overall face of soccer has changed. Set-pieces, like penalty kicks, have become more important since they could be the only opportunity a side may get in a match to score and become a winner or to advance to the next stage in a competition (Arrondel, Duhautois, & Laslier, 2019). Irrespective of the precise nature of the penalty kick situation, players experience anxiety (cognitive, somatic, or both) (Navarro, Van der Kamp, Ranvaud, & Savelsbergh, 2013). The risk of experiencing anxiety increases when a scenario gets impacted by ambient forces because the players must bear nearly all responsibility for the situation (Singh & Prakash, 2019). The penalty kicker has an advantage in that they have a high chance of success. These aspirations might have negative psychological consequences, such as increased pressure and anxiety impairing performance. These psychological pressures intensify whenever players are assessed or publicly critiqued. As a result, penalty takers do poorly whenever a lot is at stake or stakes are high (Mesagno & Beckmann, 2017). Globally, penalty kick success ranges between 75% and 86% (Arrondel, Duhautois, & Laslier, 2019). A cursive review of data on the penalty kick situation of the Ghana premier league in 2020/2021 and 2022/2023 football seasons revealed 79% and 86% of successful penalty kicks, respectively. Such performances by players have heightened the interest of coaches, sports psychologists and researchers to investigate a variety of variables that influence the players' ability to successfully reach these rates in this all-important exercise even in the midst of adversities.

While physical and technical attributes are important components in penalty kick performance, players must also achieve a psychological state that allows them to execute their well learned-skills. Thus, one cannot overlook the significant role of psychological variables such as concentration and imagery in penalty kick success rate (Bompa, Blumenstein, Hoffman, Howell, & Orbach, 2019). Imagery or mental visualization or seeing in the mind's eye is a visual and auditory sensation that mimics perceptual experiences (Waters, Barnby, & Blom, 2021). It is the production or reproduction of experiences based on memory information (Budnik-Przybylska, 2014). As soccer players approach the penalty spot to take the penalty kick, they mentally visualize the penalty kick before taking the kick. Concentration, a conscious effort to devote cognitive resources to things that appear essential at a given time is key to penalty kick performance (Goldschmied, Raphaeli, Moothart, & Furley, 2022). In fact, a penalty kicker's capacity to gaze mental effort on task-relevant cues while rejecting distractors is key to penalty kick success (Chae & Choi, 2019). Concentration is divided when players have the capacity to do more than one activity simultaneously and whether the two activities need the same or distinct cognitive processes determine task accomplishment (Santos, Memmert, Sampaio, & Leite, 2016; Vaughan & Laborde, 2021). Lack of concentration or a divided attention is detrimental to penalty kick success. As much as imagery and concentration impact performance, there is much to investigate about these two psychological variables on penalty kick performance. Thus, this study was conducted to investigate the influence of imagery, concentration, level of experience and playing position on penalty kick performance among the players of the UCC Youngsters FC.

METHODS

Study Design and Participants: In this pre-test post-test research design, all thirty ($N = 30$) players who registered to play for UCC Youngsters FC for the 2022/2023 season participated. There were 3 (10%) Goalkeepers, 12 (40%) Defenders, 9 (30%) Midfield players, and 6 (20%) Attackers. The participants playing experience ranged between six years to 23 years ($M = 12.1$, $SD = 3.99$) and the number of years these players had played for UCC Youngsters FC varied between one year to seven years ($M = 2.07$, $SD = 1.25$). The youngest player for this UCC Youngsters FC team during the 2022/2023 season was 18 years with the oldest player aged 33 years ($M = 23.5$, $SD = 4.47$). The players of UCC Youngsters FC at the time of the study were playing matches in the Central Regional Second Division Zonal League, the Central Regional Promotional Middle League, and the MTN FA Cup.

Sampling Procedure: The census sampling technique was used to include all the players in this study. To ensure that each player had an equal chance of being selected, independent of any other occurrence in the selection process, the number of penalty kicks scored during the baseline penalty kick performance by the participants was used to classify these players into six strata; that is stratum one (players who scored no goal), stratum two (players who scored one goal), stratum three (players who scored two goals), stratum four (players who scored three goals), stratum five (players who scored four goals) and stratum six (players who scored all five kicks from the penalty spot). A simple random sampling with replacement technique was used to randomly place the players in the various stratum based on the performance from the baseline data collection into experimental working group I (Imagery intervention only), experimental working group II (concentration intervention only), and experimental working group III (imagery plus concentration intervention).

Measure of Performance: Data on players' performance was collected by subjecting the participants to the taking of kicks from the penalty spot. The test required a soccer field with a standard soccer goal that conforms to FIFA and IFAB guidelines. Penalty kicks were considered goal (success) or no-goal (failure). A kick was considered a goal if the entire circumference of the ball crossed the goal line, between the uprights, and underneath the crossbar (IFAB, 2023). On the other hand, kicks were considered no-goal if the ball passed outside the goal or the goalkeeper stops the ball from entering the goal. The goals and no-goals of each player were summed up for data analysis.

Baseline Data Collection: To ensure participants performed at the same or near similar level of performance during the baseline data collection, two weeks of practical training sessions on the shooting of kicks from the penalty spot was organised for all the participants. This was done after the team's training sessions each day. To induce a competitive setting, and simulate the pressure associated with match-like penalty kick conditions, the players were informed that three players who successfully convert the most penalty kicks would be recognised and honoured after the shoot-out. In addition, a form of competition was introduced among participants. The 30 registered players were divided into six teams of five. This was done using the fishbowl sampling technique. Each team competed against one another until all teams had faced each

other. The penalty kicks were taken in a fashion where a player had to alternate his position in the team's order of taking penalty kicks. Each participant took five penalty kicks during the baseline data collection at different times from the penalty spot against different opponents. At the end of all five competitions against the other teams, each player had taken the first, second, third, fourth, and fifth penalty kicks in their team's penalty kick order.

Administration of the Intervention: The participants belonging to the experimental group I were subjected to the Physical, Task, Timing, Learning, Emotion, and Perspective (PETTLEP) imagery intervention. The participants belonging to the experimental group II underwent concentration grid exercise intervention. Those belonging to the experimental group III were exposed to both the PETTLEP imagery and the concentration grid exercise interventions. The PETTLEP imagery model for motor imagery by Holmes and Collins (2001) was utilized for the study. The objective of the PETTLEP is to make an image that is perfect or near perfect to the action desired on the field. The participants of the imagery group were also asked to rehearse imagery exercises when they were in their halls and hostels of residence using an adapted version of the imagery script designed by Hegazy (2012) while applying the principles of the PETTLEP imagery model. The concentration grid exercise developed by Weinberg and Gould (2023) was employed to enhance concentration among the players and facilitated performance readiness. The concentration grid exercise taught participants to block distractors while concentrating on the task at hand. The level of competitive challenge in using the concentration grid exercise was varied so that the exercise becomes more challenging as the weeks went by.

Post-Intervention Data Collection: The post-intervention data were collected after the 3rd, 6th and 9th weeks of the intervention programme. Each participant took five penalty kicks during each post-intervention data collection; the same way as they played the penalty kicks during the baseline data collection period. Again, the fishbowl sampling technique was used to group the players into teams during each of the three post-test data collection exercises. This was done to prevent players from belonging to a particular team throughout the data collection process. Participants in the imagery group were tasked to mentally rehearse themselves, taking penalty kicks before the execution of every kick from the penalty spot. Participants in the concentration group were tasked to concentrate on the task at hand while avoiding distractions. The participants that were exposed to the combination of imagery and concentration were tasked to mentally rehearse taking penalty kicks from the penalty spot and try as much as possible to concentrate on the task at hand while avoiding distractions.

RESULTS AND DISCUSSION

This study was conducted to determine if imagery, concentration, level of experience and playing position of players predicted penalty kick success among players of UCC Youngsters FC. A multiple regression analysis was conducted to determine if the independent variable(s) would predict penalty kick performance success among the participants. Data is presented in Table 1.

Table 1. Multiple Regression Analysis for Predicting Penalty Kick Performance Success from Imagery, Concentration, Level of Experience, and Playing Position

VARIABLE	B	BETA (β)	t	Sig	CS	
					t	VIF
Constant	7.701		1.938	.064		
Experience	-.197	-.086	-.436	.667	.906	1.104
Position	-.571	-.269	-1.398	.175	.948	1.055
Imagery	.002	.032	.122	.904	.503	1.987
Concentration	.019	.232	.865	.395	.487	2.053
R	.352					
R ²	.124					
R ² Change	.124					

N= 30; F= .635; df= (3, 27); P> .05

The multiple regression analysis conducted revealed an initial correlation analysis of very low and low correlations among the independent variables and a variance inflation factor (VIF) value of more than one and a tolerance of less than one, indicating no multicollinearity. The dependent variable (penalty kick performance) underwent regression analysis on predictor variables of imagery, concentration, level of experience, and playing position. The independent variables did not significantly predict penalty kick performance success among the participants $F(4,25) = .885, p = .487$, which signifies that the independent variables had no significant impact on the dependent variable. The sample multiple correlation coefficient was .352, indicating that approximately 12.4% of the variance of penalty kick success can be accounted for by the linear combination of these independent variables. An assessment of the coefficients on the influence of the separate independent variables revealed that none of the predictor variables predicted penalty kick performance success outcomes among the participants. But, concentration ($\beta = .232$) and Imagery ($\beta = .032$) had a positive contribution relationship in predicting the success rate of penalty kick performance among the participants. Also, level of experience ($\beta = -.086$) and playing position ($\beta = -.269$) had a negative contribution relationship in predicting the success rate of penalty kick performances among players of UCC Youngsters FC. In this study, the independent variables (imagery, concentration, level of experience and playing position) did not significantly predict penalty kick performance success among the players of UCC Youngsters FC, which signified that the independent variables had no significant impact on the dependent variable (penalty kick performance) after nine weeks of imagery and concentration intervention programmes. The study revealed that approximately 12.4% of the variance of penalty kick success among the players of UCC Youngsters FC can be accounted for by the linear combination of all the independent variables. This implies that after nine weeks of imagery, concentration and a combination of imagery and concentration intervention programme, none of the independent variables influenced penalty kick performance success outcomes of the participants. The finding of this study indicated that imagery does not predict the penalty kick performance success among the players of UCC Youngsters FC after the intervention. A possible reason could be that the participants in this study see penalty kick as normal, situation specific and therefore no need to image the kicking situation before executing the task. It could also be that the participants felt penalty kicks rarely occur in match situations and that there is no need to develop a mental picture of the kick before its execution. Regardless of this finding, other studies have shown that imagery does not predict improvement in sports performance. For example, Jordet in 2005 investigated if an

imagery intervention programme would impact elite soccer players aged between 21 and 24. It was observed that only one of the participants slightly improved in performance. The author concluded that imagery does not predict performance. Similar finding by Seif-Barghi, Kordi and Memariin 2013 revealed that imagery intervention does not predict passing performance among top-level soccer players. It is therefore not surprising that the finding of this study is in accordance with earlier research studies.

The finding of the present study revealed that concentration is an unreliable determinant of penalty kick success in football players of UCC Youngsters FC. This finding supports Fetean, Monea and Roşca (2021) study which revealed that concentration does not predict improvement in performance, even though their six months of concentration intervention showed a rise in concentration level which helped the players better understand the exercises in technical terms and the tactical requirements communicated by the coach. Players experience is not an essential indicator of penalty kick success among the players of UCC Youngsters FC. It is anticipated that the more frequent players perform a task the better they become. Unfortunately, the findings of this study did not reveal that players playing experience influence their penalty kick performance. A plausible reason could be that penalty kick is a novelty to the players in this study. And as they do not get the opportunity to practice penalty kicks frequently at training let alone executing it in matches, playing experience did not influence their penalty taking success. Thus, the players experience levels in the taking of penalty kicks did not play any significant role; all were trained to take penalty kicks in this study. Jordet, Hartman, Visscher and Lemmink (2007) reported that the level of experience of players is not a significant predictor of penalty kick performance success in players of varying ability levels. Playing position is not a significant determinant of penalty kick success among the players of UCC Youngsters FC. Penalty taking is a skill that must be learned and executed. Playing positions therefore do not matter in the taking of penalty kicks. This finding is in concord with Brinkschulte, Wunderlich, Furley and Memmert (2023) study which stated that playing position ought not to be utilized when evaluating the fundamentals of penalty kick improvement since the situational and technical criteria of scoring a goal in a match differ significantly from those of converting a penalty kick. The authors argue that goals scored in matches are scored extremely dynamically, whereas penalty kicks are taken in a more static environment. This means that goals may be scored in various methods in a match, although penalty kicks can only be attempted in a conventional manner.

CONCLUSION

On the whole, imagery, concentration, playing position, and level of experience did not predict penalty kick performance success among the players of UCC Youngsters FC. Also, the players of UCC Youngsters FC are familiar with one another and can predict their teammates and opponents' actions and kicking stances. Thus, during low-anxious pressure performances, players are not faced with adversities, and for that matter, can cope with the pressure associated with taking penalty kicks. Hence, imagery and concentration did not influence the players' penalty kick success. Playing position and the level of experience of a player is not enough to guarantee expertise in penalty kicks. All other things being equal, a less experienced player with superior technique and

execution irrespective of his playing position can outperform a more experienced player with worse technique.

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