

Mental skill levels of South African male student field hockey players in different playing positions

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Abstract

Research from other sporting codes highlighted the importance of taking positional differences into consideration when developing mental skills training (MST) programmes, due to the different requirements of each playing position. The purpose of this study was to determine the possible positional differences in mental skill levels among 91 tertiary institution male field hockey players. The participants competed in the University Sport of South Africa (USSA) tournament and were categorised into four positional groups [i.e., goalkeepers (n = 12), forwards (n = 24), midfielders (n = 25) and backs (n = 30)]. The participants completed the Ottawa Mental Skills Assessment Tool (OMSAT-3), which measures 12 mental skill subscales. The positional results were compared by means of effect sizes (expressed as Cohen's *d*-value) and yielded 18 moderate and 13 large practical significant differences among the four positional groups. Collectively, these results show that the goalkeepers had the lowest scores for seven of the 12 tested mental skills, whereas the midfielders outperformed the other positional groups in six of the 12 tested mental skills. From the results, it can be concluded that positional demands and differences should be taken into consideration when developing and implementing MST programmes for field hockey players.

Keywords: Mental skills training, positional differences, University Sport of South Africa (USSA), tournament.

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Introduction

As an applied research field, sport psychology focuses on studying the behaviour of athletes in order to explain, predict and/or change behaviour (Potgieter, 2006). According to cognitive theory, thought patterns and mental processes (e.g., attention, attributions, perceptions and memory) are the primary determinants of behaviour (Hill, 2001). Therefore, the aim of cognitive intervention is to identify and modify faulty thinking processes that foster undesirable actions and feelings, thereby reshaping information processing to promote realistic thinking. Within a

cognitive framework sport psychological interventions are essentially viewed as an educational process and learning experience.

Martens (1987) advocated a “psycho-educational” approach to help athletes develop the necessary mental skills, by means of mental skills training (MST) programmes. The importance of MST in sport was highlighted by Cox and Yoo (1995) who showed that MST prepares the body and mind for optimal performance. Shortly thereafter, Weinberg and Gould (1999) concluded that educationally based MST enhances sport performance. Hacker (2000) also observed that both coaches and players’ opinions regarding the importance of MST in sport have improved and that the development of MST programmes has increased. MST programmes are universally regarded as important tools for enhanced performance in sport (Blakeslee & Goff, 2007). Today, MST can be defined as a “systematic and consistent practice of mental or psychological skills for the purpose of enhancing performance, increasing enjoyment or achieving greater sport and physical activity self-satisfaction” (Weinberg & Gould, 2011: 248).

A number of studies have revealed the importance of different MST approaches for players in different playing positions (Kirkcaldy, 1982; Cox & Yoo, 1995; Sewell & Edmundson, 1996; Andrew, Grobbelaar, & Potgieter, 2007). In this regard, Cox and Yoo (1995) suggested that in team sports, the different requirements of each playing position should be taken into consideration when developing and implementing MST programmes as players in one playing position may have different mental skill levels and needs compared to players in the other positional groups.

Such differences were first highlighted by the findings of Kirkcaldy (1982), who indicated that soccer players in the defensive positions had higher levels of emotional stability when compared to the players in the attacking positions. Sewell and Edmundson (1996) also reported significant positional differences in self-confidence levels of soccer and field hockey players. The defenders showed higher self-confidence levels than the goal keepers and midfield players, whilst the goalkeepers were significantly more anxious than the defenders, midfield players and forwards. Cox and Yoo (1995) reported that American football players in the offensive positions have a significantly better ability to control their anxiety than the players in the defensive positions. In the sport of rugby union, Andrew et al. (2007) found that the hookers and half-backs outperformed the other playing positions in all the tested mental skills. From these findings, it is clear that positional differences do exist with regard to mental skill levels of players in various sports. Further investigation within the sport of field hockey is warranted, since the study by Sewell and Edmundson (1996) grouped male and female soccer and field hockey players together.

A field hockey team consists of 16 players (11 players on the turf with a further five reserves), which is divided into four main positional groups each with its own specialized demands. The game places immense physical, emotional and mental demands on the players, making well-developed physical, physiological, technical, tactical and mental skills in the various playing positions of the utmost importance for achieving success in this sport (Elferink-Gemser, Visscher, Lemmink, & Mulder, 2004; Anders, 2008). With regard to the mental skill levels of field hockey players, Grove and Hanrahan (1988) noted that hockey players' capacity to maintain self-confidence during games and their ability to use imagery tends to be very poor. Furthermore, Maynard and Cotton (1993) observed high levels of pre-match anxiety in hockey players and suggested that by implementing specific coping strategies, the players' anxiety levels will decrease, which in turn would lead to enhanced performances.

These findings only focus on the overall mental skill levels of hockey players. Thus, the question remains whether positional differences do exist among male field hockey players. Therefore, the purpose of the present study was to determine whether the mental skill levels of South African tertiary institution male field hockey players in different playing positions, differ significantly from one another.

Methods

Participants

A total of 94 male field hockey players (mean age 20.82; standard deviation 1.62), from seven teams who participated in the University Sport of South Africa (USSA) field hockey tournament hosted by the North-West University's Hockey Academy in Potchefstroom during 2008 completed the measuring instruments. Three participants failed to answer all the questions in the research instruments, resulting in a final participant group comprising 91 players. The players were categorised into the following positional groups, i.e. goalkeepers ($n = 12$), forwards ($n = 24$), midfielders ($n = 25$) and backs ($n = 30$), according to their primary playing position during the tournament.

Test procedures

Administration of testing

Ethical clearance was obtained from the North-West University Ethics Committee prior to the study (05K13). Testing took place during the week of the tournament. The coaches and the managers of the different teams were informed about the study and were requested to participate. The players completed and signed informed consent forms, after having been briefed about the nature and

purpose of the research project. The participants were informed that their data would be treated confidentially. They were free to withdraw their participation in the project at any stage, without having to provide reasons for doing so. Thereafter, the participants completed the demographic, general information questionnaire and one sport psychological questionnaire.

Demographic and general information questionnaire

Demographic information (name, surname, date of birth, test date, age and race) and hockey-playing history (years of playing, playing position/s) were gathered.

Measuring instrument

The various sport psychological subscales were measured by means of the 48 item Ottawa Mental Skills Assessment Tool-3 (OMSAT-3) of Durand-Bush, Salmela and Green-Demers (2001). Item responses were scored along a 7-point Likert type scale ranging from 'strongly disagree' [1] to 'strongly agree' [7]. A score of 6 or 7 reflected a high item score, 3 to 5 a medium or moderate score and 1 or 2 a low score. The OMSAT-3 measures a broad range of mental skill subscales grouped together to form three categories, namely foundation skills (*Goal-setting, Self-confidence and Commitment*), psychosomatic skills (*Stress reaction, Fear control, Relaxation and Activation*) and cognitive skills (*Focusing, Refocusing, Imagery, Mental practice and Competition planning*). A second-order Confirmatory Factor Analysis (CFA) assessing the validity of the three broader conceptual categories yielded adequate indices of fit. Internal consistency and temporal stability was also shown. For the current data the Cronbach's Alpha values for the individual subscales ranged from 0.69 to 0.79.

Statistical procedures

The collected data were processed by the Mindeval Research Team, while SPSS for Window (Version 17.0) was used for the statistical analysis. Descriptive statistics (mean, minimum and maximum) and frequencies were calculated. Effect sizes (ES) were used to determine the practical significant differences between the various positional groups for each of the 12 mental skills. ES was calculated by means of the formula described by Thomas, Nelson and Silverman (2005):

$$ES = (M_1 - M_2)/s,$$

where, M_1 = the mean value of the first positional group in the comparison, M_2 = the mean value of the second positional group in the comparison and s = the standard deviation. The pooled standard deviation (S_p) was used in which:

$$s_p = \sqrt{\frac{s_1^2(n_1-1) + s_2^2(n_2-1)}{n_1 + n_2 - 2}}$$

where, S_p = the pooled standard deviation, S_1^2 = the variance of the participants in the first positional group, S_2^2 = the variance of the participants in the second positional group, n_1 = the number of participants in the first positional group, n_2 = the number of participants in the second positional group. Effect sizes are expressed as Cohen's d -value and can be interpreted as follows: an ES of more or less 0.8 is large, an ES of more or less 0.5 is moderate, and an ES of more or less 0.2 is small (Thomas et al., 2005).

Results

Tables 1 to 3 report the mean scores and standard deviations of the 12 mental skill subscales for each of the four playing positions.

Table 1: Descriptive statistics and positional comparisons of the three *Foundation skill* subscales among male field hockey players (N = 91).

Mean ± S.D.	Positional group	Effect sizes (Cohen's d -value)			
		Goalkeepers	Backs	Midfielders	Forwards
<i>Goal-setting subscale:</i>					
5.4 ± 1.07	Goalkeepers (n = 12)	-	0.42°	0.47°	0.08
4.9 ± 1.23	Backs (n = 30)		-	0.00	0.31
4.9 ± 1.06	Midfielders (n = 25)			-	0.33
5.3 ± 1.35	Forwards (n = 24)				-
<i>Self-confidence subscale:</i>					
4.9 ± 1.30	Goalkeepers (n = 12)	-	0.78°°	0.71°°	0.57°
5.6 ± 0.69	Backs (n = 30)		-	0.11	0.00
5.7 ± 1.04	Midfielders (n = 25)			-	0.09
5.6 ± 1.20	Forwards (n = 24)				-
<i>Commitment subscale:</i>					
5.0 ± 1.34	Goalkeepers (n = 12)	-	0.05	0.22	0.65°°
5.1 ± 1.10	Backs (n = 30)		-	0.18	0.64°
5.3 ± 1.04	Midfielders (n = 25)			-	0.48°
5.8 ± 1.08	Forwards (n = 24)				-

° Moderate practical significance (d = more or less 0.5); °° Large practical significance (d = more or less 0.8)

Table 2: Descriptive statistics and positional comparisons of the four *Psychosomatic skill* subscales among male field hockey players (N = 91).

Mean ± S.D.	Positional group	Effect sizes (Cohen's <i>d</i> -value)			
		Goalkeepers	Backs	Midfielders	Forwards
<i>Stress control subscale:</i>					
4.3 ± 1.28	Goalkeepers (n = 12)	-	0.29	0.40°	0.17
4.6 ± 1.16	Backs (n = 30)		-	0.09	0.07
4.7 ± 1.05	Midfielders (n = 25)			-	0.15
4.5 ± 1.56	Forwards (n = 24)				-
<i>Fear control subscale:</i>					
4.7 ± 1.33	Goalkeepers (n = 12)	-	0.09	0.43°	0.11
4.9 ± 0.89	Backs (n = 30)		-	0.48°	0.28
4.5 ± 1.04	Midfielders (n = 25)			-	0.08
4.6 ± 1.30	Forwards (n = 24)				-
<i>Relaxation subscale:</i>					
4.1 ± 0.79	Goalkeepers (n = 12)	-	0.70°°	0.53°	0.65°°
4.8 ± 1.11	Backs (n = 30)		-	0.18	0.08
4.6 ± 1.06	Midfielders (n = 25)			-	0.24
4.9 ± 1.43	Forwards (n = 24)				-
<i>Activation subscale:</i>					
4.4 ± 1.08	Goalkeepers (n = 12)	-	0.75°°	0.68°°	0.72°°
5.0 ± 0.70	Backs (n = 30)		-	0.11	0.21
5.1 ± 1.04	Midfielders (n = 25)			-	0.09
5.2 ± 1.17	Forwards (n = 24)				-

° Moderate practical significance (*d* = more or less 0.5); °° Large practical significance (*d* = more or less 0.8)

The inter-positional comparisons were also reported, with the differences between the playing positions expressed as Cohen's *d*-value. Only practical significant differences of moderate (*d* ≈ 0.5) to large (*d* ≈ 0.8) magnitude were indicated.

Table 1 revealed that the goalkeepers (5.4 ± 1.07) had moderate practical significantly higher *Goal-setting* scores than the midfielders (4.9 ± 1.06) and backs (4.9 ± 1.23). However, the goalkeeper's (4.9 ± 1.30) *Self-confidence* scores were practical significantly lower than the forwards (5.6 ± 1.20), midfielders (5.7 ± 1.04) and backs (5.6 ± 0.69). The forwards (5.8 ± 1.08) had

practical significantly higher *Commitment* levels than the goalkeepers (5.0 ± 1.34), midfielders (5.3 ± 1.04) and backs (5.1 ± 1.10).

Table 3 reported that the goalkeepers (3.9 ± 1.00) had practical significantly lower *Focusing* scores than the forwards (4.4 ± 1.54), midfielders (4.8 ± 1.05) and backs (4.5 ± 1.01). Both the midfielders (4.3 ± 1.06) and backs (4.1 ± 1.20) had practical significantly better *Refocusing* scores than the goalkeepers (3.2 ± 1.50) and forwards (3.5 ± 1.26). It was also clear that the backs (4.5 ± 0.98) had practical significantly lower *Imagery* scores than the goalkeepers (5.0 ± 1.18), forwards (5.2 ± 1.13) and midfielders (4.9 ± 1.05). The forwards (4.6 ± 1.20) were shown to have practical significantly higher *Mental practice* values than the backs (4.2 ± 1.09). The backs (4.1 ± 1.34) scored practical significantly lower values for *Competition planning* than the goalkeepers (5.0 ± 1.10) and the forwards (4.8 ± 1.44), whilst the midfielders (4.4 ± 1.06) scored practical significantly lower values than the goalkeepers (5.0 ± 1.10).

Discussion

The results show that compared to the other playing positions, the goalkeepers scored the lowest values in seven of the 12 tested mental skill subscales (*Self-confidence*, *Commitment*, *Stress control*, *Relaxation*, *Activation*, *Focusing* and *Refocusing*). These poor results may be related to the fact that goalkeepers are the last players who can prevent the opponents from scoring goals (Anders, 2008). Goalkeepers subsequently have a considerable influence on the outcome of the game and may experience increased anxiety levels as a result. In fact, Maynard and Cotton (1993) stated that due to the strenuous demands of field hockey, the players generally experience high levels of pre-match anxiety, with the goalkeepers experiencing the highest anxiety levels of all the players. Furthermore, their results showed that field hockey goalkeepers had the lowest self-confidence levels when compared to the other playing positions. The current results (and that of Maynard and Cotton's research) are in line with that of Sewell and Edmundson (1996) who reported that goalkeepers in soccer and field hockey had the highest anxiety levels and lowest self-confidence levels compared to the players in the remaining positions.

A plausible reason for the observed *Focus* and *Refocus* shortcomings and the lack of *Self-confidence* among the goalkeepers is that they are often required to deliver short periods of high intensity work followed by periods of rest. They could therefore, face similar challenges experienced by wings and fullbacks in the game of rugby union. In this regard, Andrew et al. (2007) found that periods of inactivity gave players in these positions more time during matches to ponder over past mistakes. Goldberg (1997) termed this phenomenon "time-travelling", i.e. when the player is not focusing on the "here-and-now".

Table 3: Descriptive statistics and positional comparisons of the five *Cognitive skill* subscales among male field hockey players (N = 91)

Mean ± S.D.	Positional group	Effect sizes (Cohen's <i>d</i> -value)			
		Goalkeepers	Backs	Midfielders	Forwards
<i>Focusing subscale:</i>					
3.9 ± 1.00	Goalkeepers (n = 12)	-	0.58°	0.85°°	0.35°
4.5 ± 1.01	Backs (n = 30)		-	0.29	0.08
4.8 ± 1.05	Midfielders (n = 25)			-	0.31
4.4 ± 1.54	Forwards (n = 24)				-
<i>Refocusing subscale:</i>					
3.2 ± 1.50	Goalkeepers (n = 12)	-	0.71°°	0.92°°	0.23
4.1 ± 1.20	Backs (n = 30)		-	0.18	0.49°
4.3 ± 1.06	Midfielders (n = 25)			-	0.69°°
3.5 ± 1.26	Forwards (n = 24)				-
<i>Imagery subscale:</i>					
5.0 ± 1.18	Goalkeepers (n = 12)	-	0.52°	0.13	0.14
4.5 ± 0.98	Backs (n = 30)		-	0.39°	0.35°
4.9 ± 1.05	Midfielders (n = 25)			-	0.28
5.2 ± 1.13	Forwards (n = 24)				-
<i>Mental practice subscale:</i>					
4.3 ± 1.00	Goalkeepers (n = 12)	-	0.12	0.03	0.24
4.2 ± 1.09	Backs (n = 30)		-	0.09	0.35°
4.3 ± 1.06	Midfielders (n = 25)			-	0.27
4.6 ± 1.20	Forwards (n = 24)				-
<i>Competition planning subscale:</i>					
5.0 ± 1.10	Goalkeepers (n = 12)	-	0.67°°	0.52°	0.12
4.1 ± 1.34	Backs (n = 30)		-	0.25	0.51°
4.4 ± 1.06	Midfielders (n = 25)			-	0.32
4.8 ± 1.44	Forwards (n = 24)				-

° Moderate practical significance (*d* = more or less 0.5); °° Large practical significance (*d* = more or less 0.8)

Preoccupation about past events have been linked to a decreased ability to *Focus* and *Refocus* as well as to lowered *Self-confidence* levels, especially when there is an excessive concern with the outcome (result) instead of focussing on process goals (Goldberg, 1997).

The players at the back position scored the lowest values in the skills of *Goal-setting*, *Imagery*, *Mental practice* and *Competition planning* when compared to the other playing positions. The main role of these players is to prevent the opposing team from creating any scoring opportunities (Naik, 2010), whilst they also have to supply quality ball for the midfielders and forwards to create attacking opportunities (Collins & Williamson, 2008). During defence, the backs typically react to the movement of the opposition's forwards and as a result tend to be more reactive than pro-active. Visual imaging may as a result be used less, contributing to the poor *Imagery*, *Mental practice*, *Goal-setting* and *Competition planning* scores.

The midfielders had the highest scores of all the positional groups for *Self-confidence*, *Stress Control*, *Focusing* and *Refocusing* and the lowest scores for *Fear control*. According to Naik (2010), midfielders play an important supportive role, since they have to create opportunities for the forwards to score goals and have to fall back to support the backs during defence. This may suggest that these players do not have time during the game to ponder over past mistakes and thus do not lose their focus easily. This was earlier highlighted by Collins and Williamson (2008) who stated that these players should have extraordinary game attentiveness. The fact that players in the midfield position contribute to scoring goals and prevent the opposition from getting the ball into the goal box might contribute to high levels of *Self-confidence*, which is in line with the findings of Andrew et al. (2007), namely that half-backs in rugby union (who are regarded as the play-makers) have high levels of self-confidence.

Another positional group that has a very strong influence on the match outcome is the forwards. The main responsibility of these players is to score goals (Naik, 2010), which may contribute to the high *Commitment* levels observed among subjects in this position. The results also show that the forwards outperformed the rest of the playing positions in *Relaxation*, *Activation*, *Imagery* and *Mental practice*. The results show that the forwards tend to struggle with the skill of *Refocusing* their attention. Failure to score goals, should the opportunity present itself, may have severe consequences for the final match outcome. Similar to the "time-travelling" problems experienced by goalkeepers, the forwards may also end up pondering over the missed opportunities, rather than *Refocusing* on the task at hand. Because their main objective is to score goals (Naik, 2010), forwards might lose interest in the game if the game plan demands a more defensive style of play. When opportunities to attack present themselves these players may struggle to *Refocus* their attention.

It is important to note that the present study has some limitations. The results of this study cannot be generalized to all field hockey players due to the fact that the study was limited to tertiary institutions male field hockey players. In addition, the small number of participants might have affected the results, which

warrants caution when interpreting the results. Despite these limitations, the study contributes to the existing knowledge regarding mental skills training in field hockey.

Conclusion

From these results, it can be concluded that significant differences exist regarding the mental skill levels of male field hockey players in various playing positions. This emphasises the need to consider both the team and individual player needs, as well as the requirements and challenges facing players in different playing positions when developing and implementing an MST programme for field hockey. The potential effectiveness of position specific intervention programmes still needs to be determined.

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Disclaimer

Any opinion, findings, conclusions or recommendations expressed in this material are those of the authors and, therefore, the NRF does not accept any liability in regard thereto.

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