

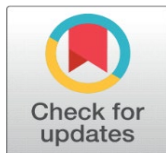
A COMPARATIVE STUDY OF PSYCHOLOGICAL VARIABLES OF STATE AND NATIONAL LEVEL TENNIS PLAYERS

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Received 19 January 2024

Accepted 21 February 2024

Published 04 March 2024

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DOI

[10.29121/granthaalayah.v12.i2.2024.5515](https://doi.org/10.29121/granthaalayah.v12.i2.2024.5515)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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ABSTRACT

The present study aimed to understand the relationship between mindfulness, mental imagery, and subjective sports performance satisfaction. This study was done on male tennis players aged 18 to 28 years who play competitive tennis at the State and National Levels in India. The tools used to measure the variables were The Mindfulness Attention Awareness Scale (MAAS) by [Brown & Ryan \(2003\)](#), Sports Imagery Ability Questionnaire by [Williams & Cumming \(2014\)](#) and Athlete's Subjective Performance Scale (ASPS) by [Nahum et al. \(2016\)](#). The results of the study show that the national-level tennis players had better self-reported satisfaction scores than the state-level players. Zero-order correlations showed that there was a statistically significant, moderate, positive correlation between Mindfulness and mental imagery ($r(53) = -.304, n = 55, p < .05$), indicating that subjective sports performance satisfaction had very little influence in controlling for the relationship between Mindfulness score and mental imagery.

Keywords: Tennis, Mental Imagery, Mindfulness, Sports Performance

1. INTRODUCTION

Mindfulness in sports enables players to consciously recognize their own thoughts, emotions, and other internal inputs. It promotes athletes to concentrate on their own ideals, skill development, and game strategy, rather than fixating on the end results of their performance [Pineau et al. \(2014\)](#). Acknowledging and embracing the current moment might potentially enable athletes to divert their attention away from pessimistic thoughts, so granting them increased vigor and

concentration for their physical endeavors [Pineau et al. \(2014\)](#). The tennis players who practice Mindfulness are more likely to effectively orient their attention towards external cues that are important to the activity at hand, such as opponent (s), and make behavioural choices that enhance their athletic performance, such as implementing skills and tactics. Mental imagery, in essence, refers to the mental pictures or visual representations that occur in our mind without any external stimuli. Mental imagery, also known as visualization or mental rehearsal, is the process of creating vivid mental representations. The process of mental imagery entails retrieving information stored in our memory from past experiences and transforming these fragments into coherent and meaningful visual representations.

Athletes employ mental images in sports to enhance their physical and psychological abilities. Mental imaging is employed to strengthen focus, bolster motivation, cultivate self-assurance, regulate emotional reactions, learn, and rehearse athletic abilities and tactics, prepare for competition, manage injury, and discomfort, and facilitate problem-solving. Athletes predominantly employ mental images both during practice sessions and in competitive events. However, studies have indicated that athletes employ mental imagery more frequently during competition compared to practice sessions [Munroe et al. \(2000\)](#), [Salmon et al. \(1994\)](#).

Curiously, the majority of studies pertaining to sports mental imaging mostly examines practice scenarios. However, in actuality, players seem to utilize mental imagery more for enhancing their performance in sports before the event takes place. The tennis players have been observed utilizing mental images during periods of short breaks during sets, injury or physical harm.

A tennis players performance on court is influenced by their technical, tactical, physiological, and psychological attributes. Satisfaction is the attainable psychological condition experienced in racket sports. The players performance and happiness are dependent on their satisfaction in tennis play. It is an essential aspect of both enjoying the game and enhancing the players' performance, as well as determining the extent to which they attain their desired objective. The tennis player's happiness is a crucial element in fostering effective performance and proficiency in sports. The current study shall enable the tennis players and their mentors/coaches to understand the subtle mental aspects: imagery, awareness and mindfulness that contribute to successful sports performance and plan their training and competition strategy accordingly. Identification of ones strength's and weaknesses can go a long way in working on the hard areas for overcoming the road blocks such as burn out and plateau in sports training.

2. PROCEDURE

This study was conducted on athletes aged 18 to 28 years who participate in tennis sport at the State and National levels. The athletes included in the study had a minimum of 1 year of experience.

Experimental Methodology: Correlational research design. It examines the correlations between variables without the researcher exerting control or manipulation over any of them.

Scientific apparatus: The researchers utilized the Mindful Attention Awareness Scale (MAAS) developed by [Brown & Ryan \(2003\)](#) to assess the level of Mindfulness in the athletes. The 15-item MAAS assesses the fundamental attribute of Mindfulness, which is a state of mind characterized by open receptivity and attentive awareness of the present moment, without judgment or interference.

The mental imaging capacity of the athletes was assessed using the Sport imaging capacity Questionnaire (SIAQ) developed by Williams & Cumming (2014). The purpose of the 15-item SIAQ is to assess the cognitive capacity of athletes to visualize several aspects relevant to their sport, including abilities, strategies, objectives, emotions, and overcoming challenging situations. It may be utilized to evaluate an athlete's capacity for mental visualization in relation to sport-specific information, either as a single examination or to track changes in imagery ability over time.

The Athletes subjective performance scale Nahum et al. (2016), consisting of 6 items, assesses the key dimensions of performance, encompassing general performance, team contribution, and personal ability. Two of the items specifically pertain to each of these three components.

Sampling technique: The data was collected via snowball sampling. This is a recruiting method where the research participants are requested to help the researcher in discovering other possible subjects for the study.

3. OBJECTIVES OF THE STUDY

- 1) To study the difference between the state and national level tennis players on three psychological variables: Mindfulness, mental imagery, and Athletes subjective performance scale (ASPS)
- 2) To study the relationship between the psychological variables: Mindfulness, mental imagery while controlling for Athletes subjective performance scale (ASPS)

Hypothesis 1= H_0 = there will not be a significant difference between the state and national level tennis players on three psychological variables: Mindfulness, mental imagery, and Athletes subjective performance scale (ASPS)

Hypothesis 2= H_a = there will be a significant difference between the state and national level tennis players on three psychological variables: Mindfulness, mental imagery, and Athletes subjective performance scale (ASPS)

Hypothesis 3= H_0 = there will not be a significant relationship between the psychological variables: Mindfulness, mental imagery while controlling for Athletes subjective performance scale (ASPS)

Hypothesis 4= H_a = there will not be a significant relationship between the psychological variables: Mindfulness, mental imagery while controlling for Athletes subjective performance scale (ASPS)

Analytical approach: The data analysis was conducted using the 25th edition of the Statistical Package for Social Sciences (SPSS). The Pearson partial correlation coefficient was employed to examine the association between Mindfulness, Mental Imagery, and Subjective Sport Performance Satisfaction.

4. RESULTS AND FINDINGS

The purpose of this study was to compare the national and state level tennis players on Mindfulness, mental imagery, and Athletes subjective performance scale (ASPS). Table 1 shows overall means and standard deviations of demographic variables and the three independent variables of the tennis players.

Table 1

Table 1 Descriptive Statistics Showing Demographic Variables of all the Participants (Tennis Players, N=55)

	N	Minimum	Maximum	Mean	Std. Deviation
Age	55	18	28	22.85	3.112
Body Mass Index	55	19	23	21.07	1.464
Mindfulness	55	1.00	3.00	1.8364	.68755
Mental Imagery	55	1.00	3.00	1.8727	.69534
Athletes subjective performance	55	1.00	3.00	1.6727	.66818

Chart 1

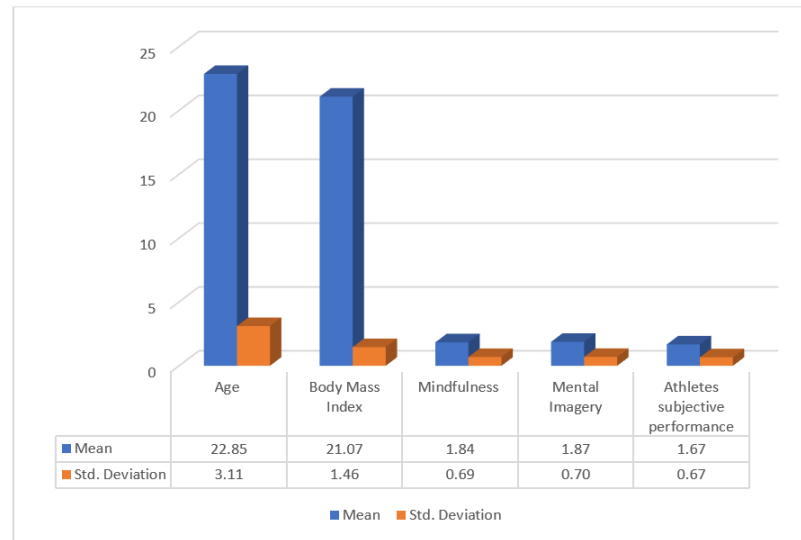


Chart 1 Descriptive Statistics Showing Demographic Variables of all the Participants (Tennis Players, N=55)

Table 2 shows that the mean test score on mindfulness for the national level group was $1.84 \pm .674$. Mean score on mindfulness for state level tennis players was $1.82 \pm .71$. Mean score on mental imagery for national level players was $1.88 \pm .65$. Mean score on mental imagery for state level players was 1.86 ± 0.74 . Mean score on subjective sports performance satisfaction for national level players was 1.88 ± 0.77 and on subjective sports performance satisfaction of state level tennis players, it was $1.48 \pm .5$.

Table 2

Table 2 Group Statistics Showing Mean and Standard Deviation of 55 Male Tennis Players According to Their Level of Participation

Variable	level_of_participation	N	Mean	Std. Deviation	Std. Error Mean
Mindfulness	National Level	26	1.8462	.67482	.13234
	State level	29	1.8276	.71058	.13195
Mental Imagery	National Level	26	1.8846	.65280	.12803
	State level	29	1.8621	.74278	.13793
Athletes subjective performance	National Level	26	1.8846	.76561	.15015
	State level	29	1.4828	.50855	.09443

Chart 2

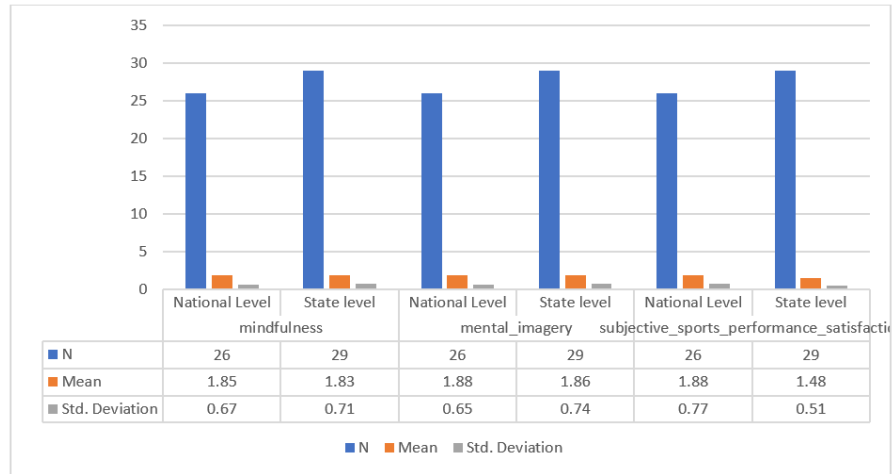


Chart 2 Group Statistics Showing Mean and Standard Deviation of 55 Male Tennis Players According to their Level of Participation

Table 3 shows an independent samples t-test, that was conducted to compare the means of the two groups. The t-statistics for Mindfulness and mental imagery amongst state and national level players were not found to be statistically significant.

Table 3

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Mindfulness	Equal variances assumed	.202	.655	.099	53	.921	.01857	.18742	-.3574	.39449
	Equal variances not assumed			.099	52.812	.921	.01857	.18689	-.3563	.39344
Mental Imagery	Equal variances assumed	1.020	.317	.119	53	.906	.02255	.18954	-.3576	.40271
	Equal variances not assumed			.120	52.983	.905	.02255	.18819	-.3549	.40001
Athletes subjective performance score	Equal variances assumed	1.890	.175	2.315	53	.025	.40186	.17359	.05367	.75004
	Equal variances not assumed			2.266	42.722	.029	.40186	.17738	.04408	.75964

The result for one dependent variable, namely “athletes subjective performance score” was found to be statistically significant ($p < .05$). Effect size by using the Hedges' g, was being used to check the magnitude of effect. Hedges' g, which provides a measure of effect size weighted according to the relative size of each sample, is an alternative where there are different sample sizes, and as seen in this study, the sample size is different. Hedges' $g = (1.48 - 1.88) / 0.640206 = 0.624799$. The benchmarks used for interpretation for effect size was developed by [Cohen \(1988\)](#) where effect sizes of about 0.20, 0.5, and 0.8 are considered small, medium,

and large, respectively. It can, therefore be said that the effect size was medium to large (Hedges $g = 0.64$).

The t-statistics for subjective performance score variable was found to be significantly different for the national level tennis players ($M=1.86$ $SD=0.74$) compared to state level players ($M=1.88$ $SD=0.77$; $t(53)=2.32$ $p=.025$), besides a medium to large effect was found ($d=0.62$ 95% CI [.54-.75]).

The results of this study indicate that there is a statistically significant difference between the mean test scores of the national level group and the state level group on Athletes subjective performance scale (ASPS). Specifically, the national level group had a higher mean test score than the state level group. These findings suggest that the national level tennis players showed better level of sports performance satisfaction as compared to the state level tennis players, with a small to medium effect size.

The first null hypothesis is therefore partially accepted since rest of the two psychological variables did not show significant differences amongst the state and national level tennis players.

Table 4

Table 4 Partial Correlations without Any Control Variable and While Controlling for Athletes Subjective Performance Score

Control Variables			Mindfulness	Mental Imagery	Athletes subjective performance score
-none ^a	Mindfulness	Correlation	1.000	.304	-.038
		Significance (2-tailed)	.	.024	.782
		df	0	53	53
	Mental Imagery	Correlation	.304	1.000	-.012
		Significance (2-tailed)	.024	.	.933
		df	53	0	53
	Athletes subjective performance score	Correlation	-.038	-.012	1.000
		Significance (2-tailed)	.782	.933	.
		df	53	53	0
Athletes subjective performance score	Mindfulness	Correlation	1.000	.304	
		Significance (2-tailed)	.	.025	
		df	0	52	
	Mental Imagery	Correlation	.304	1	
		Significance (2-tailed)	.025	.	
		df	52	0	

a. Cells contain zero-order (Pearson) correlations.

Table 4 shows partial correlation, that was run to determine the relationship between the tennis players' Mindfulness and mental imagery scores controlling for Athletes subjective performance score. There was a moderate, positive partial correlation between Mindfulness score (1.83 ± 0.69) and mental imagery (1.88 ± 0.69) whilst controlling for subjective sports performance satisfaction score of the tennis players (1.67 ± 0.67), which was statistically significant, $r(52) = .304$, $N = 55$,

$p = .025$. However, zero-order correlations showed that there was a statistically significant, moderate, positive correlation between Mindfulness and mental imagery ($r(53) = -.304, n = 55, p < .05$), indicating that the sports performance satisfaction had very little influence in controlling for the relationship between Mindfulness score and mental imagery.

Hypothesis number 3 is therefore rejected and alternate hypothesis number 4 is accepted.

5. CONCLUSION

This study's distinctive aspect is that the subjects (tennis players) are not passive listeners. The self-reported sports satisfaction scale helps athletes feel involved, valued, and creates self-awareness. Athlete satisfaction is a positive emotional state that arises from a comprehensive assessment of the structures, processes, and results linked to the athletic experience [Chelladurai & Riemer \(1997\)](#), p. 135. The study results indicate that there is no significant correlation between mindfulness and Sport Performance Satisfaction, as well as between mental imagery and Sport Performance Satisfaction. On the other hand, there is a strong beneficial association between mindfulness and mental imagery. It can be therefore contended that utilizing Mental Imagery strategies to enhance self-confidence and self-efficacy can result in improved performance in challenging tennis competition and training scenarios. This will aid individual tennis players in self-regulating their emotions and planning strategies successfully, as well as enhancing the confidence of the entire team.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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