

## PERSONALITY DIMENSIONS DRIVE ACHIEVEMENT LEVELS OF CRICKET PLAYERS: A STUDY ON THE FIVE-FACTOR MODEL

Abhishek Kumar<sup>1ABD</sup>, Manish Shukla<sup>1ACD</sup>, Jayashree Acharya<sup>1ABD</sup>

<sup>1</sup>Lakshmbai National Institute of Physical Education

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Corresponding Author: Manish Shukla, E-mail: [manish.shukla1992@gmail.com](mailto:manish.shukla1992@gmail.com)

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### Abstract

**Aim of study.** Cricket is considered a mental game among elite level performers. Specific personality traits characterize elite-level endeavors and high-potential athletes. Previous studies on psychological characteristics of cricket players reported that more skilful cricketers deal more consistently and effectively with their emotions and pressure.

Therefore the objective of the present study was analysis of personality traits of cricket players at national, state, and district levels with the help of Five-Factor Model.

**Materials and Methods.** Sample size included 120 male subjects (60 batsmen and 60 pace bowlers) recruited from cricket academies/training facilities/competition venues in India. Big-Five Personality Inventory (BFI-44) was utilized to measure personality dimensions. Differences among personality variables at different competition levels of batsmen and pace bowlers were analyzed using One-way MANOVAs.

**Results.** National level pace bowlers scored high on openness (national vs. district, Mean Difference (MD) = 4.25,  $p < 0.05$ ; national vs. state, MD = 2.75,  $p < 0.05$ ) and agreeableness (national vs. district, MD = 4.70,  $p < 0.05$ ; national vs. state, MD = 3.40,  $p < 0.05$ ). Similarly, national level batsmen scored high on extraversion (national vs. district; MD = 4.350;  $p < 0.05$ ), agreeableness (national vs. state; MD = 3.70;  $p < 0.05$ ), and conscientiousness (national ns. district, MD = 3.25,  $p < 0.05$ ; national vs. state, MD = 3.450,  $p < 0.05$ ).

**Conclusions.** National level pace bowlers exhibited greater agreeableness and openness whereas similar level batsmen showed greater agreeableness, openness, extraversion, and conscientiousness as compared to lower levels of participation. Since the concept of “Form” demands multi-factorial approach in the game of cricket, other facets of personality such as focus, mental toughness, self-belief, optimism etc. should also be explored for effective talent identification and coaching in cricket.

**Keywords:** Personality, Big-Five, Batsmen, Pace Bowlers, BFI-44.

### Introduction

Elite performance in sports is a multi-factorial outcome and an athlete requires both skill sets and psychological attributes to excel in their respective sports (Weissensteiner et al., 2012). Self-esteem, low neuroticism, conscientiousness, mental toughness, resilience, perfectionism, self-belief, confidence, and coping skills (Bojanić et al., 2019; Weissensteiner et al., 2009) are all but a few most important factors characterizing the elite players.

Cricket is the second most popular sport in the world, after soccer (Ribeiro et al., 2012). Apart from physical and physiological prowess, elite level cricket players possess great

“mental strength” to withstand long hours of play and cope with the pressure of fatigue, intimidating opposition, and crazy fans (Baumeister & Showers, 1986). Whether batting, bowling, or fielding, a player’s psychological strength has been identified by coaches, players, and commentators as a critical ingredient for winning cricket matches.

Previous studies on psychological characteristics of cricket players reported that more skilful cricketers deal more consistently and effectively with their emotions and pressure (Durand-Bush & Salmela, 2002; Gould et al., 2002; Orlick & Partington, 2016). Also, they train and develop their minds to perform more effectively and consistently throughout the game. An important consideration is the determination of future performance through the possibility that elite athletes possess personality characteristics that make them successful in their particular sport (Allen et al.,

2011). Thus identification of these personality traits proves to be a plausible area that might assist in discovering trainable attributes and screening of promising athletes for superior performance in cricket at elite level. In recent years, Five Factor Model (FFM) of personality has gained considerable traction in the identification and evaluation of personality traits among players at different achievement levels in various contexts such as organized sports achievements, academic performance and professional success (Allen & Laborde, 2014).

*Aim of study.* Although the role of big five personality traits has been extensively studied in competitive success in other sports; there are limited research evidences for their role in elite-level cricket performance. Therefore, our purpose was to investigate the difference in big five personality traits at different levels of pace bowlers and batsmen (District, State and National level).

## Material and Methods

### Study Participants

A total of 120 male cricket players (60 Batsmen, 60 Pace bowlers) of age group 18-25 years were purposively selected from various cricket academies/training facilities/competition venues in India. As per the objective of the study, 20 participants were selected from each of the three levels of participation (District, State, and National) in both batsmen and pace bowlers category. The objectives of the study were explained to them and all the participants agreed to voluntarily participate in the study and provided their written consent. The study was conducted in accordance with the guidelines of the World Medical Association Declaration of Helsinki, 2013.

### Study Organization

In the present study, 44-item Big Five Personality Inventory (BFI-44), originally developed by Oliver P. John and Sanjay Srivastava (John & Srivastava, 1999) was used. This psychological inventory measures five dimensions of personality: Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Before filling up the questionnaire, the test administrator explained each

item of the BFI-44 thoroughly and responded to the doubts of the participants, if any. Every participant was asked to answer a set of 44 items with each item being responded on a 5-point Likert scale ranging from “Disagree Strongly (1)”, “Disagree a little (2)”, “Neither agree nor disagree (3)”, “Agree a little (4)”, to “Agree Strongly (5)”. Some of the items were then reverse-scored to compute overall score of the BFI-44 for an individual player. Sufficient time was given to the participants to record their responses in the inventory. All the assessments were carried out at their respective training places by the test administrator who was blind to the allocation of the intervention throughout the study.

### Statistical analysis

The statistical analysis was performed using SPSS v22 (IBM inc., Chicago, USA). The descriptive characteristics included mean  $\pm$  SD of all the categories. According to BFI-44, personality is considered a latent factor that includes traits such as extraversion, agreeableness, conscientiousness, neuroticism and openness to experience. Since this study was designed as a comparative analysis of personality characteristics among different levels of cricket players, MANOVA (Multivariate analysis of variance) was employed to compare the group means among both the batsmen and pace bowlers groups at 3 levels of participation: district, state, and national.  $P < 0.05$  was considered statistically significant.

## Results

The descriptive characteristics (mean  $\pm$  standard deviation) of both the categories i.e. batsmen and pace bowlers at three different levels are presented in table 1. The results of multivariate tests performed on big five personality variables at different levels of pace bowlers and batsmen are presented in table 2. The equality of covariance matrices was assessed using the Box's M test which yielded statistical insignificance. This means that the covariance matrices were equal, which is an important assumption for the application of multivariate analysis. The error variances of all the big five personality variables were also equal for both pace bowlers and batsmen group as evaluated by Levene's test of homogeneity of error variances (Table 3).

**Table 1.** Descriptive statistics of big five personality variables among pace bowlers and batsmen at different levels

Variable	Statistics	Pace Bowler			Batsmen			
		District	State	National	District	State	National	
Big Five Personality Inventory	Openness	Mean	32.05	33.55	36.30	32.00	33.05	35.20
		SD*	2.70	3.78	3.48	6.17	4.31	4.20
	Extraversion	Mean	25.80	27.90	28.60	24.55	27.35	28.90
		SD*	3.43	4.95	2.78	3.43	3.38	4.40
	Agreeableness	Mean	29.40	30.70	34.10	29.20	27.35	31.05
		SD*	5.56	4.35	4.13	3.69	4.17	2.70
	Conscientiousness	Mean	31.20	32.40	33.95	29.00	28.80	32.25
		SD*	3.43	5.72	4.84	2.64	3.79	3.91
	Neuroticism	Mean	19.80	21.95	23.50	23.65	22.90	26.90
		SD*	3.36	4.70	5.53	4.31	4.39	4.10

\*SD: Standard Deviation

**Table 2.** Multivariate statistics for Big Five Personality variables of Pace Bowlers and Batsmen at different levels

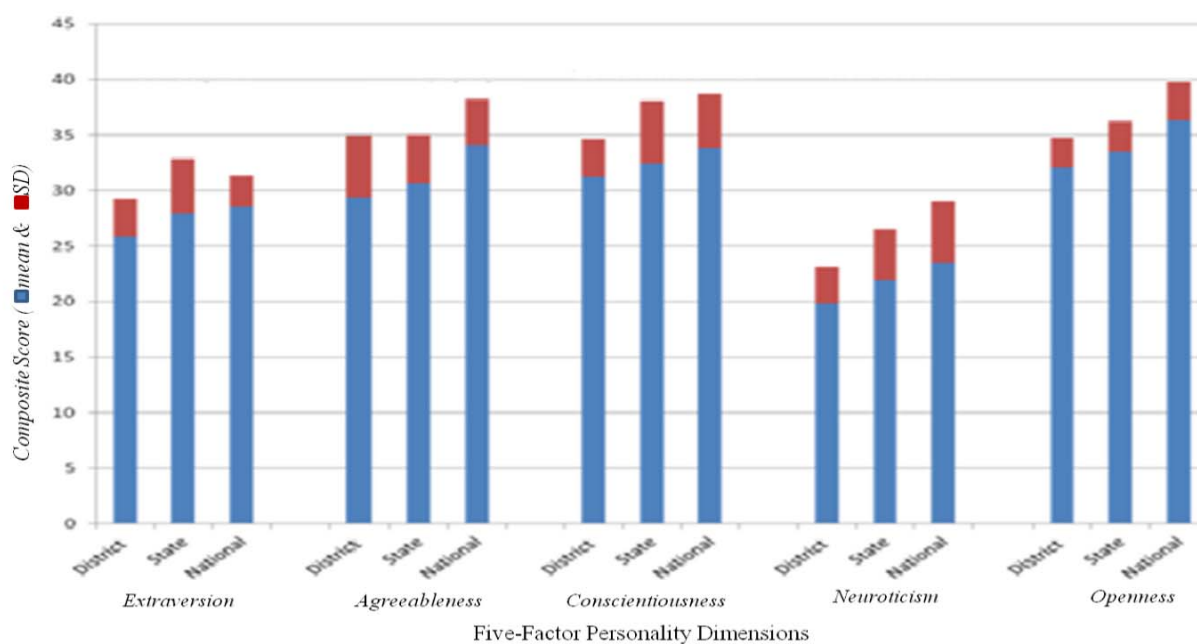
Group	Box's M Test		Wilk's λ		η <sub>p</sub> <sup>2</sup>	Power
	F	P value*	Value	F		
Pace Bowlers	1.104	0.317	0.543	3.782	<b>0.000</b>	0.263
Batsmen	1.268	0.149	0.502	4.362	<b>0.000</b>	0.292

F: F-statistics; η<sub>p</sub><sup>2</sup>: Partial Eta Squared; \*P-value in bold face indicates significance at 0.05 level of significance

**Table 3.** Univariate between-subject tests for big five personality variables among pace bowlers and batsmen

Dependent Variable	Group	Levene's Test		F	P value*	η <sub>p</sub> <sup>2</sup>	Power
		F	P value				
Openness	Pace Bowlers	1.245	0.296	8.274	<b>0.001</b>	0.225	0.953
	Batsmen	0.841	0.436	2.148	0.126	0.070	0.422
Extraversion	Pace Bowlers	2.442	0.096	2.896	0.063	0.092	0.544
	Batsmen	1.339	0.270	6.864	<b>0.002</b>	0.194	0.908
Agreeableness	Pace Bowlers	1.841	0.168	5.284	<b>0.008</b>	0.156	0.816
	Batsmen	2.450	0.095	5.354	<b>0.007</b>	0.158	0.822
Conscientiousness	Pace Bowlers	2.915	0.062	1.681	0.195	0.056	0.340
	Batsmen	1.791	0.176	6.153	<b>0.004</b>	0.178	0.874
Neuroticism	Pace Bowlers	2.566	0.086	3.239	0.047	0.102	0.595
	Batsmen	0.247	0.782	4.964	0.010	0.148	0.790

F: F-statistics; η<sub>p</sub><sup>2</sup>: Partial Eta Squared; \*Bonferroni correction to the p-value. Corrected p-value=0.05/5; P-value in bold faces indicates significance at 0.01 level of significance



**Fig. 1.** Graphical representation of various psychological dimensions of Pace bowlers

The one-way MANOVA test was statistically significant for pace bowlers ( $F_{(10,106)} = 3.782$ ;  $p < 0.05$ ; Wilk's  $\lambda = 0.543$ ; partial  $\eta^2 = 0.263$ ; Table 2) indicating that the pace bowlers at district, state, and national levels had differences in big five personality variables. Similarly, one-way MANOVA test for batsmen resulted in statistical significance ( $F_{(10,106)} = 4.362$ ;  $p < 0.05$ ; Wilk's  $\lambda = 0.502$ ; partial  $\eta^2 = 0.292$ ; Table 2) and it meant that batsmen at district, state, and national levels had differences in big five personality variables. Univariate between-subject tests were employed to determine those big five personality variables that produced significant

differences among pace bowlers and batsmen at different levels.

Openness: In openness, there was significant difference among district, state, and national level pace bowlers ( $F_{(2,57)} = 8.274$ ,  $p < 0.01$ , partial  $\eta^2 = 0.225$ ; Table 3). Post-Hoc comparison suggested that national level pace bowlers scored high in openness as compared to district level (mean difference = 4.25;  $p < 0.05$ ; 95% CI: 2.128-6.372; Table 4; Figure 1) and state level (mean difference = 2.75;  $p < 0.05$ ; 95% CI: 0.628-4.872; Table 4) pace bowlers. No significant difference was observed between district and state level

**Table 4.** Post-Hoc pairwise comparisons for Pace bowlers and batsmen at different levels

Variable	Level (I)	Level (J)	MD	P value*	95% C.I.
<b>Pace Bowlers</b>					
Openness	District	State	-1.50	.162	0.662-3.622
		National	-4.25	.000	2.128-6.372
Extraversion	State	National	-2.75	.012	0.628-4.872
		District	-2.10	.088	0.325-4.525
Agreeableness	District	State	-2.80	.024	0.375-5.225
		National	-0.70	.565	1.725-3.125
Conscientiousness	State	National	-3.40	.027	0.410-6.390
		District	-1.20	.428	1.811-4.211
Neuroticism	District	State	-2.15	.146	0.774-5.074
		National	-3.70	.014	0.776-6.624
	State	National	-1.55	.293	1.374-4.474
<b>Batsmen</b>					
Openness	District	State	-1.050	.507	2.102-4.202
		National	-3.200	.047	0.048-6.352
Extraversion	State	National	-2.150	.177	1.002-5.302
		District	-2.800	.022	0.417-5.183
Agreeableness	District	State	-4.350	.001	1.967-6.733
		National	-1.550	.198	0.833-3.933
Conscientiousness	State	National	-3.700	.002	1.436-5.964
		District	.200	.857	2.011-2.411
Neuroticism	District	State	-3.250	.005	1.039-5.461
		National	-3.450	.003	1.239-5.661
	State	National	.750	.581	1.952-3.452
		District	-3.250	.019	0.548-5.952
	State	National	-4.000	.004	1.298-6.702

MD = Mean Difference; CI = Confidence Interval; \*P-values in bold face indicate statistical significance at 0.05 level of significance

pace bowlers. But among batsmen, univariate test yielded insignificant results ( $F_{(2,57)} = 2.148$ ,  $p > 0.01$ , partial  $\eta^2 = 0.07$ ; Table 3) suggesting that the batsmen at different levels were indifferent although pairwise comparison showed difference between national vs. district level batsmen (mean difference = 3.20;  $p < 0.05$ ; 95% CI: 0.048-6.352; Table 3; Figure 1).

Extraversion: In extraversion, pace bowlers were found indifferent among district, state, and national level ( $F_{(2,57)} = 2.896$ ,  $p > 0.01$ , partial  $\eta^2 = 0.092$ ; Table 3; Figure 1). But batsmen at different levels differed significantly ( $F_{(2,57)} = 6.864$ ,  $p < 0.01$ , partial  $\eta^2 = 0.194$ ; Table 3). Post-Hoc comparison suggested significant difference between district vs. state level (mean difference = 2.80;  $p < 0.05$ ; 95% CI: 0.417-5.183; Table 4) and between district vs. national level (mean difference = 4.350;  $p < 0.05$ ; 95% CI: 1.967-6.733; Table 4; Figure 2). There was no difference between state vs. national level batsmen on extraversion (Table 3).

Agreeableness: Significant difference among district, state, and national level pace bowlers was observed on agreeableness ( $F_{(2,57)} = 5.284$ ,  $p < 0.01$ , partial  $\eta^2 = 0.156$ ; Table 3). Post-Hoc comparison suggested that national level pace bowlers scored high on agreeableness as compared to district level (mean difference = 4.70;  $p < 0.05$ ; 95% CI: 1.710-7.690; Table 4) and state level (mean difference = 3.40;  $p < 0.05$ ; 95% CI: 0.410-6.390; Table 4) pace bowlers (Figure 1). No significant difference was observed between district and state level pace bowlers. Similarly, batsmen at different levels also differed significantly ( $F_{(2,57)} = 5.354$ ,  $p < 0.01$ , partial  $\eta^2 = 0.158$ ; Table 3) on agreeableness. Post-hoc comparison among batsmen yielded significant difference between national vs. state level batsmen (mean difference = 3.70;  $p < 0.05$ ; 95% CI: 1.436-5.964; Table 4; Figure 2). Batsmen at district vs. national and district vs. state levels showed no difference (Table 4).

Conscientiousness: In conscientiousness, no statistically significant difference was observed among district, state, and

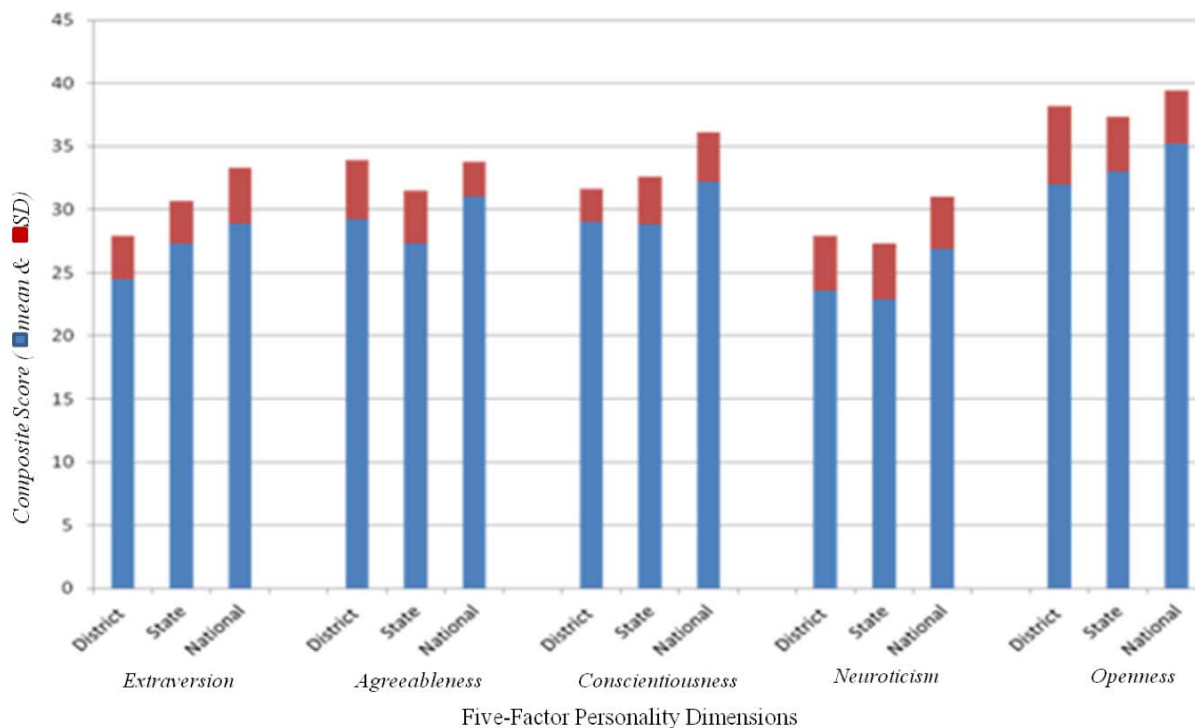


Fig. 2. Graphical representation of various psychological dimensions of batsmen.

national level pace bowlers ( $F_{(2,57)} = 1.681, p > 0.01$ , partial  $\eta^2 = 0.056$ ; Table 3; Figure 1). But batsmen at different levels differed significantly ( $F_{(2,57)} = 6.153, p < 0.01$ , partial  $\eta^2 = 0.178$ ; Table 3). Post-Hoc comparison suggested significant difference between district vs. national level (mean difference = 3.25;  $p < 0.05$ ; 95% CI: 1.039-5.461; Table 4; Figure 2) and between state vs. national level (mean difference = 3.450;  $p < 0.05$ ; 95% CI: 1.239-5.661; Table 4; Figure 2). There was no difference between district vs. state level batsmen (Table 4).

Neuroticism: Again, pace bowlers did not differ significantly in univariate between-subject test on neuroticism ( $F_{(2,57)} = 3.239, p > 0.01$ , partial  $\eta^2 = 0.102$ ; Table 3; Figure 1). Although very close to being significant, but batsmen also did not differ significantly ( $F_{(2,57)} = 4.964, p > 0.01$ , partial  $\eta^2 = 0.148$ ; Table 3) at different levels (Figure 2).

## Discussion

Behavioral researchers attribute the inter-individual differences in performance among athletes to their underlying personality characteristics (Mosalaei et al., 2014; Sternberg, 2019). During competitions, athletes inevitably expose the psychological core of their personality and this psychological core drives their athletic behavior (Mosalaei et al., 2014; Weinberg & Gould, 2011). Allen et al. (2011) stated that the five-factor model of personality can help distinguish various levels of athletic involvement (Allen et al., 2011). Therefore it was hypothesized that cricket players at different levels of participation (district, state, national) possess distinct personality traits as per Five Factor Model (FFM) of personality. Big Five Personality Inventory (BFI-44) was utilized to assess the personality of cricket players at different levels.

The results of present study suggested a significant difference in dependent variables (Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness) among pace bowlers and batsmen at different levels. Specifically, the big five personality traits explained 45.7% and 49.8% of the variance between district, state, and national level pace bowlers and batsmen respectively (Wilk's  $\lambda$ ; Table 2). National level pace bowlers scored high in openness. Openness is characterized by imagination, knowledge seeking curiosity, risk-taking attitude, unconventional, and creativity (George & Zhou, 2001; John & Srivastava, 1999). Apart from skill set, the cricket players at national level are generally older and would have trained for more years as compared to lower competition level cricket players, and hence they tend to show improvisation in basic cricketing skills (Baker et al., 2007; Schorer & Baker, 2009). As they have had more exposure to stressful match situations, they tend to develop better coping skills (Tok, 2011).

Pace bowlers are real workhorses who consistently sprint and explode during bowling and in-between their spells generally field at the boundary lines (Petersen et al., 2010, 2011; Vickery et al., 2018). As the competitive levels increase, the physiological and psychological demands also surge high. Also, the pace bowlers tend to sustain musculoskeletal injuries, hence they engage in rehabilitation program apart from regular training. This may affect their social behavior inside and outside the stadia. Although loquacious, they are often perceived as shy, self-centered, and drained athletes. On the other hand, with an increase in competitive levels, batsmen tend to be profoundly chirpy, vocal, sociable, and cheerful (Mosalaei et al., 2014; Stricker et al., 2019; Trninić et al., 2016) as suggested by our findings on extraversion among batsmen (Table 4).



National-level batsmen exhibited greater conscientiousness as compared to district or state level (Table 3). Although not significant statistically, national-level pace bowlers showed greater conscientiousness as compared to district level ( $p=0.073$ ; table 4). Cricket players are often driven by multidimensional perfectionism: perfectionistic strivings, and perfectionistic concerns (Hill et al., 2010), thus always striving for ideal stroke-playing, delivering ideal ball, tactical prowess and have fear of committing mistakes. And Waleriańczyk & Stolarski (2021) suggested that athletes having perfectionistic strivings tend to score high in conscientiousness and those having perfectionistic concern correlate negatively with emotional stability (Waleriańczyk & Stolarski, 2021). Also, perfectionistic strivings have an association with other dimensions of big five personality too. Openness follows positive correlation with perfectionistic striving whereas agreeableness and extraversion have inconsistent association. Neuroticism has been mostly negatively correlated to perfectionistic strivings (Stricker et al., 2019).

Cricket being a team game always demands optimism, liveliness, energy, cooperation, and camaraderie (Nia & Ali Besharat, 2010) and hence national level pace bowlers and batsmen exhibited high agreeableness as reported by the results of present study. Also, agreeableness and conscientiousness have been associated with age of athletes too. Thus national players being significantly older tend to show greater agreeableness and conscientiousness as compared to district or state players (Trninić et al., 2016). Although pace bowlers and batsmen at different levels did not differ significantly on neuroticism (Table 4), post-hoc analysis revealed national-level pace bowlers and batsmen being less neurotic as compared to district and state players (Table 4). Lower neuroticism is associated with higher achievement levels, coachability, motor fitness, and overall “team-man” concept (Trninić et al., 2016). Team game athletes experience low neuroticism because they tend to share responsibility and report greater emotional stability as compared to individual games athletes.

## Conclusions

The present study is considered a novel attempt to characterize personality traits of cricket players at different levels of competition based on the dimensions of Five Factor Model (FFM). The study indicates that national level pace bowlers exhibited greater agreeableness and openness whereas national level batsmen showed greater agreeableness, openness, extraversion, and conscientiousness as compared to inferior levels of participation. Since the game of cricket demands multi-factorial approach to fully elucidate the concept of “Form”, other facets of personality such as focus, mental toughness, self-belief, optimism etc. should also be explored in an attempt to optimize the salient inherent and trainable traits that should be focused in talent identification and coaching in cricket.

Although this study presents delightful findings, small sample size is considered a potential limitation. Also, age of the players was not recorded and analyzed, although the age category for this study was 18-25 years. The findings of this study must be interpreted in the light of these limitations because age and hence maturation brings significant

improvements in skill acquisition and skilful players exhibit greater self-confidence, resilience, focus, and coping skills.

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## Conflict of Interest

The authors declare that there is no conflict of interest.

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## ВПЛИВ ОСОБИСТІСНИХ ХАРАКТЕРИСТИК НА РІВЕНЬ ДОСЯГНЕНЬ ГРАВЦІВ В КРИКЕТ: ДОСЛІДЖЕННЯ П'ЯТИФАКТОРНОЇ МОДЕЛІ

Абхішек Кумар<sup>1ABD</sup>, Маніш Шукла<sup>1ACD</sup>, Джаяшрі Ачарья<sup>1ABD</sup>

<sup>1</sup>Національний інститут фізичного виховання імені Лакшмі Бай

Авторський вклад: А – дизайн дослідження; В – збір даних; С – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 8 с., 4 табл., 2 рис. 26 джерел.

**Мета дослідження.** Крикет вважається ментальною грою серед спортсменів елітного рівня. Специфічні риси особистості характерні для професійних спортсменів і спортсменів з високим потенціалом. Попередні дослідження психологічних характеристик гравців в крикет показали, що більш досвідчені гравці в крикет послідовніше й ефективніше справляються зі своїми емоціями і тиском. Тому метою даного дослідження був аналіз особистісних

якостей гравців в крикет на національному, державному та районному рівнях за допомогою п'ятифакторної моделі.

**Матеріали та методи.** У дослідженні прийняли 120 чоловіків (60 гравців з битою і 60 боулерів), набраних в академіях крикету / тренувальних центрах / місцях проведення змагань в Індії. Опитувальник великої п'ятірки (BFI-44) використовувався для вимірювання параметрів особистості. Відмінності між особистісними змінними на різних

рівнях змагань у гравців з битою і боулерів проаналізовані за допомогою одностороннього MANOVA.

**Результати.** Боулери національного рівня отримали високі бали по відкритості (національний і районний, середня різниця (MD) = 4,25,  $p < 0,05$ ; національний і штатний, MD = 2,75,  $p < 0,05$ ) і дружельності (національний або районний, MD = 4,70,  $p < 0,05$ ; національний проти штату, MD = 3,40,  $p < 0,05$ ). Так само гравці з битою національного рівня отримали високі бали по екстраверсії (національний проти округу; MD = 4,350;  $p < 0,05$ ), поступливості (національний проти штату; MD = 3,70;  $p < 0,05$ ) і сумлінності (національний проти округу, MD = 3,25,  $p < 0,05$ ; національний проти штату, MD = 3,450,  $p < 0,05$ ).

**Висновки.** Боулери національного рівня демонстрували більшу поступливість і відкритість, тоді як гравці з битою аналогічного рівня демонстрували більшу поступливість, відкритість, екстраверсію і сумлінність у порівнянні з більш низькими рівнями участі. Оскільки концепція «форми» вимагає багатофакторного підходу в грі в крикет, інші аспекти особистості, такі як зосередженість, психологічна стійкість, впевненість в собі, оптимізм тощо, так само повинні бути досліджені для ефективного виявлення талантів і підвищення ефективності тренування в крикеті.

**Ключові слова:** особистість, велика п'ятірка, бетсмени, боулери, BFI-44.

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#### Information about the authors:

**Kumar, Abhishek:** abhi9755465112@gmail.com; <https://orcid.org/0000-0002-4695-3419>; Lakshmibai National Institute of Physical Education, Gwalior, 474002, India.

**Shukla, Manish:** manish.shukla1992@gmail.com; <https://orcid.org/0000-0002-3568-8496>; Lakshmibai National Institute of Physical Education, Gwalior, 474002, India.

**Acharya, Jayashree** (Posthumous): jayashreeacharya@hotmail.com; <https://orcid.org/0000-0002-3953-1170>; Lakshmibai National Institute of Physical Education, Gwalior, 474002, India.

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