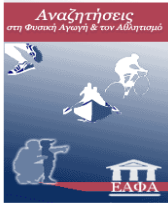


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The Relationship Between Motivational Personality and Performance of Basketball Players

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Abstract

The purpose of this study was to evaluate the relationship between motivational personality, in terms of the Behavioral Activation System (BAS) and Behavioral Inhibition System (BIS), and basketball performance. The study involved 86 male players from nine teams in the Swedish Basketball League. It was hypothesized that players with higher scores in the BAS factors (BAS Drive, BAS Reward Responsiveness, BAS Fun Seeking) would perform better, both in scored points and the plus-minus (PM) factor. BAS/BIS scores were obtained using the Carver and White (1994) questionnaire. A multilevel regression analysis revealed that BAS factors were significant predictors of the PM factor, indicative of individual contributions to the team performance, but not scored points, indicative of individual performance. These findings suggest that players with higher BAS scores may contribute more to team performance.

Keywords: *performance indicators, elite sports, Swedish basketball, sports psychology*

Περίληψη

Σκοπός της παρούσας μελέτης ήταν να αξιολογηθεί η σχέση μεταξύ του προσωπικού κινήτρου, ως προς το Σύστημα Συμπεριφορικής Ενεργοποίησης (Behavioral Activation System; BAS) και το Σύστημα Συμπεριφορικής Αναστολής (Behavioral Inhibition System; BIS), και της απόδοσης στο μπάσκετ. Η μελέτη συμπεριέλαβε 86 άνδρες παίκτες από εννέα ομάδες της πρώτης κατηγορίας μπάσκετ στη Σουηδία. Η υπόθεση που ελέγχθηκε ήταν ότι οι παίκτες με υψηλότερες τιμές στους παράγοντες του BAS (BAS Drive, BAS Reward Responsiveness, BAS Fun Seeking) θα απέδιδαν καλύτερα, τόσο σε προσωπικούς πόντους ανά παιχνίδι όσο και στον δείκτη plus-minus (PM). Οι τιμές BAS/BIS συλλέχθηκαν μέσω του ερωτηματολογίου των Carver και White (1994). Μια πολυεπίπεδη ανάλυση παλινδρόμησης (multilevel regression analysis) αποκάλυψε ότι οι παράγοντες του BAS ήταν στατιστικά σημαντικοί προγνωστικοί δείκτες του PM, που αντανακλά την ατομική συμβολή στην ομαδική απόδοση, αλλά όχι των προσωπικών πόντων ανά αγώνα, που αντανακλούν την ατομική απόδοση. Τα ευρήματα υποδηλώνουν ότι οι παίκτες με υψηλότερες τιμές BAS ενδέχεται να συμβάλλουν περισσότερο στην ομαδική απόδοση.

Λέξεις Κλειδιά: δείκτες απόδοσης, ελίτ σπορ, Σουηδικό μπάσκετ, αθλητική ψυχολογία

Introduction

Performance in elite basketball emerges from the interaction of physical, technical, tactical, and psychological factors, expressed through both individual player actions and team-level dynamics, with each domain contributing essential elements to the overall performance equation (Hughes & Bartlett, 2002). Evaluation of game performance in basketball relies on a wide array of observable statistical key performance indicators (KPIs), that may be primarily characterized as offensive (e.g., scored points, two- and three-point field goals, free throws, offensive rebounds, assists and turnovers); defensive (e.g., defensive rebounds, steals, blocks, fouls); as well as composite efficiency metrics such as the plus-minus (PM) factor, which attempts to capture individual players' overall contributions to team performance by determining the point difference between teams while a specific player is on court (Metulini & Gnecco, 2023).

Despite the multifactorial nature of basketball performance, previous research has primarily focused on technical and tactical performance indicators (Csataljay et al., 2017), while psychological factors have received comparatively less empirical attention, particularly in relation to objective performance metrics. This leads to a little consensus regarding the role of non-game performance indicators in basketball performance and selection processes (Roberts et al., 2019). However, a recent literature review highlights a range of psychological factors considered important for sports performance, including mental practice, anxiety, confidence, cohesion, goal orientation, mood, emotional intelligence, goal setting, and self-talk (Lochbaum et al., 2022). Basketball coaches have similarly identified attitude, character, coachability, communication, competitiveness, confidence, emotional control, leadership, mental health/cognition, motivation, resilience/toughness, responsibility, and work ethic as essential for basketball performance (Rogers et al., 2022). These findings underscore the importance of examining psychological dispositions that influence how players respond to competitive demands.

One theoretically grounded approach to understanding such dispositions is motivational personality, conceptualized through Gray's reinforcement sensitivity theory (RST) and operationalized by the Behavioral Inhibition System (BIS) and Behavioral Activation System (BAS) (Carver & White, 1994; Gray, 1972, 1981). According to Gray (1972, 1981), BIS is linked to anxiety and negative emotions, leading to avoidance behavior in the face of potential punishment. Conversely, the BAS is associated with the pursuit of rewards and positive emotional states, driving approach behaviors and goal-directed actions. In the context of basketball, individuals with higher BAS sensitivity may be more inclined to engage in goal-directed actions such as aggressiveness, risk-taking, and team involvement, all of which are critical in basketball's fast-paced, team-oriented environment.

Although previous studies have acknowledged personality as one of the most significant performance predictors in sports (Allen et al., 2013; Allen & Laborde, 2024) and demonstrated associations between broad personality traits (e.g., conscientiousness, extraversion, neuroticism) and basketball performance (Díaz-Rodríguez & Pérez-Córdoba, 2024; Gorelová & Halama, 2024; Maddi & Hess, 1992; Siemon & Wessels, 2022), the specific role of motivational personality in basketball remains largely unexplored. In particular, there is limited empirical evidence linking BIS/BAS sensitivity to objective performance indicators derived from competitive play. Addressing this gap is important for advancing psychological models of performance and for informing talent development, coaching, and player selection processes.

Therefore, the purpose of this study is to investigate the relationship between motivational personality and basketball performance, operationalized through the BIS/BAS framework and objective game-related performance indicators. We hypothesized that higher BAS sensitivity will be positively associated with basketball performance indicators, reflecting greater approach-oriented and goal-directed behavior, whereas higher BIS sensitivity will be negatively associated with performance, reflecting increased avoidance and performance-inhibiting anxiety.

Method

Participants

Male basketball players ($n = 100$) from the Swedish Basketball League (SBL) provided written informed consent to participate in the study. All participants were professional players, ensuring similar training backgrounds and experience levels. The age range of the players was between 18 and 40 years. The nature of the data processed rendered the present study exempt from formal ethical review according to the Swedish Ethical Review Act.

Nevertheless, all research procedures were conducted in accordance with the principles outlined in the Declaration of Helsinki (2000).

Of the original 100 players who enrolled in the study, 14 players were excluded who either a) played fewer than five games in the season, or b) averaged less than five minutes per game during the season. These exclusions were made to ensure that the sample consisted of players who were regularly involved in the games to achieve an adequate number of observations of a players' performance contributions. Therefore, the final sample used for analysis consisted of 86 players. These players were distributed across positions as follows: 16 point guards, 22 shooting guards, 15 small forwards, 15 power forwards, and 18 centers. The final sample of 86 players represents approximately 72% of the estimated SBL player population, based on the assumption that each of the ten teams includes around 12 players (≈ 120 players in total).

Instrument

The data were collected through a questionnaire encompassing 1) demographic characteristics, including name, basketball league, team name and playing position and 2) the BIS/BAS scale developed by Carver and White (1994). The scale contains 24 items that reflect either BAS or BIS sensitivity. The items are written in Likert-format with responses from 1 to 4 whereby 1 = *very true for me*, 2 = *somewhat true for me*, 3 = *somewhat false for me* and 4 = *very false for me*. BIS items reflect a sensitivity to potential negative outcomes – such as punishment, threat, or aversive events – and how individuals respond to them. In contrast, BAS items capture a strong drive toward desired goals and a tendency to pursue new and rewarding experiences.

The questionnaire consists of four sub-scales; BIS, BAS Reward Responsiveness, BAS Drive and BAS Fun Seeking. The BIS or punishment sensitivity scale consists of all the items that refer to reactions connected to punishment. The BAS Drive scale includes all the items connected to the pursuit of desired goals. The Fun Seeking scale has items about both seek for new rewards and desire for a potentially rewarding experience on the spur of the moment. The Reward Responsiveness scale has items about positive reactions to the occurrence of a rewarding event (Carver & White, 1994). Reliability testing of the BIS/BAS among 732 college students provided the following alpha values for the four sub-scales: BIS scale, $\alpha = .74$; BAS Reward Responsiveness, $\alpha = .73$; BAS Drive, $\alpha = .76$; BAS Fun Seeking $\alpha = .66$ (Carver & White, 1994). The test-retest correlation was shown to be: BIS = .66, BAS Drive = .66, BAS Reward Responsiveness = .59, and BAS Fun Seeking = .69.

Basketball KPIs related to the enrolled players were obtained from the official website of the Swedish Basketball Federation (SBBF, 2019), where they are publicly available online. The chosen performance indicators of this study were the plus-minus (PM) factor and the scored points. For each player, both indicators (PM and scored points) were expressed as per-game averages over the full season. Scored points reflect individual scoring performance, as players can accumulate points regardless of the team's overall result, making it a fundamental indicator of individual achievement. The PM factor, on the other hand, captures a player's contribution to the team's success by measuring the difference between the points scored by the player's team and those scored by the opposing team during the player's time on the court (Metulini & Gnecco, 2023). Thus, by incorporating both scored points and PM, we were able to assess the effect of motivational personality traits on both individual performance and a player's contribution to team performance.

Procedure

Team coaches within the SBL were informed about the research via phone, and nine out of ten teams from the SBL agreed to participate. The players from these nine teams were verbally informed by the first author and their own coach about the aims of the research, and they were free to decide whether or not to participate. Players were informed the day before the practice about the study, with emphasis that participation was voluntary and that they could choose not to participate at any time without repercussions. To link the questionnaire results with individual performance data, athletes were asked to state their names on the questionnaire. Participants were assured that only the first author would be able to identify respondents, and that all data would be presented at the group level to maintain confidentiality. Players completed the BIS/BAS questionnaire under similar conditions, during the last practice before an upcoming game, ensuring consistency across participants.

Statistical Analysis

All the statistical analyses were conducted via IBM SPSS Statistics 28.0.1.0 software. First, the reliability of the different sub-scales of the questionnaire were calculated showing the following results: BAS Drive, $\alpha = .75$; BAS Fun Seeking, $\alpha = .77$; Bas Reward Responsiveness; $\alpha = .54$; and BIS, $\alpha = .66$.

Then, the basic assumptions for conducting a hierarchical regression model were checked: Bivariate Pearson correlation analysis between pairs of predictor variables showed no multicollinearity (Table 1). Thus, all four BIS-BAS subscales were included in the regression models.

Table 1. Bivariate Pearson correlations, and indications of p-values, between the scores for the measured predictor variables (i.e. the scores on the BIS-BAS questionnaire).

	BAS Fun Seeking	BAS Reward Responsiveness	BIS
BAS Drive	.365**	.430**	-.048
BAS Fun Seeking		.329**	.129
BAS Reward Responsiveness			.227*

* $p < .05$; ** $p < .01$

Standardized residuals were inspected, and no outliers greater than ± 3 were identified. Cook's distance values were all below 1, indicating that no influential cases were present. The Durbin-Watson statistic was .99, suggesting acceptable independence of errors. Examination of the Normal P-P Plot of standardized residuals indicated that the residuals were approximately normally distributed, as data points closely followed the diagonal line. The scatterplot of standardized residuals versus standardized predicted values displayed a random pattern, suggesting that the assumptions of linearity and homoscedasticity were met. Furthermore, all tolerance values were above .70 and all VIF values were below 1.5, confirming that multicollinearity was not an issue. Overall, the diagnostic tests indicated that the data satisfied the assumptions required for multiple regression analysis.

Then, a multiple hierarchical regression model was constructed using the scores from the three different BAS scales as predictor variables for the first level (i.e. model 1) and with the addition of the BIS scale scores as predictor variable for the second level (i.e. model 2). Separate models were constructed for each outcome variable; scored points and the PM factor. The significance threshold was set to the conventional $p < .05$.

Results

Table 2 presents the descriptive statistics for the BIS/BAS factors. Among the BAS subscales, Fun Seeking showed the highest mean score, followed by Drive and Reward Responsiveness. The BIS factor demonstrated a higher mean score relative to all BAS subscales. Standard deviations were comparable across variables, indicating a relatively similar dispersion of scores.

Table 2. Descriptive statistics of the BIS/BAS factors

BIS/BAS Variable	Mean	Standard Deviation
BAS Drive	1.88	.47
BAS Fun Seeking	2.01	.39
BAS Reward Responsiveness	1.48	.33
BIS	2.55	.40

Prediction of Scored Points

The regression model showed that the BIS/BAS subscales could not be used to predict scored points performance (i.e. individual performance) at any level, (both $F_s < 1$). Moreover, none of the predictor variables contributed significantly to the regression (See Table 3).

Table 3. Standardized coefficients (β), t-value (t) and probability (p) for the predictor variables (i.e. BAS sub-scales) in multilevel regression analysis with points as outcome variable. In Model 2 the BIS score has been added as predictor variable.

Model	Variable	Beta	t	p
1	BAS Drive	.023	.179	.859
	BAS Fun Seeking	-.015	-.124	.901
	BAS Reward Responsiveness	.095	.760	.450
2	BAS Drive	.059	.457	.649
	BAS Fun Seeking	-.034	-.285	.777
	BAS Reward Responsiveness	.047	.368	.714
	BIS	.171	1.488	.141

In summary, the results suggest that motivational personality traits measured through the BIS/BAS framework were not associated with individual scoring performance.

Prediction of the PM Factor

On the other hand, the regression model at Level 1 was able to significantly predict the PM factor, $F(3, 81) = 7.128$, $p < .01$, $R^2 = .209$, $R^2_{\text{adjusted}} = .180$. No additional significant increase in the F -ratio was shown with adding BIS scores at Level 2. The scores on BAS subscales Drive and Reward Responsiveness contributed significantly to the regression model (Table 4).

Table 4. Standardized coefficients (β), t-value (t) and probability (p) for the predictor variables (the different sub-scores on BAS) in multilevel regression analysis with plus/minus factor as outcome variable. In Model 2 the BIS score has been added as predictor variable.

Model	Variable	Beta	t	p
1	BAS Drive	.240	2.119	.037
	BAS Fun Seeking	.004	.034	.973
	BAS Reward Responsiveness	.297	2.656	.010
2	BAS Drive	.234	2.107	.047
	BAS Fun Seeking	.007	.063	.950
	BAS Reward Responsiveness	.305	2.625	.010
	BIS	-.029	-.275	.784

In summary, the results suggest that motivational personality traits in terms of the BIS/BAS framework, and more specifically two BAS factors, were associated with athletes' contribution to the team performance, measured by the PM factor. Higher levels of BAS Drive and Reward Responsiveness were positively associated with overall on-court contribution as reflected by the PM factor. The results from our sample indicate that for every one standard deviation increase in the BAS Drive factor, the PM factor increases by .240 standard deviations. Similarly, for every one standard deviation increase in the BAS Reward Responsiveness, the PM increases by .297 standard deviations.

Discussion

The present study examined whether motivational personality, operationalized via the BIS/BAS framework, relates to objective basketball performance indicators. The results did not support the initial hypothesis that the BIS/BAS scales would predict individual basketball performance in terms of points scored. However, the BAS subscales Drive and Reward Responsiveness significantly predicted the PM factor performance, which supports the hypothesis that motivational personality is associated with individual contributions to team performance. This result contributes to a growing body of literature emphasizing the role of psychological factors in athletic performance (Rogers et al., 2022), and more specifically the role of personality traits in basketball performance

(e.g., Gorelová & Halama, 2024; Maddi & Hess, 1992; Siemon & Wessels, 2022) and sports performance in general (e.g., Allen et al., 2013; Allen & Laborde, 2014).

BAS predicts PM but not scored points

Although motivational personality traits may not show a direct statistical relationship with point-scoring in basketball, the current findings suggest they contribute meaningfully to a player's overall impact on team performance, as reflected in the PM factor. One explanation for this pattern is that scored points reflect a relatively narrow and role-dependent outcome that is strongly shaped by tactical responsibilities, minutes played, usage rate, and opportunity structure (e.g., offensive system, shot distribution). In contrast, PM is a broader, context-sensitive indicator that can capture a player's overall on-court impact, including defensive effort, off-ball movement, decision quality, and actions that facilitate teammates' performance. BAS Drive (goal persistence) and Reward Responsiveness (sensitivity to reinforcement) may be more directly expressed in these continuous, effort- and engagement-related behaviors than in a single box-score category such as points.

Traits associated with persistence, goal-driven behavior, emotional regulation, and strategic consistency – often assessed through frameworks like the BIS/BAS model (Carver & White, 1994) – may not be easily captured by box score statistics, but are vital to team efficiency and cohesion, and are consistently linked to long-term success in high-level performance environments (Allen & Laborde, 2014; MacNamara et al., 2010). Put differently, BAS-related tendencies may not “*make someone a scorer*,” but they may increase the likelihood that a player consistently contributes to sequences that end in favorable team outcomes – through higher intensity, proactive positioning, sustained engagement, and responsiveness to success-related feedback. This interpretation is consistent with applied perspectives from coaches, who frequently emphasize motivation, competitiveness, emotional control, and “*game intelligence*” as crucial determinants of high-level performance (Rogers et al., 2022).

Implications of BIS/BAS for basketball performance

The fact that the BAS subscales can predict basketball performance as measured by the PM factor, which primarily reflects players' individual contribution to team-related performance may be explained by the nature of basketball as a team sport, where interpersonal interaction, reward responsiveness, and drive are critical for success. Early research by Booth (1959) observed that athletes participating in team sports tend to exhibit higher levels of extraversion, a trait closely correlated with BAS sensitivity (Carver & White, 1994). More recent evidence supports this association, showing that extraversion and reward sensitivity are particularly pronounced among team-sport athletes (Allen et al., 2011). Given that BAS sensitivity is associated with a heightened responsiveness to positive reinforcement and goal pursuit, athletes with higher BAS scores may be better equipped to engage dynamically with teammates, sustain motivation during collaborative play, and capitalize on success-related feedback. Consequently, in basketball, individuals scoring higher on BAS factors may not only show a greater propensity for participation in team sports but also achieve higher levels of performance in domains heavily reliant on team coordination and collective goal achievement (Gorelová & Halama, 2024; Siemon & Wessels, 2022).

Among the BAS sub-scales, the Reward Responsiveness factor emerged as the most significant predictor of performance. This finding is consistent with the nature of the study's sample, which comprised professional basketball players competing in Sweden's highest league. At this elite level, athletes are often primarily motivated by the attainment of personal accolades and team championships, which serve as critical sources of satisfaction and motivation (Deci & Ryan, 2000; Vallerand & Losier, 1999). Furthermore, considering that financial compensation constitutes a major form of reward, it is reasonable to posit that these players are motivated not only by intrinsic enjoyment but also by the necessity to earn a living through their athletic performance (Ryan & Deci, 2000). In contrast, the BAS Fun Seeking sub-scale demonstrated the weakest association with performance outcomes. This may be attributed to the professional status of the participants, as although they may still derive pleasure from playing, their primary motivational drivers are likely linked to external rewards rather than the pursuit of novel or stimulating experiences (Clancy et al., 2017). These findings suggest that sensitivity to reward-related reinforcement, as conceptualized within the BAS framework, may be more strongly associated with performance outcomes in professional basketball contexts.

In summary, whereas Drive and Reward Responsiveness reflect sustained goal pursuit and reinforcement sensitivity – features compatible with disciplined, performance-oriented engagement – Fun Seeking is typically conceptualized as a preference for novelty, spontaneity, and immediate stimulation. The weak association of Fun Seeking with PM, combined with comparatively low Fun Seeking in this professional sample, may reflect the

realities of elite basketball: professional performance is shaped by structured systems, role discipline, and repeated execution under constraints, where consistency and task commitment are prioritized over novelty-seeking. In this context, a motivational profile characterized by high Drive/Reward Responsiveness but relatively low Fun Seeking may be especially adaptive because it supports persistence and reinforcement-driven engagement without encouraging excessive impulsivity or risk-taking that could undermine tactical discipline.

Finally, the descriptive statistics revealed that the basketball players exhibited a higher mean score on the BIS factor (2.55) compared to the BAS subscales, including Drive (1.88), Fun Seeking (2.01), and Reward Responsiveness (1.48). High levels of BIS activation are typically associated with heightened sensitivity to anxiety and potential threat cues (Carver & White, 1994). Thus, in line with previous research (e.g., Baumeister, 1984; Sonstroem & Bernardo, 1982; Woodman & Hardy, 2003), despite their professional status, the participants demonstrated elevated anxiety sensitivity. These results suggest that while professional players have the technical and tactical skills required for success, psychological factors such as heightened BIS activation may still pose challenges to optimal performance.

Practical Recommendations

From an applied perspective, the present findings suggest that motivational personality traits—particularly BAS Drive and Reward Responsiveness—may be more informative for understanding a player’s overall contribution to team performance than for predicting individual scoring output. For coaches and scouts, this implies that psychological profiling may complement traditional performance metrics by helping to identify players whose value lies in sustained effort, engagement, and facilitation of team success rather than in point production alone. Players with higher Drive and Reward Responsiveness may be especially well suited for roles that require consistent intensity, repeated high-quality actions, and readiness to capitalize on positive performance feedback, all of which can influence team scoring margins without necessarily being reflected in individual box-score statistics. Moreover, understanding players’ motivational profiles may enable coaches to tailor motivational strategies more effectively. For example, athletes with higher Reward Responsiveness may benefit from structured positive feedback that reinforces team-oriented behaviors such as defensive effort, spacing, or ball movement, whereas Drive-oriented players may respond particularly well to process-focused goals that emphasize persistence and role execution. More broadly, the findings highlight the importance of evaluating performance beyond scoring and suggest that integrating motivational psychological characteristics into talent identification and player development processes may enhance teams’ ability to recognize and cultivate high-impact contributors in elite basketball contexts.

Limitations and Future Directions

Some limitations should be acknowledged when interpreting the present findings. First, the relatively small and homogeneous sample restricts the generalizability of the results to other populations, such as female athletes, youth players, or athletes competing in different cultural or competitive contexts. Second, the cross-sectional design precludes causal conclusions regarding the direction of the relationships between motivational personality traits and performance outcomes. Finally, internal consistency for the BAS Reward Responsiveness subscale was low (Cronbach’s $\alpha = .54$). Low reliability typically attenuates observed associations, meaning that relationships between Reward Responsiveness and performance may be underestimated. At the same time, measurement error can also make parameter estimates less stable; therefore, despite Reward Responsiveness emerging as a strong predictor in the model, this result should be interpreted with caution until replicated by future research.

Future research should therefore aim to replicate these findings with larger and more diverse samples and across multiple competitive levels. Further studies may also benefit from examining a wider range of team- and behavior-oriented performance indicators (e.g., defensive actions, off-ball movement, decision-making efficiency) to clarify how motivational traits are expressed during competition. Longitudinal designs could provide insight into how BIS/BAS sensitivity relates to performance consistency, role development, and adaptation to competitive demands over time, thereby strengthening understanding of motivational personality in elite basketball contexts.

Significance for Sport, Physical Education, and Quality of Life

This study advances the growing body of literature on psychological performance indicators by being the first to apply the BIS/BAS model within a basketball context. It demonstrates that motivational personality traits, although not always predictive of direct performance outputs such as point scoring, may play a critical role in broader behavioral contributions that impact team success. These findings support a more integrative view of athletic performance—one that balances physical, technical, and psychological dimensions. With further research and applied innovation, psychological assessments such as the BIS/BAS framework may become valuable tools in both performance enhancement and talent identification in elite sport.

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