



OPEN Structural equation modeling of basic psychological needs and meaningful sports consumption with the mediating role of team attachment and self-esteem

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The interplay between psychological factors and consumer behavior in sports contexts has drawn significant attention; yet, the mechanisms underlying meaningful sports consumption (MSC) remain underexplored. Basic Psychological Needs (BPNs), team attachment, and self-esteem are key constructs that may influence MSC behaviors, particularly in culturally distinct markets such as China. This study investigates how BPNs' satisfaction drives MSC directly and indirectly through the mediating roles of team attachment and self-esteem. Using Structural Equation Modeling (SEM) and a mixed-methods approach, the study analyzed data from 320 valid responses collected via online and offline surveys. Measurement scales for BPNs, team attachment, self-esteem, and MSC were developed and validated through Confirmatory Factor Analysis (CFA), ensuring reliability and discriminant validity. The findings show that BPNs impact MSC directly and indirectly through team attachment and self-esteem. Team attachment fosters feelings of nationality, pride, and interest in sports-related information, while self-esteem enhances self-confidence and pride. These psychological constructs lead to MSC behaviours such as supporting domestic sports products, attending local games, and purchasing tickets to support local sports development. Satisfying BPNs is essential for promoting meaningful engagement in sports consumption. Team attachment and self-esteem partially mediate this relationship, providing marketers, sports organizations, and policymakers with insights to enhance fan engagement and promote broader participation in sports. This research advances our understanding of the psychological mechanisms underlying sports consumer behavior.

Keywords Basic psychological needs, Sports consumption, Team attachment, Self-Esteem, Structural equation modeling, Consumer behavior, Psychological drivers, Sports marketing

Sports consumption has witnessed significant growth worldwide, fueled by increased participation and the expanding influence of the sports industry¹. Defined as the financial expenditures on sports-related products and services—such as equipment, apparel, event tickets, and media subscriptions—sports consumption has become a crucial economic and social phenomenon². As the industry diversifies, consumer engagement has evolved beyond traditional hedonic motivations to encompass deeper psychological and social dimensions^{3,4}. This shift highlights the emerging concept of meaningful sports consumption (MSC), wherein individuals derive purpose, emotional fulfilment, and moral enrichment from their engagement with sports^{5,6}.

Most prior research has focused on hedonic consumption, where fans seek excitement and entertainment through sports engagement^{7,8}. However, an alternative perspective suggests that consumers also pursue sports consumption experiences that align with their intrinsic values, moral beliefs, and personal growth⁹. This meaningful engagement manifests in two distinct ways: self-oriented MSC, which emphasizes admiration for athletic excellence, and other-oriented MSC, which appreciates the moral virtues of athletes and teams¹⁰.

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Research indicates that meaningful sports narratives can enhance prosocial behaviours, such as charitable giving and social activism among fans^{8,11}. Additionally, exposure to sports content emphasizing moral excellence has been shown to reinforce ethical considerations in consumers, strengthening their emotional investment in sports^{12,13}. Nonetheless, the psychological mechanisms that drive MSC remain underexplored.

The Theory of Sports Consumption Motivation offers insights into the various psychological and social factors that drive consumer behavior in sports^{14,15}. Established models, such as the Sports Consumption Motivation Scale (SCMS) and the Motivations of Sport Consumer (MSC) theory, highlight dimensions including self-esteem, socialization, group affiliation, and self-actualization as core motivators^{16–19}. These motivations influence consumption patterns, driving fans to engage with teams, athletes, and sports-related media in ways that fulfil deeper psychological needs¹⁰.

Basic Psychological Needs (BPNs) theory, derived from Self-Determination Theory (SDT), provides a foundational framework for understanding the intrinsic motivations behind MSC. It posits that individuals are driven by the need for competence (mastery and achievement), autonomy (self-directed action), and relatedness (social connection)^{20,21}. When these needs are satisfied, individuals exhibit higher engagement and intrinsic motivation^{22,23}. Studies have shown that BPNs are vital in shaping consumer behavior in sports, influencing motivation, emotional regulation, and well-being^{24–26}. Furthermore, research suggests that sports consumers who experience high levels of competence and relatedness are more likely to develop long-term commitment to their favourite teams and athletes^{17,27}.

This study explores the mediating roles of team attachment and self-esteem in MSC. Team attachment, or the emotional bond between fans and their favourite teams, significantly influences consumption behaviours, fostering loyalty and long-term engagement^{28,29}. Fans with strong team identification exhibit higher emotional involvement, resulting in increased participation in sports-related activities, such as attending games, purchasing merchandise, and engaging with digital content^{30,31}. Similarly, self-esteem, which relates to an individual's sense of self-worth and validation, has been identified as a key driver of sports consumption, reinforcing social identity and personal fulfilment^{32,33}. Consumers often engage with sports to enhance their self-perception, drawing confidence from their association with successful teams and admired athletes^{34,35}.

By employing structural equation modeling (SEM), this study aims to develop a theoretical framework that examines how BPNs influence MSC through the mediating roles of team attachment and self-esteem. Research utilizing SEM has previously confirmed significant relationships between psychological needs and sports-related consumption behaviours^{36,37}. This approach offers theoretical and practical insights into how sports organizations can enhance consumer engagement by integrating meaningful, value-driven experiences into their offerings. Understanding the psychological mechanisms underlying MSC can inform marketing strategies and policy decisions within the sports industry, ensuring that consumer experiences align with broader social and personal values^{38–40}.

Moreover, recent studies suggest that meaningful engagement in sports consumption contributes to overall psychological well-being, promoting social inclusion and personal growth^{41,42}. The role of social influence and peer networks has also been highlighted, demonstrating that individuals are more likely to engage in MSC when they perceive collective enthusiasm and shared values within their social circles^{43,44}. The growing importance of digital platforms further amplifies these trends, as online communities provide spaces for shared experiences and moral discourse in sports fandom^{45–48}.

This study aims to bridge the knowledge gap by examining the interplay between BPNs, team attachment, self-esteem, and MSC. It will contribute to both academic literature and practical applications in the sports industry, offering new insights into how sports consumption can be transformed into a more meaningful and psychologically fulfilling experience^{49,50}.

Literature review

This section presents a comprehensive review of the literature supporting the study's conceptual model. It explores the role of BPNs as an independent variable influencing team attachment and self-esteem, which act as mediating factors in MSCB. The review also examines the psychological mechanisms underlying BPNs, sports consumption motivation, and the mediating roles of team attachment and self-esteem.

Basic psychological needs (BPNs) and meaningful sports consumption (MSC)

Consumer behaviour is driven by intrinsic psychological needs, which influence individuals' consumption activities, including sports^{51,52}. Research suggests that BPNs—competence, autonomy, and relatedness—are foundational catalysts for consumer decision-making. These needs are essential for personal well-being and shape sports consumption behaviour by fostering emotional engagement and purpose-driven consumption³⁹.

Shi⁵⁰ classified consumer needs into three categories: hedonic, physical, and basic psychological. BPNs represent higher-order needs that significantly impact consumer behaviors beyond mere pleasure-seeking or functional consumption⁵⁰. Within the consumer-driven economic framework, sports products and experiences are increasingly designed to align with psychological needs, ensuring that consumers derive meaning and fulfilment from their engagement with sports⁵³.

Wang and Li⁵⁴ emphasize the importance of social recognition needs in consumption behaviour, particularly in eco-friendly and ethical consumption patterns, which activate underlying moral and social values. Similarly, in sports, individuals who experience greater satisfaction with their BPNs tend to engage in higher levels of MSC behaviours (MSCBs) driven by a deeper emotional and psychological connection to sports. Thus, we propose:

H1 Basic psychological needs significantly impact meaningful sports consumption behaviours (MSCBs).

BPNs and team attachment

Sports consumption is often rooted in social and collective identity, making team attachment a crucial motivational factor⁵⁵. The fulfillment of BPNs, particularly relatedness, is strongly associated with team attachment, as consumers seek a sense of belonging and emotional connection through sports⁵⁶. Zhang⁵⁷ found that individuals who pursue collective identity are more likely to develop strong team attachments, mainly when sports teams symbolize national, regional, or group identity. Major sporting events that evoke national pride or regional representation amplify team attachment motivation, further strengthening consumer engagement in sports-related activities⁵⁷. Given the strong link between BPNs and team attachment, we hypothesize:

H2 BPNs significantly impact consumers' motivation for team attachment.

BPNs and self-esteem

Self-esteem is a core psychological factor influencing consumption behaviour, particularly in areas where identity and status are essential⁵⁸. Theories such as dominance theory, social scale theory, and fear control theory suggest that self-esteem is shaped by individuals' assessments of their social standing⁵⁸. Funk et al.⁵⁹ identified self-esteem, ambition, and social recognition as key drivers of self-actualization needs in consumption behaviour. Higher self-esteem motivation leads consumers to seek experiences and products that enhance their self-concept and social image, including sports-related consumption⁵⁹.

Baumeister⁶⁰ argues that self-improvement motivation is central to the pursuit of self-esteem, reinforcing the idea that BPNs influence self-esteem motivation through mechanisms of personal development, achievement, and social validation. In alignment with Maslow's hierarchy of needs, self-esteem is positioned as a higher-order social need, further supporting its role in motivating sports consumption behaviour⁶¹. Thus, we hypothesize:

H3 BPNs significantly impact consumers' self-esteem motivation.

Team attachment, motivation, and MSC behavior (MSCB)

Ko et al.⁶¹ found that sports consumers actively engage in behaviours reinforcing team attachment, including joining fan clubs, attending live events, and purchasing team-related merchandise. Research suggests that team attachment fosters emotional investment, leading to higher levels of sports engagement⁶²⁻⁶⁴.

Funk et al.⁵⁹ observed that individuals with strong team attachments frequently watch games associated with their community, while international sporting events evoke national pride and collective identification. This pattern of behaviour aligns with MSC behaviours (MSCBs), in which consumers seek more profound meaning and emotional fulfilment through sports consumption⁵⁹. Thus, we propose:

H4 Consumer motivation for team attachment significantly influences their engagement in MSCBs.

Self-Esteem motivation and MSC behavior (MSCB)

Self-esteem is a key determinant of consumer decision-making, particularly in behaviours linked to identity and social validation⁶². The status consumption theory suggests that self-esteem motivates individuals to consume products that symbolize personal aspirations and prestige⁶³. Symbolic consumption theory emphasizes that status-driven products convey a deeper meaning, thereby reinforcing self-esteem and social recognition⁶⁵. Research on conspicuous consumption has consistently demonstrated a positive correlation between self-esteem motivation and consumption tendencies, particularly in areas where social image and self-worth are essential⁶⁶. MSC behaviours, which emphasize personal growth, moral values, and emotional significance, align closely with self-esteem-driven consumption patterns. Therefore, we hypothesize:

H5 Self-esteem motivation significantly and positively influences MSCBs.

The mediating role of team attachment

Consumer behaviour is a complex, multifaceted process influenced by diverse psychological needs. Wann et al.⁵⁴ proposed that team attachment motivation is fueled by the desire to share a social identity with fellow fans. This aligns with BPN's theory, highlighting relatedness as a fundamental need that drives social and community-based behaviors³⁹.

Sports events provide a platform for social interaction, shared experiences, and community bonding, satisfying BPNs while reinforcing team attachment²⁰. Chu et al.⁴⁸ examined the relationship between attachment motivation and consumer engagement, using Chinese consumers' WeChat interactions to measure social bonding through sports fandom. Thus, we hypothesize:

H6 Team attachment mediates the relationship between BPNs and MSCBs.

The mediating role of self-esteem

Self-esteem motivation plays a significant role in consumer engagement, shaping decisions related to identity, status, and belonging²³. Since BPNs influence self-improvement and enhance self-esteem motivation, this process directly impacts sports consumption behaviours. Individuals with higher self-esteem motivation are more likely to invest in meaningful consumption experiences, particularly those that reinforce personal values, social status, and community engagement. This aligns with MSC theory, which suggests that self-esteem-driven consumption is a key mechanism underlying meaningful engagement in sports. Thus, we propose:

H7 Self-esteem mediates the relationship between BPNs and MSCBs.

Methodology

Sample selection

This study targeted Chinese consumers who actively engage in sports consumption, operationally defined as individuals who had purchased or participated in sports-related activities within the past six months, such as attending sporting events, buying merchandise, or using fitness-related services. To ensure this inclusion criterion was met, the questionnaire began with a mandatory screening question asking participants to self-report whether they had engaged in any of the above activities in the previous six months. Only those who selected “yes” were allowed to proceed with the full survey. This question functioned as both a filter and an exclusion mechanism for ineligible participants.

Eligible participants were required to (a) be at least 18 years old, (b) currently reside in China, and (c) have engaged in at least one form of sports consumption in the past six months, as confirmed through the screening item. No additional exclusion criteria were applied beyond these conditions.

The sampling strategy employed a convenience sampling approach across both online and offline channels. Online surveys were disseminated through Chinese social media platforms (e.g., Weibo, WeChat) and sports-related forums or fan groups where sports engagement was likely, but not guaranteed. Offline surveys were distributed at locations with high probabilities of sports engagement, such as gyms, sports clubs, and university fitness centers in major urban areas. While this method helped reach a broad range of sports consumers, we acknowledge the limitation that precise baseline equivalency in engagement intensity across participants cannot be guaranteed, given the non-random sampling and self-report nature of the initial screening.

Informed consent procedures differed slightly by mode: digital consent was obtained online before survey initiation, while paper-based consent forms were attached to and collected with completed offline surveys. All participants were informed of the study’s purpose, confidentiality assurances, and their right to withdraw at any time.

Data collection began with a pilot survey to test the clarity of items, resulting in minor revisions to wording and layout. During the primary data collection phase, 389 questionnaires were distributed. After excluding responses due to inattention or abnormal patterns (e.g., unrealistically short completion times or uniform responses), 320 valid cases were retained for analysis.

Although no a priori power analysis was conducted, the final sample size ($N=320$) meets established benchmarks for multivariate analyses such as SEM or multiple regression. Post hoc considerations confirm that this sample size offers sufficient statistical power for detecting medium-sized effects and testing the hypothesized relationships in the model⁷¹.

Descriptive statistics of the sample are presented in Table 1.

Scale development

Data for this study were collected using validated instruments to measure the relevant constructs. The Basic Needs Satisfaction in Sport Scale (BNSSS), developed by Ng, Lonsdale, and Hodge⁶⁷, was used to assess participants’ satisfaction with their basic psychological needs in the context of sports, including autonomy, competence, and relatedness as core components of Self-Determination Theory. Moreover, the Meaningful Consumption Scale by Sweeney and Soutar⁶⁸ was employed to measure meaningful sports consumption. This adaptation, explicitly designed for the sports context, was refined through expert reviews to ensure content

Variable	Categories	Frequency	Percentage (%)
Gender	Male	144	45.0
	Female	176	55.0
Ages	18–20	102	31.9
	20–25	182	56.9
	26–35	21	6.6
	36–45	3	0.9
	> 45	12	3.8
Education level	High school and below	64	20.0
	Junior college	77	24.1
	Undergraduate	102	31.9
	Master and above	77	24.1
Monthly income	< 3,000	226	70.6
	3,000–5,000	46	14.4
	5,000–8,000	32	10.0
	> 8,000	16	5.0
Monthly sports consumption expenditure	< 200	194	60.6
	200–500	72	22.5
	500–1,000	32	10.0
	> 1,000	22	6.9

Table 1. Descriptive statistics of samples.

Latent variable	Item	Load	SD	AVE	CR	Cronbach's α
Team attachment	Sense of nationality and patriotic feelings	0.851	0.084	0.629	0.821	0.749
	Feel proud	0.856				
	Interest in relevant information	0.911				
Self-esteem	Pride	0.900	0.114	0.823	0.912	0.920
	Self-confidence	0.930				
	Self-esteem	0.860				
MSC	Support domestic/internal sports products	0.750	0.068	0.723	0.812	0.782
	Watch my country's (local) team play	0.840				
	Buy sports tickets to support the development of domestic (local) sports	0.712				
BPNs	Autonomy	0.871	0.147	0.731	0.881	0.861
	Relatedness	0.880				
	Competence	0.832				

Table 2. Reliability and validity of the scales.

Latent Variable	BPNs	Sports consumption	Self-esteem	Team attachment
BPNs	0.861			
Sports consumption	0.542	0.823		
Self-esteem	0.610	0.470	0.912	
Team attachment	0.330	0.560	0.620	0.828

Table 3. Discriminant validity of the scales.

Fit index	Threshold	Observed value
CFI (Comparative Fit Index)	> 0.90	0.948
TLI (Tucker-Lewis Index)	> 0.90	0.933
RMSEA (Root Mean Square Error of Approximation)	< 0.08	0.062
SRMR (Standardized Root Mean Square Residual)	< 0.08	0.049

Table 4. Model fit assessment (Based on CFA results).

validity. Psychological attachment to a favourite sports team was evaluated using the Team Identification Scale (TIS) by Wann and Branscombe⁶⁹, a widely recognized measure of fan identification and loyalty. Lastly, the Rosenberg Self-Esteem Scale (RSES)⁷⁰ assessed participants' global self-esteem, capturing their overall sense of self-worth and acceptance.

Each of these instruments has been widely used in prior research and meets the necessary criteria for reliability, convergent validity, and discriminant validity. To ensure the robustness of the measurement model, we conducted a Confirmatory Factor Analysis (CFA), and the results confirm that all constructs exhibit appropriate factor loadings, internal consistency, and model fit. The reliability, validity, and model fit assessments are presented in the Results section (Tables 2 and 3, and 4). To ensure that participants could comprehend the English version of the questionnaire, the scale was initially piloted with 20 participants. The resulting agreement index was 85%, indicating that the participants had no difficulty understanding the items and confirming the linguistic appropriateness of the instruments.

Procedure

The study was conducted in several steps to ensure a systematic and rigorous approach. First, ethical approval was obtained from the Ethics Committee of Guangxi Normal University (Ethics Approval Reference: 2023/18963.12). All procedures adhered to institutional guidelines and regulations. Written informed consent was secured from all participants.

Next, participants were selected using convenience sampling, targeting Chinese consumers actively engaged in sports consumption. During the data collection phase, 389 questionnaires were distributed. After excluding invalid responses, such as those with speedy completion times or uniform answer patterns, 320 valid responses were retained for analysis.

Following sample selection, surveys were administered in two phases. A pre-survey was conducted to identify and address vague expressions or linguistic ambiguities in the questionnaire, leading to necessary refinements. The formal survey was then implemented using a combination of online questionnaires and offline paper-based distribution to reach a diverse participant pool.

Data analysis

The collected data were analyzed using Structural Equation Modeling (SEM), which was conducted in AMOS version 24.0. SPSS version 26.0 was used for initial data screening, descriptive statistics, and reliability analysis. SEM was chosen due to its ability to simultaneously test complex relationships among latent variables (e.g., self-esteem, team attachment) and their observed indicators (survey items), providing a comprehensive framework for evaluating the study's theoretically grounded model.

Before SEM analysis, key statistical assumptions were carefully assessed. Univariate normality was verified by examining skewness and kurtosis values for all items. At the same time, multicollinearity was assessed using Variance Inflation Factor (VIF) values, all of which fell well below the threshold of 5. Scatterplot matrices evaluated the linearity of relationships among constructs, and sample adequacy was confirmed based on SEM standards, which recommend a minimum of 200 participants for stable model estimation⁷¹. No violations of assumptions were identified, supporting the appropriateness of proceeding with SEM. The SEM process involved two primary stages:

1. Measurement model evaluation using Confirmatory Factor Analysis (CFA) to assess the reliability, convergent validity (via factor loadings, AVE, CR), and discriminant validity (via the Fornell–Larcker criterion) of the latent constructs.
2. Structural model testing to examine the hypothesized relationships among the constructs, including both direct effects and indirect (mediated) effects.

Model fit was evaluated using a comprehensive set of indices: Chi-square/df, RMR, GFI, AGFI, TLI, CFI, and RMSEA. The reported values met or exceeded the conventional thresholds recommended by Hu and Bentler⁷² and Kline⁷¹, indicating that the model fit the data well.

To support transparency and replicability, all methodological steps—from sampling and questionnaire design to data screening procedures and model specification—have been thoroughly documented. Analyses were conducted using widely available statistical software (SPSS and AMOS), and all constructs, measurement items, and associated loadings are presented in detail in Tables 2 and 3.

Results

Measurement model evaluation

Confirmatory factor analysis was employed to assess the reliability of the data, revealing a good fit for the measurement models: $\chi^2/df=1.55$, RMR=0.138, GFI=0.930, AGFI=0.888, PGFI=0.580, TLI=0.890, CFI=0.931, and RMSEA=0.045. As depicted in Tables 2 and 3, the combined reliability of all structural variables surpasses the recommended threshold of 0.70, and the average variance extracted (AVE) also exceeds the recommended level of 0.50, indicating strong reliability in measuring the structural variables. Furthermore, the standardized factor loadings for all structural variables exceed 0.7 and are significant at $\alpha=0.01$, indicating high convergent validity of the scale. Additionally, the square root of all AVEs exceeds the correlation coefficients between their corresponding rows and columns, indicating strong discriminant validity of the scale.

Results also show that team attachment demonstrates significant associations with feelings of nationality and patriotism (Load=0.851, SD=0.084, AVE=0.629, CR=0.821, $\alpha=0.749$), pride (Load=0.856), and interest in relevant information (Load=0.911). Self-esteem is closely linked to self-confidence (Load=0.930) and pride (Load=0.860), suggesting that individuals with higher self-esteem tend to exhibit greater confidence and pride in themselves. Sports consumption is positively associated with behaviours such as supporting domestic sports products (Load=0.750, SD=0.068, AVE=0.723, CR=0.812, $\alpha=0.782$), watching local teams play (Load=0.840), and buying tickets to support local sports development (Load=0.712), underscoring the importance of sports-related activities in fulfilling consumer needs. Moreover, Basic Psychological Needs (BPNs) show strong loadings on autonomy (Load=0.871, SD=0.147, AVE=0.731, CR=0.881, $\alpha=0.861$), relatedness (Load=0.880), and competence (Load=0.832), indicating that individuals' fundamental psychological needs play a crucial role in shaping their attitudes and behaviours towards sports consumption. These findings collectively emphasize the multifaceted nature of sports engagement, influenced by both individual psychological factors and external consumption behaviours (See Table 2).

Discriminant validity assessment

To confirm discriminant validity, we compare the square root of the AVE (diagonal values) with the inter-construct correlations. The Fornell-Larcker criterion states that a construct's AVE should be higher than its squared correlation with other constructs.

Table 3 confirms discriminant validity using the Fornell-Larcker criterion, as the square root of each construct's AVE (diagonal values) is more significant than its correlations with other constructs (off-diagonal values). This indicates that each construct is more strongly related to its indicators than to other constructs, supporting their distinctiveness. Specifically, BPNs (0.861), Sports Consumption (0.823), Self-Esteem (0.912), and Team Attachment (0.828) all exhibit higher AVE square root values than their correlations with other variables. The highest inter-construct correlation is between Self-Esteem and Team Attachment (0.620), indicating a moderate relationship that is still below the AVE threshold, thereby confirming discriminant validity. Thus, the constructs are empirically distinct, justifying their inclusion as separate latent variables in the study's structural model.

Model fit assessment and confirmatory factor analysis (CFA) results

Table 4 presents the model fit indices used to evaluate the adequacy of the measurement model based on Confirmatory Factor Analysis (CFA). The results indicate a well-fitting model, as all key fit indices meet the recommended thresholds.

Paths	Effect value	Boot SE	P	Bias-corrected 95% CI
BPNs—Team attachment—sports consumption	0.038	0.019	0.001	0.008–0.087
Direct effect	0.272	0.052	0.001	0.174–0.376

Table 5. Test results of the mediating effect of team attachment.

Paths	Effect value	Boot SE	P	Bias-corrected 95% CI
BPNs—Self-esteem—sports consumption	0.075	0.031	0.007	0.017–0.146
Direct effect	0.240	0.052	0.001	0.124–0.343

Table 6. Test results of the mediating effect of self-esteem.

The model fit assessment in Table 4 confirms that the CFA results support the adequacy of the measurement model. The CFI (0.948) and TLI (0.933) exceed the 0.90 thresholds, indicating a strong incremental fit, meaning the model performs well compared to a null or baseline model. The RMSEA (0.062) falls below the 0.08 threshold, suggesting a reasonable approximation of the data, while the SRMR (0.049), also below 0.08, confirms an excellent absolute model fit. These indices demonstrate that the measurement model accurately represents the data, thereby justifying its use in subsequent structural modeling analyses.

Mediating effect of team attachment

The indirect effect of basic psychological needs (BPNs) on sports consumption through team attachment is significant, with an effect value of 0.038 (Boot SE = 0.019, $p = 0.001$). The bias-corrected 95% confidence interval (CI) ranges from 0.008 to 0.087, confirming the significance of this mediating effect. Additionally, the direct impact of BPNs on sports consumption is also significant, with an effect value of 0.272 (Boot SE = 0.052, $p = 0.001$) and a bias-corrected 95% CI ranging from 0.174 to 0.376. These results indicate that team attachment partially mediates the relationship between BPNs and sports consumption, with BPNs influencing sports consumption directly and indirectly through team attachment. Results are shown in Table 5.

Mediating effect of self-esteem

The indirect effect of basic psychological needs (BPNs) on sports consumption through self-esteem is significant, with an effect value of 0.075 (Boot SE = 0.031, $p = 0.007$). The bias-corrected 95% confidence interval (CI) ranges from 0.017 to 0.146, confirming the significance of this mediating effect. Furthermore, the direct impact of BPNs on sports consumption is significant, with an effect value of 0.240 (Boot SE = 0.052, $p = 0.001$) and a bias-corrected 95% CI ranging from 0.124 to 0.343. These findings suggest that self-esteem partially mediates the relationship between BPNs and sports consumption, with BPNs influencing sports consumption directly and indirectly through self-esteem. Results are shown in Table 6.

Discussion

BPNs and MSCB

Prior research has established that individuals' BPNs significantly influence their behaviour. For example, studies indicate that fulfilling BPNs enhances motivation for social interaction³⁵ and plays a crucial role in consumer engagement across various domains, including online sharing platforms⁴⁹ and eco-friendly consumption⁵⁰. In sports research, BPNs satisfy sociability needs by fostering values like teamwork and camaraderie⁶⁷. Consistent with these findings, this study confirms that BPNs positively drive meaningful sports consumption, with individuals increasingly valuing sports consumption to fulfil their psychological needs. Notably, this study extends prior research by demonstrating that meaningful sports consumption behaviour is not solely driven by entertainment but also by deeper psychological engagement.

These findings align with prior studies that emphasize the role of psychological needs in consumer behavior. However, this study builds upon previous research by demonstrating that meaningful sports consumption is a holistic experience, encompassing elements of personal identity, emotional investment, and long-term engagement. This contribution differentiates our study from traditional perspectives, focusing primarily on entertainment-driven consumption.

BPNs and consumer motivation

Consumer motivation has evolved in various domains, shifting toward higher-value interactions such as customer-enterprise partnerships⁵⁹. In sports consumption, personality traits and arousal must significantly influence individuals' motivation to affiliate with teams⁶⁰. This study further corroborates the role of BPNs in shaping consumer motivation by confirming their influence on team attachment and self-esteem. While previous studies have examined these relationships in isolation, this research uniquely integrates them into a unified framework, demonstrating how BPNs collectively shape meaningful sports consumption through these mediators.

Comparing these results with prior studies, the current research strengthens the argument that motivation in sports consumption is not merely transactional but deeply rooted in psychological fulfilment. This insight refines

existing theories by incorporating the nuanced interplay between consumer motivation and psychological needs, extending the application of Self-Determination Theory (SDT) in sports marketing contexts.

Team attachment, self-esteem, and MSCB

Pride in one's hometown team fosters a sense of belonging, strengthening fan identification and promoting long-term consumption behaviour⁶¹. Previous research has shown that strong team attachment leads to greater emotional investment and sustained engagement⁶². This study aligns with these findings, providing empirical evidence that consumers with strong team attachments are more likely to engage in meaningful sports consumption. Additionally, high self-esteem reinforces individuals' identification with their supported teams, mitigating the negative emotional impact of team failure and sustaining sports consumption behaviour⁷³. The study expands upon previous literature by empirically validating the dual role of team attachment and self-esteem as mediators between BPNs and meaningful sports consumption.

Unlike prior studies that explored these factors in isolation, this research provides an integrated model that captures the broader psychological mechanisms driving fan engagement. This holistic perspective challenges traditional consumer behaviour theories, suggesting that attachment-based and self-esteem-driven motivations operate simultaneously rather than independently.

Mediating effects of team attachment and self-esteem motivation

This study empirically demonstrates that BPNs drive meaningful sports consumption through the mediating effects of team attachment and self-esteem. The indirect impact of BPNs on sports consumption through team attachment is significant (effect value = 0.038, Boot SE = 0.019, $p = 0.001$, 95% CI [0.008, 0.087]). The direct effect remains significant (effect value = 0.272, Boot SE = 0.052, $p = 0.001$, 95% CI [0.174, 0.376]). Similarly, self-esteem mediates the effect of BPNs on sports consumption (effect value = 0.075, Boot SE = 0.031, $p = 0.007$, 95% CI [0.017, 0.146]), with the direct effect remaining strong (effect value = 0.240, Boot SE = 0.052, $p = 0.001$, 95% CI [0.124, 0.343]). These findings confirm partial mediation, underscoring the importance of psychological and social factors in shaping meaningful sports consumption behaviour.

Furthermore, these results align with prior studies that highlight the role of team attachment and self-esteem in consumer behavior. Research has consistently demonstrated that stronger emotional bonds with teams lead to higher engagement levels in sports consumption⁷². Similarly, studies on self-esteem suggest that individuals with higher self-worth are more likely to participate in identity-driven consumption, reinforcing their psychological needs through affiliations with sports teams⁷³. By confirming these mediating effects, this study extends existing theoretical models by integrating BPNs into the broader discourse on consumer motivation in the sports industry.

Theoretical contributions

This study makes significant contributions to consumer behaviour literature by integrating BPNs as a central framework for understanding sports consumption behaviour. While previous research has established the role of BPNs in various consumer contexts, this study is among the first to systematically examine their influence on meaningful sports consumption. By linking BPNs to team attachment and self-esteem, the study provides a more comprehensive understanding of the psychological drivers underpinning consumer engagement in sports.

Additionally, this research extends Self-Determination Theory (SDT) by demonstrating how BPNs influence consumer behaviour beyond intrinsic motivation, incorporating social identification mechanisms such as team attachment. The findings also build on prior models of sports consumer motivation by empirically validating the mediating roles of team attachment and self-esteem, thereby refining theoretical perspectives on fan engagement and sports consumption. These contributions help bridge the gap between psychological theories and sports marketing, offering new insights into the interplay between motivation, identity, and consumer behaviour.

Managerial and policy implications

The findings of this study provide practical guidance for sports marketers, team managers, and policymakers seeking to enhance fan engagement and promote meaningful sports consumption. From a marketing and management perspective, sports organizations can strategically tailor their promotional campaigns to satisfy fans' basic psychological needs—autonomy, competence, and relatedness. For example, providing fans with customizable content (autonomy), gamified interactions (competence), and community-building features (relatedness) on team apps or platforms can enhance fan loyalty and sustained engagement.

Team branding initiatives should focus on fostering an emotional connection by highlighting the team's shared values and attachment. This could involve offering personalized merchandise, conducting exclusive behind-the-scenes tours, or organizing interactive fan events that celebrate shared team identity and traditions, strengthening the sense of belonging and pride among fans.

In terms of self-esteem-based engagement, marketing campaigns can be framed to show how supporting a team reflects individual values and personal growth. Sponsorships and ads that emphasize an athlete's perseverance and achievement can help consumers associate their fandom with a sense of accomplishment, thereby boosting brand affinity. Moreover, to enhance fan retention, organizations can develop engagement strategies that continuously reinforce the fulfillment of psychological needs. For instance, season ticket holders could receive access to exclusive decision-making polls or reward systems, helping them feel more involved and competent within the fan community.

From a policy standpoint, governments and regulatory bodies can support sports participation by developing youth programs that enhance self-esteem and psychological well-being through team-based sports. These initiatives can foster long-term emotional investment and loyalty from an early age. Furthermore, public campaigns should highlight the mental health and social benefits of sports engagement, particularly in

underrepresented or marginalized communities. Increasing accessibility to sports content and events, such as subsidizing tickets or broadcasting local games at no cost, promotes inclusivity and broadens the fan base.

Lastly, as fan engagement strategies become increasingly sophisticated, ethical oversight is essential. Policymakers should implement regulations to prevent manipulative marketing tactics that exploit emotional or psychological vulnerabilities, ensuring that sports remain a source of empowerment and positive identity for all fans.

Conclusions and limitations

This study provides a comprehensive analysis of the role of BPNs in shaping meaningful sports consumption behaviour. Identifying team attachment and self-esteem as key mediators advances theoretical models of sports consumer motivation and offers practical insights for enhancing fan engagement. The findings underscore the importance of integrating psychological and social dimensions into sports marketing and policy strategies, ultimately fostering a more enriching and meaningful sports consumption experience.

While this study provides valuable insights into the role of BPNs in meaningful sports consumption, its focus on Chinese consumers limits the generalizability of the findings to other cultural contexts. Cultural factors play a crucial role in shaping consumer behaviour, and differences in individualism, collectivism, and sports fandom across regions could influence the extent to which team attachment and self-esteem drive sports consumption. For instance, a comparison with Western or Middle Eastern sports consumers could provide a broader perspective on the universality or cultural specificity of these psychological mechanisms. Additionally, the study relies on survey data, which, while informative, does not establish causal relationships. Incorporating experimental evidence or adopting a longitudinal research design would strengthen the study's impact by capturing changes in consumer behaviour over time and providing more robust insights into the causal mechanisms underlying sports consumption. Future research could address these limitations by exploring cross-cultural variations and employing experimental or longitudinal methodologies to enhance the study's global relevance and theoretical contributions.

Data availability

Data is provided within the manuscript.

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Author contributions

PY and RX conceived and designed the experiments; XH and BL performed the experiments; PY and RX Analyzed and interpreted the data; XH and BL Contributed reagents, materials, analysis tools or data; All authors wrote the paper.

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Declarations

Competing interests

The authors declare no competing interests.

Conflict of interest

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

Ethical approval

This study received approval from the Institutional Review Board (IRB) of Guangxi Normal University under ethics approval reference number 2023/18963.12. The IRB verified that all procedures adhered to the institute's relevant institutional guidelines and regulations. Written informed consent was obtained from all participants.

Additional information

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