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Psychometric Validation of Psychological Instruments and the Interplay between Basic Psychological Needs, Motivation, and Perceived Sport Performance among Elite Male and Females Volleyball Players

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**PSYCHOMETRIC VALIDATION OF
PSYCHOLOGICAL INSTRUMENTS AND THE
INTERPLAY BETWEEN BASIC PSYCHOLOGICAL
NEEDS, MOTIVATION, AND PERCEIVED SPORT
PERFORMANCE AMONG ELITE MALE AND
FEMALES VOLLEYBALL PLAYERS**

BY

GETABIRHAN GETINET MELESSE

JUNE, 2026

BAHIR DAR, ETHIOPIA

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FEMALES VOLLEYBALL PLAYERS**

By : Getabirhan Getinet Melesse

**A Dissertation Submitted in Partial Fulfillment of the Requirements for the
Degree of Doctor of Philosophy in Sport Science (Volleyball Coaching)**

Principal Advisor: Zelalem Melkamu Tegegne (PhD, Associate professor)

CoAdvisor: Dr. Sangeetta Rani (PhD, Associate professor)

JUNE, 2026

BAHIR DAR, ETHIOPIA

Statement of Declaration

This is to certify that the thesis entitled **“Psychometric Validation of Psychological Instruments and the Interplay between Basic Psychological Needs, Motivation, and Perceived Sport Performance among Elite male and Female Ethiopian Volleyball Players”**, submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy of sport science in volleyball coaching from Department of sport science, Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during this investigation have been duly acknowledged.

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**APPROVAL OF DISSERTATION FOR DEFENSE BY
SUPERVISORS**

I hereby certify that I have supervised, read, and evaluated this dissertation titled “Psychometric Validation of Psychological Instruments and the Interplay between Basic Psychological Needs, Motivation, and Perceived Sport Performance among male and female Volleyball Players” by Getabirhan Getinet Melesse prepared under my guidance. I recommend the dissertation be submitted for oral defense.

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APPROVAL OF DISSERTATION/THESIS FOR DEFENSE RESULT

As members of the board of examiners, we examined this dissertation entitled “Psychometric Validation of Psychological Instruments and the Interplay between Basic Psychological Needs, Motivation, and Perceived Sport Performance among male and female Ethiopian League Volleyball Players” by Getabirhan Getinet Melesse. We hereby certify that the dissertation is accepted for fulfilling the requirements for the award of the degree of “Doctor of Philosophy in Sport Science”.

Board of Examiners

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Chair person’s Name	Signature	Date

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ABBREVIATIONS

ACHO- Autonomy choice
AIPLOC- Autonomy internal perceived locus of casualty
AVOL- Autonomy volition
BNSSS- Basic Need Satisfaction Sport Scale
COMP- Competence
REL- Relatedness
SDT- Self-determination Theory
SMS-II- Sport Motivation Scale-II
IM-Intrinsic motivation
IDR- Integratd Regulation
IDR Identified regulation
IJR- Introjected regulation
EXR-External regulation
AMO- Amotivation
AUTM-Autonomus motivation
CONM- Controlled motivation
PPSQ- perceived performance sports questionnaire

ABSTRACT

Volleyball development in East Africa is constrained by limited infrastructure, inadequate financial support, and scarce professional opportunities, which collectively undermine athletes' intrinsic motivation. From the perspective of Self-Determination Theory (SDT), these challenges hinder the satisfaction of basic psychological needs competence, autonomy, and relatedness thereby affecting both motivation and perceived performance. Insufficient training facilities, limited access to quality coaching, and reduced competitive exposure further weaken athletes' self-efficacy and confidence, contributing to a cycle of underdevelopment in the sport. This study aimed to validate two key psychological instruments the Basic Needs Satisfaction in Sport Scale (BNSSS) and the Sport Motivation Scale II (SMS-II) and to examine the relationships among basic psychological needs satisfaction, sport motivation, and perceived performance among elite Ethiopian volleyball players. The validation process involved 321 athletes (174 males, 147 females) from various sports disciplines, resulting in reliable and culturally appropriate versions of both instruments. Subsequently, data were collected from 148 volleyball players (85 males, 63 females) competing in different volleyball clubs in Ethiopia. Confirmatory factor analysis supported the validity of the measurement models, while correlation and regression analyses revealed significant relationships among variables. Findings indicated that satisfaction of competence, autonomy, and relatedness was positively associated with higher levels of intrinsic motivation, which in turn significantly enhanced athletes' perceived sport performance. These results highlight the critical role of psychologically supportive environments in fostering quality motivation and improving performance outcomes. The study provides both theoretical and practical contributions, offering valuable insights for coaches, sport psychologists, and administrators seeking to strengthen athlete development and volleyball performance in Ethiopia.

Chapter one

1.1. Introduction

Volleyball success depends on more than physical skill; technical ability and tactics matter, but psychological factors often determine outcomes (Li et al., 2018). Mental toughness, resilience, and motivation become crucial when competition is intense (Aksakal et al., 2018; Pelletier et al. 2017; Woodson, 2014). earchers ask why some athletes remain committed while others with similar resources lose interest, and evidence points to the role of basic psychological needs (Pelletier et al., 2017). Self-Determination Theory (SDT) explains that autonomy, competence, and relatedness drive intrinsic motivation, growth, and well-being (Deci & M. Ryan, 1985; Ryan & Deci, 2000). When these needs are satisfied, athletes show higher intrinsic motivation, greater engagement, and better performance (Pelletier et al., 2017). Conversely, unmet needs help explain dropout and declining commitment despite equal opportunities (Woodson, 2014).

Environments that fail to support autonomy, competence, and relatedness can produce controlled motivation or amotivation, harming performance and increasing dropout risk (Almagro et al., 2020 ;Deci & M. Ryan, 1985). Therefore, athletes' perceptions of their performance matter as much as objective measures. Motivation shapes persistence, effort, and performance quality (Deci & 1985, Ryan & Deci, 2000; Mosqueda et al., 2019). While extrinsic motivation driven by external rewards, may induce participation, it is intrinsic motivation, arising from personal satisfaction and enjoyment, that sustains athletes' participation and enhances their performance over time Extrinsic rewards may prompt participation, but intrinsic motivation driven by enjoyment and personal satisfaction sustains long-term engagement and improves outcomes (Deci & 1985, Ryan & Deci, 2000; Mosqueda et al., 2019). This link between need satisfaction, motivation, and performance also appears in organizational contexts, where motivated people show greater productivity and commitment (Mullins, 2005).

Although SDT has extensive Western research, its cross-cultural generalizability is less known (Chirkov et al., 2003; Ryan & Deci, 2017). Ethiopia lacks studies and validated tools examining basic psychological needs, motivation, and perceived sport performance in volleyball. This study addresses that gap by testing how basic needs predict motivation and perceived performance, how motivation predicts perceived performance, and whether motivation mediates these relationships among Ethiopian elite volleyball players, plus BNSSS's direct effect on outcomes (Ryan & Deci, 2017; Mallett, 2005). Prior projects found regional and gender differences in volleyball outcomes and highlighted coaching influences, but comprehensive work linking needs, motivation, and perceived performance is still lacking. Volleyball thus remains an important but under-researched sport in Ethiopia (Chirkov et al., 2003).

Volleyball is a prominent but under-researched sport in Ethiopia, ranked after athletics and football (Kumilachew, 2020), yet participation and competitive success have declined, EMYSC (2009). Unmet psychological needs and low motivation contribute to performance drops (Shangraw, 2017), and athletes' perceived competence and commitment are crucial for continued participation (Chirkov et al., 2003; Ryan & Deci, 2017).

A key challenge is the lack of culturally validated measures for motivation and need satisfaction. To fill this gap, two pilot studies adapted and validated SDT-based tools for Ethiopia: the Sport Motivation Scale II (SMS-II), translated into Amharic to assess six regulatory styles, and the Basic Need Satisfaction in Sport Scale (BNSSS), adapted to measure autonomy (choice, volition, IPLOC), competence, and relatedness.

Worku et al. (2023) found democratic and training-and-instruction coaching styles positively related to intrinsic motivation, while autocratic coaching predicted greater amotivation among female Premier League volleyball players. The Youth Volleyball Project reported regional and gender differences in developmental outcomes but did not examine motivational mechanisms or need satisfaction, leaving a gap linking coaching, needs, motivation, and perceived performance.

Data were collected from 321 Ethiopian athletes (174 men, 147 women; mean age = 23.48, SD = 5.07; mean years participation = 5.90, SD = 3.70). Confirmatory factor analysis showed acceptable fit for the Amharic SMS-II, with Cronbach's alpha .816–.865 across motivational dimensions. The BNSSS also showed good internal consistency, with Cronbach's alpha .848–.882 across its five dimensions. These pilot results support the reliability and cultural appropriateness of the adapted SMS-II and BNSSS, enabling a valid examination of how autonomy, competence, and relatedness relate to motivation and athletes' self-perceived performance, and offering practical tools for coaches, sport psychologists, and policymakers in Ethiopia.

This study first examines the psychometric properties of adapted instruments measuring basic psychological needs and types of motivation, and then investigates how these needs and motivation relate to perceived sport performance among elite Ethiopian volleyball players. Grounded in Self-Determination Theory (SDT), it holds that satisfaction of autonomy, competence, and relatedness fosters self-determined motivation, driving sustained effort and higher performance, while thwarting these needs produces controlled motivation or amotivation, reducing engagement and outcomes. In sport, motivation mediates the link between need satisfaction and performance: intrinsic motivation (satisfaction and mastery) promotes persistence and better perceived performance, extrinsic motivation (external rewards/pressures) may prompt participation, and amotivation predicts disengagement. Understanding how need satisfaction shapes these motivational forms helps explain variation in athletes' perceived performance and informs development of culturally valid measurement tools for Ethiopian sport.

Motivational processes are particularly relevant in Ethiopian volleyball, where athletes encounter social and cultural influences that may support or hinder their psychological needs. The satisfaction of autonomy, competence, and relatedness is shaped by coaching styles, team dynamics, and institutional support. Due to the limited availability of culturally appropriate sport psychology instruments in Ethiopia, this study seeks to ensure that adapted measures are conceptually and linguistically suitable for the local context. This will help clarify how basic psychological needs

influence motivation and perceived performance among elite Ethiopian volleyball players.

This dissertation aims (1) to validate culturally adapted tools (SMS-II and BNSSS) measuring motivation and psychological need satisfaction among Ethiopian athletes and (2) to investigate relationships of basic psychological needs, motivational regulation, and perceived sport performance among elite volleyball athletes. Provides pragmatic advice. The study fills the gap between methodological rigor and applied theory and thus makes a contribution to the sport psychology scholarship as well as practical strategies for better athlete engagement and performance in Ethiopia.

By integrating psychometric validation with theoretical modeling, this research advances understanding of motivational processes, basic psychological needs and perceived sports performance within the Ethiopian sport context. It also provides practical insights for coaches, sport psychologists, policymakers, and sport federations seeking to improve athlete motivation, engagement, and performance.

1.2 Background of the study

SDT conceptualizes motivation on a continuum from amotivation to extrinsic and intrinsic regulation, with the former being associated with engagement and well-being (Ryan & Deci, 2000; Ryan & Deci, 2017). Recent meta-analysis have shown moderate-strong correlations between motivation, self-efficacy, emotion regulation, goal setting and sport performance . Regional studies (e.g. Anhui) have confirmed that needs satisfaction and social support are predictors of commitment across different cultural contexts (Ayranci & Aydin, 2025). Despite the recent psychometric validation of sport-specific instruments in Ethiopia, no research has validated these measures for elite volleyball players and examined how they interact to predict performance outcomes in elite league settings.

Research on Ethiopian volleyball has shown the effect of coaching climates on motivation. Democratic and instructional styles have a positive correlation with

intrinsic motivation and team cohesion (relatedness), whereas autocratic styles have a negative effect on motivation Worku et al. (2023). and Birhanu (2023). However, youth volleyball studies have mentioned regional and gender differences but mostly ignore psychological need satisfaction, which shows a great opportunity for local SDT research. Motivation has a direct impact on persistence in training, self-discipline and success in competition (Mosqueda et al., 2019). Athletes who are intrinsically motivated tend to be more focused and adapt better to stress, while those who are extrinsically motivated tend to be less interested when external incentives are not present (Deci & Ryan, 1985).

Sport motivation is based on the need to satisfy the autonomy, competence and relatedness to reach optimal performance, unsatisfied needs lead to burnout and withdrawal (Almagro et al., 2020). Similar principles apply in the organizational context, where autonomy-supportive climates do have a positive effect on productivity and retention (Mullins, 2005).

Research on self-determination theory (SDT) is growing, but the evidence is still largely Western. Edward L. Deci and Richard M. Ryan (2017) emphasize the critical need for cross-cultural investigations, mentioning a significant gap in Ethiopia. Specifically, empirical studies connecting psychological needs, motivation and performance in Ethiopian volleyball are lacking and psychometric instruments to evaluate these athletes' experiences have not been validated. However, there are still questions about the cross-cultural generalizability of SDT, as basic needs may be experienced differently in collectivist or hierarchical cultures where volition and connectedness are shaped by social norms (Chirkov et al., 2003; Jang et al., 2010). In these contexts, autonomy refers to personal endorsement rather than independence and this highlights the importance of exploring SDT in the unique cultural context of Ethiopia. This dissertation fills these gaps by pursuing two objectives based on SDT: (a) validating the Basic Need Satisfaction in Sport Scale (BNSSS) and the Sport Motivation Scale II (SMS-II) in the Ethiopian context and (b) examining the structural relationships of need satisfaction, motivational regulation, and perceived performance

in elite volleyball players. Finally, the study examined the extent to which need satisfaction predicted motivational types to influence perceived performance. It makes a contribution to the field of sport psychology in Africa by providing practical insight for coaches and policymakers on how to create autonomy-supportive environments.

1.3 Local Context of the study

Ethiopia's reputation in sport is built on long distance running but there is now a broader interest in other sports such as volleyball. Despite increased participation, consistent regional and international success is yet to be achieved. One explanation could be a lack of focus on the psychological development of athletes; Self-Determination Theory links low motivation and frustration of basic psychological needs with lower performance and persistence (Edward L. Deci & Richard M. Ryan, 2017; Robert J. Vallerand, 2007). However, the Ethiopian sports system is government supported, with the Ministry of Youth and Sports Ethiopia (2009) Yet investment in team sports such as volleyball is less than in athletics and football, demonstrated by the limited infrastructure, training facilities and professional pathways. The Ethiopian Volleyball Federation promotes and organizes competitions, indicating the sport's increasing institutional presence (Shangraw, 2017). However, volleyball in Ethiopia is still lacking in public attention and fan engagement. The decline in participation and performance at the national and continental levels is often associated with unmet psychological needs and a lack of motivation. SDT-based research highlights that the satisfaction of basic psychological needs is crucial to the athletes' engagement and persistence (Edward L. Deci & Richard M. Ryan, 2017; Robert J. Vallerand, 2007).

Although there is a growing interest in this area, there is a lack of locally based studies on the psychological factors influencing elite volleyball performance. One major barrier is the unavailability of culturally adapted and validated tools, which compromises the accuracy of assessments and the effectiveness of interventions aimed at motivation, burnout prevention, and performance enhancement. Volleyball, being a team sport, presents a unique motivational need: relatedness, competence and

autonomy. In collectivist cultures, harmony is a key value, support autonomy from coaches and peers has been shown to improve motivation and enjoyment (Almagro et al., 2020). Evidence suggests in Ethiopian volleyball, coaches are authoritarian, which may affect autonomy and relatedness, thereby reducing intrinsic motivation and increasing burnout (Ethiopian Volleyball Federation, 2023). This tells us in the need for validating psychological measures in Ethiopia. Global measures such as the BPNSFS and SMS-R used globally need cultural adaptation where misinterpretation and bias can be present (Lonsdale et al., 2019; Van De Vijver & Leung, 199). Measures should be representative of Ethiopian athletes' experiences to provide valid data and meaningful interpretation.

As sport science in Ethiopia advances, there is a need for culturally relevant research methods. Instruments of measurement should be congruent with the language, practices and values of the community (Mpofu & Sefotho, 2023). For instance, the importance of autonomy and relatedness may be congruent with respect for authority and community responsibilities so the measures should be able to measure such cultural differences. Mixed methods designs are popular in cross-cultural sport psychology currently and are recommended here. Quantitative tools and qualitative insights help to establish construct validity and cultural fit (Jang, Reeve, Ryan, & Kim, 2009; Mageau & Vallerand, 2003). Qualitative input also help to clarify ambiguous items, and indigenous supports such as community mentorship provide useful insights into motivation and team bonding (Mpofu & Sefotho, 2023). The findings will be useful to coaches, sport psychologists and policy makers in developing culturally appropriate interventions to enhance motivation, reduce burnout and increase performance, paving the way for sustainable athlete development and improved long term outcomes.

1.4 Statement of the problem

Ethiopian society is characterized by strong collectivist values, where social relationships and group cohesion are emphasized over individual autonomy. Such

cultural differences may influence how athletes experience and interpret psychological constructs such as autonomy, competence, and relatedness (Markus and Kitayama, 1991). Consequently, examining basic psychological need satisfaction, motivation, and perceived performance within the Ethiopian sport context is essential, as findings from individualistic cultures may not fully generalize to Ethiopian athletes. However, few studies have been conducted on these constructs in Ethiopian athletes and even fewer on the validation of measurement tools (Melesse et al., 2024; Melesse et al., 2025), they validated the Amharic version of Basic Need Satisfaction in Sport Scale (BNSSS; $\alpha = 0.848\text{--}0.882$, CFI = 0.958), and the Amharic Sport Motivation Scale-II (SMS-II; $\alpha = 0.816\text{--}0.865$, CFI = 0.994) in 321 team-sport athletes, filling an important gap in prior descriptive research. The role of motivation in perceived participation in sports has been examined in several studies. Previous studies have acknowledged the importance of motivation in sport participation and performance; however, relatively few have investigated the direct and indirect effects of basic psychological need satisfaction on perceived sport performance through motivation (Shangraw, 2017). To the researcher's knowledge, no study has comprehensively examined these relationships among Ethiopian Premier League volleyball players using motivation as a mediating mechanism.

In addition, limited attention has been given to whether these psychological relationships differ by gender. Although Self-Determination Theory proposes that the basic psychological needs are universal, previous research has reported inconsistent findings regarding gender differences in need satisfaction, motivation, and perceived sport performance. Understanding whether male and female volleyball players experience these psychological processes differently is important for developing gender-responsive coaching strategies and athlete support programs. Therefore, the present study also examines gender differences in basic psychological need satisfaction, sport motivation, and perceived performance among Ethiopian Premier League volleyball players.

Volleyball occupies an important position in Ethiopian sport, following athletics and football, and is supported by national institutions such as the Ethiopian Ministry of Youth, Sport and Culture and the Ethiopian Volleyball Federation (EMYSC (2009; Kumilachew, 2020). Ethiopia has also participated in continental competitions in both the men's and women's categories, reflecting the sport's established history. Despite this institutional support, volleyball has experienced declining participation and competitive success in recent years.

Evidence suggests that reduced psychological need satisfaction and inadequate motivation contribute to athletes' declining performance (Deci & Ryan, 2017; Vallerand, 2007). As motivation is a key psychological determinant of sustained participation and optimal performance, understanding how basic psychological needs influence motivation and perceived performance is essential for improving the development and competitive success of Ethiopian volleyball players (Deci & Ryan, 2017; Shangraw, 2017).

1.5 Purpose of the Study

1.5.1. General objective

The study had two goals: (1) evaluate the validity and reliability of adapted measures for basic psychological needs and sport motivation in elite Ethiopian players, and (2) examine how need satisfaction, sport motivation, and perceived performance are related comparing genders. Specifically, it tested whether need satisfaction predicts motivation and perceived performance, whether motivation predicts perceived performance, and whether motivation mediates the link between need satisfaction and perceived performance among Ethiopian Premier League volleyball players.

1.5.2. Specific objectives

1. To validate the measurement instruments (BNSSS and SMS-II questionnaire) using Confirmatory Factor Analysis (CFA) in Ethiopian elite athletes.
2. To examine the correlation and predictive relationship between basic psychological needs satisfaction and sports motivation in elite Ethiopian volleyball players.
3. To investigate the correlation and predictive relationship between sports motivation and perceived sports performance in elite Ethiopian volleyball players.
4. To explore the relationship between basic psychological need satisfaction in sport and perceived sports performance, and to ascertain the extent to which need satisfaction predicts athletes' perceptions of performance among elite Ethiopian volleyball players.
5. To analyze gender differences in sports motivation and perceived performance.
6. To investigate gender differences in basic need of satisfaction in sport scale and perceived performance.
7. To assess the mediating role of sports motivation in the relationship between basic psychological needs satisfaction and perceived sports performance.

1.6 Main Research question

The main research questions are kept in view of the specific objective. The main research question is How valid and reliable are the adapted psychological instruments in measuring basic psychological needs and motivation, and what is the relationship among these factors and perceived sports performance: A Gender Comparison in elite volleyball players in Ethiopia?

Specific research questions

1. How valid and reliable are the adapted psychological instruments in measuring basic psychological needs, motivation, and performance in Ethiopian elite athlete's players?
2. To what extent does the satisfaction of basic psychological needs correlate with and predict different types of sports motivation among elite Ethiopian volleyball players?
3. How does sports motivation correlate with and predict perceived sports performance among elite Ethiopian volleyball players?
4. To what extent does the satisfaction of basic psychological need in sport correlate with and predict perceived sports performance among elite Ethiopian volleyball players?
5. Are there significant gender differences in sports motivation and perceived sports performance?
6. Are there significant gender differences the satisfaction of basic need in sports and perceived performance?
7. Does sports motivation mediate the relationship between basic psychological needs satisfaction and perceived sports performance?

1.7 Significance of the study

The present study aims to achieve two major objectives: first, to psychometrically validate the Basic Need Satisfaction in Sport Scale (BNSSS) and the Sport Motivation Scale II (SMS-II) in the Ethiopian sport context, and second, to investigate the interaction between athletes' satisfaction of basic psychological needs and types of motivation, and their influence on perceived sport performance: A Gender Comparison among Elite Ethiopian Volleyball Players. This study, with elite Ethiopian volleyball players, offers a culturally sensitive perspective on motivation and performance dynamics and validated instruments for future research in similar

contexts. Many studies showed the psychological needs and motivation impact the sports performance of athletes in different sports contexts in different levels and age groups. The purpose of this study was to examine the relationships between and among basic psychological needs, motivation and performance of volleyball players in Ethiopia. And to show how to enhance, improve volleyball players' psychological need motivation and performance. The expected findings of the study will contribute to the body of literature in sports research within the Ethiopian and global context and will provide insight to the following:

The study provides evidence-based insights into the impact of athletes' basic psychological needs and motivation on performance for sports policymakers, federations, and management boards. Understanding these relationships can help in the design of athlete-centred policies, strengthen organisational structures and align national and club-level strategies with global best practice. Validated instruments, BNSSS and SMS II, can be included in monitoring and evaluation systems to assess athlete development programs, national training camps, and talent identification processes from a psychological perspective. This supports the development of long term athlete development frameworks that integrate psychological readiness with technical, tactical and physical preparation, thus enhancing Ethiopia's competitiveness in regional and international volleyball competitions.

The study explains the relationships between autonomy, competence and relatedness, motivation and its impact on perceived performance in athletes. When athletes understand these links, they are more likely to take ownership over their development, engage in self-regulated and intrinsically motivated behaviours, and maintain motivation under pressure. This may lead to greater focus, decision making, team work and consistency in training and competition. Coaches may use these findings to inform their practice and develop training environments that adequately support athletes' basic psychological needs. Promoting autonomy (shared decision making and goal setting), competence (structured progression and constructive feedback) and relatedness (team cohesion and positive communication) can foster coaches' promotion of intrinsic motivation, persistence and creative performance. The

study also supports the integration of psychological principles into daily coaching practice, enhancing the approach to providing feedback and including psychological skills training as part of the holistic athlete development process. These strategies support coaches to move beyond a performance only model to one that supports high performance and long term psychological well-being.

The study adds to the curriculum design for higher education institutions, particularly for departments of Sport Science and Physical Education, in integrating motivational and psychological frameworks into coaching education, sport management, and athletic training programs. This inspires innovative pedagogy, highlights the psychological aspects of athletic performance and points out lacunas in empirical research that could guide future research within the Ethiopian sport context.

The psychometric validation of BNSSS and SMS II offers culturally relevant and empirically valid instruments to measure athletes' motivational profile and satisfaction of basic psychological needs for sport psychologists, counselors and mental skills coaches. These instruments allow practitioners to diagnose motivational problems, design specific psychological interventions and monitor change in motivation and well-being over time. The implementation of these validated tools in practice will enable practitioners to implement evidence based strategies that balance performance excellence with psychological health and resilience, thus facilitating holistic athlete development at all levels of competition.

Furthermore, by examining gender differences in need satisfaction, motivational regulation, and perceived sports performance, this study will reveal whether male and female volleyball players experience distinct psychological pathways to performance. This knowledge will enable coaches and sport psychologists to design gender-sensitive interventions and create equitable motivational climates that address the unique psychological needs of both male and female athletes in Ethiopian sport.

1.8. Scope of the study

This study was delimited to elite volleyball players participating in the Ethiopian Premier League during the competitive season. The research was conducted in two main phases. The first phase involved a pilot psychometric validation of two sport psychology instruments the Basic Need Satisfaction in Sport Scale (BNSSS) and the Sport Motivation Scale-II (SMS-II) using a sample of 321 athletes drawn from various competitive sports disciplines. The aim of this phase was to assess the reliability, validity and cultural suitability of the instruments in the Ethiopian sport context.

After the pilot validation, the second phase involved 148 male and female volleyball players from Ethiopian Premier League clubs. The second phase was designed to examine the relationship between basic psychological need satisfaction, motivation and perceived sport performance. The study used a correlational and predictive design to explore how the satisfaction of the three basic psychological needs of autonomy, competence and relatedness influence athletes' perceived sport performance directly and indirectly through different types of motivation (intrinsic motivation, extrinsic motivation and amotivation). Data were collected using standardized and validated instruments: the Basic Need Satisfaction in Sport Scale (Ng, Lonsdale, & Hodge, 2011), the Sport Motivation Scale-II (Pelletier et al., 2013), and the Perceived Performance in Sport Questionnaire (Almagro et al., 2020). The study focused on elite-level volleyball athletes who were currently playing in the national league, thus excluding recreational players, coaches, and athletes from other sports from the main correlational analysis. The study did not involve experimental manipulations or longitudinal follow-up, but rather concentrated on psychometric validation and the investigation of current associations between psychological constructs within a particular competitive environment.

1.9. Delimitations, Assumptions, and Limitations of the Study

Delimitations define the study's scope to ensure methodological rigor and resource feasibility for the study titled Psychometric Validation of Psychological Instruments and the Interaction between Basic Psychological Needs, Motivation and Perceived Sport Performance, among Ethiopian Premier League Volleyball Players. The sample comprised elite male and female players who competed in the 2023 Ethiopian Premier League. Participants came from Addis Ababa, Oromiya, SNNPR and Amhara regions with officially recognized Premier League teams chosen purposively for organized elite training, competition systems, and site accessibility. Findings may not represent athletes from less organized regions with different cultural, linguistic, or infrastructural contexts.

The study measured perceived sport performance (athletes' subjective evaluations) rather than objective indicators (match statistics, rankings). This aligns with Self-Determination Theory (SDT) emphasis on internal experience but limits objectivity; future studies should combine subjective and objective measures.

Participants were limited to active Premier League club members; junior, amateur, and lower-tier athletes were excluded. This increased internal validity for high-competition contexts but reduced generalisability to youth, developing, and recreational players.

BNSSS and SMS II were translated into Amharic, back-translated, and expert-reviewed for cultural and conceptual equivalence. Nonetheless, athletes from other language or ethnic backgrounds may interpret items differently; future validation in other Ethiopian languages is recommended. The correlational design focused on psychometric validation and associations among BNSSS, SMS II, and PPSQ; no longitudinal or experimental inference about causality was possible. Future longitudinal or intervention studies could examine causal and developmental relationships.

The study assumed the SDT needs autonomy, competence, relatedness are meaningful for Ethiopian elite volleyball players and central to motivation and perceived performance. Participants were assumed to respond honestly and understand items after pilot testing, Amharic translation, and cultural adaptation. The BNSSS and SMS II were assumed translatable and adaptable without losing theoretical integrity, validity, or reliability. The sample was considered representative of Ethiopian Premier League athletes' motivational orientations, and responses reflective of typical experiences despite disruptions such as COVID-19 and civil unrest, assumed to affect short-term experiences but not fundamental relationships among needs, motivation, and perceived performance.

Key limitations include:

- Sample size and composition: 148 elite players (85 males, 63 females). The smaller female sample may reduce power for gender comparisons (Streiner et al., 2015). Correlational design prevents causal inference (Tashakkori & Teddlie, 2003).
- Generalisability: Participants were from selected Ethiopian regions and elite volleyball only; cultural, organizational, and structural differences may limit applicability to other regions, sports, or competition levels (Thomas et al., 2017).
- Translation and cultural nuance: Despite forward–backward translation and expert review, some items may be interpreted differently due to language and cultural nuances, affecting reliability and validity (Beaton et al., 2000; Van de Vijver & Leung, 1997).
- Self-report bias: Use of questionnaires may introduce social desirability and recall biases, affecting objectivity of perceived performance and motivation measures (Podsakoff et al., 2003). Future work should triangulate with objective performance data or coach ratings.
- Contextual constraints: Data collection occurred during COVID-19 and periods of civil unrest, disrupting training and competition and limiting experimenter control. Similar contexts have affected athletes' training and wellbeing elsewhere (Facer-Childs et al., 2021; Pillay et al., 2020).
- These constraints necessitated a descriptive survey rather than controlled

experimental designs.

- **Method breadth:** The main study used quantitative measures with limited qualitative depth; mixed methods could better capture how Ethiopian athletes interpret autonomy, competence and relatedness (Creswell, 2014).
- **Logistics:** Time, scheduling, travel, and limited club access constrained follow-up and naturalistic observation opportunities.

1.10. Operational Definitions of Key Terms

Amotivation: A state of lacking intention or motivation to act in sport, due to perceived incompetence or non-valuing of the activity (Ryan & Deci, 2000).

Autonomy is the psychological need for volition and self-endorsement of one's actions, where individuals experience their behavior as originating from an integrated sense of self (Deci & Ryan, 2000, pp. 231–232).

Basic Psychological Needs in Sport Scale (BNSSS) is a 20-item self-report measure assessing autonomy, competence, and relatedness satisfaction in sport, rated on a 7-point Likert scale (Ng et al., 2011).

Competence: The psychological need to feel effective in one's ongoing interactions with the social environment and to experience opportunities for mastery (Ryan & Deci, 2000).

Confirmatory Factor Analysis (CFA) is a structural equation modeling technique used to test hypothesized factor structures and assess construct validity using model fit indices (Brown, 2015).

Elite athletes are individuals who compete at the highest levels of sport, typically characterized by participation in professional or national/international competition (Swann et al., 2015, pp. 3–5).

Extrinsic Motivation: Engaging in sport activities for instrumental reasons, such as obtaining rewards, avoiding punishments, or meeting external or internalized

pressures, varying in autonomy from external to integrated regulation (Ryan & Deci, 2000).

Intrinsic Motivation: Engaging in sport activities for their inherent enjoyment, interest, or satisfaction, independent of external rewards or pressures (Ryan & Deci, 2000).

Perceived Performance Sport questionnaire: is a 5-item self-report measure assessing athletes' subjective evaluation of their sport performance and perceived skill effectiveness (Almagro et al., 2020).

Psychometric validation is the evaluation of a measurement instrument's reliability and validity evidence, including internal consistency, test-retest reliability, construct validity, and factor structure using exploratory and confirmatory factor analysis (Messick, 1995; Brown, 2015).

Relatedness: The psychological need to feel connected to others, to interact with them in caring and being cared for, and to experience a sense of mutual respect (Ryan & Deci, 2000)].

Self-Determination Theory (SDT): A theory of motivation positing that human behavior is driven by the satisfaction of three innate psychological needs autonomy, competence, and relatedness which support intrinsic motivation and well-being (Deci & Ryan, 2000).

Sport Motivation Scale-II (SMS-II) is an 18-item scale measuring six types of motivational regulation along the self-determination continuum intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation in sport participation, rated on a 7-point Likert scale (Pelletier et al., 2013).

Structural Equation Modeling (SEM): is a multivariate statistical technique used to test measurement models (CFA) and structural relationships among latent constructs, such as the pathways between psychological needs, motivation, and performance (Kline, 2015).

Chapter two

Review of related literature

2.1 introduction

This chapter provides a comprehensive review of the literature relevant to the core constructs investigated in this study, basic psychological needs, motivational regulation and perceived sport performance, with a particular focus on elite athletes. This chapter is based on the theoretical and empirical contributions of self-determination theory (Deci & Ryan, 1985; Gagné & Deci, 2005) and its application in the field of sport psychology. SDT is built around the interaction of three basic psychological needs: competence, autonomy and relatedness. In sport contexts these needs are assessed with the Basic Needs Satisfaction in Sport Scale (Ng, Lonsdale & Hodge 2011). Motivational regulation is measured with the Sport Motivation Scale II (Pelletier et al., 2013) and athletes' perceived performance is usually assessed with the Perceived Performance in Sport Questionnaire (Almagro et al., 2020). We focus in particular on the psychometric validation of these instruments, especially in cross-cultural settings such as Ethiopia, including their adaptation, reliability, validity and mediation models linking need satisfaction to performance through motivation.

To place this study in the broader motivational literature, it is important to recognise that research on human motivation has been historically motivated by many different theoretical frameworks. These are hierarchy of needs by Maslow, achievement goal theory and self-determination theory (Badubi, 2017). Of these, SDT provides a particularly robust framework for understanding the impact of social-environmental factors on the satisfaction of basic psychological needs, the regulation of motivation, and ultimately athletes' performance. Achievement goal theory emphasizes task-oriented and ego-oriented goals, whereas SDT provides a more general account of the mechanisms underlying the development of motivation, emphasizing intrinsic and extrinsic factors and their interaction with psychological needs.

The present study used Self-Determination Theory (SDT) as the theoretical framework because of its comprehensiveness and explanatory power. The next section describes the major tenets of SDT, its motivational continuum, and its applicability to sport psychology and cross-cultural research contexts.

2.2 Theoretical Background: Self-Determination Theory (SDT)

This study uses Self-Determination Theory (SDT), which links motivation and behavior to three basic needs: autonomy, competence, and relatedness (Deci & Ryan, 1985; Ryan & Deci, 2000). SDT is especially relevant in sport psychology because the quality of motivation affects athlete engagement, performance, and well-being (Gagné & Deci, 2005).

When social environments satisfy these needs, athletes develop intrinsic motivation and internalized extrinsic motivation, which are associated with better engagement, persistence, and performance (Gagné & Deci, 2005; Bhavsar et al., 2019). SDT describes a continuum of regulation from intrinsic motivation to amotivation, with intermediate forms of extrinsic regulation; intrinsic motivation favors persistence and well-being, while amotivation links to disengagement and burnout (Pelletier et al., 2013; Jõesaar et al., 2011; Ng et al., 2011). Support for autonomy, competence, and relatedness fosters higher-quality motivation and improved functioning in athletes (Ryan & Deci, 2000). Conversely, need frustration predicts burnout, dropout, and poorer performance (Hagger & Chatzisarantis, 2008; Mosqueda et al., 2019). Researchers commonly use validated measures such as the Sport Motivation Scale-II (SMS-II) and the Basic Needs Satisfaction in Sport Scale (BNSSS) to assess these constructs (Pelletier et al., 2013; Ng et al., 2012).

Cross-cultural validation is crucial because measures developed in Western settings may not transfer directly to non-Western contexts due to language, norms, and cultural differences (Beaton et al., 2000; Van de Vijver & Leung, 1997). Common methodological challenges in elite-sport research include small samples, translation

issues, reliance on self-report, and logistical constraints with high-level athletes.

SDT has been widely used in the study of personality development and human behaviour and has provided a well-supported model to predict sports performance. According to the theory, self-determined behaviour is autonomous and self-regulated, representing intrinsic motivation, extrinsic motivation, or amotivation. The motivational processes are highly affected by social-environmental factors that support or hinder the satisfaction of competence, autonomy, and relatedness (Bouffard, 2017; Mosqueda et al., 2019; Ryan & Deci 2002). High levels of need satisfaction have been associated with greater persistence, resilience, engagement and consistency in performance, whereas need frustration has been associated with burnout, dropout and lower achievement (Hagger & Chatzisarantis, 2008; Mosqueda et al., 2019).

To assess these motivational constructs, researchers often use validated tools such as the Sport Motivation Scale-II (SMS-II) (Pelletier et al., 2013), which measures different types of motivation along the SDT continuum, and the Basic Needs Satisfaction in Sport Scale (BNSSS) (Ng et al., 2012), which evaluates the degree to which athletes experience autonomy, competence, and relatedness in their sporting environments. These instruments provide a structured and validated way to explore the interplay between psychological needs, motivation, and performance in sport.

In applying these frameworks to elite sport contexts, psychometric instruments such as the BNSSS, SMSII, and PPSQ provide structured and reliable measures for capturing the constructs of interest. Cross-cultural validation is especially important as measures developed in Western contexts may not be directly applicable to non-Western populations because of differences in language, social norms and cultural understandings of autonomy, competence and relatedness (Beaton et al., 2000; Ryan & Deci, 2000; Van de Vijver & Leung, 1997). Methodological issues in such contexts are often associated with limitations in sample size, issues of translation and adaptation, use of self-reported data, and logistical constraints when working with elite athletes. These challenges need to be met to generate the valid and culturally

meaningful findings.

The chapter also reviews adaptation and validation of SDT and its instruments in non-Western and cross-cultural settings, for example in Ethiopia (Van De Vijver & Leung, 1997). These adaptations emphasize the importance of maintaining conceptual equivalence while ensuring linguistic and cultural relevance (Beaton et al., 2000), understanding these nuances is essential for applying SDT in diverse settings and helps situate the current study within the broader literature. It also highlights the need for culturally sensitive research in sport psychology, especially in under-researched regions like Ethiopia

Building on this theoretical and methodological background, the following sections of this chapter review empirical studies that have examined the relationships between basic psychological need satisfaction, motivation regulation and perceived sport performance in Ethiopian volleyball players. The review examines global research evidence and findings from Africa and Ethiopia that highlight the importance of need satisfaction for intrinsic motivation and perceived performance outcomes. The chapter also deals with models in which motivation mediates the relationship between psychological needs and performance, thus providing a conceptual and empirical basis for the present study.

2.3 Validation of the Basic Needs Satisfaction in Sport Scale (BNSSS)

The Basic Needs Satisfaction in Sport Scale (BNSSS) was created by Ng et al. (2011) to measure athletes' satisfaction of SDT's three needs autonomy, competence, and relatedness within competitive sport. Unlike earlier, more general measures, the BNSSS treats autonomy as multidimensional (autonomy-choice, autonomy-volition, and perceived locus of internal causality) and treats competence and relatedness as single dimensions, yielding a 20-item scale with five factors. Initial validation with athletes in Hong Kong and New Zealand showed good CFA model fit, acceptable

internal consistency, and expected correlations with self-determined motivation, flow, and burnout, supporting the scale's theoretical and empirical validity (Ng et al., 2011).

The BNSSS has been validated by cross-validation. De Francisco et al. (2018) found the five-factor structure in Spanish athletes to be reliable, convergent valid and gender invariant. Moreno-Murcia et al. (2019) removed one autonomy-volition item to improve the fit in young Spanish athletes, thereby further endorsing the multidimensional view of need satisfaction in the BNSSS, supporting the original five-factor and a higher-order three-factor model. However, validated sport specific measures are rare in Africa particularly in Ethiopia. This gap was filled by Melesse et al. (2024) who translated and culturally adapted the BNSSS into Amharic using standard forward-backward procedures and tested it on Ethiopian athletes. CFA supported the original five-factor model with good loadings and subscales had acceptable internal consistency, composite reliability and convergent validity. Thus, the Amharic BNSSS is a valid and reliable instrument to measure autonomy, competence, and relatedness in Ethiopian sport contexts and facilitates culturally-grounded research on motivation and performance.

2.4 Basic Psychological Needs Constructs and Their Relationship to Motivation Constructs

Self-Determination Theory (SDT) identifies three basic psychological needs for autonomy, competence and relatedness as crucial to the development of intrinsic and extrinsic motivation (Ryan & Deci 2002). SDT is an empirically based framework for understanding human motivation, psychological growth and well-being, as (Deci & Ryan (2008) describe. It enables an examination of social and environmental factors that either facilitate or impede the satisfaction of basic psychological needs, thus giving rise to different forms of motivation (Ryan & Deci, 2000). Researchers are increasingly examining how each basic need autonomy, competence, relatedness distinctly shapes athletes' motivation and performance (de Francisco et al., 2020; Li et al., 2018). SDT treats these needs as universal resources for optimal functioning, but their expression varies by culture and sport context (Ryan & Deci, 2017; Shangraw,

2017). For example, coaching climates in regional leagues differ from national teams, altering athletes' experiences of autonomy, competence, and relatedness. Satisfaction of the three needs is crucial for motivation, engagement, and performance in sport (De Francisco et al., 2020; Shangraw, 2017). Need frustration produces lower motivation and engagement, while empirical studies support that need satisfaction predicts sport satisfaction and performance, aligning with SDT's claims (Deci & Ryan, 2017).

Evidence shows motivation processes mediate performance relationships: Blecharz et al. (2015) found intrinsic motivation mediated self-efficacy and performance satisfaction, explaining 57% of variance. Hoffmann & Loughhead (2016) showed leadership behaviours (like social support) differ across individual and team settings, underscoring how interpersonal environments foster need satisfaction and long-term motivation. Research also addresses coaches' basic needs: need satisfaction explains much of coaches' sport satisfaction (Lorimer & Jowett, 2009; Kim & Cruz, 2016). Coaches' intrinsic motivation predicts their satisfaction and supportive behaviours (Rocchi & Pelletier, 2017), whereas need frustration links to controlled motivation and weaker relational support..

From an SDT view, coaches who feel competent appraise their sport involvement more positively and show adaptive motivational regulation, consistent with cognitive-evaluation mini-theory (Lorimer & Jowett, 2009; Ryan & Deci, 2017). Therefore, sport environments should be designed to support autonomy, competence, and relatedness for better motivation and performance among athletes and coaches.

2.4.1 Competence and motivation

Competence is the drive to perform effectively and achieve valued outcomes, and it strongly relates to motivation, effort, and enjoyment in sport (Ng et al., 2011). Competent athletes train more, enjoy their sport, and tend to perform better (Marsh, 2004; Mallet, 2005). Together with autonomy and relatedness, competence fosters intrinsic motivation, and mastery helps internalize goals into identity (Vallerand, 1997). As an SDT need, competence shapes how athletes appraise performance,

regulate effort, and stay involved; higher perceived competence predicts more autonomous motivation and sustained activity (Deci & Ryan, 1985; Ryan & Deci, 2000; Vallerand et al., 1992; Hagger et al., 2005). Environments that fail to support competence foster inefficacy, disengagement, and amotivation, increasing dependence on external rewards or pressure (Deci & Ryan, 1985). This underscores how coaching, feedback, and training climate influence motivation quality and guides intervention design for youth and elite sport. Competence, one of SDT's three basic needs (Deci & Ryan, 1985), is an athlete's sense of effectiveness in meeting sport demands and shapes how they interpret performance, regulate effort, and enjoy their sport. Higher perceived competence predicts more autonomous motivation (intrinsic and identified regulation) and greater persistence across populations (Ryan & Deci 2000; Hagger et al. 2005; Vallerand et al. 1992).

Mageau & Vallerand (2003) proposed a coach athlete motivational model showing that coaches' interpersonal styles autonomy support, structure, and involvement fulfil athletes' needs for autonomy, competence, and relatedness. Autonomy-supportive practices (offering choice, explaining tasks, acknowledging feelings, avoiding controlling language, and providing clear structure) promote need satisfaction, help internalise motives, and foster more self-determined regulation. Crucially, competence support alone is insufficient; autonomy and relatedness must also be supported for internalisation and long-term commitment. This coach-centered model underpins much longitudinal and experimental work on motivation in sport.

Empirical studies back SDT's claims: perceived competence links to self-determined motivation (Goudas et al., 1994), and autonomy-support from teachers or coaches boosts intrinsic motivation, enjoyment, effort, and intentions to continue sport Ntoumanis (2001). Together, these findings show autonomy-supportive environments help athletes internalise motivation and sustain engagement. Pelletier et al., (2001) followed 369 Canadian swimmers (12–20 yrs) and found autonomy-supportive coaching predicted higher self-determined motivation, which in turn predicted persistence supporting SDT's claim that competence fulfilment aids internalisation and sustained intrinsic motivation (Deci & Ryan, 2000).

Experimental evidence from De Muynck et al. (2017) with 120 Belgian tennis players showed positive feedback increased enjoyment and persistence by boosting competence satisfaction and reducing negative self-talk, while autonomy-supportive feedback raised motivation by fulfilling autonomy. Together, these studies indicate competence and autonomy interact to promote adaptive motivational, emotional, and behavioural outcomes. Vallerand et al. (1992) reported that university athletes with higher perceived competence displayed greater autonomous motivation, whereas those with lower competence relied more on external regulation, consistent with SDT. Lonsdale et al. (2011) noted that measures like the PLOCQ and SIMS can behave differently across cultures, cautioning cross-cultural comparisons of motivation. Reinboth et al. (2004) found autonomy-supportive, mastery-oriented coach behaviours predicted competence satisfaction and well-being in British youth football and cricket. Individual-sport athletes (e.g., swimmers, gymnasts) may be especially sensitive to competence feedback because performance is individually visible.

Jowett & Ntoumanis (2004) validated the Coach–Athlete Relationship Questionnaire (CART-Q), showing that closeness, commitment, and complementarity in coach–athlete relationships foster competence perceptions and autonomous regulation. Mastery-oriented, structured, autonomy-supportive coaching with warm interpersonal contact promotes competence and internalization. Comparisons of coaching styles show controlling environments undermine competence, produce controlled motivation, and can encourage maladaptive behaviours (Hodge and Lonsdale, 2011). By contrast, autonomy-supportive climates associate with prosocial behaviour and autonomous motivation. These studies show that low perceived competence links to amotivation and controlled regulation: athletes lacking confidence or competence support depend on external rewards and approval rather than autonomous reasons for sport (Deci & Ryan, 2000; Ntoumanis, 2001; Ryan & Deci, 2017). Controlled motivation and amotivation predict weaker intentions and lower persistence, so perceived competence indirectly affects sustained participation (Chatzisarantis et al., 2003; Ryan & Deci, 2017). Controlling coaching reduces competence satisfaction and increases controlled motivation—and associated antisocial behaviour via moral disengagement—whereas autonomy-supportive

coaching fosters autonomous motivation and better moral outcomes (Hodge and Lonsdale (2011). Similarly, low competence satisfaction, especially under high external pressure, raises burnout risk in young elite athletes Isoard-Gautheur et al. (2012), underscoring that poor competence support undermines motivation quality and sport commitment.

Meta-analytic and systematic evidence consistently highlights competence as a central determinant of motivational functioning in sport. Competence satisfaction and competence-supportive environments are positively associated with autonomous forms of motivation, particularly identified and integrated regulation, while showing negative associations with external regulation and amotivation (Chatzisarantis et al., 2003; Vansteenkiste et al., 2020). These findings provide strong support for Self-Determination Theory across diverse sport settings. Similarly, Teixeira et al. (2012), in a systematic review of 66 studies in physical activity and exercise, concluded that competence satisfaction is positively related to intrinsic and identified regulation and negatively related to external regulation and amotivation. The review emphasizes that competence support, alongside autonomy and relatedness support, promotes high-quality motivation through need-supportive coaching practices.

Empirical studies further demonstrate that athletes who perceive themselves as competent are more likely to experience intrinsic motivation, identified regulation, enjoyment, persistence, and high performance (Mallett, 2005; Vallerand, 1997). Longitudinal evidence also indicates that competence predicts sustained sport engagement and performance, partly by strengthening self-efficacy and reducing competitive anxiety (Jowett, 2008; Lonsdale, 2019).

Nicholls (1989), and Reinboth & Duda (2006) have carried out a longitudinal study lasting five months to explore the impact of changes in athletes' perceptions of the motivational climate on their basic psychological need satisfaction and well-being. The study was based on Self-Determination Theory (Ryan & Deci, 2000) and the Achievement Goal Framework (Ames, 1992). The sample comprised of 128 university

athletes from Britain (M age = 19.56, SD = 1.83) that participated in a range of team sports such as football, rugby, netball, lacrosse and hockey. The researchers measured task- vs. ego-involving climates, need satisfaction (autonomy, competence, and relatedness), and well-being indicators, such as subjective vitality and physical symptoms, at two time points through self-report measures. The results showed that increases in perceptions of a task-involving climate predicted increases in satisfaction of all three psychological needs. In addition, enhanced autonomy and relatedness satisfaction were significant predictors of higher subjective vitality, supporting their importance for athletes' psychological well-being. Competence satisfaction was higher in task-involving climates, but was most beneficial when combined with autonomy and relatedness. The study stresses the advantages of task-oriented, need-supportive environments in fostering sustained motivation and well-being during competitive sport seasons (Reinboth & Duda, 2006).

Drawing on Self-Determination Theory (Ryan & Deci, 2000) and Achievement Goal Theory (Ames, 1992), Reinboth & Duda (2006) examined how changes in athletes' perceptions of the motivational climate influenced psychological need satisfaction and well-being over a five-month period. Studying 128 British university athletes from various team sports, they found that a more task-involving climate enhanced satisfaction of autonomy, competence, and relatedness. Greater autonomy and relatedness satisfaction predicted higher subjective vitality, while competence satisfaction increased in task-oriented environments and contributed most when combined with the other two needs. These findings highlight the value of need-supportive, task-focused coaching environments for promoting athletes' motivation and well-being throughout a competitive season (Nicholls, 1989; Reinboth & Duda, 2006).

Coach behaviours are critical in the disability sport environment in terms of influencing athletes' motivational experiences and general well-being. Banack et al. (2011) investigated the self-determination theory in 113 Canadian Paralympic athletes to determine the relationship between coach autonomy support, basic need satisfaction

and intrinsic motivation. Participants were involved in individual (10.6%), team (42.4%), and coaching sports (e.g., swimming and track and field) (46.9%) from all five disability classifications (e.g., spinal cord injury, cerebral palsy, amputee, and visual impairment) in the Canadian Paralympic Committee (Banack et al., 2011). Athletes completed validated measures of coach autonomy support, psychological need satisfaction and intrinsic motivation to know, accomplish, and experience stimulation.

The results indicated that perceived autonomy-supportive coaching was a significant predictor of athletes' autonomy and relatedness satisfaction, and competence was the most consistent predictor of all three forms of intrinsic motivation. Autonomy also predicted motivation to attain achievement and to experience stimulation, highlighting the interactive role of different needs in motivation. The findings point to competence satisfaction as a key mechanism for the maintenance of motivation among Paralympic athletes, and autonomy-supportive coaching as improving the quality of motivation through the facilitation of both autonomy and relatedness. The study suggests that in disability sport, environments that support competence and respect athletes' volition are important for promoting intrinsic motivation and long-term sport engagement (Banack et al., 2011).

2.4.2 Autonomy and motivation

Autonomy means internalizing goals so actions feel personally endorsed, not merely following external pressures (Ryan & Deci, 2000). Autonomy-supportive environments those that respect athletes' perspectives, offer meaningful choice, explain rationales, acknowledge feelings, and provide structure consistently foster intrinsic and internalized motivation, better engagement, persistence, and well-being (Mageau & Vallerand, 2003; Vansteenkiste et al., 2020). Research shows genuine volition and an internal perceived locus of causality predict autonomous motivation more than choice alone, so coaches should support athletes' endorsement of decisions, not just present options (Bhavsar et al., 2019). Ultimately, Self-Determination Theory

(Deci & Ryan, 1985) highlights that this kind of supportive coaching helps athletes internalize their drive, resulting in deeper engagement, lasting persistence, and real enjoyment in their sport.

Cultural context shapes how autonomy is expressed: although SDT posits a universal need for autonomy, its meaning and measurement differ across cultures, so instruments need conceptual and linguistic validation in non-Western settings (Reeve, 2012; Ryan & Vansteenkiste, 2023). Empirical studies link autonomy-supportive coaching to greater autonomy, competence, and relatedness satisfaction, which in turn predict intrinsic motivation, enjoyment, persistence, resilience, and optimism in both able-bodied and disability sport contexts Pelletier et al. (Pelletier et al., 2001; Ntoumanis, 2001; Amorose & Anderson-Butcher, 2007; Almagro et al., 2010; Banack et al., 2011; Zhang et al., 2025). Conversely, neglecting athletes' autonomy increases controlled motivation, amotivation, and dropout risk (Pelletier et al., 2001; Zhang et al., 2025).

2.4.2.1 Choice and Motivation as Autonomy

Autonomy choice is the feeling of having real decision-making opportunities within a specific context (Ryan & Deci, 2017). However, researchers warn that measuring it alongside overall autonomy scores can cause multicollinearity issues in statistical models Field (2018). In sports, this looks like athletes directing their own training, setting goals, or deciding how to execute skills. According to Self-Determination Theory, offering choice boosts personal agency, value internalization, and intrinsic motivation, which enhances engagement and persistence across various settings (Williams et al., 1996).

Yet, choice's direct impact is complex; options must be meaningful and relevant to actually drive motivation (Vansteenkiste et al., 2020). Methodologically, mixing narrow measures like "choice" with broader autonomy scales causes multicollinearity, which inflates errors and biases results (Hair et al., 2010). Despite

these complexities, structured choice remains a foundational element of autonomy-supportive environments (Zhou et al., 2019). Choice alone isn't as strongly linked to autonomous motivation as volition or internal perceived causality (Reeve, Jang, Carrell, Jeon, & Barch, 2004; Ryan & Connell, 1989; Ryan & Deci, 2000). Furthermore, cultural values like the emphasis on group harmony in collectivist societies shape how freedom is perceived, meaning these measures must be culturally validated (Ryan & Vansteenkiste, 2023). In short, while autonomy choice is a vital part of supportive environments, it isn't sufficient on its own. When paired with volition and internal attribution, it effectively boosts intrinsic motivation and encourages long-term participation in sports and physical education (Bouffard, 2017; Deci & Ryan, 1985; Ryan & Deci, 2017).

Research shows that autonomy-supportive and controlling environments lead to very different motivational outcomes. For example, positive feedback boosts intrinsic motivation when delivered supportively, but undermines it when delivered in a controlling way (Deci, Koestner, & Ryan, 1999); Tangible or expected rewards also tend to decrease intrinsic motivation, particularly in children. These findings align with cognitive evaluation theory, which explains that environmental factors shape motivation by impacting our sense of competence and autonomy (Deci & Ryan, 1980).

Autonomy-supportive settings encourage self-determined extrinsic motivation and sustain intrinsic drive, whereas controlling environments foster external pressures and diminish intrinsic motivation. Studies in both labs and sports confirm this: athletes with autonomy-supportive coaches show higher intrinsic motivation, better performance, and greater well-being, while controlling coaching leads to the exact opposite (Ryan & Deci, 2000). A meta-analysis of 128 experiments confirmed that rewards tied to task engagement, completion, or performance generally undermine intrinsic motivation, especially regarding free-choice behavior (Deci, et al., 1999). Conversely, informational verbal feedback consistently boosts it. Ultimately, these findings highlight that fostering autonomy and competence through supportive

feedback is far more effective for sustaining engagement than relying on external control.

Markland & Hardy (1993) developed the Exercise Motivations Inventory (EMI) to systematically measure why people work out. Refined to 44 items across 12 distinct factors, the EMI proved highly reliable. They found that enjoyment and fitness were the top motives for non-athletes, establishing the inventory as a solid early tool for assessing physical activity motivation. Exploring how motivation evolves, Mullan and Markland (1997) combined self-determination theory (Deci & Ryan, 1985) with the stages of behavioral change model (Prochaska & DiClemente, 1982). Surveying 314 adults, they found that individuals in later stages, like maintenance, exhibited much more autonomous regulation. This highlights that self-determined motivation is crucial for both starting and sustaining an exercise habit. Supporting this, Ingledew et al. (1998) found that while extrinsic motives like appearance often trigger initial activity in the early stages, intrinsic motives like enjoyment are what actually predict long-term maintenance. Ultimately, while external factors can spark a workout routine, internalized motivation is the true key to lasting exercise adherence.

Based on Self-Determination Theory, Mageau & Vallerand (2003) developed a model showing how coaching shapes athlete motivation. When coaches use autonomy-supportive behaviors like offering choices, providing informational feedback, and acknowledging feelings they satisfy athletes' basic psychological needs. This fulfillment drives intrinsic motivation, better performance, and overall well-being. Conversely, Bartholomew et al. (2009) identified six controlling coaching strategies, such as intimidation, conditional regard, and excessive personal control. These behaviors frustrate psychological needs, undermine autonomous motivation, and lead to negative outcomes, highlighting the need for more research comparing supportive versus controlling styles.

In youth sports, research strongly supports autonomy-supportive coaching. Alvarez et al. (2009) found that adolescent football players with supportive coaches

experienced greater need satisfaction, higher motivation, and more enjoyment. Longitudinal studies confirm this lasting impact: Jõesaar et al., (2011) showed that supportive coaching predicts long-term persistence in Estonian teens, while (García-Calvo, Cervelló, Jiménez, Iglesias, & Moreno Murcia, 2010) found that Spanish soccer players with high need satisfaction stayed in the sport longer, whereas unmet needs increased dropout risks. These principles also apply to education. Ntoumanis (2001) applied Vallerand, (1997) motivational model to British students and found that perceived competence was the strongest psychological driver. Intrinsic motivation successfully predicted positive outcomes like effort, while external pressures and amotivation led to negative results like boredom and disengagement.

In elite sports, need-supportive coaching during matches significantly boosts athletes' motivation, need satisfaction, and performance, while need-thwarting behaviors hinder them (Morbée et al., 2024). Furthermore, external pressures placed on coaches directly trickle down to the team; when coaches are pressured, their athletes experience lower autonomy support and reduced psychological need satisfaction, demonstrating how coach stress negatively impacts player motivation (Morbée, Haerens, and Vansteenkiste, 2025). Teixeira et al. (2012) reviewed 66 SDT studies across age groups and found autonomy-supportive interventions consistently predicted intrinsic motivation, adherence, and well-being. Williams et al. (1996) reported that early autonomy support in a weight-loss program predicted greater autonomous motivation, adherence, and long-term weight loss. Together, these studies underscore autonomy's role in internalizing motivation and sustaining behavior. Mossman et al., (2024), pooling 131 samples ($N = 38,844$), found coach autonomy support strongly linked to autonomous motivation ($\rho = .39$) and need satisfaction, and negatively to amotivation ($\rho = -.19$), across cultures and sports. Overall, offering meaningful choices and explanations boosts intrinsic motivation and persistence and reduces amotivation and external dependence, especially in youth and elite sport.

2.4.2.2 Autonomy through Volition and motivation

Volition is about acting from personal will and truly owning your actions, which goes far beyond simply having choices (Bouffard, 2017, Ryan & Deci (2017). In fact, it is the strongest predictor of intrinsic motivation, showing that deep engagement comes from personally endorsing what you do rather than just selecting it (Vansteenkiste et al., 2020; Ryan & Deci, 2000). Interventions that build this sense of ownership, like goal setting and reflection, are much more effective than just offering options (Zhou et al., 2019). Especially in high-pressure sports, this deep personal investment drives performance, persistence, and resilience, as athletes ultimately want to feel fully committed to their actions rather than just handed a menu of choices (Lonsdale et al., 2019; Mallett et al., 2007; Jowett, 2008).

Early sport research showed volition as a key motivator: Vallerand & Reid (1984) found competence-supportive feedback increased persistence and intrinsic motivation, and Goudas et al. (1994) linked autonomy in PE to greater intrinsic motivation and task-focused goals. SDT frames these effects: satisfying autonomy, competence, and relatedness fosters volitional engagement (Deci & Ryan, 1985; Ryan & Deci, 2000). Applied and longitudinal studies echo this: higher volition predicts greater engagement, lower burnout, and better-quality motivation (Standage et al. 2005; Shannon et al., 2020). Mageau & Vallerand (2003) coach–athlete model and later work (Howard et al., 2020; Van den Berghe et al., 2014) show autonomy-supportive coaching boosts need satisfaction, volition, and self-determined regulation across ages, sports, and cultures. Reinboth et al. (2004) found coach autonomy support in adolescents predicted greater need satisfaction, intrinsic motivation, and well-being. Adie et al. (2008, 2012) showed similar longitudinal effects in university and elite youth soccer players: autonomy-supportive coaching increased need satisfaction, commitment, vitality, and engagement while reducing ill-being. Together, these studies highlight volition as the mechanism linking autonomy-supportive coaching to sustained motivation and optimal functioning.

In soccer, autonomy-supportive coaching consistently boosts youth players' enjoyment, motivation, and performance games (Alvarez et al., 2009; Gillet et al., 2010; Tristán et al., 2021). Across competitive ball sports, volition acts as a crucial driver of these positive outcomes. It enhances self-confidence, flow, and persistence while preventing amotivation, though it can be hindered by competitive anxiety (Domínguez-González et al., 2024; Whitty et al., 2024). In basketball, autonomy-focused training similarly increases volitional participation (Wang et al., 2024), and volition serves as a key mediator linking psychological need satisfaction to positive emotional states (Robazza et al., 2023). Ultimately, volition is essential for predicting and sustaining motivation across these sports.

Delrue et al. (2019) found autonomy-supportive coaching fosters adaptive motivation while controlling styles harm engagement. Mossman et al. (2024) meta-analysis ($\rho \approx .39$ for autonomous motivation; $\rho \approx -.19$ for amotivation) linked coach autonomy support to need satisfaction and wellbeing. Gut et al. (2020) showed adolescents with higher volitional regulation had greater intrinsic motivation and competence satisfaction. Whitty et al., (2024) meta-analysis of youth male academy athletes found volitional traits (persistence, attention control, goal-setting) protect against amotivation. Together, these studies identify volition as a key predictor of motivational quality across sports and development (Delrue et al., 2019; Mossman, et al., 2024; Gut et al., 2020; Whitty et al., 2024).

Wolff & Englert, (2021) conceptualize volition as a vital self-regulatory resource that helps athletes maintain focus and persistence despite fatigue or pressure, translating autonomous motivation into true resilience. In coaching contexts, Haerens et al. (2018) found that a "high-autonomy/low-control" style maximizes psychological need satisfaction and autonomous motivation, whereas high-control environments lead to need frustration and amotivation. This dynamic extends beyond sports coaching; Lindwall et al. (2017) showed that adult exercisers with highly volitional and autonomous motivation profiles experience greater need satisfaction and maintain much more stable exercise habits. Ultimately, volition is essential for distinguishing adaptive motivational pathways and sustaining long-term engagement across diverse

ages and contexts (Haerens et al., 2018; Lindwall et al., 2017; Wolff & Englert, 2021).

Delrue et al. (2019) showed autonomy-supportive instructions boost intrinsic motivation and volitional engagement, while controlling styles reduces them; effects depended on athletes' baseline motivation. Jõesaar (2012) found coach autonomy support predicted intrinsic motivation over one year in youth athletes. Chen et al. (2025) reported coach autonomy support raised athletes' vitality only in teams with a high grateful climate. Autonomy-supportive coaching predicts volitional commitment and intrinsic motivation across sports: in elite volleyball it reduced stress and boosted commitment (Morbée et al., 2024), in Taekwondo it lowered withdrawal intentions via emotional intelligence (Oh & Yoo, 2023), and similar effects appear in endurance contexts (Wu et al., 2024). Together these studies show volition reliably predicts motivation and engagement across sport types

Volition acts as a vital self-regulatory bridge, translating psychological need satisfaction into positive emotions and adaptive cognitive states through strategies like cognitive reappraisal (Robazza et al., 2023). Conceptually, while motivation provides the initial drive and energy, volition is the persistence that sustains goal-directed behavior despite stress or distraction (Wolff & Englert, 2021). This allows individuals to consistently turn their motivation into actual performance. Crucially, this role extends far beyond sports. Volitional traits like persistence, mastery, and attention control are equally essential for maintaining engagement and well-being in digital gaming (Vahlo et al., 2023) and across various other non-sport domains (McKechnie-Martin et al., 2024). Ultimately, volition is a universal process necessary for sustaining adaptive motivation in any context.

Voluntary control, flow, and self-confidence profiles can limit competitive anxiety in youth football (Domínguez-González et al., 2024). Wang et al., (2024) found autonomy-supportive pedagogies (Tactical Games Model) improved volition and intrinsic motivation more than directive instruction. Volition fosters intrinsic and identified regulation, reduces maladaptive controls and amotivation (Haerens et al.,

2018), and motivational profiling shows volitional engagement predicts adaptive motivational patterns and sustained participation (Lindwall et al., 2017). Overall, autonomy–volition is a core mechanism linking autonomy support to performance, persistence, and resilience, protecting against burnout and disengagement (Domínguez-González et al., 2024; Wang et al., 2024; Lindwall et al., 2017; Wolff & Englert, 2021).

2.4.2.3 Autonomy Internal Perceived Locus of Causality (AIPLOC) and Motivation

De Charms (1968) introduced Internal Perceived Locus of Causality (IPLOC) as the degree to which people view themselves as the source of their actions. Deci & Ryan, 1985; Ryan, & Deci, 2000) refined IPLOC within Self-Determination Theory (SDT) to distinguish autonomous from controlled motivation. Athletes high in IPLOC view participation as self-initiated and value-congruent, which supports intrinsic enjoyment, persistence, and stronger athletic identity; low IPLOC links to controlled motives (external/introjected regulation) driven by pressure, guilt, or rewards (Ryan & Connell, 1989; Hagger & Chatzisarantis, 2007).

Within SDT, AIPLOC (the cognitive component of autonomy) reflects athletes' identification with and endorsement of their behavior and underpins intrinsic and integrated regulation (Deci et al., 1991; Ryan & Deci, 2017). Autonomy-supportive coaching reliably fosters IPLOC/AIPLOC, which in turn predicts adaptive outcomes higher intrinsic motivation, persistence, and well-being (Ryan & Connell, 1989). Quantitative studies show positive associations between AIPLOC and autonomous motivation/regulation (e.g., $\beta = 0.361$ and $\beta = 0.306$, respectively; Ng et al., 2012), though effects are smaller than those for autonomy–volition, suggesting cognitive endorsement alone may be insufficient without behavioral engagement (Ng et al., 2012; Hair et al., 2018). AIPLOC also supports identity-based goals, particularly in experienced athletes who internalize sport in their self-concept (Vallerand et al., 1993). Across studies, autonomous

motivation better predicts sustained engagement and behavior change than controlled regulation (Hagger et al., 2014; Mouratidis et al., 2021; Owen et al., 2014). Cross-cultural work shows interpretations of internal causality vary by context e.g., collectivist norms influence how autonomy is experienced so culturally tailored measures matter (Ryan & Deci, 2017).

Mageau & Vallerand (2003) coach–athlete model integrates Cognitive Evaluation Theory and Vallerand’s hierarchical model: autonomy supportive coaching (choice, rationale, emotional acknowledgement, structure) enhances autonomy, competence, and relatedness, which strengthens internal perceived locus of causality (IPLOC) and promotes intrinsic and identified regulation, persistence, enjoyment, and performance (Mageau & Vallerand, 2003). Rouse et al. (2011) and (Vallerand, 1997) provide direct support: autonomy support raises IPLOC, which predicts more self-determined motivation and well-being. Classical evidence IPLOC is consistently associated with higher levels of intrinsic/identified motivation, commitment and engagement in sport contexts (Deci et al., 1991; Reeve & Ryan, 2004; Robazza et al., 2023; Kostopoulos et al., 2024; Sunde et al., 2024). Autonomy supportive teaching increases IPLOC and intrinsic motivation in teams and educational settings (Wang et al., 2009; Wang, et al., 2024). Measurement and validation IPLOC is a reliable, valid and cross culturally robust construct (PLOCQ G; (Wolf et al., 2022). In sport studies it is identified as a distinct dimension of autonomy related to intrinsic and identified regulation (Bhavsar et al., 2020; Ng et al., 2011; González-Cutre et al., 2018; and Pelletier et al., 2013) Reviews conclude that supportive environments reliably increase IPLOC and autonomous motivation and decrease controlled regulation (Schüler et al., 2023).

SEM and field studies show that IPLOC, competence and relatedness predict adaptive emotion regulation, positive affect and retention across roles and cultures (Robazza et al., 2023; Sunde et al., 2024). Youth and PE interventions increasing IPLOC raise intrinsic motivation, physical self-concept, activity and well being (Pavlović et al., 2025; Qi et al., 2024; Fenton et al., 2014; Standage et al., 2005).

Competitive and longitudinal evidence Autonomy supportive feedback increases IPLOC and intrinsic motivation in competitive sport, controlled feedback reduces engagement Postma et al. (Postma et al., 2024; Johansen et al., 2023). Attribution and autonomy support interventions increase self-efficacy and decrease fear of failure (Huang et al., 2025; Teixeira et al., 2023). Longitudinal studies indicate that autonomy support predicts IPLOC and later autonomous regulation; meta analyses indicate a positive relationship between IPLOC and intrinsic/integrated/identified regulation, and a negative relationship with controlled motivation (Chatzisarantis et al., 2003; Mouratidis et al., 2008; Smith et al., 2010; Gjesdal et al., 2019). Stress, well-being and practical implications Higher levels of IPLOC are related to lower levels of stress and anxiety, and higher levels of confidence and resilience in returning to play (Holden et al., 2019, Amar et al. 2023; Behzadnia et al., 2024). In sum, IPLOC provides a pathway where contexts that enable autonomy can turn need satisfaction into self-determined motivation, sustained engagement, and positive affective and performance results across ages, roles, and cultures (Deci et al., 1991; Reeve & Ryan, 2004; Robazza et al., 2023).

Table 2.1. Summary of Autonomy Sub-dimensions

Sub-dimension	Role in Motivation	Empirical Support
Choice	Enhances perceived control	Conceptual support from SDT; weak empirical link to intrinsic motivation (Hair et al., 2010)
Volition	Strongest predictor of intrinsic motivation and performance	Supported by multiple studies (Vansteenkiste et al., 2020)
AIPLOC	Predicts identification and integration of goals	Moderate relationship with autonomous motivation (Ng et al., 2012)

2.4.3 Relatedness and motivation

longitudinal work (Ntoumanis & Biddle; 1999; Vallerand & Losier, 1999) shows that relatedness, competence and social factors influence motivational trajectories and performance. Reviews and syntheses (Hagger & Chatzisarantis, 2008).

Relatedness, the need to care for and be cared for, enhances emotion regulation, cohesion, resilience, and buffers burnout in team sport (Deci, and Ryan, 1985, 2000, 2017; Lonsdale et al., 2019). Relatedness, alongside autonomy and competence, influences the motivational quality (intrinsic → extrinsic → amotivation) and predicts persistence, enjoyment, and well-being (Ryan & Connell, 1989; Vallerand, 1997). Relatedness supportive environments foster intrinsic, integrated and identified regulation, while relatedness frustration promotes controlled motivation and amotivation (Deci et al., 2016; Reeve, 2009).

Coach, peer, and teacher support increase intrinsic and identified regulation, vitality, and persistence while reducing external regulation and amotivation (Mageau & Vallerand, 2003; Ntoumanis, 2001; Adie et al., 2008; Goudas et al., 1994). Relatedness predicts self-determined motivation above and beyond autonomy and competence (Appleton & Duda, 2016). Experimental and longitudinal work show that increases in relatedness (via interventions or inclusive climates) lead to greater intrinsic motivation, positive affect, learning and retention (Kaefer & Chiviacowsky, 2021; Paap et al., 2025; Ruiz et al., 2019). Validated measures (SMS, BRSQ, SIMS, EDMCQ C) and multivariate/longitudinal work show that relatedness is consistently associated with autonomous motivation and less dropout across sports and cultures (Pelletier et al., 1995; Lonsdale et al., 2008; Guay et al., 2000; Howard et al., 2021). Qualitative work also highlights belonging and coach-athlete closeness as core to quality sport experiences (Jowett & Cockerill, 2003; Amado et al., 2019). Nuances & mixed findings Relatedness is important, however some studies find competence and autonomy have stronger mediation effects for behaviour maintenance in performance focused contexts (Zhang & Miao, 2024). But meta analytic work shows coach autonomy support and need satisfaction (including relatedness) robustly predict autonomous motivation and lower amotivation across cultures and sports (Mossman et al., 2024; Standage, 2023). Practical implication Internalisation of goals, higher autonomous regulation, emotion regulation, resilience and sustained participation are supported by interpersonal bonds, such as coach warmth, peer cohesion and inclusive team practices (Vallerand, 1997; Reeve, 2009; Appleton & Duda, 2016).

Relatedness feeling connected and valued uniquely predicts self-determined motivation (intrinsic, integrated, identified), and reduces controlled motivation and amotivation, even controlling for autonomy and competence (Appleton & Duda, 2016; Vallerand, 2007). Relatedness is linked to better emotion regulation (more reappraisal, less suppression), adaptive self-talk, enjoyment, engagement, resilience and less anxiety/burnout (Amado et al., 2019; Kim & Tamminen, 2023; Tamminen et al., 2021; Robazza et al., 2023; Vilks & Kolesovs, 2025). Qualitative work also points to social support and belonging as indicators of quality sport experiences (Amado et al., 2019). Intervention and longitudinal studies indicate that increases in relatedness predict higher intrinsic motivation, engagement, persistence and well-being (Paap et al., 2025; Adie et al., 2012; Pelletier et al., 1995). Mechanistically, coach and peer behaviours that value athletes and foster cohesion improve interpersonal regulation, emotion regulation, goal attainment and mental health (Goudas et al., 1994; Reeve & Ryan, 2004; Morbée et al., 2024). Rich measurement and multivariate/longitudinal analyses show the special role of relatedness in keeping people involved (Appleton & Duda, 2016; Paap et al., 2025). Team cohesion and motivation in ball games Task and social cohesion predict higher intrinsic and identified motivation, engagement and lower amotivation and burnout. Cohesion -> relatedness -> autonomous motivation -> better retention and performance documented in basketball, soccer, volleyball (Wang et al., 2024; Pacewicz et al., 2020). Interpersonal closeness and peer support linked to match readiness and concentration in volleyball Longitudinal and experimental evidence Longitudinal, intervention and experimental studies support a causal role for relatedness Coach/teacher training and SDT interventions promote warmth, inclusion and team rituals to promote autonomous motivation and reduce anxiety Smith et al., (2008) and Ntoumanis et al., (2021) Social inclusion manipulations boost intrinsic motivation and positive affect Kaefer & Chiviacowsky, (2021) Cultural and theoretical notes Autonomy and competence are often stronger predictors of intrinsic/integrated motivation, but relatedness provides the social basis for internalisation, especially in collectivist contexts, supporting identified regulation and retention (Deci & Ryan, 2000; Ryan & Deci, 2017; Hagger et al., 2014; Owen et al., 2014). Overall, interpersonal bonds through coaching and peer practices meaningfully support self-

determined motivation, emotion regulation, resilience and sustained participation (Vallerand 1997; Amado et al., 2019).

2.5 Motivational Regulation constructs

Motivation drives athletes' effort, training and lifestyle behaviours and interacts with emotional and attentional control to support performance (Alderman, 1974; Straub, 1978; Singer, 1986; Lopes, 2024). Self-Determination Theory considers motivation as a spectrum of autonomous to controlled regulation, related to the needs for autonomy, competence and relatedness (Deci & Ryan, 1985; Ryan & Deci, 2000).

2.5.1 Intrinsic Motivation

Doing something for interest, enjoyment or challenge – is the most self-determined type and forecasts persistence, concentration, flow, creativity and well-being. It is fostered by mastery focused, autonomy supportive, and socially connected environments (Vallerand & Losier, 1999; Mallett, 2005; Feldman, 2017; Lonsdale et al., 2019; Deci & Ryan, 1985; Ryan & Deci, 2000; Ng et al., 2012).

2.5.2 Integrated control

Integrated regulation reflects full internalization of goals into identity and values; it motivates disciplined training and lifestyle behaviours resembling intrinsic motivation (Pelletier et al., 2013; Deci and Ryan, 2017).

2.5.3 Identified regulations

Identified regulation Identified regulation is when the personal importance of the behaviour is accepted and will lead to adherence and sustained effort even when the task is not enjoyable (Ryan & Deci, 2000; Ng et al., 2012; Teixeira et al., 2012).

2.5.4 Interjected Regulation

Is a partially internalized and is driven by guilt, ego or approval. It may lead to short term compliance but it is associated with anxiety and burnout and inconsistent effort (Williams & Deci, 1996; Amorose & Horn, 2001; Teixeira et al., 2012; Vansteenkiste et al., 2020).

2.5.5 External regulation

It is motivated by rewards, recognition or avoidance of punishment. It can lead to short term compliance but it often undermines intrinsic motivation and long term engagement (Ryan & Deci, 2000; Ntoumanis et al., 2020; Lonsdale et al., 2019; Ng et al., 2012; Karageorghis & Priest, 2012).

2.5.6 Amotivation

It is characterized by a lack of intention or perceived incompetence and predicts poor performance and psychological distress; it requires targeted interventions to restore need satisfaction (Ryan & Deci, 2000; Lonsdale et al., 2019; Ng et al., 2012; Iwasaki & Fry, 2013; Van den Broeck et al., 2021; Gillet et al., 2013).

Table 2.2: Summary: Key Motivational Constructs

Construct	Definition	Level of Self-Determination	Predictive Value for Sport
Intrinsic Motivation	Engaging insport for inherent enjoyment	Fully autonomous	High – linked to persistence, creativity, and well-being
Integrated Regulation	Behavior aligned with personal values and identity	Highly autonomous	High – predicts long-term commitment and performance consistency
Identified Regulation	Recognizing the importance of sport participation	Moderately autonomous	Moderate – supports sustained effort when enjoyment is low
Introjected	Internal pressures like	Controlled	Low – leads to short-term

Regulation	guilt or ego		compliance and increased anxiety
External Regulation	Driven by rewards, recognition, or punishment	Fully controlled	Very low – undermines long-term engagement
Amotivation	Lack of intention or perceived capability	Non-motivation	Negative – associated with withdrawal and disengagement

Intrinsic, extrinsic and general motivation were described by Halbrook, Blom, Hurley, Bell, and Holden (2012); sport motivation is both intrinsic and extrinsic. Intrinsic motivation is associated with the enjoyment, mastery and personal development (Mullins, 2005; Armstrong, 2006; Feldman, 2017) and comprises motives to learn, accomplish and seek stimulation (Vallerand & Losier 1999). Extrinsic motivation is defined as acting for outcomes outside the activity (rewards, recognition, avoidance of punishment) and is categorized into integrated, identified, introjected and external regulation (Deci & Ryan, 1985; Deci et al., 1991; Vallerand & Bissonnette, 1992).

Table 2.3: Types of Motivations and their Categorization as Self-determined vs.Non-self-determined

Types of motivations	Classification and descriptions
Amotivation	Lack of intention or interest to participate in sports activities; lower end, complete lack of self-determination continuum (Deci & Ryan, 1985; Li et al., 2018; Pelletier et al., 2017). The least self-determined type of motivation is characterized by a lack of engagement (Deci & Ryan, 2002).
External regulation	The least or non-self-determination regulation, participating in sports activities to satisfy external needs (for getting money) (Li et al., 2018; Pelletier et al., 2017); controlled type of motivation (Teixeira et al., 2012). The most non-self-determined type of extrinsic motivation (Deci & Ryan, 1985).
Introjected regulation	Non-self-determination regulation (Li et al., 2018); controlled type of motivation the most non-self-determined type of extrinsic motivation (Deci & Ryan, 1985). Participating in Sports activities for avoiding punishment or gaining rewards (Li et al., 2018; Pelletier et al., 2017).

Identified regulation	Moderately self-determined or autonomous types of motivation (Li et al., 2018). Recognizing and accepting one's importance as a Result of participating in sports activities as a means of career Development (Li et al., 2018; Pelletier et al., 2017).
Integrated regulation	Moderately self-determined or autonomous types of motivation (Li et al., 2018). Integrating or assimilating values or needs to self-valuing sports participation as part of one's life activity (Li et al., 2018; Pelletier et al., 2017).
Intrinsic motivation	The most autonomous form of motivation. Participating in sports activities for its sake or to enjoy the activity itself (Li et al., 2018; Pelletier et al., 2017).

2.5.7 Influence of Coaches, Peers and Environment on Sport Motivation

Social context coaches, peers, parents, and organizational structures strongly shapes athletes' motivation via need support or need thwarting behaviors (Deci & Ryan, 1985). Autonomy supportive coaches who offer choice, positive feedback, and reduce controlling pressure enhance athletes' autonomy, competence, relatedness, engagement, persistence, and performance (Ng et al., 2012; Jowett, 2008; Rocchi & Pelletier, 2017). Controlling behaviours (excessive pressure, verbal aggressiveness) increase external regulation and can undermine intrinsic motivation (Bekiari et al.; 2015; Amorose & Horn, 2001). Parents and coaches influence motivation in complementary ways: coaches shape practice and instruction, parents shape broader participation experiences (O'Rourke et al., 2014). Peers also create motivational climates: team belonging and social approval support relatedness and influence motives like fun, challenge and recognition (Wendling et al., 2018; Viira et al., 2012). The responsiveness to extrinsic rewards and cohesion is affected by development and role factors (Szemes et al., 2017). More generally, research in the SDT has shown that autonomy-supportive environments foster self-determined motivation and continued participation, whereas controlling environments result in controlled motivation or amotivation (Vansteenkiste & Ryan, 2023). These findings highlight the significance of coach education, peer cohesion, and organizational policies designed to promote supportive climates for athlete development and well-being.

2.5.8 Development and validation of the Sport Motivation Scale-II (SMS-II)

The original SMS (Pelletier, et al., 1995) identified seven motivational subtypes in 593 Canadian athletes and showed acceptable reliability (test-retest .58–

.84; $\alpha = .71-.85$). Mallett et al. (2007). created SMS 6 (six factors, 24 items) adding integrated regulation and confirmed its structure and concurrent validity. Pelletier et al. (2013) improved the measure into SMS II by combining the intrinsic subscales and adding integrated regulation; validation studies with adult ($N = 412$) and youth ($N = 290$) athletes supported factorial validity, reliability, and predictive utility. Cross-cultural work suggests careful linguistic adaptation may improve fit (e.g., removal of introjected regulation in some samples), and recent reviews find the SMS II broadly robust (Amaro et al., 2025).

2.5.9 Measurement of Motivation

SMS II and Related Instruments SMS II is a reference instrument for assessment of multidimensional sport motivation and athlete engagement (vigor, dedication, absorption) linked to performance (Ryan & Deci, 2000; Pereira et al., 2024). SIMS measures situational (state) motivation intrinsic, identified, external, amotivation and has demonstrated factorial validity and sensitivity to situational change (Guay & Vallerand, 2000). Cross cultural validations (including Portuguese youth samples) confirm SMS II's six factor structure and cultural relevance (Pelletier et al., 2013).

Overall, SMS II, SIMS, and related scales reliably capture motivational processes across sports and levels (Guay et al., 2000; Lonsdale et al., 2008; Gillet et al., 2010; Li et al., 2018; Amaro et al., 2025).

Further cross-cultural validations have extended its applicability:

- China: Li et al. (2018) confirmed factorial structure, test–retest reliability, and external validity among university athletes across team and individual sports ($N = 267-259$).
- Brazil: (Barreira et al. (2022) used the SMS-II with more than 1000 Brazilian college athletes, confirming the scale's high validity for five subscales, but low reliability in introjected regulation ($\alpha, \Omega < .40$).

- (Viciano et al. (2017) studied the S-SMS-II within a sample of 766 Spanish adolescents and reported acceptable internal consistency (.64–.74) and factorial invariance by sex and type of sport

Amaro, Barreira, and Fernandes (2025) found SMS-II broadly robust; some studies report removing introjected regulation improves fit after careful cultural adaptation. SMS-II, SIMS, and BRSQ are widely used to study motivation and performance across team and individual sports, levels, and cultures (Guay et al., 2000; Lonsdale et al., 2008; Gillet et al., 2010 ;Li et al., 2018 ;Amaro et al., 2025).

2.6 Motivation in sports

Motivation directs and energises behaviour and in sport it shapes effort, training, mental preparation, and lifestyle factors that athletes can control (Feldman, 2017; Alderman, 1974; Straub, 1978; Singer, 1986). Cognitive elements (thoughts, beliefs, goals) determine persistence and performance more than static ability or external conditions.

2.6.1 Motivation and Dedication to Sport in Adolescents

Adolescence is critical for long term sport engagement. Almagro et al. (2010) found that autonomy supportive coaching is related to greater autonomy, intention to stay active, and intrinsic motivation in 608 adolescent athletes using ASQC, BPNEs, and IPAS. External incentives (scholarships, medals) are important for collegiate/elite athletes, and strong coach–athlete relationships increase internal motivation and sustained participation (Aksakal et al., 2018).

2.6.2 Motivation, Fatigue and Sustained Effort

Athletes face fatigue and monotony in training (“the grind”) but high self-determination enables them to persist, maintain focus, and overcome physical and psychological demands (Taylor, 2009).

2.6.3 Gender Differences in Motivation

Findings on gender are mixed. Some studies report females as more intrinsically and self-determined, males more extrinsically motivated (Cremades & Tashman, 2014; Kingston et al., 2006; Pope & Wilson, 2012; Vallerand & Bissonnette, 1992), while others show males higher on some extrinsic or intrinsic indices (Chin et al., 2012). Inconsistencies are likely due to context, sport level and differences in measurement, suggesting more research is needed.

2.6.4 Motivation in a Competitive Environment

Competitive environments that support autonomy, competence and relatedness foster intrinsic motivation, persistence and improved performance whereas controlling, pressure-driven environments inhibit intrinsic motivation and results (Woodson, 2014).

Self-determined motives (intrinsic, integrated, identified) are linked to effort, goal orientation, and adaptive states whereas controlled types (external, amotivation) are linked to reduced effort and poorer outcomes (Pelletier et al., 2001; Cury et al., 2002). Empirical studies support these relationships with higher intrinsic motivation predicting better competitive performance (Goudas et al., 1994; Ntoumanis, 2001) and self-determined profiles being related to greater attention, effort, cohesion, and consistent performance (Occhino et al., 2014; Halbrook et al. 2012).

The PPSQ (Almagro et al., 2020) provides a consistent measure of perceived performance in technical, tactical, physical, and mental domains and is useful to explore the relationship between motivation and competition.

2.7 Motivation and perceived sport performance

Motivation influences effort, persistence and adaptability in athletes and is an important predictor of performance (Vieira et al., 2020). Self Determination Theory

distinguishes between self-determined motivation (intrinsic, integrated, identified) and controlled motivation (external, introjected) and amotivation; the more self-determined forms of motivation lead to higher effort and goal directed behavior (Pelletier et al., 2001), whereas more controlled forms of motivation are related to lower engagement and poorer outcomes (Cury et al., 2002). This distinction is empirically supported; athletes with higher intrinsic motivation perform better (Goudas et al., 1994), and meta-analytic work shows that self-determined motivation is related to indicators of sport performance (Ntoumanis, 20014).

The Perceived Performance in Sport Questionnaire Almagro et al. (2020) measures athletes' subjective evaluations in technical, tactical, physical and mental areas, and is a valuable supplement to objective measures. Autonomous motivation mediates relationships between need satisfaction and behaviours such as adherence and task performance (Weman-Josefsson et al., 2015). Controlled motivation (external, introjected) shows limited predictive power for sustained performance (Wilson et al., 2003). These findings underscore promoting autonomy supportive environments to enhance athletes' well-being and perceived performance. Athlete performance and motivation. Evidence shows self-determined motivation most strongly predicts positive performance outcomes (Ntoumanis et al., 2021). Research since 2020 supports SDT's claim that fulfilling autonomy, competence, and relatedness drives autonomous motivation and adaptive outcomes. Competence had a direct effect on perceived performance and need satisfaction predicted autonomous motivation (Lourenço et al., 2022). Almagro et al. (2020) validated a scale for perceived performance and associated intrinsic motivation with perceived performance and commitment. Meta analytic reviews confirm that autonomous motivation increases participation and reduces burnout (Ryan & Deci, 2022), while controlled motivation shows weaker and less sustainable effects (Manninen et al., 2022).

Hill and Appleton (2012) reported extrinsic motivation relates to socially prescribed perfectionism and burnout risk. Gillet et al. (2009) intrinsic motivation and need satisfaction predicted performance gains in youth tennis. In performance settings,

controlled motivation may improve short-term effort (Moen, Federici, and Skaalvik 2014). SDT explains how need satisfaction leads to autonomous motivation and as a result, more effort, persistence and performance in ball game sports. Current reviews support the idea that intrinsic and self-determined motivation are better predictors of long-term engagement and success than controlled regulation (Alkasasbeh & Akroush, 2025; Ryan, 2025).

2.8 Basic Need Satisfaction and Perceived Sport Performance

Self Determination Theory (SDT) suggests that the satisfaction of autonomy, competence, and relatedness is essential for athletes' engagement, persistence, and performance (Ryan & Deci, 2017). Competence is the best predictor of perceived performance and mediates how coaches influence satisfaction with performance (Vallerand et al., 2003; Mageau & Vallerand, 2003; Adie et al., 2012). Meta-analytic and big data have shown the importance of competence, along with autonomy and relatedness (Bartholomew et al., 2011; Vlachopoulos & Michailidou, 2006). Controlled regulations (external, introjected) have little power to predict sustained performance while autonomous motivation and competence predict persistence and perceived competence (Ng et al., 2012; Teixeira et al., 2012; Lourenço et al., 2022). In some models competence directly predicts perceived performance in the absence of autonomous motivation (Almagro et al., 2020). Empirical reviews and cross cultural validations support SDT's applicability in sport, including recent Amharic BNSSS validation with Ethiopian athletes (Ng et al., 2012; Melesse et al., 2024).

2.9 Basic Psychological Needs Satisfaction, Sport Motivation and Performance in Elite Volleyball Players

Volleyball's team demands make satisfaction of autonomy, competence, and relatedness central to sustaining self-determined motivation and performance (SDT). Athletes' perception of supportive coaching is especially important for need satisfaction and high quality motivation in volleyball. Recent studies show consistent links: Morbeé et al. (2024)) identified supportive coaching as predicting greater need

satisfaction, greater autonomous motivation and better coach rated performance, whereas need thwarting behaviours had the opposite effect. Large scale evidence (Elsborg et al., 2023) suggests mastery oriented climates promote need satisfaction, enjoyment and continued participation across competition levels. Collegiate research (Adie et al., 2011) shows that balanced satisfaction of all three needs predicts greater well-being. Kelecek et al. (2010) demonstrated that mastery climates relate to intrinsic motivation and flow, while ego climates relate to maladaptive outcomes.

2.10 Perceived Performance in Elite Volleyball

The PPSQ has not been widely used in research with elite volley ballers, but there is evidence that supportive coaching relates to enhanced motivation and performance satisfaction Loh et al. (2018). Supportive coaching improves autonomy, competence and relatedness, which in turn increase autonomous motivation and perceived performance. However, few studies test BNSSS, sport motivation, and perceived performance together in one model, and research from African contexts, especially Ethiopia, is scarce. This study fills that gap by examining direct and indirect BNSSS → SMS II → PPSQ relationships in Ethiopian elite volleyball.

2.11 Gender Differences in Basic Psychological Needs Satisfaction and Perceived Sport Performance

Gender differences in need satisfaction and perceived performance under SDT show mixed results (Ryan & Deci, 2017). Some studies find no gender differences (Adie et al., 2012; Gunnell et al., 2014), indicating need satisfaction effects are generally universal. Others report small, context-dependent differences women higher in relatedness, men higher in competence and autonomy in competitive settings (Moreno-Murcia et al., 2011; Balaguer et al., 2012). Perceived performance also shows comparable levels when training and support are similar (Chu et al., 2021; Lochbaum et al., 2022). Evidence from African contexts is limited, so testing gender

differences among Ethiopian volleyball players helps assess SDT's cross-cultural applicability.

2.12 Basic Psychological Needs, Motivation and Perceived Sports

Performance: Integrating the Conceptual Framework (BNSSS → SMS-II → PPSQ)

(Deci & Ryan, 1985; Ryan & Deci, 2000) by De Francisco et al. (2018) Using SDT and structural equation modeling (SEM), explored the mediating role of athlete self-motivation in the relationship (De Francisco et al., 2018). Grounded in Self Determination Theory (Deci & Ryan, 1985; Ryan & Deci, 2000), the model proposes that satisfaction of autonomy, competence, and relatedness (BNSSS) promotes self-determined motivation (SMS II), which in turn predicts perceived sport performance (PPSQ). Need supportive environments (autonomy support, mastery feedback, inclusive climates) therefore promote adaptive motivation and better performance (Reinboth & Duda, 2006; Ames, 1992). Empirical evidence consistently supports motivation as a mediator between need satisfaction and outcomes such as engagement, persistence and perceived performance. SEM and longitudinal studies show that coach autonomy support increases need satisfaction, which in turn improves intrinsic/integrated motivation and vitality, mental toughness and performance (De Francisco et al., 2018; Mahoney et al., 2014; Adie et al., 2012; Curran et al., 2016). The PPSQ has been validated, showing that intrinsic Motivation mediates the relationships between need satisfaction and intentions to remain active (Almagro et al., 2020). Other mediators and moderators that influence the transfer of need satisfaction to performance have been identified in the literature, including self-talk, subjective vitality, self-efficacy, resilience, psychological empowerment, and cultural values (Bingöl & Yildiz, 2021; Wang et al., 2023; Yang et al., 2024; Zeng & Yin, 2025; Levillain et al., 2025). Moral cognitive processes and mental toughness buffer negative climates and impact outcomes (Zhang & Yu, 2025; Zhong & Wang, 2025). The BNSSS has been cross-culturally validated, demonstrating its reliability and predictive utility (Nascimento Junior et al., 2018; Pineda Espejel et al., 2019). The PPSQ also has good psychometric properties in applied settings (Ng et al., 2011;

Almagro et al., 2020). Practical implication: Coaches should aim to create autonomy-supportive, mastery-oriented environments to promote autonomous motivation, engagement, and perceived performance (Quested & Duda, 2010; Reinboth & Duda, 2006). The BNSSS → SMS II → PPSQ pathway provides a pragmatic model to translate theory into coaching practice.

The diagram represents a conceptual model that illustrates the relationships among the three basic psychological needs variables, motivation variables, and sports performance in which the psychological need satisfaction affects sports performance indirectly through motivation as a mediator.

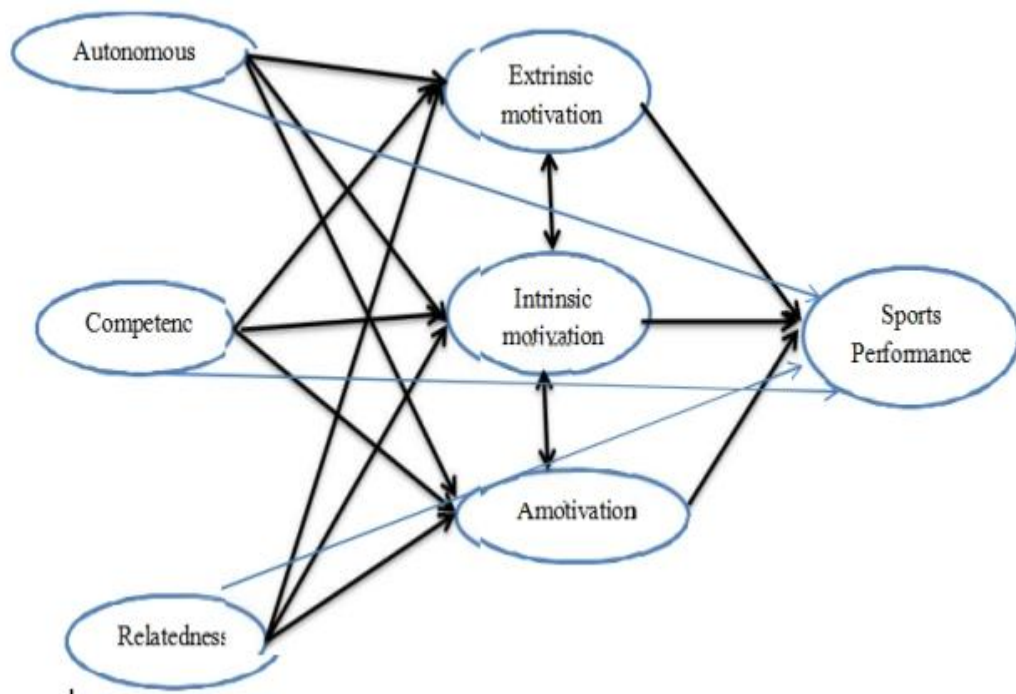


Figure 1. A Proposed Conceptual Model Linking the Psychological Needs Variables and Sports Performance through Mediating Effects of Motivation.

CHAPTER THREE

Research Methodology

3.1 Introduction

This study used a survey design to explore the impact of basic psychological needs (autonomy, competence, and relatedness) on perceived sport performance among elite Ethiopian Premier League volleyball players, with sports motivation components as mediators. Also, the study assessed the psychometric properties of the Basic Need Satisfaction in Sport Scale (Ryan & Deci, 2000; Nascimento Junior et al., 2018) and the Sport Motivation Scale – II (Pelletier et al., 2013; Pelletier, et al., 1995) in the Ethiopian volleyball context to ensure the reliable and culturally appropriate measurement of the variables. This chapter describes the methodological framework of the study, including research design, participants and sampling, instruments and procedures, data collection and analysis methods, and ethical considerations. The ultimate goal is to combine psychometric validation with testing of the BNSSS → SMS-II → perceived performance model to shed light on the processes of motivation and performance in Ethiopian elite volleyball.

3.2 Research Paradigm and Approach

The study adopted a post-positivist paradigm, which treats reality as objective but acknowledges that observations are theory- and method-bounded and that knowledge is probabilistic (Creswell and Creswell 2018). Aligned with this view, the research empirically tested theoretically grounded relationships among basic psychological need satisfaction, motivational regulations, and perceived sport performance in elite Ethiopian volleyball players.

Validated psychometric instruments the Basic Needs Satisfaction in Sport Scale (Nascimento Junior et al., 2018) and the Sport Motivation Scale–II (Pelletier et al., 2013; Pelletier et al., 1995) were used to ensure construct validity and reliability. Quantitative techniques (correlational analysis, regression, mediation analysis, and

SEM) provided rigorous tests of direct and indirect effects, supporting replicability, generalizability, and statistical inference relevant to sport science and applied practice.

3.3. Research Design

The study used a correlational survey design within a quantitative framework to examine relationships among variables and test predictive models. Correlational designs describe associations, identify predictors from variance, and allow model testing using questionnaire data collected in natural settings (Ary et al., 2010; Mcmillan & Schumacher, 2014). This approach supports analysis of relationships and mediation effects, offering insights for future research and practice in sport psychology (Creswell, 2012; Field, 2018; Gay & Airasian, 2012; Happner et al., 2016).

3.4. Research Approach

The study used a correlational survey design to examine relationships among basic psychological needs, motivation, and perceived sport performance in elite Ethiopian volleyball players. A survey approach is appropriate for assessing associations and patterns across a large sample and for testing mediation (motivation as mediator between needs and perceived performance) using standardized questionnaires (Creswell, 2012; Field, 2018).

3.5 Study Variables

BNSSS (Basic Need Satisfaction in Sport) is the primary independent variable measuring need satisfaction. SMS-II (Sport Motivation Scale-II) functions as mediator and predictor of motivation. The dependent variable is players' perceived performance, influenced by BNSSS and SMS-II (Anderson-Cook, 2005).

3.6 Population and Sampling Technique

The study used two linked sampling procedures. Instrument validation used stratified cluster random sampling across four ball-game strata (volleyball, basketball,

handball, football), selecting clusters randomly to yield a validation sample of $N = 321$. The volleyball component used total-population purposive sampling (complete enumeration) of all registered Ethiopian Premier League players ($N = 148$). The validated instrument from the multi-sport sample was then applied to the volleyball sample for hypothesis testing (Creswell, 2014).

All 148 players were contacted via clubs with cooperation from management, coaches, and team leaders; informed consent and ethical procedures were followed. Data were collected using the Amharic BNSSS and SMS-II, which had been adapted and psychometrically evaluated for Ethiopian athletes.

Table 3.1: Ethiopian Volleyball Premier League clubs and player distribution

Name of club	Category	Region/City	Number of players
Addis Ababa police	Men	Addis Ababa	13
National alcohol	Men	Addis Ababa	12
National defense	Men	Addis Ababa	13
Woliya dacha	Men	Southern	12
Bahir Dar city	Men	Amhara	14
Medawelabu University	Men	Oromiya	12
Muger cement	Men	Oromiya	12
Ethiopian coffee	Women	Addis Ababa	12
Federal prison	Women	Addis Ababa	12
Water irrigation minister	Women	Addis Ababa	12
National alcohol	women	Addis Ababa	12
Walaita sodo university	Women	Southern	12
Total			148

The study used two complementary samples. The validation sample ($N = 321$) pooled elite players from four ball-game sports, creating a heterogeneous group that improves the instrument's generalizability across sports and cultural backgrounds within Ethiopia. The volleyball sample ($N = 148$) comprised only Premier League players, a homogeneous group appropriate for precise testing of hypotheses specific to elite volleyball development. This design balances broad psychometric evidence with context-specific application: the heterogeneous sample supports cross-sport validity, while the homogeneous sample enhances internal validity for volleyball. However, findings from the volleyball sample may not generalize to other sports, non-elite

levels, or different national contexts without further cross-cultural validation.

3.7. Study Site and Participant Selection

The final sample comprised 148 elite players: 85 men (7 clubs) and 63 women (5 clubs). A separate validation sample of 321 athletes from Ethiopian Premier League clubs was collected in 2024.

3.8 Instrument Validation (Pilot / Preliminary Study)

Before the study with elite Ethiopian volleyball players, a pilot study was undertaken to validate two commonly used psychological instruments: the Sport Motivation Scale–II (Pelletier et al., 2013) and the Basic Needs Satisfaction in Sport Scale (Ng et al., 2011). The primary aim of this pilot study was to confirm that the two instruments were culturally adapted, linguistically appropriate, and reliable and valid for measuring motivation and basic psychological needs among Ethiopian athletes.

3.8.1 Rationale for Instrument Validation

SMS-II measures six motivational orientations (intrinsic, integrated, identified, introjected, external, amotivation) along the SDT continuum (Standage et al., 2003). BNSSS assesses five need-satisfaction dimensions: competence, relatedness, autonomy-choice, autonomy-volition, and autonomy-IPLOC. Although both scales have been validated across cultures, their use with Ethiopian athletes is limited; therefore cross-cultural adaptation into Amharic was necessary to ensure accurate measurement.

3.8.2 Translation and Cultural Adaptation

A rigorous multi-step translation and adaptation procedure was implemented following established guidelines:

- Forward Translation: Three bilingual translators independently translated the original English items into Amharic.
- Expert Review: Four experts in sport psychology and language reviewed the translated items for clarity, relevance, and cultural appropriateness.
- Consensus Panel: An additional panel of four experts reconciled discrepancies and finalized the item wording.
- Pilot Testing: The preliminary Amharic versions were administered to 65 athletes (38 males, 27 females) from team and individual sports to evaluate comprehension, clarity, and item relevance. Feedback was used to refine the instruments.
- Backward Translation: Two bilingual experts translated the Amharic items back into English to ensure semantic, idiomatic, and conceptual equivalence with the original versions.

This multi-step process ensured that the instruments retained semantic, idiomatic, experiential, and conceptual equivalence while being fully accessible and culturally relevant for Ethiopian athletes.

3.8.3 Participants and Data Collection

A total of 321 athletes (174 males, 147 females; mean age 23.48 ± 3.21 years) from national and regional team sports participated. Inclusion required at least two years of competitive experience. Ethical approval was obtained from Bahir Dar University Sports Academy Ethical Review Board (Protocol No. IRERC 05/2024). Participants were informed of the study, and confidentiality, anonymity, and voluntary participation were ensured. The Amharic versions of SMS-II and BNSSS were administered under standard conditions with instructions from trained researchers.

3.9 Source of Data and Data collection Instruments

Primary data were collected from Ethiopian Elite volleyball players, and Ethiopian premier league players using three questionnaires: the Basic Need Satisfaction in Sport Scale (BNSSS), Sport Motivation Scale II (SMS-II), and the

Perceived Performance Sport Scale. Focusing on these instruments allowed the researcher to examine relationships among coaching competency, coach–athlete relationships, player commitment, and team performance within elite Ethiopian volleyball clubs (Creswell, 2014; Field, 2018).

3.9.1 Basic need satisfaction sports scale

The Basic Psychological Need Scale (sport-specific) assesses athletes' competence, autonomy, and relatedness (Ng et al., 2011). It is a 20-item scale with five subscales: autonomy (choice, internal perceived locus of causality, volition), competence, and relatedness. Ng et al. (2011) reported adequate internal consistency: autonomy ($\alpha = .82$), competence ($\alpha = .77$), relatedness ($\alpha = .77$). Kent et al. (2018) validated the instrument and used it to examine links between passion, need satisfaction, and athlete burnout.

3.9.2 Sports motivation scale-II

The motivation of athletes was measured using the Sport Motivation Scale—II (SMS-II), developed from Self-Determination Theory to address limitations of the original SMS (Pelletier, et al., 1995) such as weak internal consistency and factorial problems (Li et al., 2018). SMS-II (Pelletier et al., 2013) adds an integrated regulation subscale, replaces problematic items, consolidates intrinsic regulation into one measure, and reduces items per subscale (from four to three) to improve structure and reliability (Pelletier et al., 2013; Pelletier et al., 2019). SMS-II demonstrates adequate internal and construct validity, theoretical consistency, and ease of administration (Li et al., 2018; Pelletier et al., 2013).

3.9.3 Measuring Perceived Performance in Sport questionnaire

Perceived sport performance was measured using the Amharic-adapted Perceived Performance in Sport Questionnaire (Almagro et al., 2020). The original 5-item scale (e.g., “I consider that my performance is good”) was changed from a

5-point to a 7-point Likert scale to increase response granularity and reliability (Revilla et al., 2014; Weijters et al., 2010). The adapted version matches the 7-point format of BNSSS and SMS-II to facilitate correlational and structural analyses without rescaling. Psychometric evaluation included CFA for unidimensionality (target CFI $\geq .95$, RMSEA $\leq .08$), internal consistency ($\alpha \geq .80$), and multi-group CFA for gender and competitive-level invariance to check response bias (Brown, 2015; Millsap, 2011). Almagro et al. (2020) reported strong internal consistency (Cronbach's $\alpha = 0.87$) and high correlations between perceived and actual performance in basketball players.

3.10 Data Collection Procedures

Data were collected systematically to minimize disruption and ensure accurate administration of the Amharic BNSSS, SMS-II, and PPSQ.

3.10.1 Ethical Approval and Permissions

Ethical clearance was obtained from Bahir Dar University Sports Academy Ethical Review Board (Protocol IRERC 05/2024). Permissions were granted by the Ethiopian Volleyball Federation and twelve Premier League clubs; club authorities provided written approval after briefing sessions.

3.10.2 Participant Briefing and Consent

Participants received study information, were informed of voluntary participation and withdrawal rights, and provided verbal informed consent. Confidentiality was ensured using codes and pseudonyms.

3.10.3 Administration of Questionnaires

Questionnaires were administered in person during the competitive season in Amharic. Research assistants coordinated with coaches to schedule sessions that avoided interference with training and competition. The tools used for the study were:

- **BNSSS:** 20 items across five constructs (competence, autonomy-choice, autonomy-volition, autonomy-IPLOC, relatedness) (Ng et al., 2011)
- **SMS-II:** 18 items across six constructs (intrinsic, integrated, identified, introjected, external, amotivation) (Pelletier et al., 2013).
- **PPSQ:** 5 items assessing perceived sport performance (Almagro et al., 2020).

3.10.4 Data Collection Environment

Questionnaires were completed individually in quiet club areas to reduce distractions. Participants were asked to recall recent sport experiences and answer honestly. Research team members supervised sessions to ensure consistent administration and guideline adherence.

3.10.5 Handling of Completed Questionnaires

All questionnaires were collected by the research team, coded for anonymity, and stored in locked cabinets. Electronic data were encrypted, password-protected, and accessible only to the principal investigator and authorized assistants to ensure confidentiality and data security.

3.11 Data analysis methods

Analyses were conducted using SPSS v26, AMOS v23, and JASP. Methods included correlational analysis, multiple regression, MANOVA for gender differences, and structural equation modeling (SEM) to examine how psychological needs affect volleyball performance, with motivation components as mediators (Field, 2018 ;Creswell,2014).

3.12 Ethical Considerations

Ethical approval was obtained from Bahir Dar University Sports Academy Ethical Review Board (Protocol: IRERC 05/2024). Formal permission was secured from club management before recruitment. Pilot testing included athletes from various

sports; the main study involved Premier League volleyball players only. The researcher briefed management, coaches, and players on aims, procedures, risks/benefits, confidentiality, and voluntary participation. Written club permission was obtained and verbal informed consent was collected from each athlete prior to questionnaire completion. All stakeholders cooperated during data collection.

CHAPTER FOUR

Results and discussion

4.1 introduction

This chapter presents the results and discussion of the study. Quantitative data were analyzed using a series of statistical techniques, including descriptive statistics, correlation analysis, simple and multiple linear regressions, structural equation modelling (SEM), and mediation analysis. These methods were employed to examine the psychometric properties (validity and reliability) of the adapted instruments designed to measure basic psychological needs, motivation, and perceived sport performance among Ethiopian elite volleyball players.

The chapter also explores the direct and indirect relationships among these constructs as grounded in Self-Determination Theory (SDT). Specifically, it evaluates how the satisfaction of basic psychological needs predicts different forms of motivational regulation, and how these, in turn, relate to athletes perceived sport performance. The findings are organized according to the study's specific objectives and are discussed in relation to previous empirical evidence and theoretical expectations within the SDT framework.

The quantitative data analyses were grounded to the two-sub research questions:

- I) How valid and reliable are the adapted psychological instruments basic psychological needs, motivation, and perceived performance in measuring Ethiopian elite athletes?
- II) What is the Interplay between Basic Psychological Needs, Motivation, and perceived sports Performance: A Gender Comparison in Elite Ethiopian Volleyball Players?

4.1.1 Linking research questions to data analysis

Table 4.1: Research Matrix Linking Research Questions, Data Sources, and Data Analysis

Research Questions	Variables	Data source	Instrument	Statistical Method
How valid and reliable are the adapted psychological instruments (BPNSS, SMS-II, and perceived performance in measuring elite Ethiopian athletes?	Basic Psychological Needs Satisfaction, Sports Motivation scales	Elite and regional league players from different sports in Ethiopia,	Survey Responses	Confirmatory Factor Analysis (CFA), correlation
To what extent do the satisfaction of basic psychological needs correlate with and predict different types of sports motivation among elite Ethiopian volleyball players	BNSSS, Sports Motivation	Elite men and women Volleyball players	BPNSS, SMS-II	Correlation Analysis, regression
How does sports motivation correlate with and predict perceived sports performance among elite Ethiopian volleyball players?	Sports Motivation, PPSQ	Elite men and women Volleyball players	SMS-II, PPSQ	Correlation Analysis Regression Analysis
To what extent does basic psychological need satisfaction in sport correlate with and predict perceived sports performance among elite Ethiopian volleyball players?	BNSSS and Perceived Performance	Elite men and women Volleyball players	Demographic Data, SMS-II, PPSQ	Correlation Analysis Regression Analysis
Are there significant gender differences in sports motivation and perceived sports performance?	Gender SMS,, BNSSS, PPSQ	Elite men and women Volleyball players	Demographic Data, BNSSS, PPSQ	Independent t-test / ANOVA
Are there significant gender differences in basic need of satisfaction in sport scale and perceived performance?	Gender BNSSS, PPSQ	Elite men and women Volleyball players	BNSS, SMS-II, PPSQ	Independent t-test / ANOVA
Does sports motivation mediate the relationship between basic psychological needs satisfaction and perceived sports performance?	BNSSS, SMS, Perceived Sports Performance	Elite men and women Volleyball players	BPNSS, SMS-II, PPSQ	Mediation Analysis /SEM

4.1.2 Quantitative findings

This section reports quantitative findings on athlete motivation using SMS-II, which measures six motivational dimensions intrinsic, integrated, identified, introjected, external, and amotivation along the SDT continuum (Pelletier et al., 1995; Deci & Ryan, 1985). Analyses used descriptive statistics, correlations, multiple regression, and diagnostics to (1) profile motivational types, (2) identify predictors of internalization, and (3) test associations with engagement, persistence, and affective sport experiences. Regression assumptions (linearity, normality, homoscedasticity, multicollinearity, independence) were tested and sensitivity analyses performed to confirm model stability.

4.1.3 Data screening, missing value analysis and normality test

Data screening found no missing values. A few univariate outliers (IQR rule) were retained. Skewness (−1.49 to 1.00) and kurtosis (−0.79 to 3.15) fell within acceptable limits for CFA and SEM, supporting univariate normality.

4.2 Phase I: Result of Psychometric Validation (N=321)

Research question: How valid and reliable are the adapted psychological instruments (BPNSS, SMS-II, and perceived performance in measuring elite Ethiopian athletes?

A pilot study tested clarity, reliability, and validity of the Amharic BNSSS and SMS-II to ensure cultural appropriateness and psychometric soundness for Ethiopian elite volleyball (DeVellis, 2017).

Sample (N = 321): 174 males (54.2%), 147 females (45.8%); mean age 23.48 (SD = 5.07); mean sport experience 5.90 years (SD = 3.70). Sports: football 72.6%, volleyball 11.2%, basketball 10.3%, handball 5.9%

4.2.1 Validation of the Basic Need Satisfaction for Sport Scale in Ethiopian Athletes

The 20-item BNSSS (five dimensions: competence, autonomy-choice, autonomy-volition, autonomy-IPLOC, relatedness) was translated into Amharic by experts and tested with N = 321. CFA showed acceptable fit and subscale alphas ranged from .85 (IPLOC) to .88 (volition), supporting its reliability for Ethiopian athletes (Melesse et al., 2024). Standardized loadings ranged .72–.91 (> .40). Subscale alphas were .848–.882. Mean scores 4.98–6.23 indicate moderate–high need satisfaction. Findings support BNSSS reliability and factorial validity in this context (Table 4.2).

Table 4. 2: Descriptive statistics and intra-class coefficients of BNSSS subscale scores

Name of Dimension	Dimensions & item number	Mean	Std. Deviation	Skewness	Kurtosis	Item-factor loading	Error term	α
competence	COM. N° 6	5.55	.904	-.392	-.446	.72	.52	.880
	COM. N°11	5.60	.879	.005	-.520	.76	.58	
	COM. N°12	5.62	.873	-.117	-.253	.84	.71	
	COM. N°14	5.45	.958	-.104	-.341	.74	.54	
	COM. N°17	5.73	.812	-.442	-.035	.80	.64	
Autonomy Internal perceived locus of casualty	AIPLOC. N° 2	5.99	1.012	-1.539	2.312	.72	.52	.848
	AIPLOC. N° 15	6.23	.894	-1.943	4.088	.83	.69	
	AIPLOC. N° 16	6.10	1.004	-1.467	1.328	.87	.66	
Autonomy volition	VOLI. N° 3	6.06	.967	-.947	.802	.91	.83	.882
	VOLI. N° 5	5.97	.925	-.774	.228	.82	.67	
	VOLI. N° 8	6.09	.909	-.789	-.190	.81	.66	
Autonomy choice	CHO. N° 4	5.27	1.470	-1.567	2.018	.83	.69	.879
	CHO. N°9	5.44	1.524	-1.925	3.532	.78	.60	
	CHO. N°13	5.17	1.488	-1.018	.188	.84	.70	
	CHO. N°20	4.98	1.556	-.884	-.434	.78	.60	
Relatedness	REL. N°1	5.20	1.512	-1.170	.295	.79	.63	.869
	REL. N°7	5.40	1.319	-1.931	4.664	.72	.52	
	REL. N°10	5.21	1.470	-1.348	.991	.74	.54	
	REL. N°18	5.24	1.402	-1.300	1.816	.76	.57	
	REL. N°19	5.45	1.334	-1.866	3.979	.78	.61	

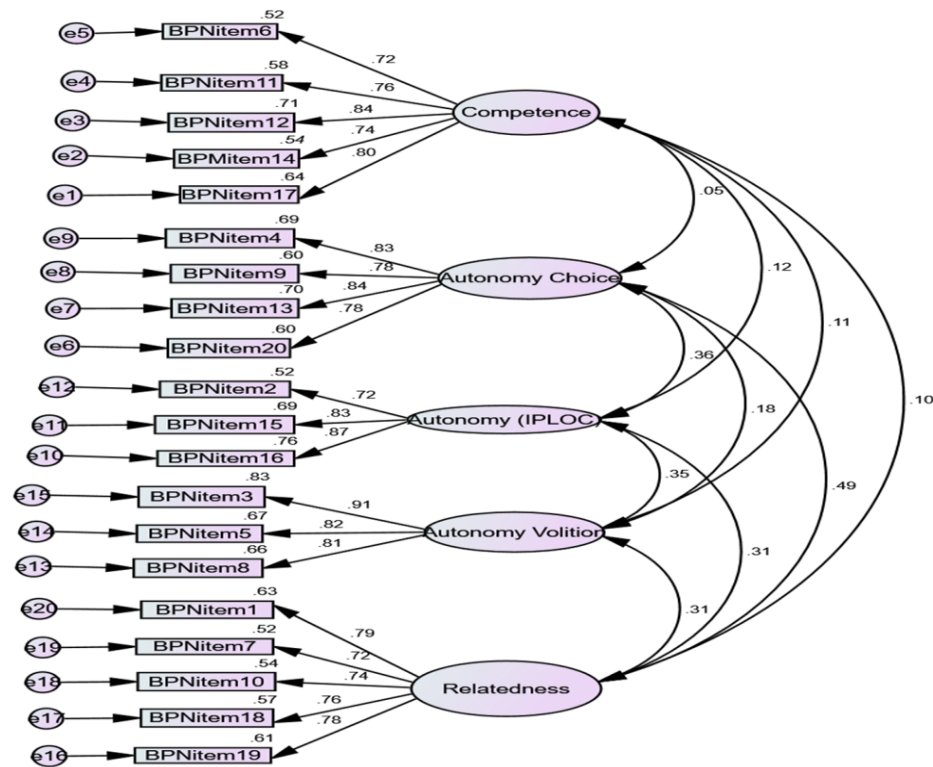
Table 4.3: Fit Indices for five model BNSSS

parameters	χ^2	DF	P-value	χ^2/DF	RMSEA	TLI	CFI	SRMR	RMR
values	301.97	160	<0.001	1.887	0.053	0.95	0.958	0.0469	0.096

The Amharic BNSSS showed strong CFA fit. Although the chi-square was significant, $\chi^2(160)=301.97$, $p<.001$, the relative chi-square ($\chi^2/df=1.887$) and other indices met recommended thresholds: CFI=.958, TLI=.950, NFI=.916, IFI=.958,

GFI=.910, RMSEA=.053, SRMR=.047, RMR=.069 — supporting the instrument's structural validity Table 4.3.

Figure 2: Factor structure of BNSSS scores



4.2.2 Validity and Reliability of Sport Motivation Scale –II for Ethiopian Athletes

The Sport Motivation Scale-II (Pelletier et al., 2013) measures six motivational orientations and has been validated in several languages (e.g., Spanish, (Viciano et al., 2017); Hungarian, Hungarian (Paic et al., 2017)). Because Amharic is widely spoken in Ethiopia, the SMS-II was translated and culturally adapted for local athletes. Factorial validity and reliability testing of the Amharic SMS-II supported its use with Ethiopian athletes and its suitability for studying links among basic needs, motivation, and performance in elite volleyball Table 4.4.

Table 4.4: Correlations (above diagonal) and internal consistency value: Cronbach's alpha between study variables

subscales	INM	IGR	IDR	IJR	EXR	AMO
INM	(.865)	.271**	.354**	IJR	.114*	.045
IGR		(.857)	.406**	.270**	.120*	.090
IDR			(.816)	.141*	.080	.023
IJR				(.821)	.128*	.007
EXR					(.857)	.190
AMO			(.816)	IJR	.114*	(.848)

**Correlation is significant at the 0.01 level (1-tailed)

* Correlation is significant at the 0.05 level (1-tailed)

* $p < 0.05$. ** $p < 0.01$, 95% CI.

Table 4.5: Fit indices for six models SMS-II

parameters	χ^2	DF	P-value	χ^2/df	RMSEA	TLI	CFI	NFI	SRMR	RMR
values	136.4	120	<0.001	1.136	0.021	0.99	0.99	0.95	0.033	0.064

The six-factor CFA for SMS-II showed excellent fit. Although $\chi^2(120)=136.38$, $p<.001$ (sample-size sensitivity), the relative $\chi^2/df=1.136$ and other indices exceeded thresholds: CFI=.994, TLI=.990, IFI=.992, NFI=.950, GFI=.960, RMSEA=.021, SRMR=.033, RMR=.064 — supporting the SMS-II's six-factor structure in elite Ethiopian ball-game athletes Table 4.5.

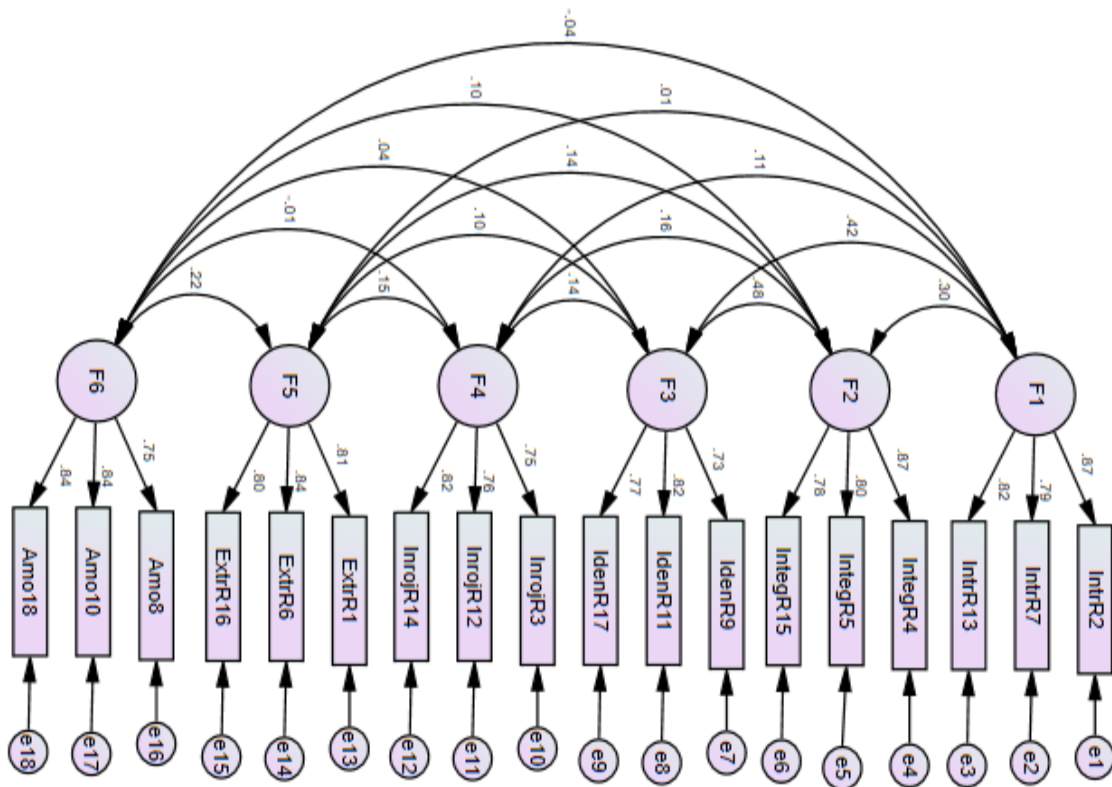
AVE (.57–.68) and CR (.80–.88) indicate adequate convergent validity and strong internal consistency for SMS II subscales. Item loadings ranged .72–.87, all above recommended thresholds Table 4.6.

Table 4.6. Item-factor loadings, Error terms of SMS-II item scores

Dimension	Item N ^o	Item factor loading	AVE	CR
INM	2	0.87	0.6844	0.88
	7	0.79		
	13	0.82		
IGR	4	0.87	0.66	0.86
	5	0.80		
	15	0.78		
IDR	9	0.73	0.5746	0.80
	11	0.72		
	17	0.82		
IJR	3	0.75	0.6042	0.82
	12	0.76		
	14	0.82		
EXR	1	0.81	0.672	0.86
	6	0.84		
	16	0.80		
AMO	8	0.75	0.6579	0.85
	10	0.84		
	18	0.84		

Note. AVE=average variance extracted each construct; CR= composite reliability of each construct

Figure 3: Factor structor of SMS sub scales



4.3 phase II: results of the structural interplay model (N=148)

Research question: To what extent do the satisfaction of basic psychological needs correlate with and predict different types of sports motivation among elite Ethiopian volleyball players?

4.3.1 Descriptive Statistics, Internal Consistency, and Confidence Interval: Ethiopian volleyball players

Sample (N = 148; 85 men, 63 women). Means show generally high need satisfaction (e.g., Competence 5.71; Autonomy Volition 5.79) and autonomous motivation (Intrinsic 5.55). Cronbach's α : BNSSS = .866, SMS-II = .822; subscales .74–.88, supporting reliability (Nunnally & Bernstein, 1994). Prior validations (Melesse et al., 2024; Melesse, et al., 2025) support use in Ethiopian athletes and align with SDT (Vallerand, 2007) (Table 4.20 in Appendix).

4.3.2 Bivariate Correlation Analysis among study variables

Bivariate correlations examine BPNS–motivation links in line with SDT (Deci & Ryan, 2000; Ryan & Deci, 2017) and reflect collectivist cultural nuances shaping motivation (Markus & Kitayama, 1991). BNSSS subscales intercorrelated ($r = .186$ – $.762$); Autonomy-Volition most strongly with competence ($r = .762$), linking volition to mastery. SMS-II showed simplex patterns (e.g., Identified $\leftrightarrow$ Autonomous $r = .790$), supporting scale structure in this non-Western sample (Vallerand, 1997). BNSSS correlated positively with autonomous motivation: competence $\rightarrow$ intrinsic ($r = .408$) and autonomous composite ($r = .531$). Relatedness strongly linked to identified regulation ($r = .706$), reflecting collectivist internalisation. Controlled motivation/amotivation showed weak BPNS links, except Autonomy-Choice modestly correlated with external regulation ($r = .124$) (Lonsdale et al., 2019) (Table 4.21 in Appendix).

Three notable deviations from prototypical SDT patterns emerged.

Amotivation correlated strongly with introjected regulation ($r = .704$), blurring SDT's distinction between non-motivation and regulated extrinsic motivation and suggesting conflict-driven disengagement warrants further study.

Weaker Predictive Power for Controlled Motivation: BPNS explained only ~11.7–20.8% of variance in controlled motivations, suggesting introjected/external regulation are driven more by external pressures (rewards, hierarchy, coaching) than by need satisfaction (Deci & Ryan, 1985; Ryan & Deci, 2017) (Table in Appendix 4.50).

AIPLOC–Autonomous Motivation Discrepancy correlated less with autonomous motivation ($r = .316$) than Autonomy-Volition ($r = .392$), indicating volitional ownership (behavioural autonomy) better predicts internalized motivation than cognitive perceptions of causality; interventions should promote athlete decision-making (see Table in Appendix 4.8).

Correlations align with SEM standards (Hair et al., 2019; Kline, 2016), validating the constructs. AIPLOC reliability was low ($\alpha = .575$) and needs refinement for collectivist contexts (Nunnally & Bernstein, 1994). Practically, relatedness strongly predicts identified regulation, while Autonomy-Choice's link with external regulation cautions against assuming Western autonomy effects generalize unchanged (Ryan & Deci, 2017). Perceived competence positively related to intrinsic and integrated regulation, reinforcing competence's central role (Ryan & Deci, 2017). The absent negative link between competence and amotivation may reflect collectivist perseverance (Adie et al., 2012). Autonomy subscales differ: AIPLOC links moderately to internalized extrinsic motives, while Volition best predicts intrinsic motivation (Vansteenkiste et al., 2020). Autonomy-Choice's weak tie to introjection suggests choices alone may not reduce pressure (Mageau & Vallerand, 2003). Strong

relatedness → identified regulation likely reflects Ethiopian collectivism (Ng et al., 2012). The amotivation–introjection overlap implies conflict-driven disengagement in elite contexts (Pelletier et al., 2013).

4.3.3 Regression Analysis: Basic psychological needs direct pathway to sport motivation

Regression results support SDT: BNSSS strongly predicted Autonomous Motivation ($R^2 = .609$; $F(5,142)=46.76$, $p < .001$). Key predictors were Relatedness ($\beta = .515$, $p < .001$), Autonomy-Choice ($\beta = .248$, $p < .001$), Competence ($\beta = .214$, $p = .015$), and Autonomy-Volition ($\beta = .164$, $p = .045$). The BNSSS total also predicted Autonomous Motivation ($R^2 = .573$, $p < .001$). Less self-determined forms were weakly or not predicted: External Regulation showed a small effect ($R^2 = .082$, $p = .004$) driven by Autonomy-Choice ($\beta = .271$, $p = .002$); Introjected Regulation and Amotivation were not predicted. Specific paths: Intrinsic Motivation ← Autonomy-Volition, Autonomy-Choice, Relatedness; Integrated Regulation ← Competence, Autonomy-Choice, Relatedness; Identified Regulation ← Relatedness (competence marginal). Analyses used descriptive stats, correlations, multiple regression and diagnostic checks (linearity, normality, homoscedasticity, multicollinearity, independence) with sensitivity analyses as needed (Deci & Ryan, 1985; Pelletier, et al., 1995) (see table in 4.30, 4.31, Appendix).

Overview of the Regression Analysis Predicting Intrinsic Motivation

Hierarchical multiple regression tested how basic need satisfaction predicts intrinsic motivation in elite Ethiopian volleyball players. Predictors: Competence, Relatedness, AIPLOC, Volition, Choice, and an Autonomy Composite (AIPLOC + Volition + Choice). Choice was removed from the main model due to multicollinearity with the Autonomy Composite (Field, 2018; Deci & Ryan, 1985). Predictors correlated moderately with intrinsic motivation ($r = .236-.475$); Competence and

Volition were highly intercorrelated ($r = .762$). Multicollinearity diagnostics were acceptable ($VIF < 3.0$).

Model Summary and ANOVA Results: The final model explained 34.4% of intrinsic motivation variance ($R^2 = .344$; $F(5,142)=14.913$, $p < .001$), indicating basic needs are meaningful predictors. (Table 4.24 in Appendix)

Coefficients and Key Predictor Significance

- Autonomy Composite: strongest positive predictor ($\beta = .449$, $p < .001$).
- Relatedness: positive predictor ($\beta = .266$, $p < .001$).
- AIPLOC: unexpected negative predictor ($\beta = -.263$, $p = .010$), suggesting a cultural or measurement nuance in perceived causality.
- All VIFs < 3.0 (no serious multicollinearity). (Table 4.25 in Appendix)

Sensitivity analysis: An alternative model including Choice (omitting the Autonomy Composite) explained slightly less variance ($R^2 = .327$; $F(5,142)=13.852$, $p < .001$). Choice ($\beta = .382$, $p < .001$), Relatedness ($\beta = .249$, $p = .002$), AIPLOC ($\beta = -.234$, $p = .016$), and Volition ($\beta = .191$, $p = .021$) remained significant, indicating exclusion of Choice did not alter substantive conclusions.

Assumption Checking: Diagnostics supported model adequacy: residuals showed linearity and homoscedasticity, Durbin–Watson = 1.811 (independence), residuals approximately normal, and VIFs < 3 (Hair et al., 2018; Field, 2018). Effect Sizes and Practical Significance: Cohen’s f^2 effect sizes show the Autonomy Composite had a large effect on intrinsic motivation ($f^2 = 0.26$), Relatedness a medium effect ($f^2 = 0.11$), and AIPLOC a small–medium ($f^2 = 0.06$) (Cohen, 2013; Ryan & Deci, 2000; Bartholomew et al., 2011). These practically meaningful effects complement statistical significance and inform applied interpretation (Julie, 2013). Sensitivity analysis including Choice (instead of the Autonomy Composite) yielded similar results ($R^2 = .327$; $F(5,142)=13.852$, $p < .001$): Choice ($\beta = .382$), Relatedness

($\beta = .249$), AIPLOC ($\beta = -.234$), and Volition ($\beta = .191$) remained significant, confirming the robustness of findings (Table 4.28 in Appendix).

Hierarchical multiple regression ($N = 148$) tested predictors of Integrated Regulation ($M = 5.60$, $SD = 0.76$): Competence, Autonomy (composite), AIPLOC, Volition, Relatedness, and Choice. Descriptives showed generally high need satisfaction (Autonomy $M = 5.62$; AIPLOC $M = 5.76$; Relatedness $M = 5.23$). Predictors correlated strongly with IGR (Autonomy $r = .520$; Choice $r = .501$; Relatedness $r = .462$; Competence $r = .407$), indicating greater need satisfaction relates to greater internalisation. Choice was removed due to perfect multicollinearity with the Autonomy Composite ($r = .836$; tolerance = 0.000), a justified decision to preserve coefficient stability and avoid inflated SEs (Field, 2018 ;Hair et al., 2018) (Table 4.28 in Appendix).

Model Summary: R^2 , Adjusted R^2 , and Durbin–Watson Statistic: Integrated Regulation

A multiple regression tested whether competence, AIPLOC, volition, relatedness, and autonomy predict Integrated Regulation (IGR) in elite Ethiopian volleyball players (see Table 4.11 for fit and diagnostics). Predictors explained $R^2 = .422$ (42.2%) of IGR a large effect (Cohen, 1988). Adjusted R^2 remained substantial (no overfitting) and Durbin–Watson = 1.941 indicated no autocorrelation, supporting model adequacy (Field, 2018; Tabachnick & Fidell, 2019) (Table 4.29 in Appendix).

ANOVA confirmed the model's significance: $F(5,142)=20.708$, $p < .001$. The larger regression sum of squares versus residual sum further supports model adequacy for inference (Table 4.30).

Standardized coefficients: Autonomy ($\beta = .547$, $p < .001$) and Relatedness ($\beta = .351$, $p < .001$) were the strongest positive predictors of IGR. Volition showed a

negative effect ($\beta = -.227$, $p = .028$), Competence a small positive effect ($\beta = .217$, $p = .046$), and AIPLOC was non-significant ($p = .096$). VIFs < 3 indicate acceptable multicollinearity, though autonomy and competence overlap somewhat (Table 4.31 in Appendix). Collinearity diagnostics showed condition indices > 30 for some dimensions and variance proportions indicated shared variance among competence, volition, and autonomy. VIFs remained < 3 , but the redundancy justifies excluding Choice; interpret unique effects cautiously (Table 4.31, 32).

Residual diagnostics: mean residual ≈ 0.000 , $SD = 0.58141$; histogram and P-P plot indicate approximate normality, and residuals vs. predicted values show no pattern (homoscedasticity). Diagnostics collectively support regression assumptions (Table 4.33). Hierarchical regression analysis tested whether competence, relatedness, AIPLOC, volition, and an Autonomy Composite predict Identified Regulation in elite Ethiopian volleyball players. Choice was removed for perfect multicollinearity (tolerance = .000) to preserve stable estimates, following best practices (Field, 2018) and SDT guidance (Deci & Ryan, 1985).

Table 4. 7: Predictors correlated moderately–strongly with IDR ($r = .282-.706$), Relatedness strongest ($r = .706$). Competence–Volition intercorrelation was high ($r =$

Table 4.7: *Correlations between Basic Psychological Needs and Identified Regulation*

variables	1	2	3	4	5	6	7
identified	--	.366**	.706**	.306**	.282**	.298**	.388**
competence	.07**	---					
relatedness	.06* *	.219*	---				
aiploc	.36**	.575**	.186	---			
volition	.82*	.76*	.193	.*	-		
choice	.2**					----	
autonomy.c	.388**	.689**	.250*	.729**	.655**	.836**	---

Note. $N = 148$. $p < .05$, $p < .01$

.762) but VIFs < 3.0 indicate multicollinearity is not problematic, supporting regression suitability.

Model fit: $R = .747$, $R^2 = .558$ (Adj. $R^2 = .543$), $F(5,142)=35.913$, $p < .001$ predictors explain 55.8% of IDR (large effect; (Cohen, 1988). $SE = .739$; Durbin–Watson = 1.441 indicates acceptable independence (Field, 2018). Results support SDT: need satisfaction strongly predicts identified regulation (Ryan & Deci, 2000) (Table 4.34 in Appendix). Key predictors: Relatedness was the sole significant predictor ($\beta = .643$, $p < .001$). Competence trended positive ($\beta = .176$, $p = .064$); Autonomy Composite, Volition, and AIPLOC were non-significant. VIFs < 3 indicate model stability. Findings imply IDR is strongly socially embedded (Ryan & Deci, 2000) (Table 4.35 in Appendix).

Assumptions met: linearity, homoscedasticity, approximate normality, Durbin–Watson = 1.441, VIFs < 3 Table 4.34 in Appendix, (Field, 2018; Hair et al., 2018; Julie, 2013). Sensitivity check with Choice (instead of Autonomy Composite) explained $R^2 = .533$; Choice, Relatedness, and Competence were significant, confirming robustness. Choice was redundant conceptually with the Autonomy Composite (Deci & Ryan, 1985). Effect sizes (Cohen's f^2): Relatedness large ($f^2 = 0.52$), Competence medium–large ($f^2 = 0.16$), Autonomy Composite small–medium ($f^2 = 0.04$) (Cohen, 2013; Cohen, 1988). These indicate strong practical importance of social connectedness for IDR and support applied interpretation (Julie, 2013).

A hierarchical multiple regression analysis was used to test the extent to which basic psychological need satisfaction predicted Introjected Regulation (IJR) among elite Ethiopian volleyball players. The six predictors initially examined were Competence, Relatedness, AIPLOC, Autonomy Choice, Choice, and Autonomy Composite (calculated from Choice, AIPLOC, and Volition). Autonomy Choice was removed from the final model because of perfect multicollinearity (Tolerance = .000) with Autonomy Composite, following best practices in regression analysis and theory from Self-Determination Theory (Deci & Ryan, 1985 ;Field, 2018).

Predictors showed weak–moderate correlations with IJR ($r \approx .031-.133$); Competence–Volition intercorrelation was high ($r = .762$) but VIFs < 3.0 indicated no problematic multicollinearity (Table 4.36 in the appendix). Multiple linear regressions (Table 4.37 in the appendix), Hierarchical regression tested whether competence, relatedness, AIPLOC, volition, and an Autonomy Composite predict Introjected Regulation in elite Ethiopian volleyball players. Choice was excluded for perfect multicollinearity with the Autonomy Composite (tolerance = .000), following best practices and SDT guidance (Field, 2018; Ryan & Deci, 2000).

Table 4.37, 4.38 in the appendix, The model was non-significant: $R^2 = .028$, $F(5,142)=0.816$, $p = .540$, explaining only 2.8% of IJR variance. No predictors were significant (autonomy $\beta = .19$, $p = .183$; competence $\beta = -.15$, $p = .286$; volition $\beta = .05$, $p = .697$; relatedness $\beta = .05$, $p = .558$; AIPLOC $\beta = -.002$, $p = .989$). Durbin–Watson = 1.727; VIFs 1.07–2.97 assumptions met (Field, 2018). Autonomy Composite showed the largest (but non-significant) positive beta, consistent with SDT’s note that autonomy can co-occur with controlled motives (Ryan & Deci, 2000). Overall, basic needs explained negligible variance in IJR, implying other factors (personality, culture, pressures) likely drive introjection.

Diagnostics supported linearity, homoscedasticity, approximate normality, independence (Durbin–Watson = 1.727), and no multicollinearity (VIF < 3.0) (Field, 2018; Hair et al., 2018). Sensitivity analysis including Choice (omitting Autonomy Composite) yielded $R^2 = .026$, $F(5,142)=.791$, $p = .562$ with no significant predictors, confirming robustness and justifying Choice exclusion. Effect sizes were negligible ($f^2 < .02$), indicating minimal practical relevance (Cohen, 1988; Julie 2013) Table 4.37, in the appendix . A similar hierarchical regression examined External Regulation (EXR) with the same predictors; Choice was excluded for collinearity (r with Autonomy Composite = .836; (Field, 2018)). Correlations with EXR were weak–moderate ($r = -.021$ to $.231$), and VIFs < 3 indicated acceptable independence (Table 4.39).

The model modestly predicted EXR: $R = .336$, $R^2 = .113$, Adjusted $R^2 = .082$, $F(5,142)=3.618$, $p = .004$ — explaining 11.3% of variance small–medium effect (Cohen, 198). Durbin–Watson = 1.441; diagnostics acceptable. Although significant, EXR’s variance was limited, consistent with SDT that external regulation is influenced mainly by contextual/external forces (Deci & Ryan, 1985; Ryan & Deci, 2000). The result suggests autonomy-related variables can relate to external regulation but other external pressures likely play a larger role (Bartholomew et al., 2011) Table 4.40 in the appendix.

As shown in Table 4.41, Autonomy Composite was the strongest positive predictor of External Regulation ($\beta = .421$, $p = .002$), indicating that greater autonomy-related perceptions co-occurred with more externally driven, reward- or pressure-based motivation an unexpected SDT pattern that may reflect cultural or performance norms in Ethiopian sport (Deci & Ryan, 1985). AIPLOC was negatively associated with EXR ($\beta = -.293$, $p = .013$), aligning with theory that internal locus reduces external regulation (Ryan & Deci, 2000). Competence trended positively ($\beta = .218$, $p = .105$). VIFs < 3.0 confirmed acceptable multicollinearity and model stability (Field, 2018). Overall, EXR appears influenced by autonomy-related perceptions and contextual factors rather than need satisfaction alone.

Correlations with amotivation were negligible ($r = .049$ – $-.127$; Table 4.41 in the appendix). Competence–Volition intercorrelated highly ($r = .762$) yet did not indicate problematic collinearity. Choice remained in descriptives for transparency but was excluded from regressions for perfect multicollinearity (tolerance = .000), preserving model stability and SDT’s conceptualisation of autonomy (Field, 2018; Hair et al., 2019; Deci & Ryan, 1985).

Keeping Choice in descriptive supports methodological transparency and allows sensitivity checks modeling autonomy components separately (Julie, 2013). Overall, basic need satisfaction especially autonomy facets was minimally associated

with motivation, consistent with SDT's view that motivation reflects lack of control/competence and often arises from need frustration rather than low need satisfaction alone (Ryan & Deci, 2000).

The regression explained only $R^2 = .029$ ($F(5,142) = .862$, $p = .508$), showing negligible explanatory power (Table 4.27). Diagnostics were acceptable (Durbin-Watson = 1.608; residuals approx. normal/homoscedastic). The trivial prediction aligns with SDT: amotivation typically stems from chronic need frustration or constraints rather than low need satisfaction alone (Deci & Ryan, 1985; Ryan & Deci, 2000) Table 4.42 in the appendix.

As shown in Table 4.28, No predictors significantly predicted amotivation (all $p > .30$): Autonomy Composite $\beta = .085$ ($p = .550$), Choice $\beta = .024$ ($p = .861$), Competence $\beta = -.145$ ($p = .300$), AIPLOC $\beta = .093$ ($p = .446$), Volition $\beta = .091$ ($p = .493$). VIFs < 3 . Results suggest amotivation in this sample is likely driven more by contextual or chronic frustrations than by momentary need satisfaction (Ryan & Deci, 2000) Table 4.43 in the appendix.

Assumptions met: residuals showed linearity/homoscedasticity, Durbin-Watson = 1.608 (independence), residuals approx. normal, and VIFs < 3.0 (no collinearity), supporting model robustness and interpretability (Field, 2018; Hair et al., 2019; Julie, 2013) Table 4.43 in the appendix. Sensitivity analysis (Choice in, Composite out) gave $R^2 = .026$, $F(5,142) = .791$, $p = .562$; no predictors were significant (Choice $\beta = .031$, $p = .861$). Effect sizes were negligible ($f^2 \approx .001-.011$), confirming minimal practical impact of need-satisfaction on amotivation. Findings support SDT's view that amotivation often stems from chronic frustration or contextual pressures (Bartholomew et al., 2011).

Table 4.29 shows, Model explained $R^2 = .029$ with no significant predictors; Choice was perfectly multicollinear with the Autonomy Composite (tolerance = .000,

$r = .836$). Including Choice did not alter outcomes, validating use of the composite for theoretical clarity and stability (Field, 2018; Hair et al., 2019). Consistent with SDT and prior work (Bartholomew et al., 2011; Lemyre et al., 2007), the weak link between need satisfaction and amotivation suggests disengagement in elite sport more likely reflects chronic need frustration or systemic pressures (coaching climate, organisational demands) than transient changes in psychological needs.

A hierarchical multiple regression tested basic psychological need satisfaction as a predictor of autonomous motivation in elite Ethiopian volleyball players. Of the initial six variables, Choice was removed due to perfect multicollinearity (Tolerance = .000) with the Autonomy Composite, aligning with statistical practices and Self-Determination Theory (SDT) (Deci & Ryan, 1985; Field, 2018). All predictors positively correlated with autonomous motivation ($r = .361$ to $.636$). Despite a strong intercorrelation between Competence and Volition ($r = .762$), multicollinearity was not serious, as all retained predictors had VIF values < 3.0 (Field, 2018) Table 4.45 in the appendix. The model explained 62.2% of the variance in autonomous motivation ($F(5,142) = 46.756$, $p < .001$), indicating strong explanatory power, while the Durbin-Watson statistic (1.721) confirmed independence of errors (Julie, 2013). These findings align with SDT, where autonomy and relatedness support foster internalisation and high-quality sports involvement (Ryan & Deci, 2017; Ntoumanis, et al., 2020). This substantial R^2 value highlights how need-supportive environments mirror the benefits of autonomy-supportive coaching on athlete enjoyment, persistence, and performance (Quested et al., 2021; Lonsdale et al., 2019) Table 4.46 in the appendix. Furthermore, the results support viewing autonomous motivation as a multidimensional construct driven by diverse facets of autonomy and competence rather than a single factor (Van Doren et al., 2021; Vansteenkiste et al., 2020). In applied sport psychology, this indicates that targeting basic psychological need satisfaction significantly optimizes self-determined motivation, even within high-pressure elite competitive settings (Bouffard, 2017; Zhou et al., 2019).

Relatedness (Table 4.47 in the appendix) emerged as the strongest positive predictor ($\beta = .515$, $p < .001$), highlighting interpersonal connection in fostering self-regulated behavior ((Bouffard, 2017). Autonomy Composite also positively predicted the outcome ($\beta = .385$, $p < .001$), supporting the SDT tenant that autonomy drives intrinsic regulation (Ntoumanis et al., 2020; Ryan & Deci, 2017), while Competence offered a smaller but significant enabling contribution ($\beta = .214$, $p = .015$). Conversely, AIPLOC displayed a weak negative association ($\beta = -.159$, $p = .039$), potentially reflecting unique cultural or contextual interpretations of internal causality in elite Ethiopian sports (Zhou, et al., 2019). Though Autonomy Choice was dropped due to multicollinearity ($r = .836$, Tolerance = .000), sensitivity tests confirmed its standalone conceptual relevance ($\beta = .371$, $p < .001$). Ultimately, VIF values < 3.0 indicated no major multicollinearity issues among the final predictors (Jr et al., 2018), highlighting autonomy's multidimensionality, the dominance of relatedness, and a need to investigate the unexpected AIPLOC trajectory.

Residual scatterplots validated regression assumptions for linearity and homoscedasticity. The Durbin-Watson statistic (1.721) fell within the ideal 1.5–2.5 range (Julie, 2013), and the approximately normal residual distribution was acceptable for $N = 148$ (Field, 2018), with VIF values remaining under 3.0 (highest = 2.967; (Jr et al., 2018), A sensitivity analysis replacing Autonomy Composite with Choice yielded a comparable model explaining 59.8% of the variance ($F(5,142) = 42.631$, $p < .001$), where Choice ($\beta = .371$, $p < .001$), Relatedness ($\beta = .492$, $p < .001$), and Competence ($\beta = .198$, $p = .021$) performed consistently. This transparency justifies retaining the Autonomy Composite for conceptual clarity. Practically, Cohen's f^2 revealed a huge effect size for Relatedness ($f^2 = 0.41$), a large effect for Autonomy Composite ($f^2 = 0.23$), and a medium-to-large effect for Competence ($f^2 = 0.10$), confirming the real-world utility of need-supportive sports interventions (Julie, 2013) (See Table 4.46 in the appendix).

Hierarchical regression tested whether competence, relatedness, AIPLOC,

volition, and an Autonomy Composite predict controlled motivation in elite Ethiopian volleyball players. Choice was excluded for perfect multicollinearity with the Autonomy Composite ($r = .836$, tolerance = .000) to preserve stable estimates (Field, 2018; Deci & Ryan, 1985) (Table 4.48 in the appendix). Variable choice was kept in descriptive statistics and tested in an alternative model, but not included in the final regression equation. This strategy offered methodological transparency for readers to grasp the original justification for including all theoretically relevant variables and to assess the distinctive contribution of choice to the model vs redundancy. Reporting variables that do not enter the final regression is consistent with the recommendations of (Maxwell, Delaney, & Kelley, 2017), and is in the spirit of comprehensive reporting and robust interpretation, particularly in exploratory or complex models, where multicollinearity or overlapping variance can mask individual contributions. The analysis provides a thoughtful, systematic approach to model evaluation in that descriptive statistics and alternative model results are presented. This avoids overlooking potentially meaningful predictors and allows basing conclusions about the importance of variables clearly on empirical evidence. Predictors correlated weakly/moderately with controlled motivation ($r \approx .044-.271$); Competence–Volition intercorrelation was high ($r = .762$) but VIFs < 3 after excluding Choice, indicating acceptable independence Table 4.48, 4.49, 4.50 in the appendix.

The model explained $R^2 = .079$ (7.9%) of variance in controlled motivation, $F(5,142)=2.444$, $p = .037$. Durbin–Watson = 1.884 and residual diagnostics supported model assumptions (Field, 2018; Julie, 2013). Overall predictive power was limited, consistent with SDT’s view that controlled motivation is mainly context-driven (Ryan & Deci, 2000) Table 4.49 in the appendix. Only the Autonomy Composite significantly predicted controlled motivation ($\beta = .411$, $p = .004$), suggesting autonomy-related perceptions co-occurred with greater external regulation in this context. Other predictors were non-significant (Competence, AIPLOC, Volition, Relatedness; VIFs < 3). Sensitivity checks with Choice (instead of the composite) showed Choice was marginally significant ($\beta = .374$, $p = .005$), but redundancy

justified using the composite (Field, 2018; Hair et al., 2019). The positive autonomy → controlled link may reflect context: when autonomy is framed around performance outcomes it can align with externally oriented motives (Vansteenkiste et al., 2020; Zhou et al., 2019). The weak overall prediction supports SDT's claim that controlled regulation is shaped more by external pressures than by need satisfaction (Deci & Ryan, 1985; Bartholomew et al., 2011) Table 4.50 in the appendix.

Choice was retained in descriptive/alternative models for transparency but omitted from final regressions to avoid predictor dependence and unstable coefficients (Maxwell, et al., 2017; Field, 2018). Sensitivity analyses confirmed the primary model's conclusions. Running separate models lets you (1) compare subcomponents (e.g., Choice) to assess distinct contributions (Van Doren et al., 2021); (2) clarify interpretations of narrow (Choice) versus broad (Autonomy Composite) autonomy, aligned with SDT's multidimensional view (Ryan & Deci, 2017); and (3) respect cultural variations—especially in collectivist settings where autonomy may be expressed through group dynamics by keeping sensitivity analyses (Zhou, et al., 2019; Ryan & Vansteenkiste, 2023).

Choice was excluded from main models due to multicollinearity with the Autonomy Composite ($r = .836$; tolerance = .000). A sensitivity model replacing the composite with Choice showed Choice's unique effect ($\beta = .382$, $p < .001$), demonstrating transparent model comparison and stability checks (Field, 2018; Hair et al., 2019; Van Doren et al., 2021).

Effect sizes (Cohen's f^2) indicated small–medium practical effects: Autonomy Composite $f^2 \approx 0.085$, Choice $f^2 \approx 0.082$, AIPLOC $f^2 \approx 0.035$, underscoring the practical relevance of autonomy subcomponents in non-Western contexts (Cohen, 1988; Ntoumanis, et al., 2020; Ryan & Vansteenkiste, 2023). Reporting f^2 aids applied interpretation beyond p-values (Julie, 2013; Van Doren et al., 2021) Table 4.51 in the appendix. Main findings (Table 4.8): Autonomous motivation predicted by Competence ($\beta = .21^*$), Autonomy-Volition ($\beta = .39^{***}$), Autonomy-Choice ($\beta = .25^{***}$), and Relatedness ($\beta = .52^{***}$), explaining ~62% variance ($F = 46.76$, $p < .001$). Integrated regulation predicted by Competence ($\beta = .22^*$), Autonomy-Choice ($\beta = .35^{***}$), and Relatedness ($\beta = .35^{***}$), $R^2 \approx .422$ ($F = 20.71$, $p < .001$). Identified regulation chiefly driven by Relatedness ($\beta = .64^{***}$) and Competence ($\beta =$

.18*), $R^2 \approx .558$ ($F = 35.91$, $p < .001$).

Table 4.8: summarizes the multiple regression models predicting different types of sport motivation.

Dependent Variables	R^2	F	P	Significant Predictor (Beta Coefficient)
Intrinsic Motivation	0.344	18.18***	<.001	volition (.15*), Choice (.29***), Relatedness (.27***), Autonomy (.45***)
Integrated Regulation	0.422	20.71***	<.001	Competence (.22*), Choice (.35***), Relatedness (.35***)
Identified Regulation	0.558	35.91***	<.001	Relatedness (.64***), Competence (.18*)
Introjected Regulation	0.028	0.82 ns	0.54	None
External Regulation	0.113	3.62**	0.004	Choice (.27**)
Amotivation	0.027	0.78 ns	0.565	None
Autonomous Motivation	0.622	46.76***	<.001	Competence (.21*), Volition (.16*), Choice (.25***), Relatedness (.52***)
Controlled Motivation	0.05	1.51 ns	0.191	Choice (.19*)

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Note: significant ($p \geq .05$), $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Only significant or near-significant ($p < .10$) predictors are listed.

A multiple linear regression was conducted to predict Autonomous Motivation based on Competence, AIPLOC, Volition, Choice, Relatedness, and Autonomy.C. The final predictive raw score equation is: Autonomy Motivation = $-0.286 + 0.269$ (competence)- 0.192 (AIPLOC) $+0.050$ (Volition) $+ 0.394$ (Relatedness) $+0.529$ (Autonomy Composite). In this model, Relatedness ($\beta=.515$, $p<.001$) and Autonomy Composite ($\beta=.385$, $p<.001$) were the strongest positive predictors of Autonomous Motivation, followed by Competence ($\beta=.214$, $p=.015$) AIPLOC was a small but significant negative predictor ($\beta=-.159$, $p=.039$), while Volition and Choice were not significant predictors. The overall model explained 62.2% of the variance in Autonomous Motivation, $R^2=.622$, $F(5,142) = 46.76$, $p<.00$. The full set of unstandardized regression equations for all motivation outcomes is presented in Appendix. The results indicate that Relatedness, Autonomy.C, Competence, and AIPLOC are statistically significant predictors of Autonomous Motivation. Relatedness was the strongest positive predictor ($\beta = .515$, $p < .001$). Practically, for every 1-point increase

in Relatedness, Autonomous Motivation increases by 0.394 points, holding other variables constant. Autonomy.choice was the second strongest predictor ($\beta = .385$, $p < .001$), with a 1-point increase yielding a 0.529-point increase in Autonomous Motivation. (Note: Even though autonomy.choice has a larger raw coefficient, Relatedness has a larger standardized beta, meaning Relatedness explains more variance in the outcome overall). Competence also significantly and positively predicted Autonomous Motivation ($\beta = .214$, $p = .015$), adding 0.269 points to the outcome for every 1-point increase. IPLOC was a significant negative predictor ($\beta = -.159$, $p = .039$). For every 1-point increase in AIPLOC, Autonomous Motivation decreases by 0.192 points."

"Interestingly, Volition ($\beta = .039$, $p = .637$) and Choice ($\beta = .024$, $p = .861$) were not statistically significant predictors. Because their p-values are greater than .05, they do not add any unique predictive value to the model when Relatedness, Autonomy. Choice, Competence, and AIPLOC are already accounted for." These findings emphasize the value of competence, autonomy (volition and choice), and relatedness in promoting autonomous motivation. Relatedness was particularly influential, reflecting the role of social connectedness in this athletic context. The weaker prediction of controlled and amotivated states suggests that other factors may be more relevant. The positive link between autonomy/choice and external/controlled motivation highlights the complex dynamics of autonomy and external pressures in elite sports.

Introjected Regulation ($R^2 = .028$, $p = .54$) and Amotivation ($R^2 = .027$, $p = .565$) were not significantly predicted, while External Regulation ($R^2 = .113$, $p = .004$) and Controlled Motivation ($R^2 = .05$, $p = .191$) showed limited influence, with Autonomy-Choice as a positive predictor Table 4.8.

Prior to analysis, assumptions were evaluated: linearity and homoscedasticity were confirmed via residual scatterplots; independence of errors was supported by Durbin-Watson = 1.884 acceptable range 1.5 – 2.5; (Julie, 2013); normality of residuals showed minor tail deviations, acceptable for $N = 148$ (Field,

2018); and multicollinearity was not problematic ($VIF < 3.0$; ($VIF < 3.0$; (Hair et al., 2019). Sensitivity Analysis: Choice was excluded from the final model due to perfect multicollinearity with Autonomy Composite ($r = .836$, Tolerance = .000). Another model including choice (but not the composite) explained 7.3% of variance, with choice as a marginally significant predictor ($\beta = .374$, $p = .005$), similar in magnitude to the Autonomy Composite. Other predictors including AIPLOC and Competence remained non-significant. This also reaffirms the strength of removing choice while staying within theoretical clarity (Deci & Ryan, 1985; Field, 2018).

4.3.4 Regression Analysis: sports motivation pathways to perceived sports performance

Research question: how does sports motivation correlate with and predict perceived sports performance among elite Ethiopian volleyball players?

The current study analyses the relationship among the motivational constructs of Intrinsic Motivation (IN), Integrated Regulation (IG), Identified Regulation (ID), Introjected Regulation (IJ), External Regulation (EX) and Amotivation (AM) and perceived sport performance of the elite Ethiopian volleyball players. This study aims to understand the relationship between the types of motivation and athletes' performance perceptions based on Self-Determination Theory (Deci & Ryan, 1985; Ryan & Deci, 2000), with a consideration of the contextual and cultural factors in Ethiopia. The dependent variable was perceived sports performance (PPSQ) and the independent variables were the six motivational regulations.

Participants reported high perceived performance ($M = 5.21$, $SD = 0.64$) and high autonomous motivation, especially intrinsic motivation ($M = 5.55$, $SD = 0.92$) and integrated regulation ($M = 5.60$, $SD = 0.76$). Identified regulation was moderately high ($M = 5.27$, $SD = 1.09$), reflecting athletes' recognition of sport's personal importance. Amotivation was evident ($M = 5.35$, $SD = 1.06$) but lower than autonomous forms, suggesting partial disengagement in line with SDT's conceptualisation of non-regulation (Pelletier et al., 2013) Table 4.21 in Appendix.

The identified motivational profiles are aligned with the SDT continuum, where autonomous behaviours (intrinsic and integrated regulation) are associated with adaptive outcomes such as better performance and persistence (Ryan & Deci, 2017; Bartholomew et al., 2011; Lonsdale et al., 2019). Amotivation emphasises the importance of supporting autonomy, competence, and relatedness in order to reduce disengagement (Quested et al., 2021).

Perceived performance was positively associated with autonomous types of motivation: intrinsic motivation ($r = .391, p < .01$), integrated regulation ($r = .401, p < .01$) and identified regulation ($r = .386, p < .01$). External regulation was positively correlated ($r = .255, p < .01$) but introjected regulation ($r = .063$) and amotivation ($r = .024$) were weak and non-significant. The results suggest controlled motivations are minimally related to performance, which supports SDT's emphasis on quality over quantity of motivation (Ryan & Deci, 2017). Substantial intercorrelations were found among autonomous forms: intrinsic and integrated regulation ($r = .676, p < .001$) and integrated and identified regulation ($r = .412, p < .001$), indicating conceptual overlap. Amotivation was highly related to introjected regulation ($r = .726, p < .001$) and shared variance with lower quality types of motivation. The analysis was conducted on the single constructs and not the composites to decrease the multicollinearity, which increases interpretability (Hair et al., 2019) (Table 4.21 in Appendix_..

Table 4. 9: Multiple Regression Predicting Perceived Sport Performance from Sports Motivation Types Among Elite Ethiopian Volleyball Players

Predictor	B	SE B	β	t	p	VIF
(Constant)	2.640	0.447	—	5.900	<.001	—
Intrinsic Motivation	0.093	0.074	0.132	1.258	.212	2.08
Integrated Regulation	0.154	0.085	0.184	1.821	.071	1.93
Identified Regulation	0.144	0.048	0.245	2.983	.003	1.28
Introjected Regulation	0.068	0.055	0.132	1.237	.218	2.17
External Regulation	0.087	0.048	0.140	1.801	.074	1.15
Amotivation	-0.075	0.063	-0.127	-1.184	.239	2.20

Note: N = 148. Dependent variable: Perceived Sport Performance. The overall model was significant, $R^2=.257$, adjusted $R^2=.225$, $F(6,141)=8.11$, $p<.001$. All VIF values were below 2.20, indicating no multicollinearity concerns. * $p < .05$, ** $p < .01$

A multiple regression model including intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation significantly predicted perceived sport performance, $R^2=.257$, adjusted $R^2=.225$, $F(6,141)=8.11$, $p<.001$, explaining 25.7% of the variance in performance. Among the predictors, only identified regulation was a significant unique predictor ($\beta=.245$, $p=.003$). Integrated regulation ($\beta=.184$, $p=.071$) and external regulation ($\beta=.140$, $p=.074$) approached significance as positive predictors, while intrinsic motivation, introjected regulation, and amotivation were not significant unique predictors Table 4.9.

The regression “equation” for perceived Ethiopian volleyball players performance is: Perceived Performance = $2.640 + 0.093$ (Intrinsic) $+0.154$ (Integrated) $+ 0.144$ (Identified) $+ 0.68$ (Introjected) $+ 0.087$ (External) -0.075 (Amotivation). These findings indicate that, among elite Ethiopian volleyball players, identified regulation (acting because the behavior is personally important) is the strongest unique predictor of perceived performance, beyond other motivation types. The positive (though not always significant) associations of intrinsic, integrated, and external motivation with performance suggest that both self-determined and some controlled forms of motivation may contribute to perceived performance, whereas amotivation shows a small negative, non-significant relationship. This pattern supports the idea that more self-determined forms of motivation are particularly relevant for athletes’ perceived performance in this context.

Multiple regression was used to examine the prediction of six motivational constructs Intrinsic Motivation (IN), Integrated Regulation (IG), Identified Regulation (ID), Introjected Regulation (IJ), External Regulation (EX), and Amotivation (AM) on perceived sport performance. All variables were entered simultaneously with no

exclusions for collinearity and using the Enter method (Bartholomew et al., 2011). This method preserves dimensional specificity, avoiding the multicollinearity of prior composite measures ($VIF > 53$) Table 4.56 in Appendix.

The regression model had a moderate relationship with the perceived performance. The model produced a multiple correlation coefficient of $R = .507$ which could explain 25.7% of the variance ($R^2 = .257$; Adjusted $R^2 = .225$), and presented a considerable predictive power considering the complex nature of psychological and contextual effects in sport (Lonsdale et al., 2019; Quested et al., 2021). The model was statistically significant, $\Delta F(6, 141) = 8.11, p < .001$, which confirms the prediction of perceived performance by motivational variables collectively. The Durbin-Watson statistic (1.132) points to mild positive autocorrelation, which is acceptable for exploratory analysis (Field, 2018).. Multicollinearity diagnostics showed no excessive shared variance between predictors (Table 4.54 in Appendix).

Predictors and Theoretical Interpretation: Among predictors, Identified Regulation (ID) was the only significant predictor of perceived performance, providing support for SDT's assertion that personal valuation of an activity increases engagement and performance, despite lack of total intrinsic enjoyment (Deci & Ryan, 2000). The autonomous forms, such as IN and IG, were significantly and positively related, in line with the contextual variability found in previous research (Vansteenkiste et al., 2020). The cultural diversity and non-Western nature of the study may also indicate the role of collectivist values and social obligations in the expression and internalization of motivation, thus confirming the relevance of Self-Determination Theory in such cases. It has been demonstrated cultural norms affect basic need satisfaction (Gurleyik et al., 2022). and that students from various cultures differ in their acceptance of autonomous versus controlled motivation for physical activity (Prieto-González et al., 2025). The motivational antecedents differs across African and European contexts, showing importance of social conditions and cultural expectations (De Man et al. 2022). The findings thus highlight the importance of

promoting self-endorsed physical activity engagement in which cultural norms may affect participation.

An analysis of variance (ANOVA) was used to determine the overall significance of the regression model predicting perceived performance from six motivational constructs: Intrinsic Motivation, Integrated Regulation, Identified Regulation, Introjected Regulation, External Regulation, and Amotivation. The model was significant, $F(6, 141) = 8.114$, $p < .001$, indicating that motivational predictors as a whole account for a meaningful amount of variance in perceived performance. Hence, motivation appears to have a significant impact on athletes' self-assessment of performance. From an SDT perspective, the results are consistent with the idea that self-determined forms of motivation such as intrinsic and integrated regulation are strong predictors of adaptive outcomes including perceptions of performance (Ryan & Deci, 2017). The high F-value further supports that it is the quality, not just the quantity, of motivation affecting athletes' performance evaluations. These results support previous research that suggests that autonomy supportive climates increase perceptions of competence and self-efficacy, and subsequently, perceived performance (Lonsdale et al., 2019; Quested et al., 2021). The model further demonstrates the value of considering a multidimensional, rather than a unidimensional, concept of motivation.

Regression Analysis: Predicting Perceived volleyball Performance In this study, a multiple linear regression analysis was performed to examine the predictive effect of six motivational constructs (intrinsic motivation [IN], integrated regulation [IG], identified regulation [ID], introjected regulation [IJ], external regulation [EX], and amotivation [AM]) on perceived sport performance in elite Ethiopian volleyball players. This analysis uses Self-Determination Theory (Ryan & Deci, 2017) and controls for other types of motivation to analyse the unique contribution of each type. The overall model was significant, $F(6, 141) = 8.11$, $p < .001$, explaining 25.7% of the variance in perceived performance. Of the predictors, only Identified Regulation was a significant predictor of performance ($\beta = 0.245$, $t = 2.983$, $p = .003$) suggesting

that athletes who become involved in sport for personal reasons tend to have a more positive evaluation of their performance. The centrality of Identified Regulation is in keeping with the SDT tenet that personal endorsement of activities is an important driver of adaptive outcomes (Ryan & Deci, 2017). Integrated Regulation ($\beta = 0.184$, $p = 0.071$) and External Regulation ($\beta = 0.140$, $p = 0.074$) approached significance and may have some influence in some cases Table 4.56 in Appendix..

Intrinsic motivation was high ($M = 5.55$, $SD = 0.92$) and moderately correlated with perceive performance ($r = 0.391$), but did not uniquely predict perceived performance. Because Table 4.21 in Appendix:

- High intercorrelations with identified and integrated regulation, it reduces unique contribution (Lonsdale et al., 2009).
- Ethiopian volleyball is known by poor infrastructure, low funding and shortage of qualified coaches that helps athletes motivated by participation rather than intrinsically (Mussema et al., 2021; Teshome et al., 2022).
- The PPSQ measures global perceptions of performance rather than transient pleasure which is more relevant for the motivational constructs based on individual valuation (Lonsdale et al., 2019).
- Athletes may rely more on identified regulation than fully autonomus motivation (Vansteenkiste et al., 2020).

These results highlight the importance of distinguishing autonomous motivation in intervention development. Perhaps it is more efficient to improve the identified regulations and to have athletes internalise and value sport participation than to focus only on intrinsic enjoyment. Future studies should use longitudinal designs to study motivational changes over time, effects of autonomy-supportive coaching, and qualitative studies of how athletes make sense of their experiences in collectivist contexts (such as Ethiopia).

Multicollinearity exists when predictors are highly correlated with each other

and it can inflate standard errors, distort regression coefficients, and make results less stable (Hair et To test for multicollinearity, which is important for the validity and reliability of regression analyses, diagnostic measures such as variance inflation factors or condition indices are used. Table 4.57 in appendix. Collinearity diagnostics for the six motivational predictors of perceived sports performance: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation. All the variance, inflation and condition indices were found to be within acceptable ranges showing no problematic multicollinearity. This confirms the stability and interpretability of the regression coefficients for the motivational constructs and favours the reliability of the results.

4.3.5 Regression Analysis: direct path from Basic Psychological Needs to Perceived Sport Performance

Research question: To what extent does basic psychological need satisfaction in sport correlate with and predict perceived sports performance among elite Ethiopian volleyball players?

Presents descriptive statistics for 148 elite Ethiopian volleyball players, perceived performance was high (PPSQ M = 5.21, SD = 0.64). Basic needs were also high: Competence M = 5.71 (SD = 0.63), Autonomy M = 5.62 (SD = 0.58), AIPLOC M = 5.76 (SD = 0.66), Volition M = 5.79 (SD = 0.62), Choice M = 5.38 (SD = 0.93), and Relatedness M = 5.23 (SD = 1.04), aligning with SDT (Ryan & Deci, 2000) (Table 4.58 in Appendix).

Perceived performance correlated significantly with Competence ($r = .44$), AIPLOC ($r = .31$), Volition ($r = .43$), Choice ($r = .36$), Relatedness ($r = .22$) and Autonomy Composite ($r = .48$), all $p < .01$. Choice, AIPLOC and Competence correlated strongly with Autonomy ($r = .84, .73, .69$), suggesting overlap but tolerance/VIFs were acceptable (Hair et al., 2018), Table 4.58 in Appendix. These results support autonomy's multidimensionality volition, locus of causality, and

choice each influencing motivation and internalisation in sport and education ((Bartholomew et al., 2011, Reeve, 2012). Relatedness showed a weaker link to performance ($r = .22$), acting more as contextual support than primary performance driver (Ng et al., 2012; Lonsdale et al., 2019).

There is theoretical reason to retain both the Autonomy Composite and Choice because Choice can explain unique variance in performance; removing it risks losing information about how autonomy subcomponents relate to outcomes (Bartholomew et al., 2011; Jang et al., 2023; Vansteenkiste et al., 2020). The regression (enter method) included five predictors: Autonomy, Relatedness, Volition, AIPLOC and Competence; Autonomy Choice was dropped due to high intercorrelation but remains conceptually important (Deci & Ryan, 2000) Table 4.59 in appendix.

The model showed a moderate relationship with perceived performance ($R = .521$), explaining $R^2 = .271$ (adjusted $R^2 = .246$), comparable to prior sport studies (Lonsdale et al., 2009; Quested et al., 2011). Durbin–Watson = 0.831 indicated slight positive autocorrelation but is acceptable for exploratory work (Field, 2018) Table 4.60 in Appendix.

Table 4. 61 in appendix The model was significant, $F(5,142) = 10.58$, $p < .001$, indicating basic psychological needs reliably predict perceived performance (regression SS = 16.473; residual SS = 44.220). Autonomy, competence and volition appear especially influential, consistent with SDT’s proposition that need satisfaction enhances perceived performance (Ryan & Deci, 2017; Vansteenkiste et al., 2020; Jang et al., 2023) see Table 4.47.

- Autonomy-related subcomponents are multicollinear, which dilutes their unique variance;
- Unique shared variance to SDT. Bartholomew et al. (2011) stated that autonomy is about choice, volition and internal locus of causality.
- Contextual factors such as cultural and structural aspects of Ethiopian volleyball may modulate need-performance relationships.

Table 4.10: Multiple Regression Predicting Perceived Sport Performance from Basic Psychological Needs among Ethiopian Volleyball Players

Predictor Variable	Unstandardized Coefficients(B)	Std. Error	Standardized Coefficients β	T-value	Sig.	VIF
Constant	1.747	.509	----			----
Competence	.145	.124	.142	1.176	.241	2.86
AIPLOC	-.116	.104	-.119	-1.12	.264	2.18
Volition	.129	.1118	.125	1.088	.278	2.58
Autonomy C	.399	.137	.358	2.900	.004	2.97
Relatedness	.061	.46	.099	1.134	.184	1.07

Note. Dependent variable: Perceived Performance Sport Questionnaire (PPSQ)

Note. Dependent variable: Perceived Sport Performance (PPSQ). Model summary: $R = .521$, $R^2 = .271$, adjusted $R^2 = .246$, SE of estimate = .558, $F(5,142) = 10.58$, $p < .001$. Durbin–Watson = .831.

The five-predictor regression significantly predicted perceived performance, $F(5,142) = 10.58$, $p < .001$, explaining $R^2 = .271$ (adjusted $R^2 = .246$, $R = .521$). Global autonomy was the only significant unique predictor ($B = 0.399$, $p = .004$), while competence, relatedness, volition and AIPLOC showed non-significant partial effects. Diagnostics were acceptable overall (VIFs ≈ 1.07 – 2.97), though Durbin–Watson = .831 indicates possible autocorrelation. Findings point to perceived autonomy as the principal need linked to self-reported performance and suggests SEM to model multidimensionality Table 4.60 in appendix.

Autonomy Choice was excluded from the final model due to high multicollinearity. Despite removal for statistical reasons, Choice remains a core SDT component and should be tested via latent-variable or SEM approaches to assess its unique contribution (Deci & Ryan, 2000) Table 4.62 in Appendix. Collinearity indices (Table 4.49) showed a highest condition index of 47.42, indicating moderate–high multicollinearity among autonomy and its subscales; variance proportions implicated Autonomy and AIPLOC heavily. However, VIFs < 3.0 suggest acceptable estimate stability (Hair et al., 2019). Given subscale overlap, future research should use SEM/latent modelling to avoid biased regression estimates (Jeno et al., 202; Bartholomew et al., 2011; Vansteenkiste et al., 2020) (Table 4.63 in Appendix).

Table 4.64 in appendix Predicted PPSQ values ranged 4.46–5.98 (mean 5.21). Residuals were approximately normal ($M = 0.00$, $SD = 0.55$), standardized residuals within ± 3 , and plots showed linearity and homoscedasticity, supporting linear regression suitability. Regression equation (predicting Perceived Sport Performance, PPSQ in Ethiopian volleyball players from BNSSS) Predicted PPSQ = $1.747 + 0.145(\text{Competence}) - 0.116(\text{AIPLOC}) + 0.129(\text{Volition}) + 0.399(\text{Autonomy}) + 0.061(\text{Relatedness})$

4.3.6 Mediation analysis: sports Motivation as mediator between basic psychological needs and perceived sports performance

Research question. Does Sport's Motivation Mediate the Relationship between Basic Psychological Needs Satisfaction and Perceived Sports Performance?

Literature shows need fulfillment (competence, autonomy, relatedness) fosters autonomous motivation, which predicts better performance (Ng et al., 2011) This study tested parallel mediation in 148 Ethiopian professional volleyball players, examining Autonomous Motivation (AUTM), Controlled Motivation (CONM), and SMS-II as simultaneous mediators between Basic Psychological Needs Satisfaction (BNSSS) and Perceived Sports Performance (PPSQ).

Table 4. 11: *Standardized Direct Effects among Basic Psychological Needs, Motivation, and Perceived Performance among Ethiopian Volleyball Players*

Path	Standardized Estimate (β)	p-value
BNSSS $\rightarrow$ AUTM	0.763	< .001
BNSSS $\rightarrow$ SMSII	0.625	< .001
BNSSS $\rightarrow$ CONM	0.195	.016
BNSSS $\rightarrow$ PPSQ	0.201	.052

Path	Standardized Estimate (β)	p-value
AUTM $\rightarrow$ PPSQ	0.517	< .001
SMSII $\rightarrow$ PPSQ	-0.390	< .001
CONM $\rightarrow$ PPSQ	0.336	.051

Note. BNSSS = Basic Needs Satisfaction in Sport Scale; AUTM = Autonomous Motivation; SMSII = Sports

Motivation Scale II; CONM = Controlled Motivation; PPSQ = Perceived Sports Performance Questionnaire. BNSSS predicted the three mediators strongly: AUTM $\beta = .763$ ($p < .001$), SMS-II $\beta = .625$ ($p < .001$), and CONM $\beta = .195$ ($p = .016$) (Table 4.60). The direct BNSSS $\rightarrow$ PPSQ effect was marginal ($\beta = .201$, $p = .052$), implying most influence is indirect via motivation. A parallel mediation model was specified, with BNSSS predicting AUTM, CONM, and SMSII, and then predicting PPSQ. Indirect effects and 95% confidence intervals were estimated using AMOS v23 on bootstrapped mediation analyses (5000 samples). The interpretation was limited to direct and indirect effects due to the focus on specific pathways rather than the validation of the global model

Table 4. 12: Bootstrapped Indirect (Mediated) Effects of Basic Psychological Needs on Perceived Performance through Motivation among Ethiopian Volleyball Players (5,000 Resamples)

Indirect Path	Estimate	Lower CI	Upper CI	Significance
BNSSS $\rightarrow$ AUTM $\rightarrow$ PPSQ	0.397	0.255	0.564	$p < .001$
BNSSS $\rightarrow$ SMSII $\rightarrow$ PPSQ	-0.241	-0.369	-0.112	$p < .001$
BNSSS $\rightarrow$ CONM $\rightarrow$ PPSQ	0.066	-0.019	0.151	$p = .118$

Note. Bootstrap analyses used 5000 resamples with percentile confidence intervals. CI = Confidence Interval.

The indirect BNSSS $\rightarrow$ PPSQ path via Autonomous Motivation was significant and positive, via SMS-II was significant but negative, while Controlled Motivation was not a significant mediator. AUTM was the strongest mediator (indirect $\beta = .397$, $p < .001$), consistent with SDT and prior findings that need satisfaction fosters

internalisation, persistence and higher self-rated performance (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017; Vallerand & Reid, 1984; Ng et al., 2012; Gagné et al., 2003). Practically, autonomy-supportive coaching (meaningful choice, perspective taking, promotion of initiative) should enhance sustained performance. Unexpectedly, SMS-II showed a negative indirect effect ($\beta = -.241$, $p < .001$), likely reflecting loss of theoretical precision when aggregating distinct regulations into a composite; subscale overlap can obscure unique effects ((Howard et al., 2020; Lonsdale et al., 2014). Researchers should examine individual regulatory subscales rather than composites.

Controlled motivation did not mediate BNSSS→PPSQ ($\beta = .066$, $p = .118$), aligning with SDT's view that externally regulated behaviour yields short-term compliance but not sustained, self-determined engagement (Deci & Ryan, 2000). Some athletes may perform under pressure, but such motivation is less durable (Taylor & Lonsdale, 2023).

Table 4. 13.: *Summary of Mediation Effects: Basic Psychological Needs → Motivation → Perceived Performance among Ethiopian Volleyball Players*

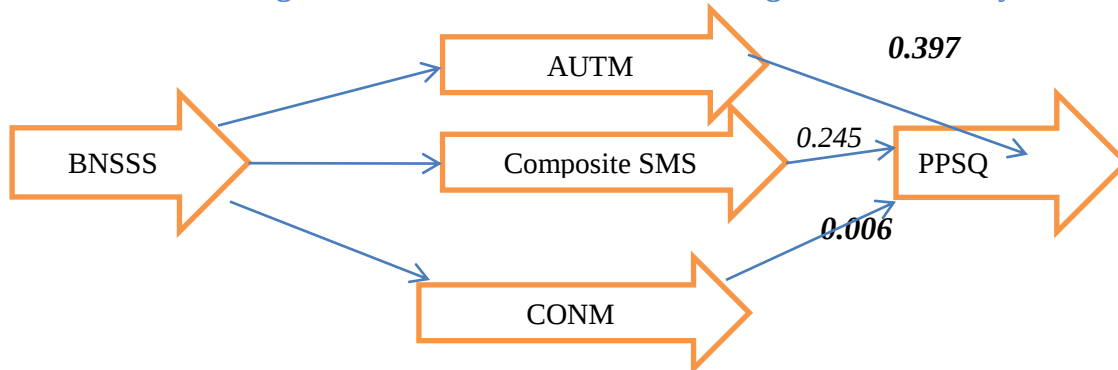
Mediator	Indirect Effect	95% Bootstrap CI	Interpretation
Autonomous Motivation (AUTM)	0.397	[0.255, 0.564]	Significant positive mediation
Sports Motivation Scale II (SMSII)	-0.241	[-0.369, -0.112]	Significant negative mediation
Controlled Motivation (CONM)	0.066	[-0.019, 0.151]	Non-significant mediation

Note. *CI = Confidence Interval; AUTM = Autonomous Motivation; SMSII = Sports Motivation Scale II; CONM = Controlled Motivation.*

The results support the theoretical model of SDT, where the satisfaction of psychological needs enhances autonomous motivation and, therefore, perceived performance. Contrastingly, the negative mediation via SMSII suggests a measurement problem, as aggregated scales may hide effects of motivational quality.

Similarly, Ng et al. (2011) found that the combination of high and low quality motivations leads to diluted or misleading associations with outcomes.

Figure 4: The of Mediation effect using SEM/Path analysis



4.4 PHASE III: RESULTS OF GENDER VARIATION

4.4.1 Research Question: Are there significant gender differences in sports motivation and perceived sports performance?

This section compares gender differences in motivation and perceived performance among elite Ethiopian volleyball players, acknowledging that socialisation, role expectations and sport opportunities can shape need satisfaction and motivation (Deci & Ryan, 2000; Lonsdale et al., 2009; Quested et al., 2011). Identifying gendered patterns helps tailor motivational strategies.

A one-way MANOVA tested nine outcomes (intrinsic, integrated, identified, introjected, external, amotivation, autonomous, controlled motivation, performance). Means (Table 4.51) showed small differences: males slightly higher on performance, females marginally higher on intrinsic/integrated motivation; overall multivariate effect was non-significant (Tabachnick & Fidell, 2019). Slightly higher autonomous motivation in males may reflect stronger athletic identity or sociocultural norms; small increases in female introjected regulation/amotivation suggest greater external pressure. These minor patterns echo prior work showing context-dependent gender differences (Brewer, Van Raalte, & Linder, 1993).

- Coaches should use autonomy supportive approaches to boost intrinsic engagement across genders.
- Support strategies can help female athletes connect sport to personal development and leadership.
- Similar controlled motivation levels imply both genders are equally affected by external pressures and deserve comparable interventions.

Although multivariate gender effects were non-significant, univariate trends aligned with past findings (Field, 2018). Limitations include cross-sectional design, self-report bias, and minor homogeneity violations; group sizes were reasonably balanced ($n = 85$ vs. 63) permitting parametric tests (Pallant, 2020).

Table 4. 14: *Multivariate Test of Gender Differences*

Effect	<i>Wilks' Λ</i>	$F(8, 139)$	p	<i>Partial η^2</i>
<i>Intercept</i>	0.007	3129.69	< .001	0.993
<i>Gender</i>	0.914	1.643	.118	0.086

Note. The multivariate test for gender did not reach statistical significance, $F(8, 139) = 1.643$, $p = .118$, $Wilks' \Lambda = 0.914$, $Partial \eta^2 = 0.086$. The intercept indicates that the overall model was significant, $F(8, 139) = 3129.69$, $p < .001$, confirming that the combined dependent variables differ from zero.

A one-way MANOVA tested nine outcomes simultaneously to control Type I error (Tabachnick & Fidell, 2019). No significant multivariate gender effect emerged, $Wilks' \Lambda = .914$, $F(8,139) = 1.643$, $p = .118$, $partial \eta^2 = .086$, indicating at most a small-moderate, context-specific relationship rather than a robust gender pattern (Cohen, 1988; Field, 2023; Ryan & Deci, 2017). Independence and normality were examined; Levene's test flagged heterogeneity for five variables (intrinsic, integrated, introjected, amotivation, controlled motivation). Given reasonably balanced groups ($n = 85$ vs. 63), MANOVA/ANOVA remain fairly robust to these violations (Field, 2023; Pallant, 2020).

Heterogeneous variances indicate differing response variability across genders, especially for introjected regulation ($p = .008$); interpret results cautiously. Homogeneity held for identified regulation and performance, supporting reliable comparisons for those constructs (Field, 2023). Only Identified Regulation differed by gender, $F(1,146) = 4.97$, $p = .027$, partial $\eta^2 = .033$ (small effect). No other construct or perceived performance showed significant gender differences. This isolated difference aligns with SDT's view of identified regulation as internalised extrinsic goals (Deci & Ryan, 2000; Field, 2023; Pallant, 2020) (see Table 4.54. at appendix)

Table 4. 15: Uni-variate ANOVA Results by Constructs

Construct	F	df ₁	df ₂	p	Partial η^2	Homogeneity Violated
Intrinsic Motivation	.003	1	146	0.957	< .001	Yes
Integrated Regulation	0.001	1	146	0.974	< .001	Yes
Identified Regulation	4.97	1	146	0.027	0.033	No
Introjected Regulation	0.223	1	146	0.638	0.002	Yes
External Regulation	0.002	1	146	0.966	< .001	No
Amotivation	0.001	1	146	0.976	< .001	Yes
Autonomous Motivation	0.001	1	146	0.976	<.001	No
Controlled Motivation	0.048	1	146	0.827	0.000	Yes
Performance	0.119	1	146	0.731	0.001	No

Note. Bolded p -values indicate significance at $p < 0.05$. A statistically significant effect of gender was found only for Identified Regulation, $F(1, 146) = 4.97$, $p = 0.027$, Partial $\eta^2 = 0.033$.

Construct-Specific Gender Differences in Sports Motivation and Perceived Performance

Intrinsic Motivation: Males scored higher ($M = 5.73$ vs. 5.31), $F(1,146)=7.93$, $p = .006$, partial $\eta^2 = .052$, but this did not survive Bonferroni correction ($\alpha = .005$). This aligns with SDT's link between intrinsic motivation and sustained engagement (Manninen et al., 2022). **Integrated Regulation:** Males were higher ($M = 5.75$ vs. 5.40), $F(1,146)=8.24$, $p = .005$, partial $\eta^2 = .053$; this effect remained after Bonferroni correction and suggests stronger internalisation among males (Ryan & Deci, 2017).

Identified, Introjected, External Regulation, Amotivation: No significant gender differences for Identified ($p = .161$), Introjected ($p = .550$), External ($p = .172$) or Amotivation ($p = .350$), indicating similar levels of these motives across genders (Vallerand & Verner-Filion, 2020; Barkoukis et al., 2020). Autonomous Motivation: Males higher ($M = 5.61$ vs. 5.28), $F(1,146)=6.68$, $p = .011$, partial $\eta^2 = .044$; effect did not survive Bonferroni correction and is therefore exploratory (Manninen et al., 2022). Controlled Motivation and Perceived Performance: No gender difference in Controlled Motivation ($p = .685$). Perceived Performance slightly higher for males ($M = 5.30$ vs. 5.09), $F(1,146)=4.00$, $p = .047$, partial $\eta^2 = .027$, but non-significant after correction; aligns with links between autonomous motivation and self-evaluation (Barkoukis et al., 2020).

Gender Differences in Motivation and Perceived Performance in sport:

Independent Samples T-Test

Independent t-tests (Levene/Welch where needed) found significant male > female differences for Intrinsic Motivation ($t(110.60)=2.701$, $p = .008$, $d = 0.47$), Integrated Regulation ($t(115.20)=2.775$, $p = .006$, $d = 0.46$), and Autonomous Motivation composite ($t(146)=2.584$, $p = .011$, $d = 0.43$). Perceived Performance showed a marginal male advantage ($t(146)=2.000$, $p = .047$, $d = 0.33$). Other constructs showed non-significant differences ($|d| = 0.17\text{--}0.47$ range) (Table 4.16).

Findings fit SDT: autonomy and competence support underpin self-determined motivation and performance (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017). Male advantages in autonomy-related variables suggest greater opportunities for volitional choice and internalization (Bartholomew et al., 2011; Vallerand & Verner-Filion, 2020).

A coaching climate that fosters autonomy and empowerment predicts internalised motivation, goal engagement and positive outcomes; controlling climates harm these outcomes, especially for females and youth (Birrell et al., 2023; Gillson et al.,

2006; Smoll et al., 2007). Interventions should support female athletes' internalisation and autonomy. Small differences in identified, introjected and external regulation indicate broadly similar regulated motivation across genders, consistent with prior evidence of stability across demographics (Pelletier et al., 2001; Bartholomew et al., 2011). The non-difference in amotivation suggests both genders are generally engaged in Ethiopian competitive sport.

Table 4. 16: *Gender Differences in Motivation and Perceived Performance among Ethiopian Elite Volleyball Players: Independent Samples T-Test Results*

Constructs	t	df	p	Mean Dif	95% CI L–U	d	Sig
INM	2.701	110.6	.008	0.42	0.11–0.73	0.47	yes
IGR	5	1.20	.006	0.36	0.10–0.61	0.46	Yes
IDR	1407	146	.161	0.25	-0.10–0.61	0.23	No
IJR	-0.626	145.996	.532	-0.12	0.02–0.27	-0.11	No
EXR	1.382	145	.169	0.24	0.10–0.58	0.17	No
AMO	-0.996	144.06	.321	-0.17	-0.51–0.17	-0.17	No
AUTM	2584	146	.011	0.33	0.08–0.59	0.43	Yes
CONM	0.26	145.94	.671	0.06	-0.31	0.11	No
PPSQ	2.000	146	.047	0.21	.00–0.42	0.33	Marginal

t = *t*-value/statistics; *df* = degrees of freedom; *d* = effect size; *p* = Sig. (2-tailed); 95% CI L–U = confidence interval lower to upper limit; Sig = Significant

Note. Levene's test for equality of variances was violated for intrinsic motivation (INM), integrated regulation (IGR), introjected regulation (IJR), amotivation (AMO), and controlled motivation (CONM); hence, Welch-corrected *t*-values were reported for these variables. Positive mean differences indicate higher male scores. Significant gender differences were found for intrinsic motivation, integrated regulation, and autonomous motivation composite, with a marginal difference in perceived performance. Effect sizes (Cohen's *d*) ranged from small (–0.11 to 0.17) to moderate (0.47), indicating meaningful differences in more self-determined motivational forms. Non-significant results for identified, introjected, external, amotivation, and controlled regulations suggest comparable extrinsic and controlled motivation levels across genders (Bartholomew et al., 2011; Gillison et al., 2006; Pelletier et al., 2001; Quested et al., 2021; Smoll et al., 2007).

4.4.2 Research Question: Are There Significant Gender Differences in Basic Need Satisfaction in Sport Scale Constructs and Perceived Performance?

Male athletes scored higher on Autonomy Choice, Autonomy Composite, Competence and AIPLOC; females scored slightly higher on Relatedness and marginally lower on Perceived Performance.

Assumptions held: Box's test was non-significant ($p = .21$), indicating homogeneous covariance matrices, and Levene's tests showed no homogeneity violations (Field, 2023). Gender Differences in Combined Psychological Needs and perceived Performance Variables Table 4.17. MANOVA showed a significant multivariate gender effect, Wilks' $\Lambda = .762$, $F(6,141) = 7.33$, $p < .001$, partial $\eta^2 = .238$, indicating a moderate-large effect: gender accounts for ~23.8% of variance across the combined BNSSS and PPSQ measures (Field, 2023). The multivariate difference is driven mainly by autonomy-related constructs rather than uniform differences across all needs; follow-up univariate tests identify which specific scales differ by gender.

Table 4. 17: Multivariate Analysis of Variance (MANOVA) Effects for Gender on PPSQ Dimensions with BNSSS as Independent Variables

Effect	Wilks' Λ	F	df ₁	df ₂	p	partial η^2
Intercept	0.007	129.69	6	141	.001	.993
Gender	0.762	7.327	6	141	<.001	.238

Note: Λ = Wilks' Lambda. ; F = multivariate test statistics indicating the overall significance of group differences across all dependent variables; df = numerator degrees of freedom (number of dependent variables); df = denominator degrees of freedom (sample size adjusted for the number of groups and variables); p = probability value; values less than .05 indicate statistically significant differences; Partial η^2 = effect size indicating the proportion of variance in the combined dependent variables explained by the factor (Gender), after controlling for other effects.

Univariate Results for Gender Differences across Psychological Needs and Performance

Bonferroni-adjusted univariate ANOVAs ($\alpha = .007$) showed significant gender differences only for Autonomy Choice and the Autonomy Composite; other constructs did not differ. Gender effects were driven by autonomy: males scored higher on Autonomy Choice ($\eta^2 = .197$) and Autonomy Composite ($\eta^2 = .122$), indicating greater perceived volitional control and self-endorsement in sport (Ryan & Deci 2000; Ryan & Deci, 2017). This may reflect contextual factors in Ethiopian sport, such as male-dominated leadership or coaching dynamics (Jõesaar et al., 2012; Pelletier et al., 2001). No gender differences emerged for Competence, Relatedness, AIPLOC, or Volition, implying similar perceived capability, social support and internal regulation across sexes (Gillison et al., 2006; Reinboth & Duda, 2006). Perceived performance differences were marginal and not practically robust.

Table 4. 18: *Tests of Between-Subjects Effects (Univariate ANOVA)*

Constructs	F	p	Partial η^2	Interpretation
Competence	2.35	.128	.016	NS
AIPLOC	2.73	.101	.018	NS
Autonomy Volition	0.43	.513	.003	NS
Autonomy Choice	35.73	< .001	.197	Significant (large)
Relatedness	1.65	.201	.011	NS
Autonomy Composite	20.34	< .001	.122	Significant (moderate)
Perceived Performance	3.99	.047	.027	Marginal

Results are based on Type III Sum of Squares; NS = Not Significant.

These findings align with prior research linking autonomy-supportive climates to higher motivation and performance (Bartholomew et al., 2011; Qusted et al., 2021. Smoll et al., 2007), while gender showed minimal effects on competence and relatedness. The results underscore autonomy as a context-sensitive driver of

motivation (Ryan & Deci, 2017) While controlling coaching undermines autonomy, female athletes often face socio-cultural restrictions that limit choice and self-expression (Gillison et al., 2006; Mageau & Vallerand, 2003), indicating the need for gender-sensitive coaching.

Practical implications include: adopting autonomy-supportive practices (Reeve, 2018), building confidence in female athletes, fostering team cultures based on communication and respect, and supporting inclusive leadership. These steps can reduce motivational gaps and promote fairer participation. Build confidence in women volleyball players and encourage their voluntary. The independent samples t-tests table 4.59 Analysis revealed males reported significantly higher autonomy choice ($t=5.579$, $p<.001$, $d=0.97$) and composite ($t=4.510$, $p<.001$, $d=0.76$), with a small performance difference ($p=.047$, $d=0.33$), but no significant gender differences in competence, relatedness, or volitional autonomy.

The findings confirm that competence and relatedness are perceived similarly across genders (Gillison et al., 2006), but the large autonomy gap suggests it is sensitive to contextual factors like coaching style and gendered expectations (Jõesaar et al., 2012; Pelletier et al., 2001). In Ethiopia's male-dominated system, limited decision-making access may reduce female athletes' volition and performance, as autonomy fosters confidence and persistence (Reinboth & Duda, 2006; Smoll et al., 2007). Recommendations include: creating autonomy-supportive environments, ensuring equal access to leadership and feedback, using inclusive coaching to enhance relatedness and trust, and offering mentoring to boost decision-making confidence. These interventions can enhance motivation, self-regulation, and performance for all athletes (Jõesaar et al., 2012).

Table 4. 19: *Gender Differences in Psychological Needs, Autonomy Dimensions, and Perceived Performance among Ethiopian Elite Volleyball Players: Independent Samples T-Test Results*

Constructs	t	df	p	Mean Diff	95% CI L–U	d	Sig
Competence	1.532	133.6	.128	+0.16	–0.05 – 0.37	0.25	No

AIPLOC	1.6	146	.1	+0.18	−0.04 – 0.39	0.27	No
Volition	0.656	146	.513	+0.07	−0.14 – 0.27	0.11	No
Choice	5.579	95.4	< .001	+0.83	0.54 – 1.13	0.97	Yes
Relatedness	−1.284	146	.201	−0.22	−0.56 – 0.12	−0.34	No
Autonomy Composite	4.510	146	< .001	+0.41	0.23 – 0.58	0.76	Yes
PPSQ	2.000	146	.047	0.21	0.00–0.42	0.33	Marginal

Note. Levene's test indicated equal variances for most constructs except autonomy choice ($F = 13.554, p < .001$); Welch-corrected values were reported where appropriate. Positive mean differences indicate higher male scores. Significant gender differences were found for autonomy choice and autonomy composite, with a marginal difference for perceived performance. Effect sizes (Cohen's d) ranged from negligible (0.11) to large (0.97), suggesting substantial practical significance particularly for autonomy-related constructs (Bartholomew et al., 2011; Gillison et al., 2006; Pelletier et al., 2001; Quested et al., 2021; Smith et al., 2007).

4.5 Discussion

Psychometric validity and cultural adaptation of BNSSS and SMS-II in Ethiopian players

The results of the present study indicated that the BNSSS and SMS-II had acceptable psychometric properties among Ethiopian elite volleyball players, thus supporting their application in this cultural setting. The reliability coefficients that were acceptable, together with the results of the confirmatory factor analyses, indicate that the constructs measured by these instruments were understood in the same way by the participants. The BNSSS and SMS-II were developed and validated in Western contexts, but the current findings suggest that the theoretical structure underlying these scales is also applicable in the Ethiopian sport context. This supports the proposition of Self-Determination Theory that the basic psychological needs for autonomy, competence, and relatedness, as well as different forms of motivation, are universal psychological processes and not culture-specific constructs (Ryan & Deci, 2017). At the same time, the successful adaptation and validation of these scales also highlights the importance of assessing psychometric properties before the application of instruments developed in the West in East African contexts. Overall, the findings offer empirical evidence that the BNSSS and SMS-II are appropriate and reliable instruments to assess basic psychological needs and sport motivation among Ethiopian athletes in general and volleyball players in particular when culturally adapted and validated.

With regards to the Self-Determination Theory (SDT), the “quality” of motivation is whether an athlete’s motivation is autonomous or controlled. The difference is essentially based on the satisfaction of three basic psychological needs; autonomy, competence and relatedness. Autonomy is the main influence on quality motivation. Athletes with volition will successfully internalise extrinsic regulations, changing from controlled compliance to identified or intrinsic motivation. In synergy, competence satisfaction (supported by optimal challenges and constructive feedback)

builds the self-efficacy necessary for sustaining intrinsic interest and relatedness provides the secure social foundation needed for athletes to adopt and integrate the values of their sport. In the Ethiopian volleyball context, however, these needs are directly thwarted by environmental and coaching deficits, a dynamic that is empirically reflected in the athletes' actual psychometric scores. Inadequate training infrastructure and equipment, for example, directly decrease competence satisfaction, which is shown in lower mean scores on the competence subscale of the Basic Need Satisfaction in Sport Scale (BNSSS) and consequently lower intrinsic motivation scores on the Sport Motivation Scale II (SMS-II). Autocratic leadership style and deficit in autonomy-supportive practices, like coaching deficits, reduce BNSSS autonomy and relatedness scores and increases SMS-II scores for external regulation, introjected regulation and amotivation. These structural constraints ultimately produce a measurable psychological signature in which unfulfilled basic needs systematically reduce the quality of motivation, and explain the difficulties faced by elite Ethiopian volleyball players in achieving consistent optimal performance.

The deficiency in infrastructure (substandard facilities, inadequate training apparatus) and coaching challenges (scarcity of qualified coaches, insufficient technical proficiency) directly correlate with players' motivational scores by hindering their ability for skill enhancement and performance optimisation, which is reflected in the comparatively modest perceived performance scores ($M = 5.21$, $SD = 0.64$) among elite Ethiopian volleyball players. Self-Determination Theory posits that when athletes' fundamental psychological need for competence is compromised by subpar training conditions and insufficient coaching, they find it challenging to fully internalise the values of their sport. This elucidates why identified regulation ($\beta = 0.245$, $p = .003$) is the predominant predictor, as athletes engage in the sport due to personal valuation rather than intrinsic enjoyment of the activity. The significant intercorrelation among autonomous motivation constructs ($r = .676$ for intrinsic-integrated) and the lack of pronounced performance disparities indicate that infrastructural and coaching limitations impose a ceiling effect, preventing even

motivated athletes from converting their motivation into markedly enhanced perceived performance results. The significant gender disparity in autonomy choice ($d = 0.97$) illustrates how structural constraints disproportionately impact female athletes, who have diminished access to decision-making and leadership roles within the male-dominated coaching framework of the Ethiopian sports system, thereby restricting their voluntary participation and self-assessed competence.

Identified regulation ($\beta = 0.245$, $p = .003$) was the strongest unique predictor of perceived performance outcomes among elite Ethiopian volleyball players, explaining that athletes who participate in volleyball because they personally value it have more positive performance evaluations. This is consistent with the Self-Determination Theory which holds that the personal endorsement of activities is important for adaptive outcomes such as perceived performance (Ryan & Deci, 2017).

The overall model was significant, $F(6, 141) = 8.11$, $p < .001$, accounting for 25.7% of the variance in perceived performance ($R^2 = .257$), confirming that motivational constructs collectively influence performance self-assessment. Intrinsic motivation ($r = .391$) and integrated regulation ($r = .401$) were positively correlated, but they were not unique predictors because of high intercorrelations with identified regulation ($r = .676$) that diminished their unique contributions.

Contextually, the dominance of identified regulation over intrinsic motivation is likely a reflection of the constraints of Ethiopian volleyball (poor infrastructure, low funding, shortage of coaches) and collectivist cultural values where athletes are motivated by personal value rather than pure enjoyment (Mussema et al., 2021; De Man et al., 2022). The findings highlight the importance of differentiating autonomous motivation in intervention development, suggesting that it may be more effective to target identified regulation and promote internalisation and valuing of sport participation than to target intrinsic enjoyment alone.

The Mediating Effect of Sports Motivation

The present study investigated whether sport motivation mediated the relationship between basic psychological needs satisfaction and perceived sport performance among Ethiopian elite volleyball players. The findings partially confirm the Self-Determination Theory (SDT), with autonomous motivation mediating the relationship between basic psychological needs satisfaction and perceived performance, but not a direct path. Specifically, satisfaction of basic psychological needs was a strong predictor of autonomous motivation, which was a positive predictor of perceived sport performance. The important indirect effect through autonomous motivation means that athletes who feel more satisfied in their needs of autonomy, competence and relatedness are more likely to internalise their motivation, which leads to better perceptions of their performance. This is consistent with SDT (Ryan & Deci, 2017) and previous studies that reported autonomous motivation is associated with persistence, effort and performance in sport (Ng et al., 2012; Gagné et al., 2003; Chu et al., 2021). However, the direct effect of satisfaction of basic psychological needs on perceived performance was not statistically significant once motivation was added to the model. The results indicate that the satisfaction of psychological needs may not have a direct effect on performance, but its effect is mediated by motivation. This finding supports the SDT proposition that motivation is the key psychological mechanism through which need satisfaction leads to adaptive outcomes. Interestingly, the overall composite score of the SMS-II showed a significant negative mediating effect. The combination of these regulations can hide their unique effects and reduce the theoretical precision. The SMS-II includes different sources of motivation that differ in the level of self-determination. This explanation is consistent with previous work showing that composite motivation scores can take on the major roles of autonomous and controlled motivational dimensions (Howard et al., 2020; Lonsdale et al., 2014). Hence, the examination of individual motivational regulations separately can provide a better understanding of motivational processes in sport.

Results showed that need satisfaction was positively related to perceived performance and this relationship was not significantly mediated by controlled motivation. This accords with SDT that motivation through external pressure or internal compulsion is less effective in maintaining engagement and optimal performance than more autonomous types (Ryan & Deci, 2017). While controlled motivation might encourage short-term effort, it seems insufficient to translate basic psychological need satisfaction into improved perceived performance in Ethiopian volleyball players.

Gender variation in Ethiopian Volleyball

Gender Differences in Motivation and Perceived Performance in Sport Multivariate analyses did not find a statistically significant overall gender effect on the combined motivational constructs and perceived performance (Wilks' $\Lambda = 0.914$, $F(8, 139) = 1.643$, $p = .118$), indicating that gender does not have a strong systematic effect on the overall pattern of sports motivation among elite Ethiopian volleyball players (Tabachnick & Fidell, 2019). However, the small-to-moderate effect size (partial $\eta^2 = 0.086$) suggests that observable differences do exist but are probably context dependent rather than robust generalisable patterns (Field, 2023). Follow-up univariate tests indicated that significant gender differences were present for some autonomous motivation constructs. Males scored significantly higher on intrinsic motivation ($M = 5.73$ vs. 5.31 , $p = .006$, $d = 0.47$), integrated regulation ($M = 5.75$ vs. 5.40 , $p = .006$, $d = 0.46$), and autonomous motivation composite ($M = 5.61$ vs. 5.28 , $p = .011$, $d = 0.43$). This suggests that male athletes internalise sport-related goals and participate more volitionally than female athletes (Ryan & Deci, 2017). There was a marginal difference in perceived performance for males ($M = 5.30$ vs. 5.09 , $p = .047$, $d = 0.33$) although this did not survive Bonferroni correction and should be interpreted cautiously.

No significant gender differences were found for controlled motivation constructs (introjected regulation, external regulation, controlled motivation

composite; $p > .05$), indicating that both genders have similar levels of externally driven or pressure-based motivation. Likewise, no significant gender difference was found in amotivation ($p = .350$), indicating similar levels of engagement and purpose for male and female athletes. The lack of significant differences ($p > .05$) between genders concerning competence and relatedness needs suggests similar views on capability and social connection. These findings are in line with the Self-Determination Theory (Ryan & Deci, 2017) that highlights the context-sensitive and culturally constructed nature of autonomy. The autonomy gap, especially the large difference in autonomy choice ($d = 0.97$) and autonomy composite ($d = 0.76$), is probably reflective of features of the Ethiopian sport system in which male-dominated leadership and coaching dynamics limit female athletes' access to decision-making opportunities (Jõesaar et al., 2012; Pelletier et al., 2001). This suggests that female athletes may have less volitional control over the training, participation and team roles that are prerequisites for self-determined motivation. In practice, these findings underscore the necessity of autonomy-supportive coaching practices that intentionally involve female athletes in the decision making of training and goal setting (Reeve, 2018). Coaches can ensure that leadership, feedback and decision-making opportunities are available to all genders, and can create mentoring programs to help female athletes build confidence in their decision-making abilities. Coaches can also create team cultures that value communication, respect and shared accountability. Such interventions can reduce motivational differences and enable female athletes to operate in a self-determined manner, leading to more equitable participation and continuous performance improvements.

CHAPTER FIVE

Summary, Conclusion and Recommendation

5.1 Introduction

Chapter five of this dissertation, Psychometric Validation of Psychological Instruments (SMS-II and BNSSS) and The Interplay between Basic Psychological Needs, Motivation and Perceived Sport Performance in Elite Ethiopian Volleyball Players The main empirical results of the study are summarised. The chapter is based on a rigorous process of instrument validation and sophisticated analytical techniques such as correlation analysis, regression, mediation and structural equation modelling (SEM). It also casts a critical eye on the role of psychological needs and motivational profiles in perceived performance, with an emphasis on gender differences and measurement implications. Additionally, the paper discusses the broader implications of these findings for research, practice, policy and future research in sports psychology in Ethiopia and internationally.

The results of the present study indicated that the BNSSS and SMS-II had acceptable psychometric properties among Ethiopian elite volleyball players, thus supporting their application in this cultural setting. The reliability coefficients that were acceptable, together with the results of the confirmatory factor analyses, indicate that the constructs measured by these instruments were understood in the same way by the participants. The BNSSS and SMS-II were developed and validated in Western contexts, but the current findings suggest that the theoretical structure underlying these scales is also applicable in the Ethiopian sport context. This supports the proposition of Self-Determination Theory that the basic psychological needs for autonomy, competence, and relatedness, as well as different forms of motivation, are universal psychological processes and not culture-specific constructs (Ryan & Deci, 2017). At the same time, the successful adaptation and validation of these scales also highlights the importance of assessing psychometric properties before the application of

instruments developed in the West in East African contexts. Overall, the findings offer empirical evidence that the BNSSS and SMS-II are appropriate and reliable instruments to assess basic psychological needs and sport motivation among Ethiopian athletes when culturally adapted and validated.

5.2 Summary of Findings

This dissertation is a holistic study of the relationships between satisfaction of basic psychological needs, different types of sport motivation and perceived performance in elite Ethiopian volleyball players with particular focus on gender as a contextual and structural variable. The study started with a full psychometric validation of the Basic Needs Satisfaction in Sport Scale (BNSSS) and the Sport Motivation Scale II (SMS-II) in a heterogeneous sample of various sports. Both instruments demonstrated internal consistency (Cronbach's $\alpha > .80$) and cross-sport reliability, confirming their suitability for use in Ethiopian sports (Melesse et al., 2024; Melesse et al., 2025).

Main analyses were performed using a descriptive survey design with correlational, regression, mediation and structural equation modelling (SEM) analyses. Results showed high levels of autonomy ($M = 5.62$), competence ($M = 5.71$) and integrated motivation ($M = 5.60$) reported by participants, supporting the cross-cultural applicability of self-determination theory (Deci & Ryan, 2000; Ryan & Deci, 2017). The regression and SEM analyses results revealed that autonomy (autonomy composite and choice) and relatedness and competence were significant predictors of self-determined motivation (autonomous and integrated regulations) and explained 40-62% of the variance in the main motivational outcomes (see Tables 4.16-4.32). Most importantly, relatedness was the strongest predictor of identified regulation ($\beta = .64$), underscoring the importance of team dynamics and relational factors in the Ethiopian athletic context.

The gender analysis revealed that males generally reported higher satisfaction in autonomy, higher levels of autonomous motivation and slightly higher

perceived performance. There were no gender differences in competence and relatedness. Such differences in autonomy satisfaction mirror the gendered experiences and the structural differences in motivational climates of elite sports.

The mediation models and SEM provided direct empirical support for the core propositions of SDT (De Francisco et al., 2018; Ryan & Deci, 2017) that autonomous motivation was the primary pathway through which need satisfaction influenced perceived performance. In contrast, controlled motivation was not a significant mediator of this relationship and the use of composite motivation scores (e.g., total SMS-II scores) were found to obscure important distinctions and potentially mask positive and negative psychological pathways (Lonsdale et al., 2013).

The results support the validity of the BNSSS and SMS-II in this regional context and provide insights into the dynamic interaction between psychological need satisfaction, regulatory motivation and perceived sport performance. The multi-level and statistically rigorous analytical approach employed in this investigation provides fresh perspectives for the design of motivational interventions, the evaluation of gender equity in sports, and the application of SDT in sub-Saharan Africa.

5.3 Conclusion

This research substantiates self-determination theory in elite Ethiopian volleyball, demonstrating that the fulfillment of autonomy, competence, and relatedness forecasts enhanced intrinsic and autonomous motivation, as well as improved self-perceived performance. Structural equation modelling and mediation analyses indicate that relatedness is a significant predictor of identified regulation ($\beta = .64$), emphasizing the importance of team cohesion in the internalization of goals, whereas autonomy is the primary driver of self-determined motivation. The routes from need fulfillment to performance differ based on the type of motivation and the circumstance. Female athletes notably express diminished autonomy and decreased self-determined motivation, indicative of enduring social and institutional obstacles

despite equivalent resources. The validation of the SMS-II and BNSSS offers dependable instruments for African athletes and facilitates a more nuanced evaluation of motivational subtypes instead of composite scores. The results advocate for autonomy-supportive and gender-equitable policies and practices in Ethiopian and African sports to enhance motivation and performance.

5.4 Recommendations

The empirical evidence suggests that coaches and sports administrators would be well advised to promote autonomy-supportive environments. This includes promoting participatory decision-making, providing clear feedback based on rationale and involvement of athletes in the training and competition processes. Such practices are associated with increased need satisfaction and more self-determined types of motivation, particularly when implemented consistently in youth sport settings (Bartholomew et al., 2011; Quested & Duda, 2009). The persistence of gender gaps in autonomy and self-determined motivation highlights the need for intentional efforts to empower women by enhancing their agency, voice and leadership opportunities in teams and organisations. There needs to be proactive policy development of pathways to improve women's representation in coaching, mentorship and team leadership roles. This approach is intended to overcome organisational barriers to autonomy and volition (Jõesaar et al., 2012). Gender equity and psychological support should be part of the coach education and certification programs and not an option for the sports federations.

The level of assessment should distinguish between autonomous, controlled and amotivated regulations in motivational profiles. This differentiation is important in order to accurately reflect the quality of athletes' motivation and avoid the overgeneralization of different regulatory styles. This type of approach allows for a more accurate interpretation of motivational processes in sport contexts, consistent with self-determination theory-based measurement frameworks (Lonsdale et al., 2009). Regular disaggregated assessments of athletes' motivational states will

facilitate early identification of athletes at risk of disengagement and inform need-supportive strategies at the individual level. In conclusion, successful interventions should consider the three basic psychological needs of autonomy, competence and relatedness through providing meaningful choices for athletes, improving team cohesion and mentoring structures and providing constructive feedback based on skill mastery and confidence building.

From the research perspective, there is a clear need to combine longitudinal structural equation modelling (SEM), mixed-method approach and intervention studies. This combination will help us to disentangle the developmental trajectories and flexibility of motivational profiles across different sports, genders and competitive seasons. This research will advance our understanding of the causal mechanisms and contextual factors that shape athletes' motivation, performance, and well-being across time (Vansteenkiste, Ryan, & Soenens, 2020).

5.5 Limitations

Despite the methodological rigour of this descriptive survey, which includes regression, mediation and structural equation modelling (SEM), there are some limitations to be noted. First, although the advanced statistical analysis provides strong associations and possible mediation pathways, no causality can be confirmed without longitudinal or experimental manipulation (Quested & Duda, 2009). The self-report method has its advantages, as it uses validated and reliable scales, but is still vulnerable to response bias and social desirability effects (Melesse et al., 2024). Furthermore, the study was conducted on elite volleyball which may be relevant to the understanding of high performance sports in Ethiopia but the generalisability of the findings to other sports, age groups or resource constrained and marginalised populations is limited. The statistical models accounted for contextual variables such as coaching climate, organisational structure and resource access, but these were not directly or experimentally measured. Hence, potential moderators of gendered autonomy and motivational climates are less well explored. Finally, the high

collinearity of the subcomponents of autonomy necessitated a careful refinement of the model. Therefore, a more detailed understanding is suggested using advanced SEM or multilevel analysis (Lonsdale et al., 2009; Jeno et al., 2020).

5.6 Directions for Future Research

Given the limitations and importance of context, future research should explore the developmental and potentially causal relations between basic psychological needs, satisfaction, motivation and performance using longitudinal and cross-context structural equation modelling (SEM) designs. Such studies also could examine the persistence and malleability of gender differences over time. Future research should take a mixed-methods approach by combining quantitative measures with qualitative interviews or focus groups to better understand the influence of cultural norms, gender expectations and organisational climates on motivational experiences and outcomes in sports (Vansteenkiste et al., 2020).

Additionally, research should include a broader range of populations, including youth, athletes with disabilities, grass root participants and people from different regions. Such an extension would increase the scope, representativeness and practical relevance of the findings. Rigorous testing in randomised trials or naturalistic experiments should also be carried out for intervention based research promoting autonomy, supportive coaching, participatory goal setting and gender equality in order to evaluate their effectiveness in enhancing motivational states and performance. Finally, the use of objective markers such as competition statistics and coach assessments along with athlete self-reports will provide a more complete and valid picture of the relation between motivation and performance.

5.7 Contribution to Sport Research and Policy in East Africa

This study contributes to the emerging field of sport psychology in East Africa where research on motivation and psychological well-being of athletes is limited. It has three main contributions. First, it psychometrically validates the Amharic BNSSS and SMS-II (Melesse et al., 2024, 2025) providing reliable, specific instruments for Ethiopian athletes which have been missing so far in African contexts.

Second, it offers the first empirical evidence regarding the relationships between need satisfaction, autonomous motivation, relatedness ($\beta = .64$) and perceived performance in elite volleyball, providing insights into the motivational pathways as well as gender differences. Third, the findings support sport policies, talent development and coaching practices. Results highlight psychological needs as determinants of performance and support autonomous environments, gender equity interventions, and national strategies to optimize athlete wellbeing and competitive outcomes.

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Appendix- A

The Basic Needs Satisfaction in Sport Scale (BNSSS)

1=strongly disagree; 2=disagree; 3=somewhat disagree; 4=Neutral; 5=somewhat agree; 6=agree; 7= strongly agree

Items								
In sports, I have a close relationship with other people.								
In sports, I feel I am pursuing goals that are my own.								
I feel I participate in my sport willingly.								
In sports, I get opportunities to make choices.								
In sports, I feel that I am being forced to do things that I don't want to do.								
I can overcome challenges in my sports.								
How much concern for others in my sport.								
I choose to participate in my sport according to my own free will.								
In my sport, I have a say in how things are done.								
There are people in my sport who care about me.								
I am skilled at sport.								
I feel I am good at sport.								
In sport, I can take part in the decision making process.								
I get opportunities to feel that I am good at sport.								
In sport, I really have a sense of wanting to be there.								
In sport, I feel I am doing what I want to be doing.								
I have the ability to perform well in sport.								
In sport, there are people who I can trust.								
I have close relationships with people in sport.								
In sports, I get opportunities to make decisions								

)

Appendix B: Sports Motivation Scales (SMS-II)

correspond completely

Items					
Because it gives me pleasure to learn more about my sport.					
Because I find it enjoyable to discover new performance strategies.					
Because it is very interesting to learn how I can improve.					
Practicing sports reflects the essence of whom I am.					
Because participating in sports is an integral part of my life.					
Because through sport, I am living in line with my deepest principles.					
Because I have chosen this sport as a way to develop myself.					
Because I found it is a good way to develop aspects of myself that I value.					
Because it is one of the best ways I have chosen to develop other aspects of myself.					
Because I would feel bad about myself if I did not take the time to do it.					
Because I feel better about myself when I do it.					
Because I would not feel worthwhile if I did not.					
Because people I care about would be upset with me if I didn't.					
Because I think others would disapprove of me if I did not.					
Because people around me reward me when I do it.					
I used to have good reasons for doing sports, but now I am asking myself if I should continue.					
So that others will praise me for what I do					
It is not clear to me anymore; I don't really think my place is in sport.					

1 =Does not correspond a

Appendix C

Perceived Performance in Sport Questionnaire

1=strongly disagree; 2=disagree; 3=somewhat disagree; 4=Neutral; 5=somewhat agree; 6= agree; 7= strongly agree

Items Overall, during the competition:							
I consider my performance is being good.							
I am satisfied with my results in the competition.							
I feel that I am collaborating with my effort and my performances in competition to improve the competitive level of the club or the team							
I feel like I'm doing very well in the competition							
I am offering good performance							

Table 4. 20: Descriptive Statistics and Internal Consistency Reliability of BNSSS and SMS-II Constructs in Ethiopian elite volleyball players

Construct	Mean	SD	Cronbach's α	95% CI
BNSSS Construct			.866	
Competence	5.71	0.63	0.88	[.85, .91]
Relatedness	5.23	1.04	0.85	[.69, .81]
Autonomy IPLOC	5.76	0.66	0.76	[.71, .82]
Autonomy volition	5.79	0.62	0.77	[.73, .83]
Autonomy choice	5.38	.93	0.79	[.81, .88]
SMS-II constructs			.822	
Intrinsic	5.55	0.92	0.83	[.78, .86]
Integrated	5.60	0.76	0.74	[.68, .79]
Identified	5.27	1.09	0.82	[.78, .86]
Introjected	5.24	1.24	0.87	[.84, .90]
Extrinsic	5.50	1.03	0.85	[.81, .88]
Amotivation	5.33	1.14	0.81	[.76, .85]

Note: All variables measured on 7-point scales. Negative skewness indicates clustering toward higher scores, typical in elite athlete samples (Gillet et al., 2016). Kurtosis values > |3.0| were addressed via robust statistical methods (Field, 2018).

Table 4. 21: *Pearson correlation matrix of BNSSS and SMS-II constructs*

	CO	IPLOC	AVO	ACH	REL	AUTC	INM	IGR	IDR	IJR	EXR	AMO	AUT M	CONM
CO	1	.575**	.762* *	.380**	.219*	.689**	.408* *	.407**	.366**	.031	.198*	.045	.531**	.117
AIP		1	.523* *	.337**	.186*	.729**	.236* *	.312**	.306**	.087	.038	.126	.361* *	.116
AVO			1	.234**	.193*	.655**	.416**	.281**	.282**	.071	.111	.094	.471* *	.124
ACH				1	.192*	.836**	.402* *	.501**	.298**	.124	.282**	.068	.458* *	.208*
REL					1	.250**	.375* *	.462**	.706**	.075	.021	.072	.636* *	.061
AUTC						1	.475**	.520**	.388**	.133	.231**	.118	.571**	.246**
INM							1	.676**	.409**	-.074	.310**	-.012	.857* *	.086
IGR								1	.412**	.017	.202*	.023	.738* *	.102
IDR									1	.107	.090	.118	.790* *	.144
IJR										1	.027	.704**	.001	.826**
EXR											1	.136	.233* *	.487**
AMO												1	.036	.859**
AUTM													1	.148
CONM														1

Note: ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

BNSSS- basic need satisfaction sport scale; CO-competence; AIPLOC- autonomy internal locus of causality; AVO- autonomy volition; ACH- autonomy choice; REL- relatedness, AUTC- autonomy composite, SMS-II- sport motivation scale -II; INM- intrinsic motivation; IGR- integrated regulation; IDR- identified regulation; IJR- introjected regulation; EXR- extrinsic regulation ;AMO- amotivation; AUTM- autonomous motivation; and CONM- controlled motivation.

Table 4. 22: *synthesizes key predictions and their theoretical alignment*

BNSSS Construct	SMS-II Outcome	Correlation	SDT Alignment	Literature Support
Competence	Intrinsic Motivation	.408**	Yes	Ryan & Deci (2017)
Relatedness	Identified Regulation	.706	Culturally amplified	Ng et al. (2012)
Autonomy volition	Intrinsic Motivation	.416**	Extended	Vansteenkiste et al. (2020)
Autonomy choice	Introjected Regulation	.189*	No (weak)	Pelletier et al. (2013)

Table 4. 23: *Descriptive Statistics and Inter-correlations among Study Variables In Ethiopian volleyball Players*

VARIABLES	M	SD	1	2	3	4	5	6
Intrinsic	5.55	.92	---					
competence	5.71	.93	.408**	---				
relatedness	5.23	1.04	.375**	.219*	---			
AIPLOC	5.76	.66	.236**	.575**	.186	---		
volition	5.79	.62	.416**	.762**	.193	.523**	---	
Autonomy composite	5.62	.58	.475**	.689**	.250*	.729**	.655**	----

Note. N = 148. *p < .05*, **p < .01**

Table 4. 24: *Regression Model Summary and ANOVA for Basic Psychological Needs Predicting Intrinsic Motivation in Ethiopian elite volleyball players*

Model	R	R ²	Adjusted R ²	SE Estimate	F	df1	df2	p
1	.587	.344	.321	.754	14.913	5	142	< .001

Table 4. 25: *Standardized Beta Coefficients, t-values, and VIF Scores*

Predictor Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients β	T-value	Sig.	VIF
Constant	.521	.688	----	.757	.450	----
Competence	.113	.167	.078	.678	.499	2.858
AIPLOC	-.367	.140	-.263	-2.621	.010	2.178
Volition	.219	.160	.149	1.367	.174	2.582
Autonomy	.712	.186	.449	3.833	< .001	2.967
Relatedness	.235	.062	.266	3.777	< .001	1.071

Table 4. 26: Key regression Findings and Implications: Ethiopian volleyball players

Component	Finding	Implication
Sensitivity Analysis	Excluding choice did not alter key findings; Autonomy Composite provided superior fit	Justifies variable selection based on theory and statistics
Effect Sizes (f ²)	Autonomy Composite: Large effect; Relatedness: Medium; AIPLOC: Small-Medium	Highlights practical relevance of predictors beyond p-values

Table 4. 27: Inter-correlations basic psychological needs and IGR Ethiopian volleyball players

Variables	1	2	3	4	5	6	7
Integrated	---	.407**	.462**	.312**	.281**	.501**	.520**
competence	.407**	---					
relatedness	.462**	.219*	---				
AIPLOC	.312**	.575**	.186	---			
volition	.281**	.762**	.193	.523**	---		
Choice	.501**					----	
Autonomy composite	.520**	.689**	.250*	.729**	.655**		---

Table 4. 28: Excluded Variables Due to Multicollinearity

Variables	BETA IN	SIG	Collinearity statistics
Autonomy choice	.b	.	Tolerance = 0.000

Table 4. 29: Model Summary for BNSSS Predicting Integrated Regulation: Ethiopian volleyball players

Model	R	R ²	Adjusted R ²	SE Estimate	F	df 1	df2	p	Durbin-Watson
1	0.649	0.422	0.401	0.592	20.708	5	142	< .001	1.941

Table 4. 30: Analysis of Variance for the Integrated Regulation Regression Model

Source	Sum of Squares	df	Mean Square	F-value	Sig. (p)
Regression	36.232	5	7.246	20.708	.000
Residual	49.692	142	0.350		
Total	85.924	147			

Table 4. 31: Multiple Regression Coefficients BNSSS Predicting Integrated Regulation

Predictor	B	Std. Error	Standardized Coefficients	T-value	Sig.	VIF
Variable						
Constant	1.340	.540	---	2.483	0.014	---

Competence	0.263	.131	0.217	2.012	0.046	2.858
AIPLOC	-0.184	.110	-0.158	-1.675	0.096	2.178
Volition	-0.278	.125	-0.227	-2.216	0.028	2.582
Autonomy	0.725	.146	0.547	4.976	<.001	2.967
Relatedness	0.259	.049	0.351	5.307	<.001	1.071

Table 4. 32: Collinearity Diagnostics for the Multiple Regression Model Predicting Integrated Regulation

Dimension	Eigenvalue	Condition Index	Variance Proportions
1	5.951	1.000	Minimal shared variance
2	0.030	14.025	Moderate shared variance
5 & 6	~0.003	~47	High shared variance

Table 4. 33: Residuals Statistics

Statistic	Predicted Value Mean	Residual Mean	Std. Deviation of Residual	N
Value	5.6014	0.000	0.58141	148

Table 4. 34: Model Summary and ANOVA Results

Model	R	R ²	Adjusted R ²	SE Estimate	F	df1	df2	p	Durbin-Watson
1	.747	.558	.543	.739	35.91	5	142	< .001	1.441

Table 4. 35: Regression Coefficients Predicting Identified Regulation from Basic Psychological Needs

Predictor Variable	B	Std. Error	Standardized Coefficients	T-value	Sig.	VIF
Constant	-.939	.674	---	-1.394	.165	---
Competence	.305	.164	.176	1.868	0.064	2.858
AIPLOC	-.040	.137	.024	.290	.772	2.178
Volition	-.143	.157	-.082	-.913	.363	2.582
Autonomy	.270	.182	0.142	1.482	<.001	2.967
Relatedness	.679	.061	0.643	11.147	<.001	1.071

Table 4. 36: Descriptive Statistics and Correlations between Basic Psychological Needs and Introjected Regulation

VARIABLES	1	2	3	4	5	6	7
Introjected	---	.031	.075	.087	.071	.124	.133*
competence	.031	---					
relatedness	.075	.219*	---				
AIPLOC	.087	.575**	.186	---			
volition	.071	.762**	.193	.523**	---		
Choice	.124					----	
Autonomy.C	.133*	.689**	.250*	.729**	.655**	--	836**

Note. $N = 148$. $p < .0$, $p < .01$

Table 4. 37: Model Summary and ANOVA for Predicting Introjected Regulation

Model	R	R ²	Adjusted R ²	SE Estimate	F	df1	df2	p	Durbin-Watson
1	.167	.028	-.006	1.247	.816	5	142	< .540	1.727

Table 4. 38: Standardized Beta Coefficients, t-values, and VIF Scores for Predicting Introjected Regulation

Predictor Variable	B	Std. Error	Standardized Coefficients	T-value	Sig.	VIF
Constant	3.727	1.137	---	3.277	.001	---
Competence	-.296	.276	-.150	-1.071	.286	2.858
AIPLOC	-.003	.231	-.002	-.014	.989	2.178
Volition	.103	.264	.052	.390	.697	2.582
Autonomy	.411	.307	.191	1.337	.183	2.967
Relatedness	.060	.103	.050	.587	.558	1.071

Table 4. 39: Descriptive Statistics and Correlations between Basic Psychological Needs and External Regulation

Variables	1	2	3	4	5	6	7
External. R	---	.198*	-.021	.038	.111	.282	.231*
competence	.198*	---					
relatedness	-.021	.219*	---				
AIPLOC	.038	.575**	.186	---			
volition	.111	.762**	.193	.523**	---		
Choice	.282*					----	
Autonomy. C	.231*	.689**	.250*	.729**	.655**	836**	---

Note. $N = 148$. $p < .05$, $p < .01$

Table 4. 40: Model Summary and ANOVA BNSSS Results for Predicting External Regulation

Model	R	R ²	AdjustedR ²	SE Estimate	F	df1	df2	p	Durbin- Watson
1	.336	.113	.082	.990	3.618	5	142	.004	1.441

Table 4. 41: Standardized Beta Coefficients, t-values, and VIF Scores for Predicting External Regulation

Predictor	B	Std. Error	Standardized Coefficients	T-value	Sig.	VIF
Constant	3.877	.903	---	4.292	<.001	---
Competence	.358	.219	.218	1.633	.105	2.858
AIPLOC	-.462	.184	-.293	-2.515	.013	2.178
Volition	-.266	.210	-.161	-1.268	.207	2.582
Autonomy	.755	.244	.421	3.094	.002	2.967
Relatedness	-.088	.082	-.088	-1.075	.284	1.071

Table 4. 42: Descriptive Statistics and Intercorrelations among Study Variables

Variables	1	2	3	4	5	6	7
1.Amotivation	---	.049	.083	.130	.096	.080	.127
2.competence	.049	---					
3.relatedness	.083	.219*	---				
4. AIPLOC	.130	.575**	.186	---			
5. volition	.096	.762**	.193	.523**	---		
6. Choice	.080	.380**	.192*	.337**	.234**	----	
7.Autonomy.C	.127	.689**	.250*	.729**	.655**	.836**	---

Table 4. 43: Model Summary and ANOVA Results

Model	R	R ²	Adjusted R ²	SE Estimate	F	df1	df2	p	Durbin- Watson
1	.172	.029	-.005	1.092	.862	5	142	.508	1.608

Table 4. 44: *Standardized Beta Coefficients, t-values, and VIF Scores*

Predictor	B	Std. Error	Standardized Coefficients	T-value	Sig.	VIF
Constant	3.744	.996	---	3.759	<.001	---
Competence	-.252	.242	-.145	-1.041	.300	2.858
AIPLOC	.155	.203	.093	.765	.446	2.178
Volition	.159	.232	.091	.688	.493	2.582
Choice	.031	.177	.024	.176	.861	2.858
Relatedness	.061	.090	.058	.678	.499	1.071
Autonomy. C	.161	.269	.085	.600	.550	2.967

Table 4. 45: *Summary of Regression Findings and Methodological Insights for Amotivation*

components	Findings	Implications
Coefficients	No significant predictors of amotivation	Suggests low predictive value of psychological needs
Model Fit	$R^2 = .029$, $F = .862$, $p = .508$	Indicates weak explanatory power
Assumption Checking	Met all assumptions except for multicollinearity between choice and Autonomy Composite	Supports validity of findings despite low predictive strength
Effect Sizes (f^2)	All effect sizes negligible or small	Reinforces limited real-world relevance of predictors
Sensitivity Analysis	Including choice did not alter conclusions	Justifies exclusion due to redundancy and lack of unique contribution

Table 4. 46: *Descriptive Statistics and Intercorrelations Among Study Variables*

Variables	1	2	3	4	5	6	7
1.Autonomus.M	---	.531**	.636**	.361**	.471**	.458**	.571**
2.competence	.531**	---					
3.relatedness	.636**	.219*	---				
4. AIPLOC	.361**	.575**	.186	---			
5. volition	.471**	.762**	.193	.523**	---		
6. Choice	.458**	.380**	.192*	.337**	.234**	----	
7.Autonomy.C	.571**	.689**	.250*	.729**	.655**	.836**	---

Note: $N = 148$. $< .05$, $p < .01$

Table 4. 47: Model Summary and ANOVA Results (Autonomous Motivation)

Model	R	R ²	Adjusted R ²	SE Estimate	F	df1	df2	p	Durbin-Watson
1	.789	.622	.609	.496	46.75	5	142	< .001	1.721

Table 4. 48: Standardized Beta Coefficients, t-values, and VIF Scores (Autonomous Motivation)

Predictor	B	Std. Error	Standardized Coefficients	T-value	Sig.	VIF
Constant	-.286	.452	---	-.633	.527	---
Competence	.269	.110	.214	2.452	.015	2.858
AIPLOC	-.192	.092	-.159	-2.083	.039	2.178
Volition	.050	.105	.039	.473	.637	2.582
Choice	.031	.177	.024	.176	.861	2.858
Relatedness	.394	.041	.515	9.643	< .001	1.071
Autonomy. C	.529	.122	.385	4.335	< .001	2.967

Table 4. 49: Descriptive Statistics and Intercorrelations of Predictors with Controlled Motivation

Variables	1	2	3	4	5	6	7
1.Controlled.M	---	.148*	.044	.091	.124	.271**	.246**
2.competence	.148*	---					
3.relatedness	.044	.219*	---				
4. AIPLOC	.091	.575**	.186	---			
5. volition	.124	.762**	.193	.523**	---		
6. Choice	.271**	.380**	.192*	.337**	.234**	----	
7.Autonomy.C	.246**	.689**	.250*	.729**	.655**	.836**	---

Note: N = 148. < .05, p < .01

Table 4. 50: Model Summary and ANOVA for Controlled Motivation

Model	R	R ²	Adjusted R ²	SE Estimate	F	df1	df2	p	Durbin-Watson
1	.281	.079	.047	.799	2.44	5	142	< .037	1.884

Table 4. 51: Standardized Beta Coefficients, t-values, and VIF for Controlled Motivation

Predictor	B	Std. Error	Standardized Coefficients	T-value	Sig.	VIF
Constant	3.802	.729	---	5.214	<.001	---
Competence	.031	.177	.024	.176	.861	2.858
AIPLOC	-.233	.148	-.186	-1.569	.119	2.178
Volition	-.082	.170	-.062	-.481	.631	2.582
Choice	.031	.177	.024	.176	.861	2.858
Relatedness	-.014	.066	-.017	-.208	.836	1.071
Autonomy. C	.583	.197	.411	2.960	.004	2.967

Note. The model explains 7.9% of the variance in controlled motivation ($R^2 = .079$), with an adjusted R^2 of .047, based on 148 observations. The F -test indicates the overall model is significant at $p < .05$ ($F(5, 142) = 2.444$, $p = .037$). The Durbin-Watson statistic suggests no severe autocorrelation concerns ($DW \approx 1.88$).

Table 4. 52: Summary of Findings – Predictors of Controlled Motivation

Component	Finding	Implication
Coefficients	Only Autonomy Composite significantly predicted controlled motivation ($\beta = .411$, $p = .004$)	Suggests autonomy-related beliefs are linked to externally regulated behavior in this context
Model Fit	$R^2 = .079$, $F(5, 142) = 2.444$, $p = .037$	Indicates limited explanatory power
Sensitivity Analysis	Including choice did not alter conclusions; Autonomy Composite provided better fit	Supports exclusion due to redundancy and lack of unique contribution
Effect Sizes (f^2)	Autonomy: Small-Medium ($f^2 = 0.085$); autonomy choice: Small-Medium ($f^2 = 0.082$)	Reinforces limited practical relevance of autonomy sub-components

Table 4. 53: Inter-correlations of Motivation Constructs and Perceived Performance

VARIABLES	1	2	3	4	5	6	7
performance	---	.391**	.401**	.386**	.063	.255**	.024
IN Motivation	.391**	---					
IG Regulation	.401**	.676*	---				
ID Regulation	.386**	.409**	.412**	---			
IJ Regulation	.063*	-.074	.017	.107	---		
EX Regulation	.255**	.310**	.202*	.090	.027	----	
Amotivation	.024	-.011	.030	.128	.726**	144*	---

Note. $N = 148$. * $p < .05$ (one-tailed), ** $p < .01$ (one-tailed). PPSQ = Perceived Performance Sport Questionnaire; IN = Intrinsic; IG = Integrated; ID = Identified; IJ = Introjected; EX = External.

Table 4. 54: Variables Entered and Removed

Model	Variables Entered	Variables Removed	Method
1	Amotivation, IN Motivation, EX Regulation, ID Regulation, IJ Regulation	-----	Ente

Note. Dependent variable: Perceived sport Performance.

Table 4. 55: Model Summary and ANOVA

Model	R	R ²	Adjusted R ²	SE Estimate	F	df1	df2	p	Durbin-Watson
1	.507	.26	.225	.565	20.71	6	141	< .001	1.132

Note. Predictors: (Constant), Amotivation, IN Motivation, EX Regulation, ID Regulation, IG Regulation, IJ Regulation. Dependent variable: Performance.

Table 4. 56: ANOVA Results for Regression Model Predicting Perceived Performance

Source	Sum of Squares	df	Mean Square	F-value	Sig. (p)
Regression	15.577	6	2.596	8.114	.000
Residual	45.115	141	0.320		
Total	60.693	147			

Table 4. 57: Regression Coefficients

Predictor Variable	B	Std. Error	Standardized Coefficients	T-value	Sig.	VIF
Constant	2.640	0.447	---	5.900	0.000	---
IN Motivation	0.093	.074	0.132	1.258	0.480	2.08
IG regulation	0.154	.085	0.184	1.821	0.071	1.93
ID Regulation	0.144	.048	0.245	2.983	0.003	1.28
IJ regulation	0.068	.055	0.132	1.237	.218	2.17
EX regulation	0.087	.048	0.140	1.801	.074	1.15
Amotivation	-0.075	0.063	-0.127	-1.184	.239	2.20

Note. Dependent variable: Perceived Sport Performance. All VIF values were below 2.20, indicating no multicollinearity concerns.

Table 4. 58: Collinearity Diagnostics

Dimension	Eigenvalue	Condition Index	Variance Proportions							
1	6.848	1.000	.00	.00	.00	.00	.00	.00	.00	.00
2	.070	9.921	.00	.02	.01	.03	.15	.02	.06	
3	.035	14.072	.00	.00	.00	.42	.01	.44	.00	
4	.019	18.746	.02	.12	.09	.54	.02	.38	.01	
5	.012	24.030	.00	.01	.00	.00	.77	.08	.89	
6	.010	25.935	.68	.38	.01	.00	.05	.04	.02	
7	.006	33.327	.30	.48	.89	.00	.01	.05	.02	

Note. Dependent variable: Perceived sports Performance.

Table 4. 59: Descriptive Statistics and Intercorrelations for BNSSS and PPSQ

variables	1	2	3	4	5	6	7
1.ppsq	---	.438**	.222*	.308**	.425**	.362**	.476**
2.competence	.438**	---					
3.relatedness	.222*	.219*	---				
4.aiploc	.308**	.575**	.186	---			
5.avolition	.425**	.762**	.193	.523**	---		
6.achoice	.362**	.380**	.192*	.337**	.234**	---	
7.autc	.476**	.689**	.250*	.729**	.655**	.836**	---

Note. $p < .05$ (one-tailed), $p < .01$ (one-tailed, PPSQ = Perceived Performance Sport Questionnaire, AIPLOC= autonomy internal perceived locus of casualty, AVolition = Autonomous Volition; AChoice = Autonomous Choice, AUTC= Autonomy composite,

Table 4. 60: Variables Entered/Removed (Regression)

Model	Variables Entered	Variables Removed	Method
1	Autonomy, Relatedness, autonomy volition, AIPLOC, Competence	Autonomy Choice	Enter

Note. Dependent variable: Performance. Tolerance = .000 limit reached.

Table 4. 61: Model Summary — Regression Predicting PPSQ

Model	R	R ²	AdjustedR ²	SE Estimate	F	df1	df2	P	Durbin-Watson
1	.521	.271	.246	.55804	10.58	5	142	< .001	.831

Note. Predictors: (Constant), Autonomy, Relatedness, AVolition, AIPLOC, Competence. Dependent variable: perceived Performance.

Table 4. 62: ANOVA — Regression Predicting PPSQ

Model	Source	Sum of squares	Mean square	F	Sig.
1	Regression	16.473	3.295	10.580	.000
	Residual	44.220	.311		
	Total	60.693	29.592		

Note. Dependent variable: Performance. Predictors: (Constant), Autonomy, Relatedness, Volition, AIPLOC, Competence.

Table 4. 63: Excluded Variables

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions
1	1	5.951	1.000	.00
	2	.030	14.025	.00
	3	.007	29.592	.76
	4	.007	29.901	.22
	5	.003	46.664	.02
	6	.003	47.418	.00

Note. Dependent variable: Performance. Predictors in the model: (Constant), Autonomy, Relatedness, autonomy volition, AIPLOC, Competene, .B in=unstandardized regression coefficient (B)

Table 4. 64: Collinearity Diagnostics and Residuals Statistic

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions
1	1	5.951	1.000	.00
	2	.030	14.025	.00
	3	.007	29.592	.76
	4	.007	29.901	.22
	5	.003	46.664	.02
	6	.003	47.418	.00

Note. Dependent variable: Perceived Performance Sport Questionnaire (PPSQ)

Table 4. 65: Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted value	4.46	5.98	5.21	.335	148
Residual	-1.65	1.18	.000	.5484	148
Std. Predicted Value	-2.254	2.287	.000	1.000	148
St. Residual	-2.958	2.121	.000	.983	148

Table 4. 66: presents means and standard deviations for motivational constructs and perceived performance by gender.

Construct	Male (n = 85)		Female (n =63)	
	M	(SD)	M	(SD)
Intrinsic Motivation	4.12	(0.69)	4.15	(0.63)
Integrated Regulation	3.98	(0.75)	4.01	(0.68)
Identified Regulation	4.05	(0.71)	3.86	(0.79)
Introjected Regulation	3.76	(0.82)	3.72	(0.76)
External Regulation	2.94	(0.91)	2.98	(0.87)
Amotivation	1.89	(0.65)	1.92	(0.61)
Autonomous composite Motivation	4.08	(0.70)	4.03	(0.66)
Controlled composite Motivation	3.12	(0.80)	3.08	(0.74)
Perceived Performance	7.42	(1.23)	7.29	(1.15)

Note . Means (M) and standard deviations (SD) are presented for each motivational construct and performance by gender. Group sizes: n = 85 males, n = 63 females.

Table 4. 67: Levene's Test of Homogeneity of Variances

Construct	Levene Statistic	df ₁	df ₂	p	Homogeneity Violated
Intrinsic Motivation	4.292	1	146	0.04	Yes
Integrated Regulation	4.4	1	146	0.038	Yes
Identified Regulation	0.297	1	146	0.587	No
Introjected Regulation	7.206	1	146	0.008	Yes
External Regulation	0	1	146	0.999	No
Amotivation	5.149	1	146	0.025	Yes
Autonomous Motivation	0.183	1	146	0.669	No
Controlled Motivation	5.321	1	146	0.022	Yes
Performance	1.518	1	146	0.22	No

Note. Violations of homogeneity were found for intrinsic motivation, integrated regulation, introjected regulation, amotivation, and controlled motivation. Given balanced sample sizes, analyses were considered robust (Field, 2023; Pallant, 2020).

Table 4.67: descriptive statistics by Gender

Variables	Gender	Mean	Std. Deviation	Std. Error Mean
Competence	Male	5.78	0.63	.068
	Female	5.62	0.63	.079
Autonomy IPLOC	Male	5.84	0.64	.070

	Female	5.66	0.67	.084
Autonomy Volition	Male	5.82	0.65	.070
	Female	5.75	0.60	.075
Autonomy Choice	Male	5.74	0.64	.069
	Female	4.90	1.05	.132
Relatedness	Male	5.13	1.16	.126
	Female	5.35	0.82	.104
Autonomy composite	Male	5.79	0.51	.055
	Female	5.38	0.59	.074
Perceived Performance	Male	5.30	0.68	.074
	Female	5.09	0.56	.071