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Doctoral Dissertation

A CROSS-CULTURAL STUDY ON ACHIEVEMENT MOTIVATION IN
SPORTS, COMPETITIVE TRAIT ANXIETY, AND PHYSICAL SELF-
CONCEPT OF TRADITIONAL AND VIRTUAL FOOTBALL PLAYERS

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Abstract

This doctoral dissertation examined achievement goals, competitive trait anxiety, and physical self-concept among traditional football and competitive eFootball players in Poland and India. The study employed a cross-cultural, cross-contextual 2×2 design to investigate differences associated with country and competitive context, their joint interaction, relationships among the psychological constructs, and the role of contextual factors and professional aspirations. The final sample comprised 800 male competitive players aged 18-35 years, with 200 participants in each country-by-context group. Achievement goals were assessed using the 3×2 Achievement Goal Questionnaire for Sport (3×2 AGQ-S), competitive trait anxiety using the Sport Anxiety Scale-2 (SAS-2), and physical self-concept using the short form of the Physical Self-Description Questionnaire (PSDQ-S).

Measurement analyses supported scalar invariance of all three instruments across country, competitive context, and the four country-by-context groups, providing a basis for substantive group comparisons. Significant multivariate effects of both country and competitive context were found for achievement goals, competitive anxiety, and physical self-concept, whereas country-by-context interactions in psychological mean levels were not statistically significant. Indian participants reported stronger other-referenced achievement goals than Polish participants. They also reported greater concentration disruption and somatic anxiety, although the predicted country difference in worry was not observed. Contrary to expectations, Indian participants generally reported more favourable physical self-concepts. Across countries, football players reported higher physical self-concept, particularly in activity, sport competence, and endurance, stronger achievement-goal endorsement, and lower competitive anxiety than eFootball players.

Relationships among the psychological constructs were generally weak and varied across groups. The predicted associations between approach and avoidance goals and competitive anxiety, and between approach goals and physical self-concept, were not consistently supported. Competitive anxiety was largely unrelated to physical self-concept, and no evidence was found for the hypothesised indirect effects of achievement goals through competitive anxiety.

Contextual variables showed limited associations after correction for multiple testing. Professional aspiration produced the clearest contextual finding: football players were substantially more likely than eFootball players to report an intention to pursue their activity professionally, with this difference varying between Poland and India.

Taken together, the findings demonstrate that country and competitive context are meaningfully associated with psychological characteristics and professional aspirations among competitive football and eFootball players, while showing that differences in mean levels do not necessarily correspond to differences in the relationships among psychological constructs. By integrating cross-cultural and cross-contextual comparisons within a single balanced design and establishing measurement comparability before substantive comparisons, this dissertation provides a rigorous framework for examining the psychology of traditional and virtual sport. Importantly, it extends established sport-psychological constructs into competitive eFootball and provides an empirical foundation for future research on how culture, competitive environment, and emerging forms of sport jointly shape athletes' psychological experiences and professional aspirations.

Keywords: achievement goals; competitive anxiety; physical self-concept; esports; cross-cultural comparison; measurement invariance; association football; eFootball

Streszczenie

Niniejsza rozprawa doktorska dotyczyła celów osiągnięć, cechy lęku sportowego oraz fizycznego obrazu siebie wśród zawodników tradycyjnej piłki nożnej i rywalizujących zawodników eFootball w Indiach i Polsce. W badaniu zastosowano międzykulturowy i międzykontekstowy schemat 2×2 w celu analizy różnic związanych z krajem i kontekstem rywalizacji, ich łącznego oddziaływania, zależności pomiędzy badanymi konstruktami psychologicznymi oraz znaczenia czynników kontekstowych i aspiracji zawodowych. Próba końcowa obejmowała 800 mężczyzn w wieku 18–35 lat uczestniczących w zorganizowanej rywalizacji, po 200 osób w każdej z czterech grup wyodrębnionych ze względu na kraj i kontekst rywalizacji. Cele osiągnięć mierzono za pomocą 3×2 Achievement Goal Questionnaire for Sport (3×2 AGQ-S), cechę lęku sportowego za pomocą Sport Anxiety Scale-2 (SAS-2), natomiast fizyczny obraz siebie za pomocą skróconej wersji Physical Self-Description Questionnaire (PSDQ-S).

Analizy właściwości pomiarowych potwierdziły inwariancję skalarną wszystkich trzech narzędzi względem kraju, kontekstu rywalizacji oraz w modelu obejmującym cztery grupy, co umożliwiło interpretację porównań międzygrupowych. Stwierdzono istotne wielowymiarowe efekty kraju i kontekstu rywalizacji dla celów osiągnięć, lęku sportowego oraz fizycznego obrazu siebie, natomiast interakcje kraj $\times$ kontekst dotyczące średnich poziomów zmiennych psychologicznych nie osiągnęły istotności statystycznej. Uczestnicy z Indii wykazywali silniejsze cele osiągnięć odnoszące się do innych osób niż uczestnicy z Polski. Wykazywali również większe zaburzenia koncentracji oraz wyższy poziom lęku somatycznego, jednak nie stwierdzono przewidywanej różnicy między krajami w zakresie zamartwiania się. Wbrew przewidywaniom uczestnicy z Indii generalnie charakteryzowali się bardziej pozytywnym fizycznym obrazem siebie. Niezależnie od kraju piłkarze uzyskiwali wyższe wyniki w zakresie fizycznego obrazu siebie, szczególnie aktywności, kompetencji sportowych i wytrzymałości, silniej deklarowali cele osiągnięć oraz wykazywali niższy poziom lęku sportowego niż zawodnicy eFootball.

Zależności pomiędzy konstruktami psychologicznymi były na ogół słabe i różniły się między grupami. Przewidywane związki celów dążenia i unikania z lękiem sportowym oraz celów dążenia z fizycznym obrazem siebie nie uzyskały spójnego potwierdzenia. Lęk sportowy

pozostawał w dużej mierze niezwiązany z fizycznym obrazem siebie i nie stwierdzono zakładanych efektów pośrednich celów osiągnąć poprzez lęk sportowy.

Po uwzględnieniu korekty na wielokrotne testowanie stwierdzono jedynie ograniczone związki zmiennych kontekstowych z badanymi konstruktami. Najwyraźniejszy wynik dotyczył aspiracji zawodowych: piłkarze znacznie częściej niż zawodnicy eFootball deklarowali zamiar profesjonalnego kontynuowania swojej aktywności, a wielkość tej różnicy była odmienna w Indiach i Polsce.

Łącznie wyniki wskazują, że kraj i kontekst rywalizacji są istotnie związane z charakterystykami psychologicznymi oraz aspiracjami zawodowymi zawodników piłki nożnej i eFootball, jednocześnie pokazując, że różnice w średnich poziomach zmiennych nie muszą odpowiadać różnicom w zależnościach pomiędzy konstruktami psychologicznymi. Poprzez połączenie porównań międzykulturowych i międzykontekstowych w jednym zrównoważonym schemacie badawczym oraz wcześniejsze ustalenie porównywalności pomiaru niniejsza rozprawa dostarcza rygorystycznych podstaw do badania psychologii sportu tradycyjnego i wirtualnego. Co istotne, rozszerza zastosowanie uznanych konstruktów psychologii sportu na rywalizację w eFootball oraz tworzy empiryczną podstawę dla dalszych badań nad tym, w jaki sposób kultura, środowisko rywalizacji i rozwijające się formy sportu wspólnie kształtują doświadczenia psychologiczne zawodników oraz ich aspiracje zawodowe.

Słowa kluczowe: cele osiągnąć; lęk sportowy; fizyczny obraz siebie; esport; eFootball; piłka nożna; porównanie międzykulturowe; inwariancja pomiaru

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Preface

This thesis is an original work by Kanupriya Rawat. This series of research received ethical approval from the Ethics Committee of Kazimierz Wielki University (Opinion no. 4/17.10.2022; date of approval: 29 November 2022).

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Chapter 1: Introduction

1.1. Issue and its background

This thesis compares achievement motivation, competitive trait anxiety, and physical self-concept between football players and virtual football players. The starting point for the comparison is the emergence of esports, and of virtual football in particular, as a new and contested branch of competitive play, with ongoing debate over whether it constitutes a sport in its own right. The COVID-19 pandemic accelerated this development. With traditional competition suspended and training disrupted, particularly in team sports such as football, participation and viewership in competitive gaming rose sharply. The effect was pronounced in India, where weekly time spent on mobile games rose from 151 to 218 minutes per user during lockdown, and where the number of registered esports players is reported to have doubled over the same period (IBEF, 2020). The pandemic thus functioned as a catalyst for an industry that had until then occupied a relatively marginal position in the Indian sporting landscape. This shift raises a number of questions regarding the extent to which the digitalization of sport offers an equivalent experience versus a fundamentally different one; hence the need to explore this issue further.

The present study asks what similarities and differences exist in achievement motivation, physical self-concept, and competitive trait anxiety between traditional football players and competitive virtual players of EA SPORTS FC (hereafter EAFC) and eFootball, and what factors influence these constructs in each context. Establishing this is of practical as well as theoretical interest as digitalisation in sport continues to expand. In this thesis, *virtual football* refers to competitive play of football simulation games, and *eFootball* is used as a short label for the group of competitive virtual football players studied, who played either EA SPORTS FC or Konami's eFootball. Where the Konami title specifically is meant, it is referred to as "Konami's eFootball".

Football was selected for the comparison because it is one of the few disciplines with a well-established competitive presence in both traditional and virtual forms, and because it is played at competitive level in both countries examined here (i.e. Poland and India). Comparing traditional and virtual players within the same sport, rather than across different sports, removes an obvious confound and allows the traditional-versus-virtual contrast to be interpreted more clearly.

The comparison is situated in two culturally distinct settings. Poland and India differ on Hofstede's cultural dimensions, most markedly in individualism and uncertainty avoidance

(Hofstede Insights, n.d.), and it is an open question whether cultural difference shapes how these three constructs relate to traditional and virtual participation, or whether those relationships hold irrespective of culture. The cross-cultural layer also has applied value: as players increasingly move between countries or are recruited into clubs abroad, adaptation becomes a practical concern for players, coaches, and support staff, and a cross-cultural account of these variables offers a basis for addressing it.

1.2. Objectives of the research

The principal aim is to examine differences in achievement motivation, physical self-concept, and competitive trait anxiety between traditional football players and eFootball players. Although both forms of competition centre on football, they involve different modes of participation: playing the sport physically and competing through a digital game.

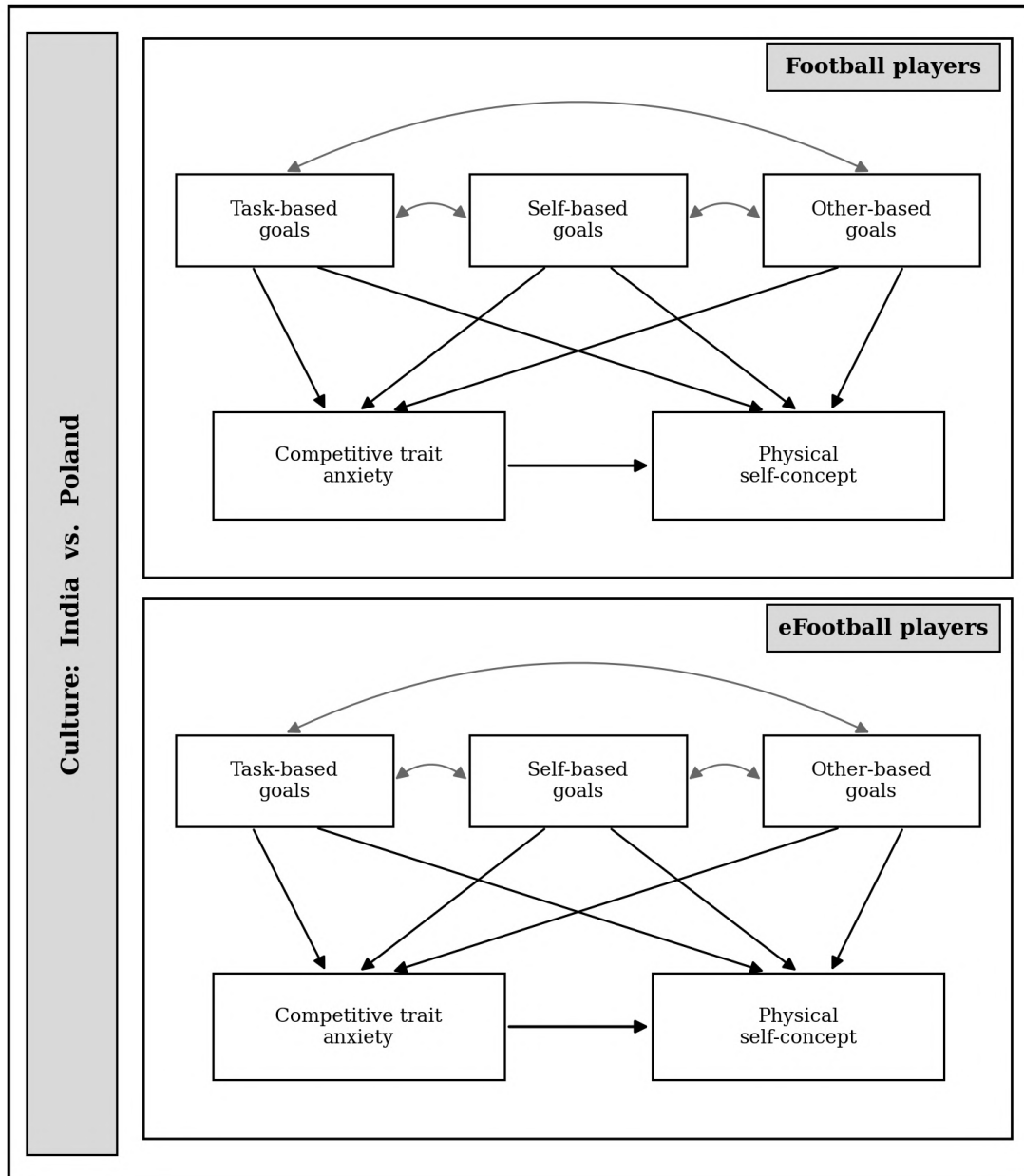
The second aim is to examine whether the similarities and differences in achievement motivation, physical self-concept, and competitive trait anxiety between football and eFootball players are consistent across the two countries studied. Specifically, the study investigates whether differences between the player groups vary in magnitude or direction between the two countries.

The study first examines whether achievement motivation, physical self-concept, and competitive trait anxiety describe the experience of eFootball players in the same terms as they describe that of traditional players. This question has immediate relevance, since football players compete within established teams while virtual football players compete individually or in temporarily assembled ones.

It then examines the structural relationships among the three constructs, and whether those relationships differ between the two cultural settings. A further contribution lies in the cultural adaptation of the three instruments for the Polish and Indian contexts, which extends the evidence for their validity across cultures and bears on the question of how far these constructs are comparably measured in different settings.

A **hypothesized research model** is prepared to show the structural relationship among variables (see Fig. 1):

Figure 1. *Hypothesized model of comparison of structural relationship between achievement motivation in sports, physical self-concept and competitive trait anxiety in cross-contextual (traditional vs virtual football players) and cross-cultural (Poland vs India) perspective.*



1.3. Significance

The principal contribution of this research lies in its treatment of virtual sport as a competitive domain in its own right. The study examines a virtual game that is a direct adaptation of an established sport, which is among the reasons football was selected: it permits the traditional and virtual forms to be compared without the confound of differing activities. The comparison covers achievement motivation, examining what sustains motivation among competitive eFootball players and which factors strengthen it; physical self-concept, examining how self-perception differs between the two groups; and competitive trait anxiety, examining which group reports higher anxiety and what conditions are associated with it.

A second contribution lies in the instruments used. Similarities and differences are assessed using recent questionnaires adapted for the Polish and Indian contexts, addressing a gap in both settings. Much existing research in these countries relies on older instruments, and in the Indian case several of the measures used here had not previously been adapted for the population at all, despite being validated in English and other languages. Adapting these instruments and testing whether they function equivalently across the two settings is therefore a contribution independent of the substantive findings.

A third contribution concerns the integration of the cross-cultural and cross-contextual comparisons within a single design rather than as two separate studies. The rationale is that culture may not simply produce a fixed difference between football and eFootball players but may moderate the size of that difference. Existing comparisons between esports players and athletes on personality, self-confidence, and physical self-image have been conducted within single, culturally homogeneous samples for example in Bosnia and Herzegovina (Ivanišević & Šunje, 2022) and South Korea (Kang et al., 2020) with a recent review concluding that athletes typically report greater self-confidence and a more positive physical and emotional self-image than esports players (Zubić, 2026). None of these studies has tested whether this gap is consistent across cultures.

There is reason to expect that it is not. Culture shapes the motives for which people play. A distinct dichotomy emerges between collectivist cultures, where play is driven by the desire for interpersonal connection, and individualist cultures, where the primary focus centers on competitive success and individual goals (Chew et al., 2024). Culture also alters how strongly gaming relates to psychological outcomes rather than merely shifting their average level. The association between gaming motivation and gaming disorder is stronger in individualist than collectivist countries (Wang & Cheng, 2022), and the association between gaming and creativity weakens as individualism increases (Ding et al., 2025). Taken together, these findings indicate that culture may change how the two groups relate to one another, not simply where each group sits.

The present study accordingly treats the traditional-versus-virtual difference as something to be tested separately in an individualist and a collectivist context rather than assumed to hold uniformly. It thereby addresses a single coherent question whether the psychological difference between traditional football players and competitive eFootball players in achievement motivation, physical self-concept, and competitive trait anxiety is consistent

across Polish and Indian samples. Instead of pursuing two parallel comparisons, it examines whether this difference is itself conditioned by cultural context.

1.4. Organising framework of the study

To integrate the elements of this design, the study adopts Bronfenbrenner's bioecological model as its organising framework (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). The model holds that the psychological characteristics of a person can be understood only within the nested systems of context in which they develop and are expressed: the immediate settings in which a person acts (microsystem), the institutional structures that shape their opportunities without their direct participation (exosystem), the cultural value system surrounding these (macrosystem), and the historical changes that reshape the whole ecology over time (chronosystem). The model has also begun to be used in research on digital gaming: a funded project at Hong Kong Shue Yan University adopted Bronfenbrenner's bioecological model as the framework for studying problematic gaming among adolescents in the era of esports, examining individual factors alongside family, school, industry, policy and cultural influences (Fu, 2020–2021). To our knowledge, however, the framework has not yet been used to organise a comparison of competitive players across sporting contexts and cultures, which the present study undertakes.

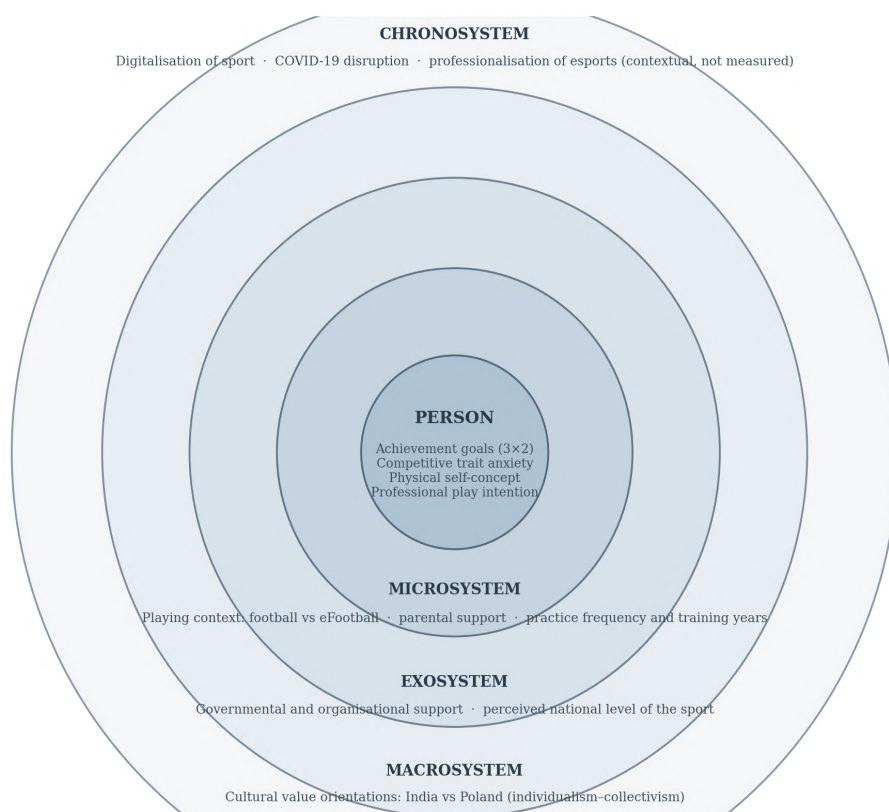
Each element of the present design occupies a level of this model (Figure 2). At the person level sit the psychological constructs: achievement goals, representing the motivational domain; physical self-concept, representing the self-perceptual domain; competitive trait anxiety, representing the emotional domain; and professional play intention, representing the aspirational outcome to which the other three may contribute. Together the first three cover the dispositional domains identified in previous research as favourable personal resources for a sporting career (Asghar et al., 2013), and each is grounded in its own construct-level theory: the 3 × 2 achievement goal model, the multidimensional hierarchical model of self-concept, and multidimensional anxiety theory.

At the microsystem level lies the central comparison of this thesis. Club-based, physically co-present football and predominantly individual or temporarily assembled virtual football constitute two different immediate settings that make different demands on the player. Parental support and the intensity of engagement in that setting, practice frequency and years of training, also operate at this level. At the exosystem level sit the contextual variables examined here: governmental and organisational support, and the perceived standing of the

sport within one's country, which together constitute the structures through which playing may become a profession. The macrosystem level is occupied by the cultural value orientations that differentiate Poland and India, used in this thesis as an interpretive framework. Finally, the digitalisation of sport and the disruption of the COVID-19 pandemic, which motivated the study of virtual football in the first place, constitute the chronosystem: a historical shift in the ecology of football itself.

Two clarifications bound the use of this framework. First, the bioecological model serves as an organising framework rather than a tested theory. The hypotheses of this thesis derive from the construct-level theories named above; the bioecological model explains why the comparisons are structured as they are, namely the same person-level constructs examined across two microsystems embedded in two macrosystems, with exosystem factors examined as correlates of professionalisation. Second, the process component of the full process-person-context-time model, the repeated proximal interactions between person and environment is not directly measured in this cross-sectional design. The model is therefore applied in its person-context form.

Figure 2. *The variables of the present study mapped onto Bronfenbrenner's bioecological model (person-context form; adapted from Bronfenbrenner & Morris, 2006).*



Chapter 2: Literature review

2.1. Football

Football (association football) is a team sport played and followed worldwide, in which the ball is moved primarily with the feet and handling is strictly limited. From a psychological standpoint, its defining features are those of an open-skill sport: play unfolds in a dynamically changing environment, demands continuous perception of teammates, opponents, and space, and draws simultaneously on physical conditioning, technical skill, and tactical decision-making (Araújo et al., 2006; Vestberg et al., 2012). It is also a strongly role-differentiated sport, in which success depends on coordinated interdependence between distinct positions rather than on individual performance alone.

Each team comprises a goalkeeper, whose task is to prevent goals; defenders, who stop opposing attacks; midfielders, who link defence to attack and control the tempo of play; and forwards, whose primary role is goal-scoring, with some versatile players able to occupy several of these roles. Tactical formations (such as 4-4-2 or 4-3-3) determine how these lines are arranged on the field, so that each player's demands depend on both position and the team's tactical plan.

2.1.1. History and state of football in Poland and India

Polish football. Organised football in Poland predates independence: clubs were already active in the partitioned territories, particularly in Kraków and Lwów, before 1918. Once Poland regained independence, representatives of 31 clubs met in Warsaw on 20-21 December 1919 and founded the Polski Związek Piłki Nożnej (PZPN, Polish Football Association), with its first seat in Kraków (PZPN, n.d.). The first national championship was held in 1921, with Cracovia crowned as the inaugural champions.

The national team's development was significantly disrupted by the devastation of the Second World War, and it was not until the late 1950s that a new generation of talented players, such as Ernest Pohl, Gerard Cieślik, and Lucjan Brychczy, began to emerge. A major turning point came in 1970 with the appointment of coach Kazimierz Górski, under whom Poland evolved into a competitive force on the international stage.

The Polish league system is hierarchical. The Ekstraklasa is the highest professional tier, followed by the I liga (second tier) and II liga (third tier). From the III liga (fourth tier) downward, competition is organised regionally: the III liga is divided into regional groups, and the IV liga and lower amateur divisions are run by the 16 voivodeship football associations.

Promotion and relegation connect all levels, so successful clubs from lower divisions can advance toward professional football. At national-team level, Poland was ranked 36th in the July 2026 FIFA ranking (FIFA, 2026).

Development below the elite level has also been supported by public funding. Under the Football Infrastructure Development Programme, launched by the Ministry of Sport and Tourism in 2022, the first edition allocated over PLN 114 million to 29 clubs in the top two divisions for youth academy facilities, including training pitches, halls, and coaching centres (Chancellery of the Prime Minister, 2023). Together with PZPN's own development programmes, these investments reflect a system in which the state and the national association actively support the pathway from youth to professional football.

Beyond its league structure, football in Poland therefore functions as an established professional pathway. Clubs across the tiers maintain youth academies, and the regionalised lower divisions provide a continuous route from amateur to professional play, so that a talented player can realistically progress within the domestic system. At the same time, the great majority of registered players compete at amateur and semi-professional levels, combining football with education or other employment. The Polish football sample of the present study spans this pathway and comprises elite, semi-elite, and non-elite players.

Indian football. Football in India has a long and diverse history, with deep cultural roots in several regions of the country ("Regionalism and Club Domination," 2005). The game was introduced during the British colonial period. Calcutta Football Club, founded in 1872, is often cited as the country's first club, although it initially played rugby. The Indian Football Association (IFA), India's first football governing body, was established in Calcutta in 1893 and had no Indian members until the 1920s (All India Football Federation [AIFF], n.d.). Two other historic clubs, Mohun Bagan (1889) and Mohammedan Sporting (1891), remain among the most prominent in India.

During the colonial era, Indian clubs regularly competed against British regimental teams in the Calcutta League and in major tournaments such as the IFA Shield (Calcutta, 1893), the Rovers Cup (Bombay, 1891), and the Durand Cup (Simla, 1888). Mohun Bagan's 1911 IFA Shield victory made it the first Indian team to win a trophy previously won only by British sides. The Durand Cup, India's first football competition, is regarded as the third-oldest surviving football competition in the world (AIFF, n.d.).

Despite this strong legacy, particularly in West Bengal, Goa, Kerala, and the North-East, the growth of Indian football was long hindered by inadequate infrastructure, administrative difficulties, and competition from other sports, and India fell behind many other footballing nations in international competitiveness (Shaikh et al., 2024). Football is nevertheless the country's second most popular sport after cricket: according to a recent Nielsen survey, half of Indian adults name it as their favourite sport after cricket (BestMediaInfo Bureau, 2026).

In recent years, undergone a revival. The Indian Super League (ISL), whose first season was played in 2014 alongside the existing I-League, introduced new levels of professionalism, private investment, and international collaboration. Major European football organisations, including Atlético de Madrid (with ATK), City Football Group (with Mumbai City FC), and Borussia Dortmund (with Hyderabad FC), have formed partnerships with Indian clubs, with a focus on coaching expertise and youth development (Foley, 2020). India has also hosted major international tournaments, including the FIFA U-17 World Cup in 2017, its first FIFA tournament (AIFF, n.d). On the international stage, the men's national team rose from 173rd in the FIFA ranking in 2015 into the top 100 in subsequent years, but it had fallen to 138th by the July 2026 ranking (FIFA, 2026). With a population of over 1.4 billion, growing corporate support, and improving infrastructure, Indian football retains considerable potential, even if World Cup qualification remains a long-term aspiration.

The institutional and historical context of Indian football is relevant to the interpretation of this study. Despite the professionalisation brought by the ISL, football in India remains a less established career pathway than in many European countries: the financial base of professional clubs remains fragile (Mondal et al., 2022), and sport is often relegated to secondary status behind education and conventional employment (Kaur, 2021; Kumar, 2024). In this context, players compete in an environment where parental support, governmental assistance, and the perceived standing of the sport may weigh heavily on whether a playing career appears viable, particularly below the professional tier. These are precisely the factors that the contextual variables of this study capture. As with the Polish sample, the Indian football sample comprises elite, semi-elite, and non-elite players.

Taken together, football in Poland and India is popular, organised, and played at international level, but the two countries differ in the maturity of their professional pathways and in the institutional support available below the elite level. This contrast between a long-established

professional pyramid and a system undergoing rapid professionalisation forms the exosystem backdrop against which the psychological comparisons of this study are made.

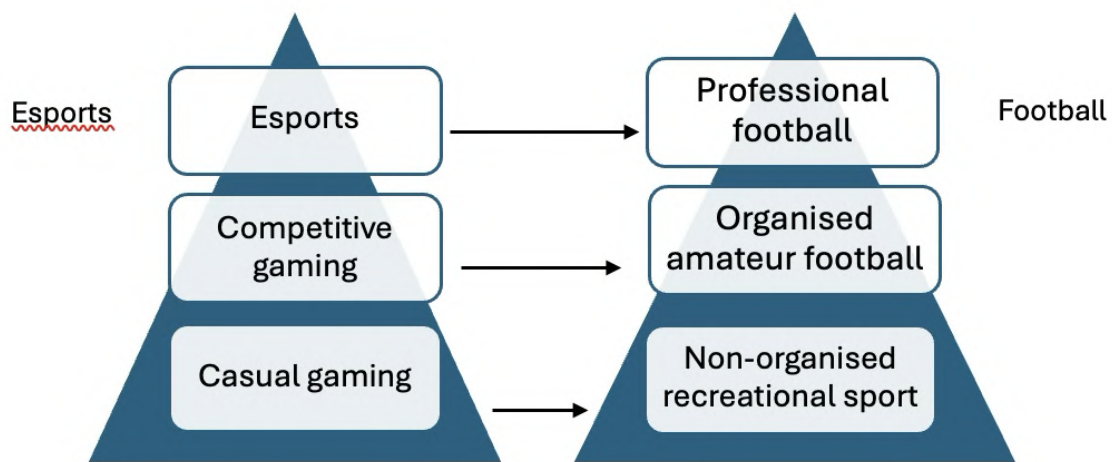
2.2. Competitive gaming (EAFC/eFootball)

Over the past decade, esports, commonly defined as the organised competitive playing of video games, has grown into a multi-billion-dollar industry sustained by an ecosystem of international tournaments, domestic leagues, game publishers, and third-party organisers (Rana & Bhandari, 2026). Newzoo projected that the global esports audience would exceed 640 million viewers by 2025, including 318 million regular viewers (Indiantelevision.com, 2022). This scale has prompted wider debate about the role of competitive gaming in society and its relationship with traditional sport.

At the centre of this debate is whether esports should be considered a "full-fledged sport" (Pezdek et al., 2023; Kwon, 2026). Proponents point out that it shares core features of traditional sport: interpersonal competition, systematic skill development, and the pursuit of performance goals (Jenny et al., 2017). Professional esports organisations increasingly invest in performance facilities and employ support staff, including sport psychologists, which mirrors the structure of high-performance sporting environments (Pedraza-Ramirez et al., 2020). However, this status remains contested, and public perceptions often conflate casual, and at times problematic, gaming with the highly disciplined world of professional esports (Chung et al., 2019).

The European Club Association distinguishes three tiers of gaming and maps each onto an equivalent level of football (Figure 3). Casual gaming, the recreational play of video games without organised competition, corresponds to unorganised recreational football. Competitive gaming, in which ambitious amateurs compete in organised tournaments while recreational motives still predominate, corresponds to organised amateur football. Esports, the professional competition among the best players, corresponds to professional football.

Figure 3. European club association



The present study focuses on football simulation games, specifically EA Sports FC (EAFC; known as FIFA until 2023) and Konami's eFootball. As in esports generally, competitive play in these titles is shaped by the publishers who own the games and control their official competitions (Novák et al., 2025), alongside numerous independent tournaments. Many professional football clubs have established esports divisions for these titles; in Poland, for example, Ekstraklasa clubs compete in the league's own EA Sports FC competition, Ekstraklasa Games (Liquipedia, 2023). Virtual and traditional football therefore share a common institutional setting. The gaming sample of the present study, like the football samples, comprises elite, semi-elite, and non-elite players. In terms of the pyramid, elite players compete at the esports level, while semi-elite and non-elite players belong to the competitive gaming tier, which parallels the professional and organised amateur levels of football.

Progress in competitive gaming, as in traditional sport, depends on structured, deliberate practice, and goal-setting has been identified as a foundational psychological skill in high-performance esports environments. Players and coaches describe a hierarchical approach that distinguishes a "macro picture" (long-term objectives such as winning a championship or improving team synergy) from "micro goals" (specific daily or weekly targets for improving a particular skill or addressing a weakness), with coaches playing a central role in facilitating the process (Poulus et al., 2025). This structure makes improvement more manageable and helps players avoid being overwhelmed by competing priorities.

Although esports are largely sedentary, physical health is also regarded as important for sustaining performance. Elite players, coaches, and support staff emphasise physical training and healthy lifestyle behaviours, viewing physical activity as a protection against mental fatigue, stress, and burnout, which are common challenges in the industry (Poulus et al., 2025). This emphasis suggests that physical self-concept may be relevant to competitive gamers as well as to traditional athletes.

To integrate these elements, Poulus et al. (2025) proposed the Esports High-Performance Model (EHPM), which organises the determinants of success into three concentric layers, each comprising a performance-oriented and a support-oriented component. The outer layer, Training Environment, encompasses performance activities (game play and game analysis) as well as support and resourcing (physical training, psychological services, and training and housing facilities). The middle layer, Interpersonal Dynamics, encompasses team cohesion (communication and conflict resolution) as well as social connections (friendships and togetherness). The inner layer, Intrapersonal Development, encompasses performance optimisation (psychological skills and characteristics) as well as mental health protection (negative mental health experiences and protective behaviours). The model therefore suggests that sustained excellence in esports depends not only on in-game skill but on the integration of environmental, interpersonal, and intrapersonal factors, with performance and wellbeing treated as interdependent. Because the EHPM was derived from professional team-based esports, its interpersonal layer may apply less directly to football simulation games, which are predominantly played one against one.

2.2.1. History and state of competitive gaming (EA SPORTS FC / eFootball) in Poland and India

First released in 1993 as FIFA International Soccer, EA's football franchise became the best-selling sports video game series in history, with lifetime sales surpassing 325 million units by early 2021 (Electronic Arts, 2021), before the FIFA licence expired and the series was rebranded as EA SPORTS FC in 2023. Its principal competitor is Konami's franchise, published as Pro Evolution Soccer until 2021 and as eFootball thereafter. The two are not directly comparable on sales, since eFootball adopted a free-to-play model on release: Konami reports a combined lifetime total of sales and downloads across the franchise, from its origins as Winning Eleven in 1995 onwards, exceeding one billion as of 2026 (Konami Digital Entertainment, 2026a), a figure that is not equivalent to units sold.

The relationship between football video games and football itself runs in both directions and has attracted sustained scholarly attention. Markovits and Green (2017) argue that the FIFA series functioned as a major vehicle for the popularisation of soccer in the United States, with a substantial proportion of American fans encountering the sport first through the game and only subsequently through live competition. Hinck (2018) documents how the game operates alongside other digital media in reshaping patterns of fandom, and Crawford and colleagues (2022) found that football-themed digital content, including the FIFA series, allowed fans to sustain their engagement with the sport during the suspension of live competition in the COVID-19 pandemic. On this evidence the game is better understood as a route into the sport, and a means of maintaining attachment to it, than as a substitute for it.

Tentative evidence at the level of the individual player comes from Keane (2020), who summarised findings from his unpublished master's research in a professional online post. Around half of respondents reported that their view of a given footballer was coloured by that player's performance in the game, and roughly a quarter had followed the social media account of a player they relied on in their virtual squad. Far fewer, under one in twenty, had purchased merchandise associated with such a player. Although these findings have not been peer reviewed and should be treated with caution, the pattern is consistent with the published literature in suggesting that virtual engagement carries over into interest in the real sport, while indicating that the effect weakens as the commitment required increases.

Esports, and EA SPORTS FC in particular, offers football clubs a range of opportunities. Its similarity to traditional football, its growth in user and fan numbers, and the economic profile of its audience make it attractive to clubs seeking to reach new target groups, generate additional revenue, or extend their own brands, and many clubs have accordingly integrated an esports team into their activities (European Club Association, 2021). Competitive virtual football is organised through separate publisher-led pathways rather than a single unified pyramid, and the structure of these pathways is revised by the publishers between seasons; the account given here describes the 2024-25 competitive season. At the entry level, eligible EA SPORTS FC players can access the FC Pro Open Ladder after reaching the required division in Ultimate Team Rivals, with the leading players on each regional ladder progressing to regional qualifiers and subsequently to the FC Pro Open Global Qualifier (EA SPORTS, 2025a). Konami operates a parallel pathway through the eFootball Championship Open, which is available to all users, and through Club Events that select representatives of official partner

clubs, with the leading competitors advancing towards the eFootball Championship World Finals (Konami Digital Entertainment, 2026b). National club-linked competitions constitute a further level of the EA SPORTS FC pathway. In Poland, PKO Bank Polski Ekstraklasa Games is organised as the country's official EA SPORTS FC championship, with professional football clubs selecting players to represent them (Ekstraklasa Games, 2023). Ekstraklasa Games is one of twelve European FC Pro Leagues with a defined allocation of qualification places for the eChampions League, which in the 2024-25 season filled 28 of the 32 places at the FC Pro World Championship (EA SPORTS, n.d.).

In India, Football Sports Development Limited launched the eISL in 2021 in collaboration with EA SPORTS and NODWIN Gaming, which FSDL described as making the Indian Super League the country's first major sports league to enter competitive gaming. The inaugural season featured all eleven ISL clubs, each represented by two esports athletes, one male and one female, giving 22 competitors in total, a structure explicitly intended to support female participation in Indian esports (Football Sports Development Limited [FSDL], 2021). The third edition, held in 2024 in collaboration with EA SPORTS FC and JioGames, was contested offline throughout, with qualifiers held across ten ISL club cities and winners representing their home club in a 1v1 league staged in Mumbai. The gender-parity requirement of the inaugural edition was not retained. The champion received a route to the EA SPORTS FC Pro World Championship Play-Ins (FSDL, 2024). In both countries, club-linked national competition has been organised mainly around EA SPORTS FC. eFootball, however, sustains an active competitive community, particularly on mobile, and in India it provides the pathway to national representation: since 2024, the AIFF has selected India's national esports team for the FIFAE World Cup through online qualifiers in eFootball on mobile and console (All India Football Federation [AIFF], 2024; FIFA, n.d.).

At the highest level, successful players advance to continental and global competitions. The 2025 eChampions League brought together 36 players who had qualified through European FC Pro Partner Leagues and who represented real-world European clubs. They competed in a two-day League Phase, from which the top 24 progressed to a Knockout Phase and eight reached the finals in Munich (EA SPORTS, 2025b). The FC Pro World Championship represents the culmination of the global EA SPORTS FC competitive season. Its 2025 edition featured 32 players who qualified through FC Pro competitions, partner leagues, and the World

Championship Play-Ins, and was held at the Esports World Cup in Riyadh with a prize pool of one million US dollars (EA SPORTS, 2025c).

Formal recognition of competitive gaming has also advanced in both countries, though along different routes. In Poland, the Act on Sport of 25 June 2010 was amended in 2017 to add Article 2(1a), which extends the definition of sport to competition based on intellectual activity aimed at achieving a sporting result (Ustawa z dnia 20 lipca 2017 r. o zmianie ustawy o sporcie, 2017). According to the justification for the amendment, the change was motivated in part by the popularity of esports, bringing it within the scope of sports law alongside mind sports such as chess and bridge. The Ministry of Sport has nevertheless characterised the change as a symbolic opening towards the esports community rather than full parity with traditional sport, and the surrounding legal framework remains fragmented. In India, the Government officially recognised esports as part of multi-sport events in December 2022, placing it under the Ministry of Youth Affairs and Sports (Asian News International, 2022). For the players studied in the present study, such recognition matters because it shapes the institutional context within which a competitive gaming career appears legitimate and supported, the same layer captured by the study's contextual variables for traditional football.

The virtual football participants of the present study, players of EA SPORTS FC and eFootball, were recruited across the competitive levels of these pathways rather than from the casual base of the gaming pyramid described earlier in this section. As with the traditional football participants, they were classified as elite, semi-elite, or non-elite according to their self-reported highest level of competition. Non-elite players had competed at local, district, or regional level; semi-elite players at second-tier national or inter-regional level; and elite players at top-tier national or international level, for example in FC Pro events, Ekstraklasa Games, the eISL, or national team qualifiers. The virtual and traditional football samples are therefore structurally comparable: in each discipline and country, participants occupy the actively competing strata of their respective pyramids, where motivation, competitive anxiety, physical self-perception, and the viability of a playing career are live concerns.

2.3. Context: traditional and virtual football players

Whether competitive gaming warrants comparison with traditional sport has been examined most directly by Carrani et al. (2022), who set out the case in three parts. The first concerns bodily demand: competition and training produce measurable physiological responses, and

players themselves train physically in the belief that fitness supports their play. The second concerns expertise: competing at the highest level depends on skills acquired through sustained practice. These include rapid perceptual judgement (reading situations, forecasting an opponent's actions, and deciding under time pressure) as well as detailed knowledge of the particular title being played. The third concerns organisation: professional competition is structured through leagues that regulate eligibility, maintain rankings, and stage tournaments, much as sporting federations do.

Their own survey of elite Spanish esports players supports the comparison. Participants reported a mean training load of 38.37 hours per week ($SD = 20.33$) and used performance-enhancing strategies comparable to those of traditional athletes, including warm-ups (73.91%), resistance training (74.19%), and psychological training (31.25%), although these activities were often not designed or supervised by qualified professionals. On this basis, the authors conclude that elite esports players experience a training load similar to that of traditional athletes and can be considered professional athletes, while stressing the need for strategies that protect players' long-term health and prevent burnout. Two further lines of evidence bear on the comparison from different directions. Kari and Karhulahti (2016) surveyed elite esports players and found that they engage in physical exercise more than the popular image of the sedentary gamer would suggest, in the belief that it supports their competitive performance. Kang et al. (2020) tested the comparison directly, contrasting professional internet game players with professional baseball players on psychological and cognitive characteristics, and found both similarities and domain-specific differences between the two groups.

Beyond these points of similarity, the psychological comparison between esports players and traditional athletes has become a defined research field in its own right. In a systematic review, Pedraza-Ramirez et al. (2020) set the scientific stage for esports psychology. They argued that esports performance should be studied using the theoretical foundations of sport psychology, while acknowledging that the cognitive and contextual demands of competitive gaming differ from those of traditional sport. Qualitative work with elite players supports this continuity: Poulus et al. (2022) found that elite esports players describe confidence, uninterrupted focus, flow states, emotion regulation, and team cohesion as determinants of success, mirroring the psychological profile of high performance in traditional sport. Quantitative comparisons point the same way. Behlau, Dreiskaemper, and Strauss (2025) compared 159 esports players with 165 traditional sports players using structural equation

modelling. They found that the models linking team trust, collective efficacy, and shared mental models to perceived performance were essentially similar across the two domains, with esports teams reporting significantly higher team trust.

The limits of this continuity are nevertheless actively debated. Young, Poulus, and Adie (2026) studied 480 high-level esports players drawn from the top 40% of competitive ranks across seven titles, none of them football simulations. They found that neither mental toughness ($\beta = -0.001, p = .928$) nor resilience ($\beta = -0.024, p = .159$) was associated with competitive achievement and concluded that instruments developed for traditional sport may not capture the psychological attributes most relevant to digital competition. This debate bears directly on the present study. The study formally tests the measurement invariance of the 3×2 AGQ-S, the SAS-2, and the PSDQ-S across traditional and virtual football players (and across Poland and India). It therefore provides empirical evidence on whether these sport-psychological instruments function equivalently in a virtual competitive context, rather than assuming that they do.

Evidence on football simulation games specifically, the population studied here, remains scarce but is growing. Zagala and Strzelecki (2019) documented the development of the FIFA series into an established esports ecosystem with its own leagues and tournaments. In a survey of 452 FIFA players recruited through a fan community, they found that most played as a hobby and few had competed in tournaments, but a majority (59%) regarded esports as a sport. Monteiro Pereira et al. (2023), studying the Portuguese national eFootball team, found that elite players and their staff perceived gaming, competition, and performance pressure as affecting their mental health, and prolonged sitting, equipment, and facilities as affecting their physical health. The authors therefore recommended structured training schedules, lifestyle support, and access to mental health professionals. These studies suggest that, beyond a largely recreational player base, competitive virtual football players experience demands recognisably similar to those of traditional athletes, while operating in a distinctly different physical and social environment.

This evidence supports the comparison undertaken here. Virtual football players and traditional football players occupying equivalent positions in their respective competitive structures may reasonably be compared on physical, psychological, and cognitive dimensions. Both commit substantial time to training and competition, and both face performance demands that are comparable in their competitive character, whatever their differences in kind. The

present study makes that comparison across the full range of competitive levels in both contexts, from local and regional competition to national and international representation, using the common classification described in Chapter 3.

These comparisons nevertheless share an important limitation. Each has been conducted within a single national context, often with modest samples; for example, Carrani et al. (2022) surveyed 51 elite Spanish players, and Behlau et al. (2025) 159 esports players. At the same time, the degree of psychological similarity between esports players and athletes remains debated (Pedraza-Ramirez et al., 2020), and some researchers question whether instruments developed for traditional sport capture the constructs most relevant to digital competition at all (Young et al., 2026). It therefore remains unknown whether the similarities and differences between traditional and virtual football players reported in these studies are universal, or whether they depend on the cultural context in which both forms of play are embedded. The present study addresses this gap directly by comparing traditional and virtual football players in two culturally distinct countries, Poland and India, using the same sport in both its traditional and virtual form.

2.4. Achievement motivation in sport

Achievement motivation concerns the disposition to pursue success and to approach or avoid situations in which performance will be judged. Weinberg and Gould (2024), following Murray (1938), describe it as a person's efforts to master a task, achieve excellence, overcome obstacles, perform better than others, and take pride in exercising talent; it is thus a person's orientation to strive for task success, persist in the face of failure, and take pride in accomplishments (Gill, 2000; Weinberg & Gould, 2024). A closely related construct, competitiveness, has been defined as a disposition to strive for satisfaction when making comparisons with some standard of excellence in the presence of evaluative others (Martens, 1976; Weinberg & Gould, 2024). McClelland et al. (1953) likewise framed achievement motivation in terms of competition with a standard of excellence, understood as the effort to develop or sustain one's capabilities in domains where such standards apply. Once a standard is adopted, an outcome becomes interpretable as success or failure. Achievement goals, in turn, shape how a task is approached and express a wish to demonstrate competence (Harackiewicz et al., 1997).

Theories of achievement motivation

Need achievement theory. Developed by McClelland (1961) and elaborated by Atkinson (1974), need achievement theory addresses the question of why individuals differ in their orientation towards achievement situations. The account rests on two opposing dispositions: a motive to approach success and a motive to avoid failure. Behaviour in any given achievement setting is held to reflect the balance between them, so that an individual whose motive to approach success predominates will engage with the task, whereas one in whom the motive to avoid failure is stronger will withdraw from it or decline to participate.

The framework is dispositional, treating achievement motivation as a relatively stable characteristic of the person rather than a response to circumstances. It generates a specific prediction about task selection. Individuals high in the motive to approach success are expected to prefer tasks of intermediate difficulty, where the outcome is genuinely uncertain and success therefore informative about ability, and to perform better under evaluative conditions. Those in whom the motive to avoid failure predominates are expected to avoid intermediate difficulty altogether, choosing either tasks so demanding that failure carries no diagnostic weight or tasks so undemanding that success is assured, and to perform less well when evaluated. Dispositional achievement motivation is not, however, the only determinant of behaviour in achievement settings, and subsequent accounts have given greater weight to situational and cognitive factors.

Attribution theory. Attribution theory, originating with Heider (1958) and developed for achievement settings by Weiner (1985), addresses the explanations people construct for their own successes and failures. Weiner's formulation classifies these explanations along three dimensions. The first is locus of causality, distinguishing causes residing in the person from those residing in the situation. The second is stability, distinguishing causes that persist across occasions from those that fluctuate. The third is controllability, distinguishing causes subject to volitional influence from those that are not. The four attributions most familiar from achievement research (ability, effort, task difficulty, and luck) derive from the original crossing of locus and stability: ability is internal and stable, effort internal and unstable, task difficulty external and stable, and luck external and unstable (Weiner et al., 1971). Controllability was added later, distinguishing, for example, effort, which is controllable, from ability, which is not.

The significance of attributions lies in their consequences rather than their accuracy. Because the explanation a person adopts shapes their expectation of future outcomes,

attributions influence motivation indirectly, by way of confidence. Attributing a success to internal and stable causes supports the expectation that it will be repeated; attributing a failure to external or unstable causes limits the damage to self-evaluation. The former has been characterised as ego-enhancing and the latter as ego-protective. Where confidence in future success is sustained, motivation to seek out further achievement situations is correspondingly greater.

Competence motivation theory. Competence motivation theory accounts for participation, persistence, and effort in achievement settings by proposing that individuals are drawn towards activities in which they experience themselves as capable. Its origins lie in White's (1959) concept of effectance motivation, a tendency to explore and influence the environment, and his definition of competence as the capacity to interact with it effectively. White's central claim was that this form of motivation is distinct from biologically driven motivation such as hunger or thirst: rather than regulating a state of deprivation, it serves to extend the individual's capabilities, and people frequently engage in activities for no reason other than to experience competence. Harter subsequently developed this into a more specified framework, initially as effectance motivation theory (Harter, 1978) and later as competence motivation theory (Harter, 1981). In Harter's model, perceptions of competence and of control over outcomes shape affective responses such as enjoyment, pride, or anxiety, which in turn determine whether an individual persists in or withdraws from an activity. Applied to sport, the theory implies that athletes who perceive themselves as competent, and who experience positive affect as a result, are more likely to remain motivated and engaged (Weiss & Amorose, 2008). This emphasis on perceived competence anticipates the central role that competence plays in achievement goal theory.

Achievement goal theory. Advanced by Nicholls (1984, 1989), achievement goal theory has been a central framework within sport psychology for the past several decades, treating achievement goals as the route to understanding differences in achievement (Duda & Hall, 2001; Dweck, 1986). Three factors interact to determine motivation: achievement goals, perceived ability, and achievement behaviour. To understand an individual's motivation it is necessary to understand what success and failure mean to that person, which is best approached by examining their achievement goals and how these interact with their perceptions of competence, self-worth, or perceived ability.

Achievement goal theories (Dweck, 1986; Elliot, 1999; Nicholls, 1984, 1989) rest on the premise that variation in how individuals judge their own ability and define successful accomplishment is a critical antecedent of motivational process (Duda, 2001). According to Nicholls (1984), an internal sense of ability may be conceived as high or low in relation to one's own past performance or judged as a capacity relative to others. These conceptions underpin two contrasting achievement goal states, task and ego involvement, which determine how individuals define success in achievement settings. Individuals who derive a sense of competence from improvements in personal mastery are task-involved; those who derive it from demonstrating superior performance relative to others are ego-involved. Achievement goals within a specific situation are determined by an interaction between dispositional goal orientations at the intrapersonal level and the wider motivational climate created by key social agents at the situational level.

At the intrapersonal level, Nicholls' (1984) dichotomous model proposes that individuals develop, over time, a dispositional proneness to conceive ability in task- or ego-oriented terms (Nicholls, 1989; Smith et al., 2008). Considerable evidence indicates that high task orientation is associated with a range of positive cognitive, affective, and behavioural outcomes, whereas high ego orientation is associated with neutral or less optimal outcomes, particularly where perceptions of competence are low or not accompanied by task-based goals (Harwood et al., 2008).

At the situational level, Ames (1992) proposed two types of motivational climate capable of influencing an individual's achievement goal state. A mastery- or task-involving climate is created when coaches, parents, and peers are perceived to emphasise self-referenced improvement, effort, and cooperative learning. A performance- or ego-involving climate is created where the perceived focus falls on outcomes, on outperforming others, where preferential treatment is given to selected performers, and where mistakes are punished (Seifriz, Duda, & Chi, 1992). Motivational climates are thus established through patterns of normative influence, evaluative standards, rewards and sanctions, interpersonal interaction, and the values communicated by social agents within achievement contexts (Smith et al., 2008).

Elliot and McGregor (2001) extended this approach by importing the approach–avoidance distinction from the achievement motive tradition. Their 2×2 model crosses two definitions of competence with two valences. Mastery goals evaluate competence against the

task or the self, and performance goals against other people. Approach goals are organised around attaining a positive outcome, and avoidance goals around avoiding a negative one. The four resulting goals are mastery-approach (developing competence and mastering the task), mastery-avoidance (not falling short of one's own standard or failing to improve), performance-approach (outperforming others), and performance-avoidance (not being outperformed). In educational settings, mastery-avoidance goals fall between the extremes: their correlates are less positive than those of mastery-approach goals but less negative than those of performance-avoidance goals (Elliot & McGregor, 2001).

The 2×2 framework was brought into sport through the 2×2 Achievement Goal Questionnaire for Sport (Conroy, Elliot, & Hofer, 2003) and has since been widely adopted in sport research. Its value lies in specifying not only the standard against which athletes judge competence but also the direction of their orientation: towards a desirable outcome or away from an undesirable one. This dual specification helps explain how athletes engage with competition and informs interventions that address the goals athletes actually hold. Meta-analytic evidence shows that approach goals tend to be positively related to sport performance, whereas performance-avoidance goals tend to be negatively related to it (Lochbaum & Gottardy, 2015). More broadly, avoidance goals have been associated with a range of maladaptive outcomes in sport, including lower self-esteem, positive affect, satisfaction, vitality, self-confidence, and performance, together with greater worry and anxiety (Gaudreau & Braaten, 2016).

The present thesis adopts the most recent development of this framework, the 3×2 achievement goal model. It was proposed in the educational domain by Elliot, Murayama, and Pekrun (2011) and extended to sport by Mascaret, Elliot, and Cury (2015), whose 3×2 Achievement Goal Questionnaire for Sport (3×2 AGQ-S) builds on the 2×2 AGQ-S (Conroy, Elliot, & Hofer, 2003). The 3×2 model separates mastery-based goals into task-based and self-based categories. Task-based goals refer to the absolute demands of the task, such as scoring a goal or applying the right tactics and strategies, whereas self-based goals take one's own prior performance as the referent. This yields six goal constructs: task-approach, task-avoidance, self-approach, self-avoidance, other-approach, and other-avoidance, the last two having previously been labelled performance-approach and performance-avoidance. The separation is warranted, Mascaret and colleagues argued, because individuals can evaluate mastery either against task demands or against their own past performance.

Mascret et al. (2015) investigated the 3×2 model in the sport domain and found task-based and self-based goals to be distinct: perceived competence correlated positively with task-approach goals but was unrelated to self-approach goals. Wang et al. (2017) subsequently raised concerns about some of the items used in that study, particularly those assessing task-approach and task-avoidance. The task-approach items were "to perform well", "to obtain good results", and "to be effective", and the task-avoidance items their negative counterparts. Wang and colleagues argued that these may be ambiguous to respondents, who could interpret them as self- or other-referenced, and that since mastery in sport involves techniques, skills, and strategies, items assessing task goals should engage these dimensions directly.

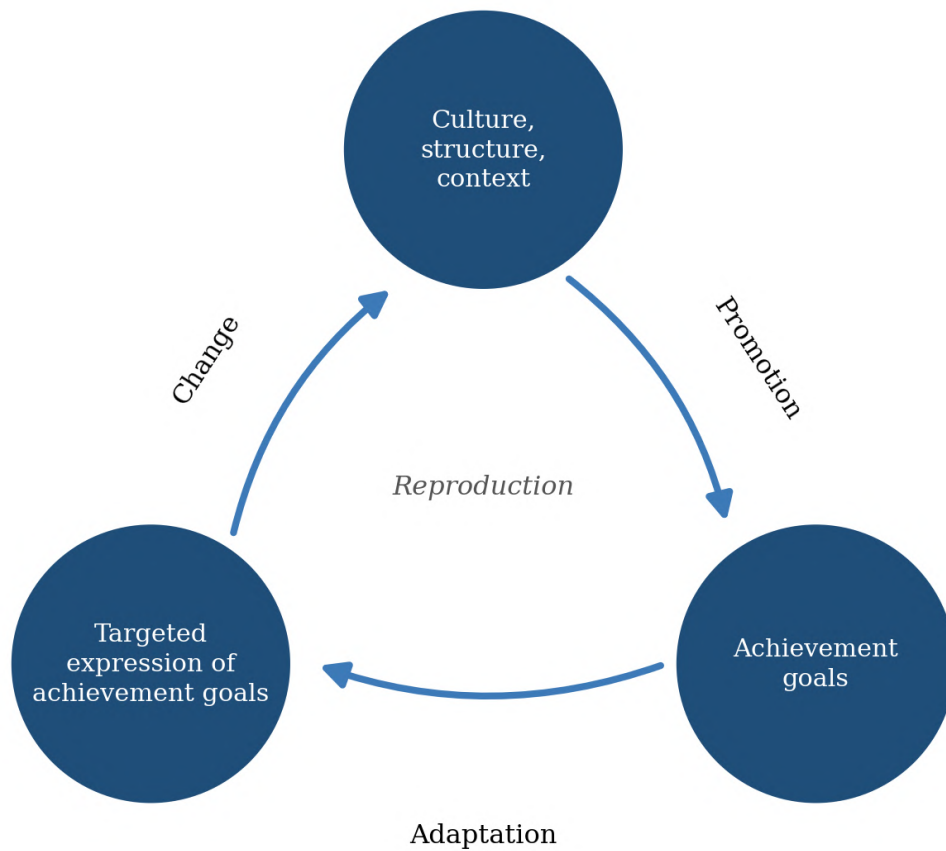
Wang et al. (2017) accordingly assessed task-approach goals with items such as "I aim to execute the skills correctly", "I strive to apply the right tactics and strategies", and "I want to execute every technique successfully", and task-avoidance goals with their avoidance counterparts. Their findings revealed a very different pattern of correlations among the six goals from that reported by Mascret et al. (2015) in a French sample. In the earlier study almost all achievement goals correlated positively with one another, with a single exception; this pattern did not emerge in the Singaporean sample, where several coefficients were high in magnitude but others were non-significant and close to zero. Strong associations between task-approach and task-avoidance goals, and between self-approach and self-avoidance goals, suggested that Singaporean athletes concurrently adopt goals that in Western samples are treated as opposed in valence, in the service of mastering a task and improving competence. Wang and colleagues interpreted this as evidence of cultural difference between the two samples. This pattern, in which the relations among goal constructs differ across cultural samples even where the factor structure replicates, is directly relevant to the analyses reported in Chapter 6. This richer framework permits more precise predictions and better alignment with athletes' motivational dynamics, particularly in cross-cultural and performance-based contexts. On this basis the 3×2 Achievement Goal Questionnaire for Sport was adapted for use in Polish (Rawat et al., 2024) and Indian (Rawat et al., 2026) contexts. A second Polish validation of the 3×2 AGQ-S, which also examined its personality correlates, was published independently by Tomczak et al. (2024). As with the two Polish versions of the SAS-2 (section 2.6), independent adaptation by separate teams adds to the evidence that the six-factor structure holds in Polish samples.

The 3×2 framework was selected for this study for three reasons. First, it is among the most differentiated models of achievement goals currently available: by separating mastery-based goals into task-based and self-based standards of competence, it distinguishes six goals rather than four, and this finer structure has been supported in athlete samples (Mascaret et al., 2015), including in Poland (Rawat et al., 2024). Second, the differentiation matters specifically for the comparisons made in this study. The distinction between other-based goals, which rest on social comparison, and task- or self-based goals, which do not, is relevant to cultural differences in how success is defined. India is more collectivist than Poland, with group and particularly family orientation exerting a strong influence on individual decisions (Hofstede et al., 2010; Kuźmińska-Haberla, 2018), and the weight placed on social comparison may differ accordingly. The same distinction also maps onto the structural difference between team-based traditional football and predominantly individual virtual football. Third, the questionnaire derived from this model has shown cultural variation in how the six goal constructs relate to one another (Wang et al., 2017), which makes formal testing of its measurement properties across cultures a contribution in its own right.

2.4.1. Culture and achievement goals

Achievement goals do not arise in isolation. As Butera et al. (2024) argue, the cultural, structural, and contextual conditions of a society determine the settings within which achievement goals are formed: norms, institutions, and shared values shape how success is conceptualised and which means of pursuing it are available. Those goals, once established, are in turn expressed within that society and contribute to the collective understanding of what counts as achievement, producing the cycle of social reinforcement illustrated in Figure 4. Achievement goals therefore carry both personal and societal dimensions, linking the human need for competence to the value systems of the community in which it is expressed.

Figure 4. *The cycle of social influence in the development and transmission of achievement goals. Cultural, structural and contextual conditions promote particular achievement goals; those goals are expressed in ways adapted to the setting; and that expression feeds back into the conditions that produced it. Reproduction occurs where endorsed goals fit the existing context better than an available alternative; change occurs where the reverse holds. Adapted from Butera et al. (2024).*



Early cross-cultural work suggested that people in individualistic societies place greater emphasis on effort as a driver of success than those in collectivistic settings (Triandis, 1973), and Western contexts have more generally been associated with an emphasis on individual performance while collectivist cultures have been characterised as framing achievement in terms of community, cooperation, or family outcomes (Markus & Kitayama, 1991). Later findings indicate that such generalisations hold less reliably than was once assumed. East Asian populations attribute academic success primarily to sustained effort, whereas North Americans are comparatively more likely to attribute it to innate ability (Stevenson, 1993; Stigler & Stevenson, 1991). What counts as an individualistic or collectivistic orientation therefore depends on which aspect of achievement is being examined, and on the domain in which it is assessed.

The individualism-collectivism dimension nevertheless remains the most widely used framework for such comparisons, though it has been substantially refined since Hofstede's

(1980) original formulation. Triandis and colleagues shifted measurement from the national to the individual level and replaced the original bipolar dimension with four orthogonal dimensions. These dimensions combine individualism and collectivism with either a horizontal orientation, which emphasises equality, or a vertical orientation, which emphasises hierarchy and social status (Singelis et al., 1995; Triandis & Gelfand, 1998). India has frequently been characterised as vertically collectivist, a classification attributed to the hierarchical nature of Indian social institutions, which combines interdependent self-construal with an emphasis on hierarchy and social recognition (Triandis, 1995). The picture is not uniform, however: Indian respondents have appeared vertically collectivist when compared with American respondents but more horizontally collectivist in within-group analyses (Cooper, 2015), and Indian scholars have emphasised that individualist and collectivist orientations coexist (Sinha & Tripathi, 1994). Poland, by comparison, is more individualist (Hofstede et al., 2010; Kuźmińska-Haberla, 2018). This combination is directly relevant to the salience of socially comparative achievement goals.

The framework is not without critics. Oyserman et al.'s (2002) meta-analysis prompted sustained debate about the validity of the construct and the reliability of its measures. Priming studies indicate that individualistic and collectivistic tendencies can be experimentally induced, suggesting that the dimension may be more situationally sensitive than dispositional (Oyserman & Lee, 2008), and self-construal scales have themselves been criticised for weak validity (Levine et al., 2003), and the reference-group effect raises the further difficulty that respondents in different cultures may implicitly compare themselves against different standards when answering Likert-type items (Heine et al., 2002; Li et al., 2024; Lo, 2024; Rawat et al., 2025). These criticisms bear directly on the present study and which is one of the reasons why measurement invariance is tested formally before any cross-cultural mean comparison is interpreted.

Within achievement goal research, the most instructive evidence comes from King et al. (2017), who compared students from nine cultural groups. Their starting assumption was that motivational processes may share a common structure across cultures while differing in how they operate, and the results bore this out. The four-factor goal structure held in every group, and mastery goals predicted favourable learning outcomes in most of them. Performance, social and extrinsic goals behaved differently: their links with valued outcomes changed from one cultural group to another. In other words, it is the goals built on comparison

with others, rather than those built on mastering the task, whose meaning appears to depend most on culture.

This asymmetry maps onto the distinctions the 3×2 model draws. Task-based and self-based goals reference the task itself or one's own prior performance and correspond to the mastery goals whose adaptive functions King et al. (2017) found largely consistent across cultures. Their approach forms should therefore relate to outcomes comparably across groups, although the pattern reported by Wang et al. (2017) indicates that the relations between approach and avoidance forms may still differ. Other-based goals reference the performance of other people and correspond most closely to the performance goals on which King et al. (2017) found cultural variation; they are therefore the constructs on which differences in the salience of social comparison would be expected to appear. Evidence from gaming points the same way: among Singaporean and Australian gamers, vertical collectivism was associated with competitive motivation, the wish to outperform others in ranked systems (Chew et al., 2024). If India is characterised by vertical collectivism, other-based goals may therefore be relatively salient among Indian players in virtual as well as traditional football.

The two findings from Chew et al. (2024) cited in this chapter are not contradictory. At the level of the national samples, the collectivist Singaporean gamers placed more weight on social motives and the individualist Australian gamers on competitive ones; within samples, however, it was the vertical form of collectivism, which ties social standing to rank, that was associated with competitive motivation. The prediction for India therefore rests on its vertical rather than its collectivist character: where status follows position in a hierarchy, outperforming others becomes a route to recognition.

Direct evidence in sport comes from Asghar et al. (2013), whose study is the closest existing precedent to the present one. Comparing German, Chinese, and Pakistani adolescent athletes on goal orientation, physical self-concept, and competitive anxiety within the individualism-collectivism framework, they found that the Chinese and Pakistani players reported higher ego orientation, lower task orientation, and higher cognitive anxiety than the German players. Results for somatic anxiety were mixed. For physical self-concept the pattern was consistent: German players scored higher across all subscales relative to the Chinese sample, and higher on three subscales relative to the Pakistani sample.

The present study differs from theirs in three respects. First, it employs the 3×2 achievement goal model rather than the dichotomous task-ego distinction, permitting other-referenced goals to be separated from task- and self-referenced ones. Second, it assesses competitive anxiety as a trait rather than a state. Third, it crosses cultural comparison with a comparison of competitive contexts, allowing the two influences to be examined jointly rather than separately. A further methodological difference is that Asghar et al. (2013) compared observed means without first establishing measurement invariance, a step taken here before any cross-cultural comparison is interpreted.

Taken together, this literature supports directional expectations for the present comparison. Where interdependent self-construal predominates and social recognition is more salient, other-referenced goals should be more strongly endorsed and competitive anxiety, particularly its cognitive component, should be higher. For physical self-concept the expectation runs in the opposite direction, since positive self-description is more normative in individualist settings and self-effacement more normative in collectivist ones, an expectation borne out in Asghar et al's (2013) comparison. These expectations are formalised in the hypotheses stated in section 2.8.

2.4.2. Achievement goals and motivation in esports

Competitive esports have developed rapidly as an achievement domain, and increasing numbers of young players now regard them as a career opportunity rather than a recreational activity (Bányai et al., 2020). Whether the motivational processes documented in traditional sport transfer to this setting is, however, unresolved, and the existing evidence supports competing expectations.

One position holds that esports players are motivationally similar to traditional athletes. Horoszkiewicz et al. (2023) point out that athletes in traditional sport are driven both by rewards inherent in the activity, such as enjoying competition and getting better, and by external incentives such as financial reward and public recognition, and they argue that the same mixture is found among esports players. Seo (2016) found that players who chose competitive gaming as a career valued the mastery of skills, continual self-improvement, and fairness, equality and respect within the gaming community, and reported high self-esteem, a sense of accomplishment and recognition. On this account, task- and self-referenced goals should be at least as prominent in esports as in traditional sport.

A second position holds that the competitive structures push esports players towards extrinsic motives. Brock (2017) argued that esports may drive players towards extrinsic motivations such as rewards and tournament prize pools rather than intrinsic ones such as self-development and identity. Kim and Thomas (2015) traced five stages in becoming a professional player and noted that competing in the top tiers should be considered work, typically driven by extrinsic rather than intrinsic motivation. Consistent with this, Horoszkiewicz et al. (2023) found that Polish players belonging to professional esports clubs reported significantly higher extrinsic motivation than amateur players ($U = 527.5, p < .001, r = .55$), a large effect. Intrinsic motivation, however, did not differ between the two groups ($p = .167$). That last finding suggests the two positions are less sharply opposed than they appear. Even accounts that stress extrinsic motives at elite level, such as Kim and Thomas (2015), treat intrinsic motivation and identity as central to reaching it, and the evidence is better read as indicating that extrinsic motives are added at higher levels of competition rather than substituted for intrinsic ones.

Motives also relate to career aspirations. In a study of 190 Hungarian male players with competitive experience, Bányai et al. (2020) found that competition, skill development, and social motives predicted plans to become a professional esports player, with competition the strongest predictor, whereas coping motives negatively predicted career plans. Younger players tended to be more likely than older players to seek a professional career, although this association was only marginally significant.

Two limitations of this literature should be stated plainly. First, to our knowledge, none of these studies employs achievement goal theory. Achievement goal theory and self-determination theory underpin the most widely used motivation measures in traditional sport (Clancy et al., 2017), yet motivation in esports has been examined predominantly through gaming-motive taxonomies and self-determination theory, and the six goal constructs of the 3×2 model have not previously been assessed in this population. Second, this literature is rarely cross-cultural. Samples are typically drawn from a single country, and quantitative studies have involved around 200 participants, often exclusively male (Bányai et al., 2020; Horoszkiewicz et al., 2023). One of the few exceptions, a comparison of Singaporean and Australian gamers, found that culture shaped the motivational routes to problematic gaming: social motives were more prominent in the collectivist sample and competitive motives in the individualist sample, while vertical collectivism was associated with competitive motivation, the wish to outperform

others in ranked systems (Chew et al., 2024). Whether such cultural differences extend to achievement goals among competitive players remains untested.

The comparison of achievement goals between traditional and virtual football players therefore cannot be assigned a confident direction on the basis of existing evidence and is expressed as a research question rather than a hypothesis. The structural differences between the two settings nevertheless support one directional expectation. Association football is a team activity with codified progression pathways, institutional support, and an established professional route, whereas competitive virtual football is predominantly individual, more recently institutionalised, and offers a less visible pathway to professional status. Where the professional route is less codified, aspiration to it may reasonably be expected to be lower; this expectation concerns career aspiration rather than achievement goals and is stated as a hypothesis (section 2.8).

2.4.3. The structural and institutional context of sport and esports in Poland and India

Cultural values shape not only individual motivation but also the systems through which sport is funded, organised, and integrated into everyday life (Sava et al., 2024). This matters for the present study because the institutional environment determines the opportunities available to athletes and the plausibility of a professional pathway, and because perceived institutional support is examined here as a contextual variable in its own right.

Sava et al. (2024), examining cultural values and sporting excellence across nations, describe several ways in which the wider environment conditions athletic development. Where sport carries strong cultural significance it tends to become embedded in national identity, sustained through long-term investment, and reflected in public engagement with athletic success. Established traditions of public sports infrastructure provide stable foundations for development, as in the European financing arrangements described by Siebold and Klingmüller (2004, as cited in Sava et al., 2024). Moreover, national pride can itself function as a motivational resource where sporting success is linked to collective identity.

Cultural priorities also shape governance and the allocation of resources. Countries with a well-established sporting ethos tend to direct funding towards competitive excellence and to prioritise the disciplines most closely aligned with national tradition, which can concentrate institutional support within particular sports (e.g., cricket in India)] (Sava et al., 2024). As

described in section 2.1.1, a consequence for the present study is that association football in India has a markedly lower institutional priority than the dominant national sport, unlike in Poland where it occupies a central place in the national sports landscape.

Socio-economic and political conditions provide the structural capacity within which these cultural influences operate. Economic stability permits predictable funding and political commitment enables investment in infrastructure and athlete support (Sava et al., 2024). Acquah-Sam (2021), reviewing sports development within emerging economies, argues that it depends on a set of long-term complementary strategies, furthermore, sustained investment must be accompanied by strong institutions and effective governance to generate sustainable outcomes. Where these conditions are absent, financial constraints and systemic barriers limit the capacity of sport systems to compete internationally.

The institutional position of competitive esports differs again, and differs between the two countries. Esports has attracted attention not only from the gaming community but from traditional sport, commercial organisations, and the education sector. This has given rise to a range of professional roles beyond the player, including managers, coaches, psychologists, commentators, and event organisers. The competitive structures described in section 2.2.1 illustrate how differently this has developed in Polish and Indian settings: In Poland, Ekstraklasa Games operates as an established national championship with a defined allocation of qualification places for European continental competition. In India the eISL, launched in 2021, has undergone substantial changes of format and partnership across its editions. The recency of institutionalisation in both countries means that formal recognition, federation structures, and public funding remain less settled than in traditional sport.

Formal recognition has nonetheless advanced in both countries, though along different routes. In Poland, the Act on Sport of 25 June 2010 was amended in July 2017, with effect from 12 September of that year, to add Article 2(1a), extending the statutory definition of sport to competition based on intellectual activity aimed at achieving a sporting result (Szatkowska, 2021). The government's stated intention was to bring the increasingly popular category of electronic sports within the scope of the legislation. The amendment had institutional consequences: the Polish Esports Association was established on 4 September 2018 and registered as a sports association under Article 6 of the Act, and in December 2020 became the fiftieth member of the Polish Non-Olympic Sports Committee, the first Polish esports organisation admitted to that body (Szatkowska, 2021). The legal framework nevertheless

remains incomplete, with esports subject to no dedicated regulation and its treatment under tax and intellectual property law still contested (Biliński, 2022; Szatkowska, 2021).

In India, the Government officially recognised esports as part of multi-sport events in December 2022, placing it under the Ministry of Youth Affairs and Sports (Asian News International, 2022). Evidence from players suggests, however, that formal recognition has not been matched by perceived provision. Interviewing 41 professional gamers in India, Bihari and Pattanaik (2023) found the absence of government and institutional backing to be among the principal sociocultural-political obstacles to an esports career, alongside family censure and cultural stigmatisation. These were compounded by techno-economic constraints including inadequate infrastructure, high tournament costs, insufficient sponsorship, and low income. That their participants competed at professional level indicates these constraints operate even for those who have progressed furthest within the Indian competitive structure.

These two national contexts are documented differently, and this should be borne in mind. For Poland the available evidence concerns statutory status and organisational recognition; for India it concerns what players report experiencing. The comparison is therefore between a legal account of one country and an experiential account of the other. These structural differences bear directly on two of the contextual variables examined in this thesis. The asymmetry in the existing evidence is part of what makes them worth examining. Perceived institutional or governmental support is expected to differ by competitive context, given the longer-established funding structures of traditional sport. Measuring this support in both countries enables a comparison at the player-level, a perspective hitherto absent from the literature. Perceived parental support is also expected to differ by culture. The legitimacy of a chosen pursuit is subject to greater family influence where interdependent self-construal predominates. Unlike traditional sports, competitive gaming lacks established social acceptance; this phenomenon, manifested as disapproval from family, has been empirically confirmed by Bihari and Pattanaik (2023) in the context of Indian gamers. Together these considerations position achievement motivation as emerging from an interaction between individual ambition and the wider cultural, socio-economic, and political environment: cultural values define not only what success means, but also the systems, investments, and public engagement that make such success attainable.

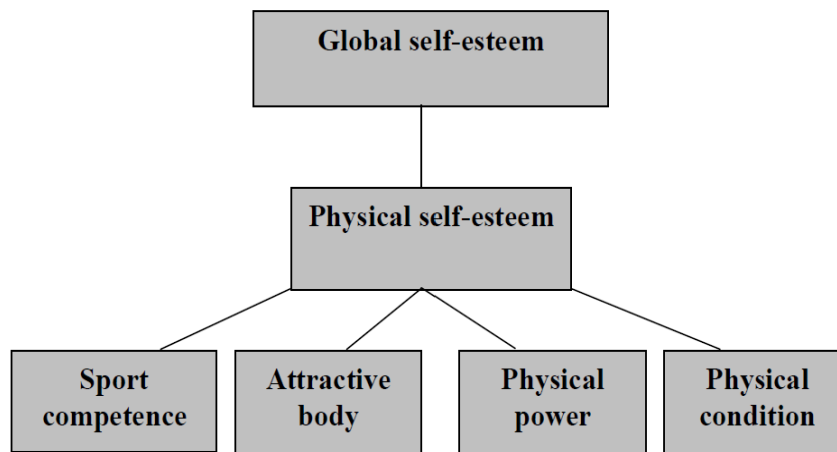
2.5. Physical self-concept

How people perceive themselves in achievement settings bears substantially on how they behave. Fox (1998) argues that the body is the medium through which we engage with the world such as exploring, learning, presenting ourselves, and that because its appearance is publicly visible, the physical self becomes central to the self as a whole. On this account, perceptions of the physical self offer a route into understanding identity, the foundations of self-esteem, and a wide range of behaviour.

In this study, self-concept is understood as the set of attitudes a person holds towards themselves: a perception formed through experience and through interpretations of the environment, influenced by the evaluations of significant others, by reinforcement, and by attributions of behaviour (Marsh, 1990). It is distinguished from self-esteem, the evaluative sense of self-worth, and from self-efficacy, a person's judgement of their capability to organise and execute the courses of action required to attain a designated performance (Bandura, 1986). Physical self-concept is treated here as one specific domain within this broader construct.

The present study draws on the work of Fox and Corbin (1989) on physical self-concept, which is itself adapted from the multidimensional and hierarchical model of self-concept advanced by Shavelson, Hubner, and Stanton (1976). Global self-concept, the overall positive or negative appraisal of oneself, occupies the highest level of this model. Global physical self-concept, the corresponding appraisal within the physical domain, occupies the intermediate domain level. More specific component such as sport competence, physical condition, physical strength, flexibility, coordination, and physical appearance, occupy the subdomain level below. Fox and Corbin's (1989) Physical Self-Perception Profile operationalises this structure with four subdomains beneath physical self-worth: sport competence, physical condition, physical strength, and body attractiveness (Figure 5).

Figure 5. *The scheme of physical self-perception's structure (K. R. Fox, 2000)*



Marsh, Richards, Johnson, Roche, and Tremayne (1994) subsequently developed and validated the Physical Self-Description Questionnaire (PSDQ) to operationalise the same model at greater breadth. The PSDQ was developed for adolescents and comprises 70 items assessing eleven dimensions: activity, appearance, body fat, endurance, coordination, flexibility, health, sport competence, strength, global physical self-concept, and global self-esteem. Maïano et al. (2015) note that it remains the most comprehensive available measure of physical self-concept, covering eleven dimensions against six or seven for alternative instruments, and that its factor validity, reliability, and convergent and discriminant validity have been documented across a range of language versions, age groups, and sample types (Klomsten, 2004; Janić et al., 2014). Its length is nevertheless a constraint in studies administering several instruments together.

Marsh, Martin, and Jackson (2010) accordingly developed and validated a 40-item short form, the PSDQ-S, balancing brevity against psychometric strength. The short form was developed on a normative sample of 1,607 Australian high-school students aged 12 to 18, and cross-validated on five further samples: 708 Australian students, 349 Australian elite adolescent athletes, 986 Spanish adolescents, 395 Israeli university students, and 760 Australian older adults. It retains all eleven subscales of the original instrument, measured by three items each (appearance, body fat, endurance, flexibility, global physical self-concept, sport competence, strength), four items (activity), or five items (coordination, global self-esteem, health).

The short form has since been examined in other language contexts. Maïano et al. (2015) validated a French version in a sample of 587 adolescents, finding support for its factor validity, reliability, and convergent validity, and establishing strict measurement invariance across sex, age, body mass index, and involvement in organised sport. Notably, latent means were not invariant across sex, body mass index, or sport involvement: the instrument functioned equivalently in each group while the groups themselves differed in level. That combination demonstrated equivalence of measurement alongside genuine differences in the underlying construct is precisely the logic on which the comparisons in this thesis depend. Adaptations have also been reported for Indian university students (Agarwal et al., 2013) and for German-speaking samples (Jones & Stumbrys, 2014), though the psychometric evidence for these remains more limited.

The cross-cultural generalisability of the PSDQ-S beyond the contexts in which it has been formally validated therefore remains an open question, and one that requires attention before the instrument can be used with confidence in cross-cultural comparison. The present study addresses that question directly for the Polish and Indian contexts.

2.5.1. Culture and physical self-concept

The evidence reviewed above concerns whether the PSDQ-S can be administered comparably across languages. A separate question is whether physical self-concept itself differs across cultures, and here the theoretical expectation runs counter to what might be assumed from the achievement goal literature.

Self-report measures of self-concept are subject to culturally patterned response tendencies. Positive self-description is more normative in individualist settings. In collectivist settings, on the other hand, modesty is the norm, and flaunting one's superiority entails social costs (Markus & Kitayama, 1991). On this basis, reported physical self-concept would be expected to be higher among participants from individualist cultures, independently of any difference in objective physical capability.

This account is contested, however. Sedikides et al. (2015) argue that self-enhancement and self-protection motives are equally potent across cultures and that the desire for self-esteem is pancultural; what varies is the domain in which self-enhancement is expressed and the constraints on expressing it candidly. On their account, respondents from collectivist settings

self-enhance on collectivistic attributes while reporting greater modesty on individualistic ones and behave much as Western respondents do once those reporting constraints are removed. If this is correct, an observed difference in reported physical self-concept may reflect the conditions of self-report rather than a difference in how the physical self is actually evaluated and it leaves open the question of whether the physical domain is one in which collectivist samples self-enhance or self-efface.

A further and more troublesome possibility is that any difference lies in the referent rather than in the construct. The reference-group effect (Gardner et al., 1999; Heine et al., 2002; Kenny et al., 2015; Rawat et al., 2025) holds that respondents in different cultures implicitly compare themselves against different standards when answering Likert-type items, so that a Polish and an Indian participant reporting the same numerical value on a strength item may be making judgements against quite different comparison groups. This difficulty is particularly acute for self-concept measures, which are explicitly comparative in their wording, and it is a principal reason that measurement invariance is established formally in this thesis before any mean difference is interpreted.

Direct evidence in athlete samples supports the modesty expectation. Asghar et al. (2013) compared German, Chinese, and Pakistani adolescent athletes on physical self-concept within the individualism-collectivism framework and found large differences on all subscales between the German and Chinese players and smaller but significant differences on three subscales between the German and Pakistani players, with the German sample scoring higher throughout. This is the closest available precedent to the present comparison, and it generates a directional expectation for the contrast between Polish and Indian participants.

Several considerations nevertheless qualify that expectation. The literature is small and draws predominantly on adolescent samples, and the two collectivist samples in Asghar et al.'s (2013) study were East and South Asian rather than the specific Indian population examined here. More substantially, if Sedikides et al. (2015) are right that self-enhancement is pancultural and differs only in its domain of expression, then physical capability may be a domain in which collectivist samples self-enhance rather than self-efface, particularly among competitive athletes, for whom physical capability is directly implicated in performance and is therefore a source of legitimate rather than immodest self-assertion. The expectation is accordingly stated as a hypothesis rather than as an established finding.

2.5.2. Physical self-concept in esports

Physical self-concept is the construct on which traditional and virtual football players might be expected to differ most sharply, which makes the emerging evidence on esports players' physical status directly relevant. That evidence is, however, contested.

Several studies report a less favourable physical profile among esports players. DiFrancisco-Donoghue et al. (2022) found that collegiate esports players took fewer than half the daily steps of age-matched controls and showed a higher body fat percentage, lower lean body mass, and lower bone mineral content, despite no difference in body mass index. Kusan et al. (2025) reported that longer esports involvement was associated with lower physical activity and lower body appreciation. Training demands may contribute to this profile: elite esports players have been found to train for a mean of approximately 38 hours per week, against the 9 to 17 hours reported for traditional elite athletes in sports such as handball, tennis, and volleyball, and this volume of sedentary practice is accompanied by overuse injuries associated with the movement patterns of specific technical skills (Carrani et al., 2022).

The contrary position is equally well evidenced. In a laboratory-based comparison, Ketelhut et al. (2023) found no significant differences between competitive esports players and matched peers in body composition, blood pressure, grip strength, maximal oxygen uptake, or physical activity, concluding that the generalised portrait of the esports player as unhealthy may need reconsideration and that esports players span the full range of the fitness and health spectrum. Consistent with this, most elite esports players report performing complementary physical training in order to improve performance, much as traditional athletes do (Carrani et al., 2022), and a ten-week exercise intervention with elite players has been associated with improvements in cerebral haemoglobin saturation, cognitive function, and heart rate variability (Nicholson et al., 2024).

Two features of this literature limit what can be inferred for the present study. First, it concerns objective physical status rather than physical self-concept: body composition, activity levels, and grip strength are not perceptions, and the relationship between measured physical capability and its self-perception is neither direct nor uniform. Only Kusan et al.'s finding on body appreciation speaks to perception, and it addresses a single facet.

Second, the conditions under which esports players train differ markedly by region. Poulus et al. (2025), interviewing elite players, coaches, and support staff from major and minor competitive regions, found that major-region players benefited from dedicated training facilities, structured physical training, and access to psychological services, whereas minor-region players faced resource limitations, restricted access to support, and appeared at higher risk of burnout. Since neither India nor Poland hosts a football-simulation circuit comparable to the best-resourced regions described by Poulus et al. (2025), the opportunities available to the eFootball participants of the present study for structured physical preparation are likely to be limited in both countries, and any difference between contexts may itself be conditioned by national setting.

Whether virtual football players' perceptions of their physical selves differ from those of traditional footballers, and whether any such difference holds across cultures, is therefore an open empirical question. The multidimensional structure of the PSDQ-S permits a more specific expectation than the literature alone would support: if a difference exists, it should be concentrated in the facets most closely tied to physical activity and body composition rather than distributed uniformly across all eleven subscales.

2.6. Competitive trait anxiety

Sport is a context in which athletes develop themselves intensively, compete, strive to win, and work to improve their skills. This process of self-development exposes them to anxiety. The importance of anxiety in sport is documented by a substantial body of research (Correia & Rosado, 2018; Hamidi & Besharat, 2010; Koehn, 2013). Athletes frequently experience excessive anxiety when competing (Vealey, 1990), and Kumbara et al. (2018) report that 63% of competitors feel anxious before a competition, and pre-competitive anxiety has long been treated as a construct in its own right (Martens et al., 1990).

The multidimensional anxiety theory (Martens et al., 1990) holds that competitive anxiety, in both its state and trait forms, occurs at somatic and cognitive levels. Competitive anxiety is an emotional response that typically manifests before or during competition. It consists of two components: cognitive and somatic. According to Martens et al. (1990), cognitive anxiety arises from negative expectations about success or from negative self-evaluation; its content concerns thoughts about poor performance, unfavourable evaluation, social comparison, and the expectations of others (Vieira et al., 2011; Wallhead et al., 2004),

all of which can affect performance adversely. Somatic anxiety refers to the physiological and affective aspects of anxiety arising directly from autonomic arousal (Martens et al., 1990), and includes reactions such as muscle tension, tremor, and sweating. The two components relate to athletic performance in distinct ways. While the larger part of this literature documents the costs of competitive anxiety, a smaller body of work has examined its potentially facilitative effects (Mellalieu et al., 2009).

Grounded in multidimensional anxiety theory, two distinct questionnaires have been developed to assess anxiety either as a temporary state or as a stable trait. The Competitive State Anxiety Inventory-2 (Martens et al., 1990) and its revision (Cox et al., 2003) assess the situational occurrence of competitive anxiety and are the most widely used measures of competitive state anxiety. Meanwhile, the Sport Anxiety Scale-2 (Smith et al., 2006) measuring the sport-specific trait anxiety remains the leading instrument within this domain.

The original Sport Anxiety Scale (Smith et al., 1990) was developed to assess individual differences in athletes' cognitive and somatic anxiety and the stability of these tendencies over time. It comprised 21 items assessing anxiety response tendencies across two dimensions, somatic and cognitive, with exploratory and confirmatory factor analysis subsequently subdividing the cognitive dimension into worry and concentration disruption (Dunn et al., 2000; Smith et al., 1990). Smith et al. (2006) later observed that because the original items had been developed with high-school and college athletes, some may have been difficult for younger respondents to understand. They accordingly revised the instrument, using exploratory and confirmatory factor analysis to extract 15 items from a pool of 30 new or revised items, and replicating the original factor structure across samples of differing age. The resulting SAS-2 distributes its items evenly across three subscales: somatic anxiety (items 2, 6, 10, 12, 14), worry (items 3, 5, 8, 9, 11), and concentration disruption (items 1, 4, 7, 13, 15). Items are rated on a four-point scale from 1 (not at all) to 4 (very much), giving subscale scores that range from 5 to 20 when summed. Confirmatory factor analysis supported the three-factor structure (CFI = .95–.97; RMSEA = .050–.065), with satisfactory internal consistency ($\alpha \geq .84$) and test–retest reliability ($\geq .76$) (Smith et al., 2006).

The present study assesses competitive anxiety as a trait rather than a state, and this choice follows from the design. Trait anxiety, understood as a relatively stable disposition to respond to competitive situations with worry, somatic tension, and concentration disruption, can be compared meaningfully across groups tested outside the immediate competitive setting.

A state measure, by contrast, indexes a momentary reaction to a specific upcoming event, and would confound group differences with situational differences at the time of testing.

The SAS-2 has been adapted into a wide range of languages and national contexts, including Spanish (Ramis et al., 2010), Portuguese (Sousa et al., 2011), Brazilian Portuguese (Silva-Rocha & Osório, 2017; Silva-Rocha et al., 2019), Dutch (Jannes et al., 2011), Malay (Hashim et al., 2017), Indonesian (Putra et al., 2021), and Korean (Cho et al., 2018), with accompanying validity and reliability evidence confirming its diagnostic value for psychological assessment in sport.

Research using the instrument has examined how anxiety symptoms vary by gender, age, type of sport, and other psychological factors, with a view to informing individualised intervention. Female athletes have typically reported higher levels of pre-competitive state anxiety, higher worry, and higher global competitive trait anxiety than male athletes (Abrahamsen et al., 2008; Martens et al., 1990). Correia and Rosado (2018) found women higher on general anxiety, somatic anxiety, and concentration disruption, while Ramis et al. (2015) found a smaller difference confined to worry. Some researchers further contend that gender moderates the relationships between the antecedents and consequences of anxiety: Grossbard et al. (2007) found that the associations between motivational climate and anxiety, and between anxiety and performance, differed by gender.

In Poland, the SAS-2 was adapted independently by two research teams working concurrently. Tomczak et al. (2022) published first; the adaptation by the present author and colleagues was completed subsequently and published as Rawat et al. (2023). Comparison of the two Polish versions identified minor differences in the phrasing of individual statements, which linguists and sport psychologists judged equivalent in meaning. The independent replication is itself informative, since convergent adaptation by separate teams provides additional evidence for the stability of the instrument's structure in Polish. A corresponding adaptation was subsequently completed for the Indian context (Rawat et al., 2026).

2.6.1. Culture and competitive anxiety

The adaptations reviewed above establish that the SAS-2 can be administered in a wide range of languages and that its three-factor structure replicates across them. They do not

establish whether competitive anxiety differs in level across cultures, which is a separate question and one on which the evidence is considerably thinner.

The theoretical expectation follows from the individualism-collectivism framework. Where the self is construed interdependently and social recognition carries greater weight, evaluation by others is more salient in achievement settings, and the anticipated social cost of poor performance is correspondingly higher. Since the cognitive component of competitive anxiety is defined precisely by negative expectations about success and negative self-evaluation (Martens et al., 1990), and its content concerns unfavourable evaluation, social comparison, and the expectations of others (Vieira et al., 2011), it is this component rather than the somatic one that should be most sensitive to cultural variation. The horizontal-vertical distinction (Singelis et al., 1995; Triandis & Gelfand, 1998) sharpens this expectation further: India has been characterised as vertically collectivist, combining interdependence with an emphasis on hierarchy and social recognition (Triandis, 1995).

Asghar et al. (2013) provide the most direct test in athlete samples. Comparing German, Chinese, and Pakistani adolescent athletes, they found that the Chinese and Pakistani players reported higher cognitive anxiety than the German players, consistent with the account above. Their results for somatic anxiety were mixed, with the German sample scoring higher than the Chinese but lower than the Pakistani athletes. This asymmetry between the cognitive and somatic components is itself informative: it suggests that cultural differences in competitive anxiety are not uniform across the construct, and that a study reporting only a total anxiety score would obscure them.

The three-factor structure of the SAS-2 permits a more precise expectation still. It separates the cognitive component into two distinct facets. Worry concerns the evaluative content of anxious thought such as, apprehension about failure and its consequences. Concentration disruption, which concerns its attentional consequences, the difficulty of maintaining focus under competitive conditions. If the individualism-collectivism account is valid, the cultural difference should manifest itself in worrying which most directly registers concern about evaluation by others, rather than on the attentional or somatic components.

Several considerations qualify this expectation. Asghar et al. (2013) used a state measure of competitive anxiety rather than a trait measure, their samples were adolescent, and the collectivist comparison groups were East and South Asian rather than specifically Indian.

The reference-group difficulty described in section 2.5.1 applies here with equal force, since anxiety items require respondents to judge the intensity of their own reactions against an implicit standard, and that standard may differ systematically between cultural groups.

2.6.2. Competitive anxiety in esports

Competitive esports involve substantial performance-related demands that may contribute to anxiety, with a growing body of research documenting psychological strain among esports players. The stressors are in some respects more severe than in traditional sport: elite esports players report training volumes of approximately 38 hours per week against 9 to 17 hours for traditional elite athletes, and psychosocial, cultural, and economic pressures contribute to elevated stress with consequences for health and wellbeing (Carrani et al., 2022). Palanichamy et al. (2020) reviewed the evidence on esports and stress systematically, and Rudolf et al. (2022) documented stress and wellbeing outcomes among German esports players.

Qualitative work with elite players and staff describes the psychological texture of these environments in more detail. Poulus et al. (2025) identified burnout, mental ill-health, adverse wellbeing impacts, stress, and mental fatigue as recurrent features of elite esports participation, attributed by participants to the demanding and pressurised nature of training and competition. Support staff described burnout as an anticipated end-of-season outcome for most players rather than an exceptional one. Players also reported protective behaviours, including maintaining social connections and engaging in physical activity, and psychological skills such as goal setting, breathing work, and meditation used to optimise performance.

A structural finding from the same study bears directly on the cross-cultural comparison made here. Access to psychological support differs markedly between major and minor esports regions: players in major regions had access to dedicated training facilities, one-to-one psychological services, and structured physical training, whereas those in minor regions often trained remotely with limited opportunity for psychological support and appeared at higher risk of burnout (Poulus et al., 2025). Since neither India nor Poland occupies the position of a major region in the global competitive landscape, this raises the possibility that anxiety in esports is shaped as much by disparities in institutional provision as by cultural values, and it connects the present question to the structural considerations set out in section 2.4.3.

Two limitations of this literature should be stated. First, it addresses stress, burnout, and general mental health rather than competitive anxiety as conceptualised within the multidimensional model, and, to our knowledge, no study has administered a sport-specific trait anxiety measure such as the SAS-2 to esports players; the closest exception, Ivanišević & Šunje (2022), compared pre-competition anxiety between esports players and athletes. The somatic, worry, and concentration-disruption components have therefore not been separately examined in this population. Second, the literature is not cross-cultural: samples are drawn predominantly from single countries, and where regional comparison occurs it concerns competitive infrastructure rather than cultural values.

Whether competitive trait anxiety differs between traditional and virtual football players cannot therefore be predicted with confidence, and the comparison is expressed as a research question rather than a hypothesis. Arguments can be constructed in either direction. The higher training volumes, the insecurity of the professional pathway, and the limited institutional support available outside the major regions might all be expected to elevate anxiety among eFootball players. Conversely, the absence of physical risk, the more private setting in which much competition takes place, and the lower stakes attaching to any single match in an online format might be expected to reduce it. The three-factor structure of the SAS-2 allows these possibilities to be distinguished at subscale level rather than assessed only in aggregate.

2.7. Cross-cultural comparison: Poland and India

Cultural difference between Poland and India is characterised here using Hofstede's model of cultural dimensions. The model was selected on practical rather than theoretical grounds: it is the most widely applied framework in cross-cultural research, published country scores are available for both nations, and the extensive body of work using it provides a basis against which findings can be interpreted. Its limitations are addressed in section 2.7.3.

The model derives measures of culture from self-reported values, beliefs, and orientations, expressing each as a numerical score on which countries can be compared. These scores have been used extensively in business and management research, and subsequently in political and social science. Minkov and Kaasa (2022) note that several major models of culture have followed Hofstede's example, including those of Schwartz (1994, 2008), Inglehart and Welzel (Inglehart & Baker, 2000; Welzel, 2013), and the GLOBE project (House et al., 2004).

2.7.1. Hofstede's cultural dimensions

The framework originated in survey data collected from IBM employees across more than forty countries between 1967 and 1973, published by Hofstede (1980). Four dimensions were proposed initially. A fifth, long-term orientation, was added following Bond's work with the Chinese Value Survey, which identified a dimension not captured by the original instrument and attributed its absence to the Western cultural assumptions embedded in the survey items (Hofstede & Bond, 1988). A sixth, indulgence versus restraint, was derived by Minkov from World Values Survey data and incorporated subsequently (Hofstede et al., 2010).

Power distance. It concerns the extent to which the less powerful members of a society expect and accept that power is distributed unequally. Societies scoring high on this dimension treat hierarchical difference as a natural feature of social organisation, in workplaces, institutions, and family structures alike. Societies scoring low tend to expect that inequalities of power will be justified and to prefer flatter, more consultative arrangements.

Individualism versus collectivism. It concerns the relationship between the individual and the group. In individualist societies the ties between individuals are loose and people are expected to look after themselves and their immediate family; identity is grounded in the person. In collectivist societies people are integrated from birth into cohesive in-groups that offer protection in exchange for loyalty; identity is grounded in the social network to which one belongs.

Masculinity versus femininity. It concerns the values a society emphasises. Societies at the masculine pole favour achievement, assertiveness, competition, and material reward, and tend to maintain distinct emotional roles for men and women. Societies at the feminine pole favour cooperation, modesty, concern for the vulnerable, and quality of life, with emotional roles that overlap more substantially between the sexes.

Uncertainty avoidance. It concerns a society's tolerance for ambiguity and the unfamiliar. Societies scoring high maintain rigid codes of belief and behaviour, prefer explicit rules and procedures, and are less comfortable with unstructured situations. Societies scoring low maintain a more relaxed attitude in which practice matters more than principle, and deviation from the norm is more readily tolerated.

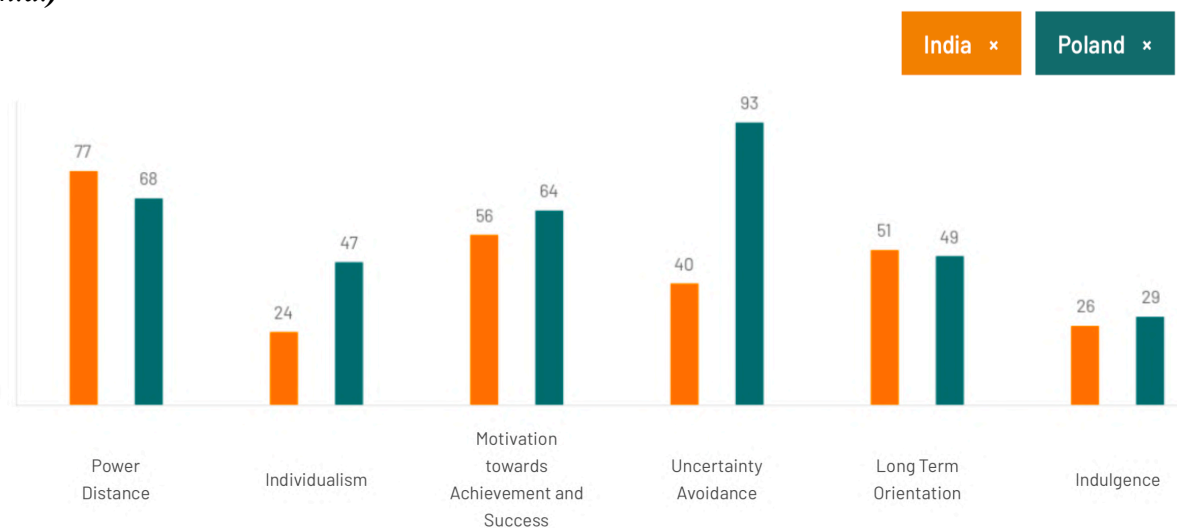
Long-term versus short-term orientation. It concerns the temporal horizon against which a society directs its efforts. Long-term oriented societies regard the world as changing and emphasise preparation, perseverance, and adaptation to circumstance. Short-term oriented societies place greater weight on established tradition and on maintaining continuity with the past, which serves as a normative reference point.

Indulgence versus restraint. It concerns the degree to which a society permits the gratification of basic human drives related to enjoyment and leisure. Indulgent societies allow relatively free gratification and place value on leisure and on the expression of positive emotion. Restrained societies regulate gratification more tightly by means of strict social norms.

2.7.2. Comparison of Poland and India

Figure 6 presents the scores for both countries on the six dimensions, retrieved from the Hofstede Insights country comparison tool (Hofstede Insights, n.d.). The two countries differ substantially on two dimensions and only marginally on the remaining four.

Figure 6. Hofstede cultural dimensions for Poland and India (data from Hofstede Insights, n.d.)



Uncertainty avoidance produces the largest difference. Poland scores 93 against India's 40, placing Poland among the most uncertainty-avoidant societies in the framework and India well below the midpoint. This indicates a strong Polish preference for explicit rules, structured procedures, punctuality, and predictability, alongside a lower tolerance for unorthodox

behaviour, set against a considerably greater Indian tolerance for ambiguity and for departure from plan.

Individualism produces the second-largest difference. India scores 24, placing it clearly towards the collectivist pole, while Poland scores 47, near the midpoint and without a strong preference in either direction. Indian society has been characterised as combining collectivist and individualist elements, with the collectivist emphasis on family, extended family, and work group operating alongside a religious and philosophical tradition that assigns responsibility for the conduct of one's life to the individual (Hofstede Insights, n.d.).

On the remaining four dimensions the two countries are close. Both score high on power distance (India 77, Poland 68), indicating that hierarchical difference is broadly accepted in each. Both fall near the midpoint on motivation towards achievement and success (the dimension formerly termed masculinity) with India at 56 and Poland at 64, though Poland's slightly higher score indicates a somewhat greater emphasis on competition, performance, and assertiveness. Both are near the midpoint on long-term orientation (India 51, Poland 49), showing no strong preference for either a future-directed or a tradition-anchored temporal horizon. And both score low on indulgence (India 26, Poland 29), indicating cultures of relative restraint in which gratification is regulated by social norms and less emphasis is placed on leisure.

Two of these dimensions bear on the present study, and they bear on different parts of it. Individualism underlies the theoretical expectations set out in sections 2.4.1, 2.5.1, and 2.6.1, since those rest on differences in the salience of social comparison and in the norms governing self-description. It is also the dimension relevant to perceived parental support, since family influence over a young person's pursuits is characteristically greater where interdependent self-construal predominates. The difference between the two countries on this dimension is nevertheless substantial rather than extreme: India sits clearly on the collectivist side, while Poland occupies an intermediate position rather than an emphatically individualist one, so predictions resting on an individualist-collectivist contrast should be regarded as directional rather than as describing two poles.

Uncertainty avoidance bears on a different aspect of the study. Professional aspiration involves committing to a career route whose outcome is uncertain, and a strong cultural preference for avoiding uncertainty would be expected to make such commitment contingent

on evidence of likely success that is, on the competitive standard a player has already reached. Where tolerance for uncertainty is higher, aspiration might be expected to depend less closely on attainment. These dimensions are used here to interpret differences rather than to generate predictions and are applied where the pattern of findings makes each relevant.

One caution attaches to these figures. The scores are national aggregates derived originally from a specific occupational population, and their applicability to particular subgroups within a country such as competitive athletes and esports players is not established. This and related issues are considered in section 2.7.3.

2.7.3. Limitations of the Hofstede framework and its role in the present study

Hofstede's model has been enormously influential, but it has also attracted sustained criticism on both conceptual and empirical grounds. McSweeney (2002) questioned the inferential basis of the original work, arguing that national cultures cannot be reliably characterised from survey responses given by employees of a single corporation. Empirical critiques have focused on particular dimensions rather than the framework as a whole. Taras et al. (2012) identified problems with masculinity–femininity and uncertainty avoidance specifically, and subsequent work has been more damaging still: Minkov (2018), Beugelsdijk and Welzel (2018), and Minkov and Kaasa (2021) each found that these two dimensions could not be recovered from nationally representative databases and lacked convincing predictive properties.

The picture for individualism–collectivism is different. Measures of this dimension have been developed independently using diverse methods theory-driven in the case of House et al. (2004), data-driven in the Chinese Culture Connection (1987), and mixed in Minkov et al. (2017) and they converge strongly, which suggests that the dimension tracks something beyond the particular instrument used to measure it. Large-scale revision of the model has confirmed this asymmetry: individualism–collectivism emerges as the most robust and reproducible dimension of national culture, while uncertainty avoidance and masculinity–femininity fail to replicate (Minkov & Kaasa., 2022). Akaliyski et al. (2026) nevertheless caution that Hofstede's original individualism–collectivism scores may overestimate individualism in English-speaking countries and collectivism in East Asian societies, and recommend that researchers rely on updated rather than original indices.

Two implications follow for the present study. First, the India–Poland contrast drawn in this thesis rests primarily on individualism–collectivism, the dimension that has survived this critical literature, rather than on the contested dimensions. Where uncertainty avoidance is invoked in section 2.7.2 to interpret findings on professional aspiration, it is used with awareness of its disputed psychometric status and as one possible reading among others rather than as an established explanatory resource.

Second, and more importantly, the cultural comparison made here does not depend on Hofstede's country scores at all. Lacko et al. (2022) demonstrate that comparing raw questionnaire means across countries can produce biased conclusions where instruments do not measure the same construct in the same way in each group, and that valid cross-cultural comparison requires testing measurement invariance and comparing latent means within a multi-group confirmatory factor analysis framework. That is the strategy adopted here: measurement invariance of the 3×2 AGQ-S, the SAS-2, and the PSDQ-S is formally established across the Indian and Polish samples before any substantive comparison is interpreted, so that observed differences can be attributed to the constructs themselves rather than to differences in how the instruments function across cultures.

Hofstede's dimensions therefore serve an interpretive rather than a measurement function in this thesis. Individualism–collectivism provides a theoretical framework for explaining the pattern and direction of any differences observed between the Indian and Polish samples; it is not a measured variable on which the validity of the comparison depends. The empirical basis of the comparison is the invariance-tested structure of the three instruments, and the cultural dimension supplies the conceptual lens through which the resulting similarities and differences are interpreted.

2.8. Research questions and hypotheses

This study examines achievement goals, competitive anxiety and physical self-concept among competitive football and eFootball players in Poland and India. Three aims follow from the literature reviewed above. The first is to establish whether these constructs differ across cultures and across competitive contexts, and whether cultural and contextual influences operate independently or interactively. The second is to determine how achievement goals relate to competitive anxiety and to physical self-concept, and whether those relationships are

themselves culturally or contextually contingent. The third is to establish what role contextual variables play in accounting for these differences and in shaping professional aspiration.

Hypotheses are stated below where the existing literature supports a directional prediction. Where the literature is absent, mixed, or concerns populations sufficiently different from the present samples that a directional prediction could not be justified, the aim is expressed as a research question instead.

Cultural differences

The three predictions below follow from the individualism-collectivism framework set out in section 2.4.1, and from Asghar et al.'s (2013) comparison of German, Chinese and Pakistani athletes on the same three constructs.

Where the self is construed interdependently and social recognition is salient, competence is more often judged against the performance of others.

H1. Indian participants will report higher other-approach and other-avoidance goal orientations than Polish participants.

Where evaluation by others carries greater weight, the anticipated cost of failure is higher, and the cognitive component of anxiety should be most affected.

H2. Indian participants will report higher competitive anxiety than Polish participants, particularly on the worry subscale.

For physical self-concept the expectation reverses, since positive self-description is more normative in individualist settings and self-effacement more normative in collectivist ones.

H3. Polish participants will report higher physical self-concept than Indian participants across the PSDQ-S subscales.

Contextual differences

The evidence on esports players' physical status reviewed in section 2.5.2 concerns physical activity levels, body composition, and lean mass rather than physical self-perception generally. If differences in objective physical status translate into differences in self-perception, they should appear in the facets that correspond most directly to what has been measured: activity,

sport competence, endurance, and body fat rather than in facets such as coordination, flexibility, or global self-esteem, which the physical-status literature does not address. The contextual comparison is therefore stated as a directional hypothesis for physical self-concept only. Physical self-concept is grounded in bodily activity and performance feedback, which differ systematically between the two forms of competition, and this provides a basis for predicting both the direction and the location of the difference. No comparable basis exists for competitive anxiety or achievement goals in esports, and these are accordingly addressed through an open research question RQ1 rather than a hypothesis.

H4. Football players will report higher physical self-concept than eFootball players, with the difference concentrated in the activity, sport competence, endurance and body fat subscales rather than distributed uniformly across all eleven.

Competitive esports offer a more recent and less codified pathway to professional status than association football.

H5. Football players will report stronger intention to pursue their activity professionally than eFootball players.

For competitive anxiety and achievement goals no directional prediction is warranted: neither has been examined in esports using the instruments employed here, and the available evidence on esports motivation does not converge (section 2.4.2).

RQ1. Do competitive anxiety and achievement goal orientations differ between football and eFootball players?

The joint interaction of culture and context

To our knowledge, no study has crossed cultural and contextual comparison in this domain, and there is accordingly no basis for predicting whether the two operate additively or interactively. This question is central to the design and is stated as a research question.

RQ2. Does the magnitude of cultural difference in achievement goals, competitive anxiety and physical self-concept depend on competitive context, or do cultural and contextual influences operate additively?

Relationships among the constructs

Within achievement goal theory, approach goals are associated with adaptive motivational and affective outcomes, whereas avoidance goals, being organised around the prospect of failure, are associated with maladaptive ones. In sport, performance- and ego-oriented goals have been positively associated with competitive anxiety, whereas task- and mastery-oriented goals show negative or non-significant associations (Abrahamsen et al., 2008; Cury et al., 2002; Li & Chi, 2007; Ntoumanis & Biddle, 1998). Applied to the 3×2 model, this yields opposing predictions for the two valences.

H6. Approach goal orientations will be negatively associated with competitive anxiety, whereas avoidance goal orientations will be positively associated with it.

Task- and self-referenced goals concern the development of competence, and their pursuit has been linked to more favourable self-perceptions in the domain concerned (Cetinkalp, 2012).

H7. Task-approach and self-approach goal orientations will be positively associated with physical self-concept.

Existing structural models have treated anxiety as a predictor of physical self-concept alongside motivational variables. Melguizo-Ibáñez et al. (2022), for example, modelled general anxiety as correlated with perceived task- and ego-oriented climates and found that it predicted lower physical self-concept among educational sciences students ($\beta = -.31$). That model used a general anxiety measure and a non-athlete sample, and anxiety was not positioned between motivation and self-concept. Whether sport-specific competitive anxiety relates to physical self-concept, and whether it links personal achievement goals to physical self-concept, is therefore unresolved.

RQ3. Are competitive anxiety and physical self-concept related to one another, and if so does either mediate the relationship between achievement goals and the other?

Whether these relationships hold uniformly across cultural and competitive contexts has not been examined, and no theoretical account specifies which paths should differ or in which direction. Establishing measurement invariance across all four comparison frames, reported in Chapter 4, permits the question to be addressed but does not answer it.

RQ4. Do the relationships among achievement goals, competitive anxiety and physical self-concept differ across countries or across competitive contexts?

Contextual variables

In collectivist cultural settings the family exerts greater influence over the legitimacy of a young person's pursuits, and competitive gaming in particular lacks the established social sanction of traditional sport. Perceived parental support would therefore be expected to bear more strongly on psychological outcomes where interdependent self-construal predominates (section 2.4.1).

H8. Perceived parental support will be more strongly associated with achievement goals, competitive anxiety and physical self-concept among Indian participants than among Polish participants.

The remaining contextual variables are examined without directional prediction.

RQ5. Are perceived institutional support and perceived standard of the game associated with achievement goals, competitive anxiety or physical self-concept, and do these associations differ by country or context?

Body mass index is not a contextual variable in the same sense but is examined alongside them as a characteristic that may condition how participants perceive their physical selves.

RQ6. Is body mass index associated with physical self-concept, and does this association differ by country or context?

The correlates of professional aspiration have not been examined in either population, and the relative contribution of psychological and structural factors is unknown.

RQ7. Which demographic, structural and psychological variables predict the intention to pursue the activity professionally, and do these predictors differ across countries or across competitive contexts?

Consistent with the analytic strategy described in section 3.7, perceived parental support is treated as the confirmatory contextual variable and the remaining contextual analyses as exploratory.

Chapter 3: Methodology

The central question of this thesis whether achievement motivation, competitive anxiety, and physical self-concept operate similarly among traditional and virtual football players, and whether they do so similarly across cultures is addressed through a 2×2 cross-cultural, cross-contextual design. Indian and Polish football and eFootball players were compared in a fully crossed arrangement, permitting cultural and contextual influences to be examined both separately and jointly.

The empirical work proceeds in four steps, each addressing a distinct question. Chapter 4 establishes the measurement properties of the three instruments, testing whether they function equivalently across country within each competitive context and across context within each country. This comes first because every subsequent comparison depends on the answer: mean differences between groups can only be interpreted where the instruments are shown to measure the same constructs on the same scale in each. Chapter 5 then examines group differences, testing the effects of culture and competitive context on the three constructs and, critically, whether the two operate independently or interactively. Chapter 6 turns from differences in level to differences in relationship, examining how achievement goals relate to competitive anxiety and physical self-concept and whether those relationships are themselves culturally or contextually contingent. Chapter 7 examines the contextual variables: parental and institutional support, perceived standard of the game, and body mass together with the correlates of professional aspiration.

This ordering is analytic rather than hierarchical. Each chapter answers one question and reports each analysis once; the four comparison frames that the design permits, Indian against Polish players within each context, and football against eFootball players within each country recur as sections within chapters rather than as chapters in their own right. This arrangement avoids describing the same participants and instruments repeatedly and allows the question of whether cultural and contextual influences are additive to be addressed directly rather than inferred by the reader from separately reported comparisons.

3.1. Research Design

The study employed a fully crossed 2×2 between-participants design, with country (India, Poland) and context (football, eFootball) as the two between-participants factors. A total of 800 competitive players took part, with 200 in each of the four cells. The balanced cell structure was achieved by design rather than by post hoc matching, so that the two factors were

orthogonal and the interaction term could be estimated without the loss of power that accompanies unequal cell sizes.

The design supports two complementary comparison frames. The cross-cultural frame contrasts Indian and Polish participants within each competitive context, while the cross-contextual frame contrasts football and eFootball participants within each country. Because both frames are slices of the same 800 participants, a single set of descriptive statistics organised by cell serves both, and only the inferential contrasts differ between them.

3.2. Sample

A total of 800 competitive players took part in the study: 400 football players and 400 eFootball players, with 200 participants from India and 200 from Poland within each context. A total of 823 players completed the questionnaire battery. Twenty-three cases were removed prior to analysis owing to missing data: 10 from the Indian football sample, 5 from the Indian eFootball sample, 3 from the Polish football sample, and 5 from the Polish eFootball sample. This left 800 complete cases, distributed evenly across the four cells. Recruitment in each cell continued until 200 complete questionnaires had been obtained.

A further 22 cases were identified during data screening as multivariate outliers on the Mahalanobis distance criterion (section 3.6). These were retained in the analyses, since they contained no missing data and their exclusion could not be justified on the grounds of incomplete response alone; they were instead flagged and examined in a sensitivity analysis reported in Chapter 5.

Eligibility criteria

Three criteria applied to all four samples. Participants were required to be male, to be aged between 18 and 35 years, and to be currently active in organised competition within their respective context.

The decision to recruit only male participants was made for reasons of accessibility rather than theoretical interest. Women's association football in India remains substantially less developed than the men's game in terms of the number of registered clubs, league structures, and available participants at the competitive levels sampled here, and recruiting a female sample of comparable size and competitive standard was not feasible within the constraints of the project. Restricting all four cells to male participants preserves comparability across the 2

× 2 design, since a sex imbalance concentrated in one country or one context would have confounded the comparisons of interest. This restriction nevertheless limits the generalisability of the findings and is revisited in the discussion of limitations.

The age range of 18 to 35 years was applied so that all participants were adults with accumulated competitive experience, and so that consent could be obtained directly rather than through guardians. The lower bound excludes youth players whose achievement goals and physical self-perceptions may still be undergoing developmental change; the upper bound excludes veteran and masters competitors, whose relationship to competitive aspiration differs from that of players in the active phase of a competitive career.

Participation in organised competition was required in both contexts, though operationalised differently in each. For the football samples, eligibility required current registration with a club competing in an organised league. Recreational and purely casual players were not eligible. For the eFootball samples, eligibility followed the standardised definition proposed by Mendoza et al. (2023), under which esports players are competitive players involved in organised tournaments as well as participating in, training for, and preparing for them. All 400 eFootball participants reported participation in named, organised competitions; players whose competitive activity was limited to in-game ranked modes did not qualify, consistent with Mendoza et al.'s distinction between ranked play and esports. Training engagement, the second element of that definition, was assessed through two self-report items measuring session frequency and session duration, following the frequency-by-duration logic of standard physical activity measurement (Craig et al., 2003) as applied in previous esports research (Giakoni-Ramírez et al., 2022; Nagorsky & Wiemeyer, 2020). Estimated weekly playing volumes were consistent with those reported for competitive esports players (Nagorsky & Wiemeyer, 2020), although, as frequency was measured on an ordinal scale, weekly estimates required assigning days-per-week values to the ordinal categories and should be regarded as approximate.

Recruitment

Convenience sampling was used in both contexts, with recruitment procedures adapted to the different organisational structures of the two settings.

Football players were recruited through clubs competing in national league structures in both countries. The researchers approached clubs directly and, with the agreement of coaching staff, invited players to take part during scheduled training sessions. Recruiting through clubs at comparable levels of the national league pyramid was intended to hold competitive standard broadly consistent across the two countries.

eFootball players were recruited through three channels, reflecting the more distributed organisation of competitive gaming. First, tournament organisers of federation-sanctioned and league-affiliated competitions were approached and invited to circulate the study to registered competitors. Second, the study was distributed through established competitive eFootball communities and player groups in both countries. Third, players contracted to or affiliated with esports club rosters were invited through their organisations. In all three channels, participation was restricted to players meeting the eligibility criteria described above.

No compensation was offered for participation. Participants were, however, provided with contact details through which they could request free counselling support, in the event that completing the questionnaires caused distress.

Classification of competitive standard

Because competitive standard is defined differently in traditional sport and in esports, participants in each context were classified against a context-appropriate five-tier framework and then collapsed onto a common three-band scale, so that the two contexts could be compared on an equivalent footing.

Football players were classified following the principles set out by Swann, Moran, and Piggott (2015) for defining elite athletes in sport psychology research, and the participant classification framework of McKay et al. (2022), both of which grade competitive standard by the level of competition entered and the selectivity of that level. Each participant self-reported the most important leagues and competitions in which they had played, and quality of their sports career. Five options were given to the players to report their quality of sports career (competitive standard): international or representative competition, including national youth team selection and foreign top-league experience, with all such entries individually reviewed given their rarity; top-tier national senior competition, such as the ISL, I-League, Santosh Trophy, and Durand Cup in India, and the Ekstraklasa and Polish championships in Poland;

second-tier national competition and national-level youth, school, or university competition, such as I liga and II liga, the I-League Second Division, the Central Junior League, and national school and university championships; state or regional premier competition, such as the Goa Professional League, the Kerala Premier League, III and IV liga, and voivodeship leagues; and district, local, or school-regional competition.

Virtual football players were classified using the competition-standard approach of Poulus et al. (2024). Each participant reported the most important leagues and competitions in which they had played and the quality of their esports career, and was assigned to the highest category matched by any of the competitions reported. Five options were given to the players to report their quality of esports career (competitive standard): international selective events, such as the FIFAE World Cup and FIFAE Nations Series; top-tier national competition organised by official federations or leagues, such as the AIFF eFootball Challenge, eISL, PZPN eFutbol, and Ekstraklasa Games; international open or online qualifiers, such as the FIFAE Club Series open stages; second-tier national leagues; and regional, community, or collegiate competition. Open-entry international qualifiers were ranked below selective national competition because tier assignment followed competition selectivity rather than geographic scope: entry to a top-tier national league requires selection by a professional club for a limited number of contracted places, whereas open online qualifiers may be entered by any player holding a sufficient in-game ranking. This ordering is consistent with the emphasis on competition standard and selectivity in Poulus et al. (2024). The five tiers were collapsed identically in each context, with Tiers 1 and 2 forming the elite band, Tier 3 the semi-elite band, and Tiers 4 and 5 the non-elite band, so that the band variable carried the same meaning across contexts. The distribution of participants across both classifications is reported in Table 2. One feature of that distribution warrants comment: no Indian eFootball participant fell into Tier 4, reflecting the structure of the Indian competitive circuit, in which organised competition below the top national level is delivered predominantly through open online events classified at Tier 5.

Participant characteristics

Participants were aged 18-35 years. The four equally sized groups differed in age, anthropometry, education, domicile, frequency of training in football/eFootball, and contextual support variables (Tables 1-3). These differences reflect the recruitment of intact competitive populations across two countries and contexts; their possible influence was therefore examined

in covariate-adjusted and experience-matched sensitivity analyses (section 5.7) and, for the contextual variables, in the moderation models of Chapter 7.

Table 1. *Demographic and anthropometric characteristics of participants by country and context*

Characteristic	Football India	Football Poland	eFootball India	eFootball Poland
	(n = 200)	(n = 200)	(n = 200)	(n = 200)
Age (years)				
M (SD)	21.00 (3.01)	23.37 (4.52)	23.16 (3.13)	22.50 (3.65)
Range	18-35	18-35	18-32	18-35
Anthropometrics				
Height (cm), M (SD)	170.76 (7.79)	175.68 (9.63)	170.53 (8.96)	174.52 (9.49)
Weight (kg), M (SD)	62.40 (8.21)	70.78 (11.64)	66.62 (12.36)	70.86 (14.24)
BMI (kg/ m ²), M (SD)	21.39 (2.32)	22.84 (2.65)	22.83 (3.35)	23.16 (3.74)
Educational attainment, n (%)				
Primary	2 (1.0)	3 (1.5)	2 (1.0)	1 (0.5)
Secondary / high school	63 (31.5)	21 (10.5)	9 (4.5)	6 (3.0)
Vocational	26 (13.0)	59 (29.5)	10 (5.0)	34 (17.0)
Graduation	109 (54.5)	117 (58.5)	179 (89.5)	159 (79.5)
Domicile, n (%)				
Village	88 (44.0)	41 (20.5)	28 (14.0)	41 (20.5)
Town	32 (16.0)	30 (15.0)	26 (13.0)	29 (14.5)
City	66 (33.0)	20 (10.0)	92 (46.0)	34 (17.0)
Metropolitan	14 (7.0)	109 (54.5)	54 (27.0)	96 (48.0)

Note. All participants were male. BMI = body mass index. Percentages are computed within cell.

Table 2. *Competitive standard and engagement by country and context*

Characteristic	Football India	Football Poland	eFootball India	eFootball Poland
	(n = 200)	(n = 200)	(n = 200)	(n = 200)
<i>Tier (five-band), n</i>				
Tier 1	4	17	14	6
Tier 2	63	35	63	58
Tier 3	54	50	44	79
Tier 4	58	55	0	35
Tier 5	21	43	79	22
<i>Competitive standard, n (%)</i>				
Elite (Tiers 1–2)	67 (33.5)	52 (26.0)	77 (38.5)	64 (32.0)
Semi-elite (Tier 3)	54 (27.0)	50 (25.0)	44 (22.0)	79 (39.5)
Non-elite (Tiers 4–5)	79 (39.5)	98 (49.0)	79 (39.5)	57 (28.5)
<i>Frequency of training football/eFootball, n (%)</i>				
Several times a month	13 (6.5)	7 (3.5)	36 (18.0)	24 (12.0)
Once a week	10 (5.0)	14 (7.0)	17 (8.5)	27 (13.5)
A few times a week	18 (9.0)	120 (60.0)	45 (22.5)	84 (42.0)
Daily	159 (79.5)	59 (29.5)	102 (51.0)	65 (32.5)
<i>Competitive Experience (years)</i>				
M (SD)	8.48 (3.00)	12.50 (4.52)	4.73 (1.63)	4.95 (2.27)
Range	3–20	4–27	1–10	2–15

Note. Tiers were assigned within context: for football, following Swann et al. (2015) and McKay et al. (2022); for eFootball, following Poulus et al. (2024). The three-band collapse (elite = Tiers 1-2, semi-elite = Tier 3, non-elite = Tiers 4-5) was applied identically in both contexts.

Table 3. *Contextual variables by country and competitive context*

Characteristic	Football India (n = 200)	Football Poland (n = 200)	eFootball India (n = 200)	eFootball Poland (n = 200)
<i>Parental support, n (%)</i>				
Yes	82 (41.0)	86 (43.0)	44 (22.0)	51 (25.5)
Mixed	41 (20.5)	36 (18.0)	85 (42.5)	13 (6.5)
No	46 (23.0)	36 (18.0)	36 (18.0)	78 (39.0)
Indifferent	31 (15.5)	42 (21.0)	35 (17.5)	58 (29.0)
<i>Institutional support, n (%)</i>				
Yes	115 (57.5)	132 (66.0)	52 (26.0)	61 (30.5)
No	85 (42.5)	68 (34.0)	148 (74.0)	139 (69.5)
<i>Professional intention, n (%)</i>				
Yes	127 (63.5)	132 (66.0)	76 (38.0)	51 (25.5)
Maybe or no (Not planned)	73 (36.5)	68 (34.0)	124 (62.0)	149 (74.5)

Note. Parental support and institutional support were recorded as single self-report items. “Indifferent” corresponds to the response option “I don’t care” from participant’s perspective. Professional intention is shown in its dichotomised form; the three-category distribution is reported in Chapter 7.

Table 4. *Context-specific participant characteristics*

Characteristic	India (n = 200)	Poland (n = 200)
<i>Football - playing position, n (%)</i>		
Goalkeeper	20 (10.0)	20 (10.0)

Characteristic	India (n = 200)	Poland (n = 200)
Defender	59 (29.5)	62 (31.0)
Midfielder	69 (34.5)	69 (34.5)
Forward	52 (26.0)	49 (24.5)
<i>eFootball - platform used, n (%)</i>		
PC	87 (43.5)	141 (70.5)
PlayStation	84 (42.0)	92 (46.0)
Xbox	40 (20.0)	88 (44.0)
Mobile phone	47 (23.5)	7 (3.5)
<i>eFootball - usual play setting, n (%)</i>		
At home	82 (41.0)	51 (25.5)
esports club / Gaming café / Football Club	55 (27.5)	19 (9.5)
Both	63 (31.5)	130 (65.0)
<i>eFootball - hours per session</i>		
M (SD)	3.60 (0.99)	3.84 (0.78)
Range	1.5–7.0	2.0–6.0

Note. Platform use was a multiple-response item, so percentages sum to more than 100. Hours per session was derived from the midpoint of the reported range.

3.3. Measures

Three self-report instruments were administered, together with a set of single-item contextual measures described in section 3.4. They had been adapted for the Polish and Indian contexts by the author and colleagues prior to the main study (Rawat, 2026; Rawat et al., 2023, 2024, 2026, under review, using the procedure described below. Internal consistency and factorial validity in the present samples are reported in Chapter 4.

Adaptation procedure

Each instrument was adapted for both target populations before the main data collection, in a separate phase conducted between December 2022 and February 2023 using independent samples. For the Polish versions, three language specialists produced independent translations, which were compared and reconciled in discussion with the research team and a sport psychologist to ensure conceptual accuracy. Two independent psychologists fluent in English then performed a back-translation, and remaining discrepancies were resolved through discussion. The finalised versions were evaluated for clarity and comprehensibility before administration. For the Indian versions, three subject-matter experts reviewed and culturally adapted the original English instruments for linguistic clarity and contextual relevance, introducing minor wording modifications where the original phrasing risked ambiguity while retaining the conceptual meaning of the items. Hindi translations were also prepared and subjected to expert review and back-translation by two independent bilingual psychologists, but the number of completed Hindi questionnaires proved insufficient for robust psychometric testing and this version was not carried forward.

Measure for Achievement Motivation

Achievement goals were measured with the 3×2 Achievement Goal Questionnaire for Sport, developed by Mascret, Elliot, and Cury (2015) and subsequently revised by Wang et al. (2017). The instrument operationalises the 3×2 model by crossing three standards of competence: task-based, self-based, and other-based with two valences, approach and avoidance, yielding six subscales: task-approach, task-avoidance, self-approach, self-avoidance, other-approach, and other-avoidance.

The questionnaire comprises 18 items, three per subscale. Wang et al. (2017) revised several items to improve clarity, particularly within the task-approach and task-avoidance subscales, where the original wording could be interpreted as self- or other-referenced; the revised items refer explicitly to the techniques, skills, and tactics that constitute mastery in sport (for example, “I aim to execute the skills correctly” for task-approach, and “I avoid making a lot of technical errors” for task-avoidance). The revised version was used here.

Responses are recorded on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Subscale scores were computed as the mean of the three constituent items,

so that scores retain the metric of the response scale and range from 1 to 7, with higher scores indicating stronger endorsement of that goal orientation.

The instrument was adapted for the Polish population by Rawat et al. (2024) in a sample of 396 athletes aged 18-35 across a range of disciplines, and for the Indian population by Rawat (2026) in a sample of 402 athletes of the same age range. Both studies confirmed the six-factor structure and established measurement invariance across gender, level of sport participation, and type of sport. Internal consistency was high in both (total scale $\alpha = .93$; subscale $\alpha = .83-.91$ in Poland and $.88-.92$ in India), as was test-retest reliability ($ICC = .89-.97$ in both samples). Convergent validity was supported through associations with the Task and Ego Orientation in Sport Questionnaire and the State-Trait Anxiety Inventory in Poland, and with the Anxiety, Depression and Stress Scale and the Achievement Motivation Scale in India.

In the present samples, internal consistency was acceptable to excellent across all six subscales in all four cells ($\alpha = .784-.962$; $\omega = .785-.962$), and full scalar invariance was established across country within each context, across context within each country, and in the four-group model crossing the two factors; these results are reported in Chapter 4.

Measure for competitive anxiety

Competitive trait anxiety was measured with the Sport Anxiety Scale-2, developed by Smith, Smoll, Cumming, and Grossbard (2006). The instrument assesses dispositional anxiety in competitive settings across three subscales: somatic anxiety, worry, and concentration disruption. The scale was selected in preference to state measures such as the CSAI-2 because trait anxiety can be compared meaningfully across groups tested outside the immediate competitive setting, whereas a state measure would confound group differences with situational differences at the time of testing.

The questionnaire comprises 15 items, five per subscale. Somatic anxiety is assessed by items 2, 6, 10, 12, and 14; worry by items 3, 5, 8, 9, and 11; and concentration disruption by items 1, 4, 7, 13, and 15. Responses are recorded on a four-point scale ranging from 1 (not at all) to 4 (very much). Subscale scores were computed as the mean of the five constituent items, so that scores range from 1 to 4; where sum scores are reported in the source literature these range from 5 to 20, and the two metrics are linearly equivalent.

The SAS-2 has been adapted into a wide range of languages, including Spanish (Ramis et al., 2010), Portuguese (Sousa et al., 2011), Brazilian Portuguese (Silva-Rocha et al., 2019), Korean (Cho et al., 2018), Malay (Hashim et al., 2017), Indonesian (Putra et al., 2021), Chinese (Zhang et al., 2023), and Japanese (Yamaguchi et al., 2025), with the three-factor structure replicating consistently. The instrument was adapted for the Polish population by Rawat et al. (2023) in a sample of 396 athletes aged 18-35, and for the Indian population by Rawat et al. (2026) in a sample of 416 athletes aged 18-35 ($M = 22.83$, $SD = 3.38$). A Polish adaptation was also published independently by Tomczak et al. (2022); the two versions were compared and found to differ only in minor points of phrasing, which linguists and sport psychologists judged equivalent in meaning. Both the three-factor and hierarchical models fitted well in each sample (Poland: $CFI > .95$, $TLI > .95$, $RMSEA < .08$; India: $CFI > .90$, $TLI > .90$, $RMSEA < .08$), and measurement invariance was established across gender and level of competition. Internal consistency was satisfactory in both (Poland total $\alpha = .93$, subscale $\alpha = .86-.95$; India total $\alpha = .90$, subscale $\alpha = .77-.79$), as was test-retest reliability ($ICC = .87-.90$ and $.79-.84$ respectively).

In the present samples, internal consistency was acceptable to excellent across all three subscales. The lowest α is .761, in all four cells ($\alpha = .761-.958$; $\omega = .764-.958$), and full scalar invariance was established across country within each context, across context within each country, and in the four-group model crossing the two factors; these results are reported in Chapter 4.

Measure for Physical self-concept

Physical self-concept was measured with the short form of the Physical Self-Description Questionnaire (Marsh, Martin, & Jackson, 2010), a 40-item instrument derived from the 70-item original (Marsh, Richards, Johnson, Roche, & Tremayne, 1994). The PSDQ operationalises the multidimensional and hierarchical model of self-concept advanced by Shavelson, Hubner, and Stanton (1976) and developed for the physical domain by Fox and Corbin (1989).

The short form retains all eleven subscales of the original instrument. Seven are measured by three items each: appearance, body fat, endurance, flexibility, global physical self-concept, sport competence, and strength. Activity is measured by four items. Three are measured by five items each: coordination, health, and global self-esteem. The eleven subscales

span three levels of the hierarchical model: global self-esteem at the apex, global physical self-concept at the domain level, and the remaining nine at the subdomain level.

Responses are recorded on a six-point scale ranging from 1 (false) to 6 (true). Subscale scores were computed as the mean of the constituent items, so that scores range from 1 to 6 and are comparable across subscales of differing length. Ten items are negatively worded and were reverse-scored before subscale means were computed (items 6, 15, 25, 32, and 39 of health; 9, 17, and 21 of body fat; and 24 and 40 of global self-esteem). Health and body fat therefore consist entirely of reverse-keyed items, and global self-esteem contains two, a feature that bears on the analyses reported in Chapters 4 and 5.

The short form was developed and validated on a normative sample of 1,607 Australian high-school students and cross-validated on a new sample of 708 Australian adolescents together with four further samples: 349 Australian elite-athlete adolescents, 986 Spanish adolescents, 395 Israeli university students, 760 Australian older adults (Marsh et al., 2010). The eleven-factor structure was invariant across all six groups. Subsequent validations have been more mixed. The structure has been supported among Slovenian school students (Dolenc, 2016) and Finnish adolescent athletes (Haapea et al., 2018), but fitted poorly in a Flemish sample (Simons & Van Damme, 2019), and a recent Chinese revision retained only eight factors (Cai et al., 2025). Maïano et al. (2015) established strict invariance across sex, age, body mass index, and involvement in sport, although the model required a method factor for the negatively worded items, and the latent means were not invariant across sex, body mass index, or sport involvement. Martin and Whalen (2012) likewise reported weak functioning of the negatively worded self-esteem items among athletes.

The instrument was adapted for both populations by the author and colleagues], in samples of 596 Polish and 616 Indian athletes aged 18-35 drawn from a range of disciplines. The eleven-factor structure fitted acceptably in both (Poland: CFI = .932, TLI = .922, RMSEA = .057, SRMR = .045; India: CFI = .953, TLI = .946, RMSEA = .048, SRMR = .039), with satisfactory internal consistency (Poland α = .839-.922; India α = .813-.955) and composite reliability and average variance extracted exceeding conventional thresholds throughout. Measurement invariance held across gender, level of sport participation, and country, with no change in CFI exceeding .01 or increase in RMSEA exceeding .015, except in the four-group model crossing country with participation level, where full scalar invariance required the intercepts of items 38 and 40 to be freed. The adaptation paper was under review at the time of

writing; psychometric detail is provided in Appendix D (Rawat et al., under review). In the present samples, internal consistency was acceptable to excellent across all eleven subscales in all four samples ($\alpha = .789-.952$; $\omega = .792-.952$), the lowest value being for the body fat subscale in the Indian eFootball sample.

3.4. Contextual variables

Alongside the three psychological instruments, participants completed a set of single-item measures concerning the circumstances in which they competed. These were included because the two countries and two competitive contexts differ in the institutional and familial support available to players, and because such differences may bear on the psychological constructs under study. Each is described below, together with its coding.

Perceived parental support: Participants indicated the extent to which they perceive their parents as supporting their pursuit of football or eFootball, selecting one of four options: yes, mixed, no, or an expression of : indifference to parental support ("I don't care"). Responses were coded 1 = no, 2 = yes, 3 = mixed, and 4 = indifferent. The variable is nominal rather than ordinal, since indifference does not fall on a continuum between support and its absence, and it was accordingly analysed with tests appropriate to unordered categories. For the supplementary binary contrast reported in Chapter 7, the variable was dichotomised into clear support (yes) versus its absence (no, mixed, or indifferent).

Perceived institutional support: Participants indicated whether they received support from government bodies or sporting organisations in pursuing their activity, responding yes or no. Responses were coded 0 = no, 1 = yes.

Professional intention: Participants indicated whether they intended to pursue their activity professionally, selecting yes, maybe, or no. For the inferential analyses the variable was dichotomised into a clear professional intention (yes) versus its absence (maybe or no), coded 1 and 0 respectively. The dichotomisation was necessary because the uncertain category was unevenly distributed across cells, ranging from 55 participants in the Indian eFootball sample to 10 in the Polish eFootball sample, an asymmetry that rendered the proportional odds assumption untenable in one cell. Both the three-category and dichotomised distributions are reported in Chapter 7.

Perceived standard of the game: Participants rated the current state and level of development of their sport or competitive gaming scene in their own country on a five-point scale from 1 (very poor) to 5 (very good). Because the extreme categories were sparsely populated in some cells, with no Indian football participant selecting the lowest category, responses were collapsed into three ordered categories for analysis: poor (original 1-2), fair (3), and good (4-5).

Body mass index category: Height and weight were self-reported, and body mass index was computed as weight in kilograms divided by height in metres squared. The continuous value was banded into four categories following World Health Organization criteria: underweight (< 18.5), normal weight (18.5-24.9), overweight (25.0-29.9), and obese (≥ 30.0). Because the highest category contained only seven participants across the full sample, rank correlations with the psychological measures were computed using the ordinal band variable, and the continuous value was retained for the covariate analyses.

3.5. Procedure

The adaptation phase of data collection was conducted between December 2022 and February 2023, in which the three instruments were adapted for the Polish and Indian contexts. Those studies used independent samples and are reported separately (Rawat et al., 2023, 2024, 2026); the PSDQ-S adaptation manuscript for both languages is currently under review (Rawat et al., under review). Data collection for the present study ran from September 2023 to September 2024.

Ethical approval and consent

The study received ethical approval from the Ethics Committee of Kazimierz Wielki University (Opinion no. 4/17.10.2022; date of approval: 29 November 2022. Before taking part, all participants read an information sheet describing the study and provided informed consent, in writing where the battery was completed on paper and electronically by selecting "Yes" on the consent form where it was completed online (see Appendix C).

Language versions

Each sample completed the instruments in the language version adapted for its own context. Polish participants completed the Polish adaptations of the 3×2 AGQ-S, the SAS-2, and the

PSDQ-S. Indian participants completed the Indian English adaptations of the same three instruments, likewise developed by the author and colleagues. English was selected for the Indian samples in preference to any single Indian language because of the linguistic diversity of India. A Hindi version of each instrument was prepared during the adaptation phase and subjected to expert review and back-translation by two independent bilingual psychologists, with the intention of improving accessibility for participants from North India. However, the number of completed Hindi questionnaires proved insufficient for psychometric evaluation, and the Hindi version was therefore not carried forward to the main study. Beyond this practical constraint, administering the instruments in any single Indian language would in any case have restricted recruitment to speakers of that language, while producing and validating versions in several would have introduced further sources of non-equivalence into a design already comparing four groups. English is the medium of higher education and some of the organised competitive sport administration in India. Most Indian participants had completed or were completing university education (54.5% of football and 89.5% of eFootball participants reported graduation), and nearly all had completed at least secondary schooling (99.0% in each group). The adaptation process nevertheless simplified item wording where the original phrasing risked ambiguity for non-native speakers, and the resulting versions were subjected to the same psychometric evaluation as the Polish versions.

Administration

Administration took place in two modes. Where participants completed the battery in person, it was administered on paper under the supervision of a researcher, who remained available to clarify procedural questions. Where participants completed it remotely, administration was online and unsupervised. Both modes were used within each of the four participation sample. The full battery took approximately 20 minutes to complete.

The demographic and contextual items were presented first, followed by the three instruments in a fixed order: the 3×2 AGQ-S, the SAS-2, and the PSDQ-S. The battery concluded with a debriefing note thanking participants and providing contact details through which free counselling support could be requested. The order of presentation was identical for all participants and was not counterbalanced.

3.6. Data screening

Multivariate outliers were identified using Mahalanobis distance computed across the 20 subscale scores on the full sample. Distances ranged from 2.30 to 83.93 ($M = 19.97$), and 22 cases (2.8%) exceeded the criterion of $\chi^2(20) = 45.315$, $p < .001$: one in the Indian football sample, nine in the Indian eFootball sample, two in the Polish football sample, and ten in the Polish eFootball sample. Careless responding was assessed by examining the within-person standard deviation across all 73 instrument items; the lowest observed value was 0.795, indicating that no participant responded uniformly across the battery as a whole. Within single instruments, invariant responding was more common: 47 participants gave the same response to every SAS-2 item (39 of them the lowest anxiety category), 34 to every AGQ-S item, and one to all 40 PSDQ-S items. The single PSDQ-S case, an Indian football participant who answered 5 to all forty items, nonetheless varied in responding to the other two instruments ($SD = 0.51$ and 0.62), so mechanical responding across the battery can be excluded. This case was retained, and because it is one observation in a cell of 200 it cannot materially affect any result reported below. None of these cases was also identified as a multivariate outlier, and with the exception of the single PSDQ-S case the pattern is substantively plausible rather than clearly careless, so all were retained.

The 22 multivariate outliers were likewise retained in the primary analyses. All contained complete data, and exclusion on the basis of atypical multivariate profiles alone risks removing genuine variation, particularly where extreme scores may reflect real differences in competitive experience rather than inattention. The flagged cases were concentrated in the two eFootball samples (nine and ten, against one and two in the football samples), which is consistent with the greater dispersion of responding in those samples reported in section 4.3: where the subscales are less strongly interrelated, atypical multivariate profiles arise more readily. A binary indicator (Screen) was computed to record flagged status, and the three multivariate analyses reported in Chapter 5 were re-run with these cases excluded as a sensitivity check.

3.7. Analytic strategy

Analysis proceeded in seven stages, corresponding to the structure of the empirical chapters that follow. First, the distributional properties of all twenty subscales were examined within each cell, and internal consistency was estimated using both Cronbach's alpha and McDonald's omega, computed separately for each country within each competitive context.

Because high internal consistency shows that items within a subscale cohere but not that two subscales measure distinct constructs, discriminant validity was examined separately. Composite reliability and average variance extracted (AVE) were computed from the standardised loadings in each cell. A Fornell-Larcker violation was recorded whenever the squared latent correlation between two factors exceeded the AVE of either factor (Fornell & Larcker, 1981), and the heterotrait-monotrait ratio (HTMT) was used as a second criterion (Henseler et al., 2015). For the PSDQ-S, the degree of differentiation among the eleven dimensions was summarised by the mean of the 55 latent correlations, the proportion of variance accounted for by the first eigenvalue, the number of latent correlations exceeding .85, and the structural position of each dimension relative to the cell mean. Percentile confidence intervals for between-group differences in these summaries were obtained from 2,000 bootstrap resamples per cell, with inadmissible resamples recorded and reported.

Second, measurement invariance was tested for each instrument across country within each context and across context within each country. Meaningful comparison across groups requires that the constructs are measured equivalently in each, and establishing invariance is therefore a necessary first step (Davidov et al., 2014). Metric invariance, which constrains factor loadings to equality, licenses the comparison of associations between variables such as regression coefficients and covariances (Steenkamp & Baumgartner, 1998). Scalar invariance, which additionally constrains item intercepts, is required before observed group means can be interpreted as reflecting differences in the underlying construct rather than differences in how the items function. Because the present study compares both mean levels and relationships across groups, scalar invariance was the target.

All confirmatory factor analyses and invariance models were estimated in R using lavaan (Rosseel, 2012) with robust maximum likelihood (MLR; Yuan–Bentler scaled test statistic), and nested models were compared with the scaled chi-square difference test (Satorra & Bentler, 2001), because the item distributions departed from normality. Changes in fit were evaluated on the robust indices against Δ CFI of $\geq .010$ or better (Cheung & Rensvold, 2002), Δ RMSEA of $\geq .015$ or better, and Δ SRMR of $\geq .030$ for metric and $\geq .010$ for scalar invariance (Chen, 2007); scaled chi-square difference tests are reported for completeness but were not used as the decision rule. Before any cross-group constraint was imposed, each model was estimated within each cell and checked for admissibility: convergence, a positive-definite latent covariance matrix, and no negative residual variances. Because a two-group test averages over

the other grouping variable, invariance was also tested in a four-group model crossing country with competitive context, which corresponds to the factorial design used in Chapters 5 to 7.

Third, group differences were examined using three factorial multivariate analyses of variance (MANOVA), one per instrument, with country and competitive context as fixed factors. Three separate analyses were conducted rather than a single omnibus model of all twenty dependent variables, preserving the conceptual distinctiveness of the three constructs and avoiding the instability associated with estimating a twenty-variable multivariate model. Pillai's trace was adopted as the multivariate test statistic throughout, as it is the most robust criterion under violations of the homogeneity of covariance matrices assumption, which was anticipated given the number of dependent variables and the cell sizes. Because the four cells differed in age, years of competitive experience, training frequency and competitive standard, two sensitivity analyses examined whether these characteristics accounted for the group differences. First, the MANOVAs and univariate analyses were repeated as MANCOVAs and ANCOVAs with age and competitive experience (centred), training frequency (four categories) and competitive standard (three bands) as covariates, and the homogeneity of regression slopes was tested for each subscale. This adjustment is informative for the country effects, but it cannot separate context from experience, because long competitive careers and frequent training are part of what distinguishes football from eFootball participation. Where a covariate differs between groups for reasons intrinsic to group membership, adjusting for it removes part of the group effect itself (Miller & Chapman, 2001). Second, therefore, the contexts were compared among players with overlapping competitive experience (4-8 and 5-10 years), and by weighting eFootball players to match the football players' experience distribution within each country (coarsened exact matching; Iacus et al., 2012). The persistence of context differences in these reduced samples was evaluated from effect sizes as well as significance tests, given their smaller cell sizes.

Fourth, multivariate effects on the eleven-subscale PSDQ-S were followed up with descriptive discriminant function analysis, with the functions derived from the hypothesis and error matrices of the factorial MANOVA so that each corresponds to a MANOVA effect (Huberty & Olejnik, 2006), and bootstrap confidence intervals (2,000 resamples within cells) for the structure coefficients and their ranks.

Fifth, the relationships among achievement goals, competitive anxiety, and physical self-concept were examined using multi-group path analysis, conducted separately for each of

the four comparison frames. The six achievement goal subscales were entered as predictors of the three competitive anxiety subscales and eleven PSDQ-S subscales. Observed composite scores were used, so the unconstrained model is a saturated multivariate regression. Nested model comparisons tested whether structural weights, the covariances among the achievement goals, and residuals differed across groups. The equality of the achievement goal covariance matrix was also tested directly, without outcomes in the model, because that comparison does not depend on the outcomes chosen. Since the six goal orientations are substantially intercorrelated, interpretation rests on the omnibus tests; individual standardised paths are reported alongside the corresponding bivariate correlations so that suppression effects can be identified. The path from competitive anxiety to physical self-concept specified in the hypothesised model (Figure 1) was tested in a separate model in each cell (see Figure 12), in which the achievement goals predicted the three anxiety subscales and goals and anxiety together predicted the eleven PSDQ-S subscales. The 33 anxiety → physical self-concept paths were tested jointly in each cell with a robust Wald test (Holm-adjusted across cells), and their equality across the four cells with a scaled chi-square difference test. Indirect effects of each achievement goal through the three anxiety subscales on global physical self-concept and global self-esteem were estimated with 2,000 bootstrap resamples per cell and percentile confidence intervals.

Sixth, the contextual variables were examined using nonparametric tests and rank correlations, and professional intention was modelled using binary logistic regression with receiver operating characteristic analysis. Given the number of comparisons conducted at this stage, perceived parental support was designated a priori as the confirmatory contextual variable on theoretical grounds, consistent with the distinction drawn between H8 and RQ5, and the remaining contextual analyses are reported as exploratory. Holm adjustment was applied within the confirmatory parental-support family and Benjamini-Hochberg adjustment within the exploratory families. Because the highest body mass index category was sparsely populated, body mass index was also analysed as a continuous variable in moderated regression. The Body Fat, Health, Global Physical Self-Concept and Appearance subscales were each regressed on centred body mass index, country, context, all their interactions, and age. Country and context were effect-coded (-0.5, +0.5) so that lower-order terms represent effects averaged over the other factor. Group-specific slopes were compared with Holm adjustment across the six pairwise comparisons (Holm, 1979), and HC3 robust standard errors (Long & Ervin, 2000) and additional adjustment for years of competitive experience and

training frequency served as sensitivity checks. Because body mass index indexes body size rather than adiposity, the slopes are interpreted as the relation between body size and physical self-perception.

Seventh, two sets of sensitivity analyses addressed the possibility that group differences reflect how the questionnaires were answered rather than the constructs themselves. The first concerned negative wording. The Health and Body Fat subscales of the PSDQ-S are entirely reverse-keyed and Global Self-Esteem is partly so, and negatively worded items in this instrument are known to carry method effects (Maïano et al., 2015). The PSDQ-S model was therefore re-estimated in each cell with an orthogonal method factor on the ten reverse-keyed items, and group differences on the three positively worded Global Self-Esteem items were compared with those on the two negatively worded items. The second concerned response style. Five indices were computed for each participant from the items of each instrument (PSDQ-S, 3x2 AGQ-S, and SAS-2) as reported in section 5.6, following Tellis and Chandrasekaran (2010): the person mean, the within-person standard deviation, and the proportions of responses in the top two categories, in the two middle categories, and at the endpoints. Country and context differences in these indices were tested with Welch t tests and Cohen's d. Subscale scores were then ipsatised by subtracting each participant's person mean and the group effect sizes recomputed. Because ipsatisation also removes genuine differences in overall level, these analyses indicate which differences are robust to response style rather than providing corrected estimates.

3.8. Summary of hypotheses and corresponding analyses

Table 5. *Mapping each hypothesis and research question to the analysis by which it is addressed.*

	Prediction / question	Analysis
Prerequisite	Instruments measure the same constructs in all groups	CFA within each cell; measurement invariance (configural, metric, scalar) across country, across context and in the four-group model
H1	Higher other-referenced goals (other-approach, other-avoidance) in India	2×2 MANOVA (3×2 AGQ-S), country main effect; univariate follow-up (Bonferroni); Mann–Whitney U confirmation
H2	Higher competitive anxiety in India, particularly worry	2×2 MANOVA (SAS-2), country main effect; univariate follow-up (Bonferroni); Mann–Whitney U confirmation
H3	Higher physical self-concept in Poland	2×2 MANOVA (PSDQ-S), country main effect; univariate follow-up; descriptive discriminant function analysis
H4	Higher physical self-concept in football, concentrated in activity, sport competence, endurance and body fat	2×2 MANOVA (PSDQ-S), context main effect; univariate follow-up; descriptive discriminant function analysis
H5	Stronger professional intention in football	Pearson χ^2 test; binary logistic regression
RQ1	Context differences in competitive anxiety and achievement goals	2×2 MANOVA (SAS-2, 3×2 AGQ-S), context main effect; univariate follow-up; Mann–Whitney U confirmation
RQ2	Additive or interactive operation of country and context	Country $\times$ context interaction term in the three 2×2 MANOVAs and univariate follow-ups
Sensitivity	Robustness of group differences	MANCOVA/ANCOVA adjusted for age, experience, training frequency and competitive standard; context comparisons within overlapping experience ranges and after coarsened exact matching; outlier exclusion; response-style and item-wording analyses

H6	Approach goals negatively, avoidance goals positively associated with competitive anxiety	Path analysis within each cell (standardised coefficients, MLR standard errors)
H7	Task-approach and self-approach goals positively associated with physical self-concept	Path analysis within each cell (standardised coefficients, MLR standard errors)
RQ3	Relationship between competitive anxiety and physical self-concept; mediation	Pearson correlations (Spearman check); path model with anxiety → physical self-concept paths (robust Wald test per cell; equality test across cells); bootstrapped indirect effects
RQ4	Group differences in the structural relationships	Multi-group path analysis: nested model comparisons (ML and MLR, Holm adjustment); direct test of the achievement-goal covariance matrix
H8	Stronger parental-support associations in India	Kruskal–Wallis tests within cells (Holm adjustment); country-moderation tests (HC3); bootstrap comparison of country-specific partial R ²
RQ5	Institutional support and perceived standard of the game	Mann–Whitney U (institutional support); Spearman correlations (perceived standard); moderation models with country and context (HC3, Benjamini–Hochberg adjustment)
RQ6	Body mass index and physical self-concept	Spearman correlations (BMI category and continuous BMI); age-adjusted moderated regression (BMI × country × context, HC3)
RQ7	Predictors of professional intention	Binary logistic regression with context × country interaction; logistic models for each achievement goal (Benjamini–Hochberg adjustment); ROC analysis with repeated 10-fold cross-validation

Chapter 4: Measurement properties

This chapter establishes whether the three instruments function equivalently across the four groups compared in this thesis. The question precedes every substantive comparison that follows: differences in observed scores can be attributed to differences in the underlying constructs only where the instruments are shown to measure those constructs in the same way, on the same scale, in each group. The chapter reports the factor structure of each instrument within each cell, internal consistency, and the sequence of increasingly constrained models by which measurement invariance is evaluated.

4.1. Analytic approach

Measurement invariance was assessed through the conventional hierarchy of nested models. The configural model specifies the same pattern of factor loadings in each group but estimates all parameters freely, establishing that the same number of factors and the same item-to-factor assignment hold in both. The metric model additionally constrains factor loadings to equality, and its acceptance licenses the comparison of associations between variables across groups, such as regression coefficients and covariances (Steenkamp & Baumgartner, 1998). The scalar model further constrains item intercepts, and its acceptance licenses the comparison of observed means as reflecting differences in the underlying construct rather than differences in how the items function (Davidov et al., 2014).

Because the present study compares both mean levels and structural relationships across groups, scalar invariance was the required standard. Model comparison followed Cheung and Rensvold's (2002) criterion of $\Delta CFI \leq .01$, supported by $\Delta RMSEA \leq .015$ and $\Delta SRMR \leq .030$ (Chen, 2007). The chi-square difference test was not used as the primary criterion, given its sensitivity to sample size at $n = 200$ per group.

Four sequences were estimated, corresponding to the four comparison frames the design permits: India against Poland within football, India against Poland within eFootball, football against eFootball within India, and football against eFootball within Poland. Each sequence was run separately for the three instruments, giving twelve sequences in total.

4.2. Factor structure

The measurement model for each instrument was first estimated separately within each of the four cells, to establish that the proposed structure held before any cross-group constraints were imposed. Results are reported in Table 6. The six-factor structure of the 3×2 AGQ-S fitted well in all four cells, with CFI between .956 and .982 and RMSEA between .046 and .069. The

three-factor structure of the SAS-2 fitted well in three cells and marginally in the fourth: fit was weakest among Polish football players (CFI = .928, RMSEA = .082), where the RMSEA point estimate exceeded the conventional .08 threshold, though its confidence interval included values below it.

The eleven-factor structure of the PSDQ-S produced the weakest fit of the three instruments, and did so consistently. CFI reached the conventional .95 threshold only among Polish football players (.954); it was just below it among Indian football players (.947) and further below it in both eFootball samples (.937 and .934, with RMSEA values of .057 and .054; Table 6). This pattern is consistent with the demands of estimating forty items across eleven factors at $n = 200$, a ratio of cases to free parameters below the conventional minimum. The structure is retained because it is the structure the instrument was designed and validated to measure, and because fit remains within the range regarded as acceptable; the limitation is nevertheless carried forward to the interpretation of the physical self-concept results in Chapter 5 and to the specification of the structural models in Chapter 6.

Table 6. *Confirmatory factor analyses for the three instruments within each cell*

Instrument / group	n	χ^2	df	p	CFI	RMSEA [90% CI]	SRMR
<i>Achievement goals</i>							
Football India	200	208.24	120	< .001	.956	.069 [.053, .084]	.047
Football Poland	200	156.11	120	.015	.978	.046 [.021, .065]	.055
eFootball India	200	171.26	120	.001	.980	.055 [.035, .073]	.036
eFootball Poland	200	168.22	120	.002	.982	.048 [.029, .064]	.036
<i>Competitive anxiety</i>							
Football India	200	107.66	87	.066	.975	.038 [.000, .060]	.046
Football Poland	200	178.65	87	< .001	.928	.082 [.065, .099]	.055
eFootball India	200	141.85	87	< .001	.970	.060 [.041, .077]	.037
eFootball Poland	200	129.43	87	.002	.981	.054 [.033, .073]	.042

Instrument / group	n	χ^2	df	p	CFI	RMSEA [90% CI]	SRMR
<i>Physical self-concept</i>							
Football India	200	1069.76	685	< .001	.947	.056 [.049, .062]	.050
Football Poland	200	1023.03	685	< .001	.954	.051 [.044, .057]	.041
eFootball India	200	1100.05	685	< .001	.937	.057 [.051, .063]	.053
eFootball Poland	200	1051.83	685	< .001	.934	.054 [.048, .06]	.054

Note. All models estimated with robust maximum likelihood; the scaled chi-square and robust CFI and RMSEA are reported. FB = football; EF = eFootball. CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardised root mean square residual.

4.3. Internal consistency

Internal consistency was estimated for each of the twenty subscales within each of the four cells, using both Cronbach's alpha and McDonald's omega. Omega was computed alongside alpha because alpha assumes tau-equivalence, an assumption unlikely to hold exactly and particularly consequential for the three-item subscales of the AGQ-S, where alpha is known to be unstable. Results are reported in Table 7.

All 160 estimates equalled or exceeded .76, and the great majority exceeded .80. The lowest value in the set was for the somatic anxiety in the Indian football sample ($\alpha = .761$, $\omega = .764$). Alpha and omega were closely comparable throughout, differing by more than .01 in only a small number of instances, which indicates that the tau-equivalence assumption underlying alpha was not seriously violated in these data. No subscale required modification and all items were retained as specified in the source instruments.

Two further checks were conducted on the measurement models. First, discriminant validity was examined in every cell using composite reliability (CR), average variance extracted (AVE), the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT). CR was at least .77 for every subscale in every cell. AVE was at least .50 for all subscales of the 3 $\times$ 2 AGQ-S and the PSDQ-S; the only values below .50 were four values for two SAS-2 subscales in the football samples (somatic anxiety .40 among Indian and .49 among Polish players, and concentration disruption .45 in both). For the PSDQ-S, the number of Fornell-

Larcker violations was 5 of 55 in the Indian football sample, 1 in the Polish football sample, 2 in the Indian eFootball sample and 0 in the Polish eFootball sample, and no HTMT value exceeded .90. For the SAS-2, a single violation occurred in each football sample: between somatic anxiety and concentration disruption among Indian players ($r = .70$), reflecting the low AVEs of both subscales, and between worry and concentration disruption among Polish players ($r = .79$), reflecting the low AVE of concentration disruption. No SAS-2 HTMT value exceeded .85, and all SAS-2 subscales had AVEs above .60 in both eFootball samples. For the 3×2 AGQ-S, one to three violations occurred per sample, all between goals sharing a competence standard or valence. In the Polish eFootball sample, task-approach and task-avoidance ($r = .91$, HTMT = .92) and self-approach and self-avoidance ($r = .90$, HTMT = .92) were barely separable, so paths involving these goals in that sample are interpreted with caution.

Second, the degree of differentiation among the eleven PSDQ-S dimensions was summarised by the mean of the 55 latent correlations and by the proportion of variance accounted for by the first eigenvalue. Both were highest among Indian (.689 and .727) and Polish football players (.660 and .695), and lower among Indian (.559 and .622) and Polish eFootball players (.432 and .512). Percentile bootstrap intervals (2,000 resamples per sample; 1,899–1,988 admissible resamples per comparison) showed that football players' physical self-concept was less differentiated than that of eFootball players in both countries (India: difference in mean correlation = .130, 95% CI [.046, .213]; Poland: .228, 95% CI [.149, .306]). Among eFootball players, the physical self-concept of Indian players was less differentiated than that of Polish players (.128, 95% CI [.037, .211]); among football players, the two countries did not differ (.030, 95% CI [−.046, .104]). Appearance occupied a more central position in the physical self-concept structure of Indian than of Polish participants in both contexts (football: .110, 95% CI [.047, .181]; eFootball: .114, 95% CI [.014, .208]). Physical self-concept therefore appears to be organised as a more unitary evaluation where competitive participation is physical, and as a more differentiated set of judgements where it is not.

Table 7. *Internal consistency of the twenty subscales within each cell*

Subscale	FB India		FB Poland		EF India		EF Poland	
	α	ω	α	ω	α	ω	α	ω
<i>SAS-2</i>								

Subscale	FB India		FB Poland		EF India		EF Poland	
	α	ω	α	ω	α	ω	α	ω
Somatic anxiety	.761	.764	.819	.825	.893	.895	.902	.903
Worry	.840	.840	.924	.924	.899	.900	.958	.958
Concentration disruption	.797	.802	.799	.801	.911	.912	.921	.922
<i>AGQ-S</i>								
Task-approach	.879	.880	.909	.911	.931	.932	.858	.862
Task-avoidance	.861	.864	.889	.890	.881	.883	.868	.869
Self-approach	.898	.899	.818	.819	.920	.920	.881	.885
Self-avoidance	.784	.785	.825	.834	.881	.881	.825	.829
Other-approach	.896	.899	.878	.880	.954	.954	.962	.962
Other-avoidance	.901	.904	.790	.799	.950	.951	.941	.941
<i>PSDQ-S</i>								
Health	.925	.924	.921	.923	.915	.917	.908	.911
Coordination	.952	.952	.906	.907	.936	.936	.879	.883
Activity	.936	.937	.943	.944	.923	.928	.891	.906
Body fat	.937	.938	.938	.939	.789	.792	.794	.808
Sport competence	.874	.875	.933	.934	.880	.880	.895	.897
Global physical	.905	.906	.915	.916	.890	.890	.882	.883
Appearance	.863	.864	.880	.880	.881	.882	.898	.898
Strength	.908	.908	.878	.879	.903	.903	.897	.897
Flexibility	.845	.845	.877	.879	.897	.899	.906	.910

Subscale	FB India		FB Poland		EF India		EF Poland	
	α	ω	α	ω	α	ω	α	ω
Endurance	.877	.879	.869	.869	.892	.892	.855	.857
Global esteem	.943	.944	.935	.937	.940	.941	.931	.934

Note. α = Cronbach's alpha; ω = McDonald's omega. FB = football; EF = eFootball. n = 200 per cell.

4.4. Invariance across country

Invariance across country was tested separately within each context, giving six sequences. Results are reported in Table 8. Scalar invariance was supported in all six sequences. No change in CFI exceeded the .01 criterion at any step, and no change in RMSEA or SRMR approached its respective threshold. Four of the six scalar steps approached the CFI criterion without exceeding it: the AGQ-S in football ($\Delta\text{CFI} = -.008$), the PSDQ-S in football ($\Delta\text{CFI} = -.009$), the AGQ-S in eFootball ($\Delta\text{CFI} = -.009$), and the PSDQ-S in eFootball ($\Delta\text{CFI} = -.0096$, which rounds to the criterion value of $-.010$). In each of these cases the supporting indices were comfortable, with ΔRMSEA no greater than .009 and ΔSRMR no greater than .004, and the convergence of three criteria provides a stronger basis for accepting the constrained model than the CFI criterion alone would offer. Observed means, and structural relationships, may therefore be compared between Indian and Polish participants within each context.

Table 8. *Measurement invariance across country, within each context*

Model	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
<i>Country: India vs. Poland, football players</i>						
<i>Achievement goals</i>						
Configural	.966	.058	.049	—	—	—
Metric	.965	.058	.056	-.002	.000	.007
Scalar	.957	.063	.058	-.008	.005	.002
<i>Competitive anxiety</i>						

Model	CFI	RMSEA	SRMR	Δ CFI	Δ RMSEA	Δ SRMR
Configural	.946	.064	.048	—	—	—
Metric	.948	.06	.053	.003	−.004	.005
Scalar	.945	.061	.056	−.004	.000	.003
<i>Physical self-concept</i>						
Configural	.950	.053	.044	—	—	—
Metric	.950	.053	.049	.000	.000	.004
Scalar	.941	.057	.050	−.009	.004	.002
<i>Country: India vs. Poland, eFootball players</i>						
<i>Achievement goals</i>						
Configural	.981	.051	.034	—	—	—
Metric	.980	.051	.039	−.001	.000	.005
Scalar	.972	.060	.042	−.009	.009	.004
<i>Competitive anxiety</i>						
Configural	.976	.057	.037	—	—	—
Metric	.975	.056	.047	−.001	−.001	.010
Scalar	.972	.058	.049	−.003	.002	.002
<i>Physical self-concept</i>						
Configural	.936	.056	.052	—	—	—
Metric	.934	.056	.056	−.001	.000	.005
Scalar	.925	.059	.058	−.009	.003	.002

Note. Δ values are relative to the preceding, less constrained model. Criteria: Δ CFI $\leq$.01, Δ RMSEA $\leq$.015, Δ SRMR $\leq$.030.

4.5. Invariance across context

Invariance across context was tested separately within each country, giving a further six sequences. Results are reported in Table 9. Scalar invariance was again supported throughout. Most changes in fit were smaller than in the cross-cultural sequences: ten of the twelve steps produced a change in CFI of .003 or less, and the achievement goal sequence within the Indian samples showed no change in CFI at all across these models. The largest change was in the physical self-concept sequence within the Polish samples, where the scalar step produced the largest change observed in this set ($\Delta\text{CFI} = -.009$), still within the criterion and supported by $\Delta\text{RMSEA} = .003$, and $\Delta\text{SRMR} = .002$. The physical self-concept sequences again produced the lowest absolute fit of the three instruments, consistent with the pattern observed in section 4.2, but the changes across constrained models remained small. Observed means and structural relationships may therefore be compared between football and eFootball participants within each country.

Table 9. *Measurement invariance across context, within each country*

Model	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
<i>Context: football vs. eFootball, Indian players</i>						
<i>Achievement goals</i>						
Configural	.970	.062	.040	—	—	—
Metric	.970	.061	.040	.000	-.001	.000
Scalar	.970	.060	.040	.000	-.001	.000
<i>Competitive anxiety</i>						
Configural	.971	.050	.039	—	—	—
Metric	.973	.047	.045	.001	-.003	.006
Scalar	.972	.047	.047	-.001	-.001	.001
<i>Physical self-concept</i>						
Configural	.942	.056	.05	—	—	—

Model	CFI	RMSEA	SRMR	Δ CFI	Δ RMSEA	Δ SRMR
Metric	.942	.056	.054	.000	.000	.004
Scalar	.939	.057	.055	-.002	.001	.001
<i>Context: football vs. eFootball, Polish players</i>						
<i>Achievement goals</i>						
Configural	.980	.047	.043	—	—	—
Metric	.977	.049	.052	-.003	.002	.009
Scalar	.972	.053	.053	-.005	.004	.001
<i>Competitive anxiety</i>						
Configural	.960	.069	.046	—	—	—
Metric	.959	.068	.056	-.001	-.001	.010
Scalar	.959	.066	.056	-.001	-.002	.000
<i>Physical self-concept</i>						
Configural	.945	.052	.046	—	—	—
Metric	.942	.053	.055	-.003	.001	.009
Scalar	.933	.057	.056	-.009	.003	.002

Note. Δ values are relative to the preceding, less constrained model. Criteria: Δ CFI $\leq$.01, Δ RMSEA $\leq$.015, Δ SRMR $\leq$.030.

4.6. Four-group invariance across country x context

The twelve sequences reported above compare two groups at a time and therefore average over the remaining factor. Because the analyses in Chapters 5 to 7 compare all four cells within a single factorial design, invariance was also tested in a four-group model crossing country with context (football and eFootball). Full scalar invariance was supported for all three instruments. Every solution was admissible (minimum eigenvalue of the latent covariance matrices = .048).

Results are reported in Table 10. Observed mean comparisons across the four cells are therefore interpretable as differences in the constructs rather than in item functioning.

Table 10. *Measurement invariance across country $\times$ context*

Model	CFI	RMSEA	SRMR	Δ CFI	Δ RMSEA	Δ SRMR
<i>Achievement goals</i>						
Configural	.975	.055	.041	—	—	—
Metric	.973	.055	.048	-.002	.000	.006
Scalar	.966	.060	.05	-.008	.005	.003
<i>Competitive anxiety</i>						
Configural	.965	.061	.042	—	—	—
Metric	.964	.058	.055	.000	-.003	.012
Scalar	.96	.059	.058	-.005	.001	.003
<i>Physical self-concept</i>						
Configural	.938	.058	.049	—	—	—
Metric	.936	.058	.057	-.001	.000	.008
Scalar	.929	.06	.058	-.007	.002	.002

Note. Δ values are relative to the preceding, less constrained model. Criteria: Δ CFI $\leq$.01, Δ RMSEA $\leq$.015, Δ SRMR $\leq$.030.

4.7. Summary

The three instruments demonstrated adequate to good factorial validity within each of the four samples, high internal consistency across all twenty subscales in all four samples, and full scalar invariance across country within each context, across context within each country, and in the four-group model crossing the two factors. All invariance sequences reached the scalar level within the Δ CFI $\leq$.01 criterion, supported by Δ RMSEA and Δ SRMR.

Two qualifications should be carried forward. First, the eleven-factor structure of the PSDQ-S produced consistently weaker fit on the comparative fit index than the other two instruments, falling short of the .95 threshold in three of the four samples and most clearly in the two eFootball samples ($CFI = .937$ and $.934$). Two features of the model bear on this. The instrument estimates roughly 130 parameters from 40 items in cells of 200 participants, which is demanding relative to the 15-item SAS-2 and the 18-item AGQ-S, and small misspecifications accumulate across so many parameters. In addition, the ten negatively worded items carry a method effect (Maïano et al., 2015): adding a method factor for these items raised CFI to .94–.96 across cells. The baseline-model argument does not apply here: the baseline RMSEA is .20–.23 in every cell, above the .158 level below which CFI becomes uninformative. The absolute fit indices, which are not evaluated against that baseline, were acceptable throughout ($RMSEA = .051$ to $.057$; $SRMR = .041$ to $.054$), and every solution was admissible.

Second, one scalar step sat at the criterion rather than inside it: the PSDQ-S across country within eFootball ($\Delta CFI = -.0096$). Both supporting indices were well within their thresholds ($\Delta RMSEA = .003$, $\Delta SRMR = .002$), so scalar invariance was accepted, though the mean comparison in that frame rests on a narrower margin than the others.

Subject to these qualifications, the comparisons undertaken in Chapters 5 to 7 are licensed: observed differences between groups may be interpreted as differences in the constructs measured rather than as artefacts of differential item functioning.

Chapter 5: Group differences

This chapter addresses the first of the three aims: whether achievement goals, physical self-concept, and competitive anxiety differ across cultures and across competitive contexts, and whether the two influences operate independently or interactively. The measurement evidence reported in Chapter 4 licenses these comparisons, having established scalar invariance for all three instruments across both country within each context, across context within each country, and in the four-group model crossing the two factors.

Three factorial multivariate analyses of variance were conducted, one per instrument, with country and context as fixed factors. Box's M was significant for all three instruments (achievement goals, $M = 353.99$, $F = 5.54$, $p < .001$; physical self-concept, $M = 629.65$, $F = 3.10$, $p < .001$; competitive anxiety, $M = 124.39$, $F = 6.86$, $p < .001$), indicating heterogeneity of covariance matrices and supporting the use of Pillai's trace as the multivariate criterion. Multivariate results are reported in Table 12 and are referred to throughout the sections that follow.

5.1. Descriptive statistics

Means, standard deviations, skewness, and kurtosis for all twenty subscales are reported by cell in Table 11. Skewness fell within ± 2 and kurtosis within ± 7 for every subscale in every cell, satisfying conventional criteria for the use of parametric procedures (Hair et al., 1998).

Two distributional features warrant comment. The task-approach and self-approach subscales showed pronounced negative skew, most markedly for self-approach in the Polish football sample (skewness = -1.65 , kurtosis = 4.24), indicating a ceiling effect: mean scores on these two subscales ranged from 5.32 to 6.08 on a seven-point scale, and up to 40% of participants in a cell scored at or near the scale maximum. Somatic anxiety showed the mirror pattern, with positive skew and means between 1.53 and 1.88 on a four-point scale, indicating a floor effect. Nonparametric confirmation of the multivariate results was therefore conducted for all subscales and is reported in section 5.5.

Table 11. *Descriptive statistics and distributional properties of the twenty subscales by cell*

Subscale	FB-Ind	FB-Pol	EF-Ind	EF-Pol	FB-Ind	FB-Pol	EF-Ind	EF-Pol
	M (SD)	M (SD)	M (SD)	M (SD)	Sk / Ku	Sk / Ku	Sk / Ku	Sk / Ku
<i>AGQ-S</i>								

Subscale	FB-Ind	FB-Pol	EF-Ind	EF-Pol	FB-Ind	FB-Pol	EF-Ind	EF-Pol
	M (SD)	M (SD)	M (SD)	M (SD)	Sk / Ku	Sk / Ku	Sk / Ku	Sk / Ku
Task-approach	5.59 (1.29)	5.86 (1.20)	5.32 (1.64)	5.42 (1.35)	-1.55 / 2.55	-1.61 / 2.76	-1.19 / 0.49	-1.15 / 1.28
Task-avoidance	5.09 (1.39)	5.64 (1.24)	4.93 (1.62)	5.24 (1.35)	-0.86 / 0.29	-1.06 / 0.79	-0.69 / - 0.43	-0.88 / 0.41
Self-approach	5.72 (1.28)	6.08 (1.00)	5.66 (1.62)	5.64 (1.26)	-1.58 / 2.98	-1.65 / 4.24	-1.33 / 0.74	-1.31 / 1.94
Self-avoidance	5.38 (1.35)	5.64 (1.32)	5.20 (1.66)	5.25 (1.30)	-1.08 / 1.11	-1.21 / 1.35	-0.92 / - 0.17	-0.95 / 0.76
Other-approach	5.75 (1.40)	5.14 (1.39)	5.00 (1.77)	4.20 (1.80)	-1.47 / 1.78	-0.33 / - 0.77	-0.64 / - 0.83	-0.24 / - 1.05
Other-avoidance	5.17 (1.72)	4.43 (1.50)	4.55 (1.89)	4.18 (1.73)	-0.87 / - 0.37	-0.21 / - 0.41	-0.42 / - 1.15	-0.24 / - 1.10
<i>PSDQ-S</i>								
Health	4.42 (1.21)	4.79 (1.17)	4.41 (1.28)	4.84 (1.26)	-0.40 / - 0.92	-0.86 / 0.06	-0.62 / - 0.52	-1.15 / - 0.85
Coordination	4.51 (1.21)	4.44 (1.06)	4.20 (1.16)	4.25 (1.06)	-0.73 / - 0.30	-0.54 / 0.00	-0.32 / - 0.79	-0.35 / - 0.28
Activity	4.71 (1.19)	4.23 (1.22)	3.85 (1.39)	3.43 (1.47)	-0.97 / 0.10	-0.41 / - 0.72	-0.17 / - 1.04	0.07 / - 1.25
Body fat	4.53 (1.36)	4.32 (1.39)	3.96 (1.38)	4.24 (1.47)	-0.59 / - 0.77	-0.45 / - 0.81	0.02 / - 1.09	-0.50 / - 0.78
Sport competence	4.53 (1.13)	4.17 (1.15)	3.98 (1.32)	3.46 (1.36)	-0.57 / - 0.38	-0.51 / - 0.09	-0.37 / - 0.48	-0.08 / - 0.78
Global physical	4.69 (1.17)	4.23 (1.19)	4.02 (1.39)	3.69 (1.37)	-0.81 / 0.03	-0.53 / - 0.05	-0.29 / - 0.76	-0.13 / - 0.80

Subscale	FB-Ind	FB-Pol	EF-Ind	EF-Pol	FB-Ind	FB-Pol	EF-Ind	EF-Pol
	M (SD)	M (SD)	M (SD)	M (SD)	Sk / Ku	Sk / Ku	Sk / Ku	Sk / Ku
Appearance	4.51 (1.21)	4.19 (1.14)	4.1 (1.32)	4 (1.27)	-0.71 / - 0.16	-0.54 / 0.21	-0.32 / - 0.78	-0.43 / - 0.52
Strength	4.53 (1.18)	4.12 (1.05)	4.03 (1.33)	3.5 (1.34)	-0.69 / - 0.12	-0.41 / 0.04	-0.32 / - 0.82	-0.16 / - 0.87
Flexibility	4.46 (1.19)	4.08 (1.20)	3.98 (1.33)	3.62 (1.37)	-0.51 / - 0.60	-0.42 / - 0.44	-0.33 / - 0.72	-0.13 / - 0.99
Endurance	4.53 (1.19)	3.93 (1.30)	3.92 (1.38)	3.15 (1.40)	-0.66 / - 0.35	-0.36 / - 0.56	-0.16 / - 0.87	0.24 / - 0.85
Global esteem	4.58 (1.10)	4.39 (1.08)	4.15 (1.17)	4.22 (1.13)	-0.76 / - 0.33	-0.68 / 0.30	-0.36 / - 0.58	-0.53 / - 0.29
SAS-2								
Somatic anxiety	1.61 (0.52)	1.53 (0.52)	1.88 (0.72)	1.74 (0.71)	1.20 / 1.24	1.32 / 1.95	0.64 / - 0.49	1.18 / 0.80
Worry	1.94 (0.65)	2.00 (0.76)	2.09 (0.72)	2.18 (0.95)	0.68 / 0.07	0.74 / 0.45	0.33 / - 0.77	0.41 / - 1.04
Concentration disruption	1.83 (0.57)	1.52 (0.51)	1.94 (0.72)	1.64 (0.67)	0.49 / - 0.40	1.02 / 0.50	0.66 / - 0.61	0.99 / 0.16

Note. FB = football; EF = eFootball; Ind = India; Pol = Poland. Sk = skewness; Ku = kurtosis. n = 200 per cell. AGQ-S items were rated 1–7, PSDQ-S items 1–6, and SAS-2 items 1–4.

Table 12. *Multivariate tests for country, context, and their interaction*

Effect	Pillai's V	F (df)	p	ηp^2
<i>Achievement goals (6 dependent variables)</i>				
Country	.105	15.474 (6, 791)	< .001	.105
Context	.071	10.004 (6, 791)	< .001	.071

Effect	Pillai's V	F (df)	p	η^2
Country $\times$ Context	.015	2.046 (6, 791)	.057	.015
<i>Physical self-concept (11 dependent variables)</i>				
Country	.166	14.223 (11, 786)	< .001	.166
Context	.132	10.829 (11, 786)	< .001	.132
Country $\times$ Context	.024	1.786 (11, 786)	.053	.024
<i>Competitive anxiety (3 dependent variables)</i>				
Country	.101	29.667 (3, 794)	< .001	.101
Context	.036	9.970 (3, 794)	< .001	.036
Country $\times$ Context	.001	.313 (3, 794)	.816	.001

Note. Pillai's trace reported for all effects. N = 800, with 200 participants per cell.

5.2. Achievement goals

Significant multivariate effects emerged for both country, Pillai's $V = .105$, $F(6, 791) = 15.474$, $p < .001$, $\eta^2 = .105$, and competitive context, $V = .071$, $F(6, 791) = 10.004$, $p < .001$, $\eta^2 = .071$. The interaction did not reach significance, $V = .015$, $F(6, 791) = 2.05$, $p = .057$, $\eta^2 = .015$.

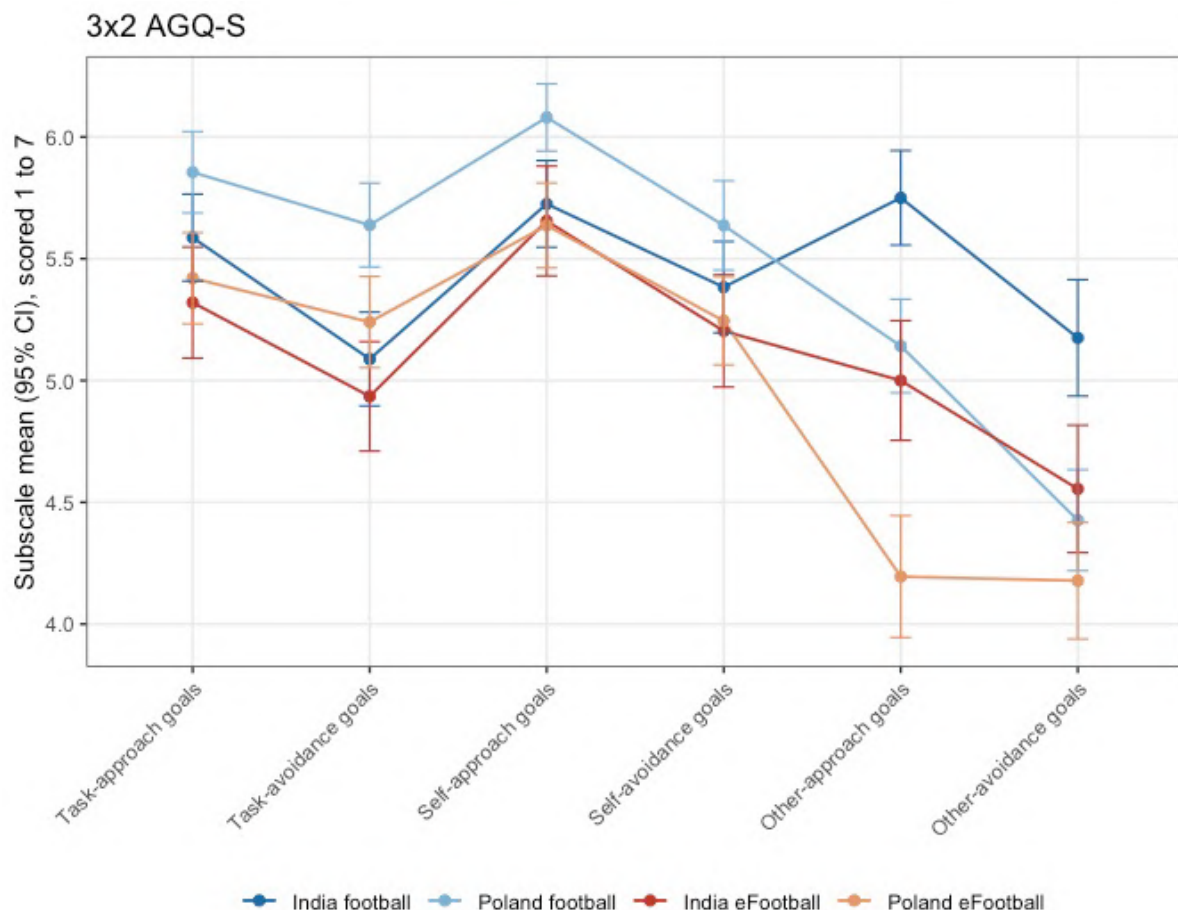
Univariate follow-up (Table 13), evaluated against a Bonferroni-adjusted criterion of $\alpha = .008$ within this instrument, showed that the country effect was concentrated in the other-based goals. Indian participants scored higher than Polish participants on other-approach ($\eta^2 = .047$) and other-avoidance ($\eta^2 = .026$), consistent with H1. Task-avoidance also differed by country ($\eta^2 = .023$), but in the opposite direction, with Polish participant scoring higher. The three remaining subscales: task-approach, self-approach, and self-avoidance, showed no significant country effect, and their effect sizes were several times smaller ($\eta^2 = .004$, .004 and .003).

This pattern largely matches the asymmetry anticipated in section 2.4.1: both goals referenced to the performance of other people were higher in India, whereas three of the four task- and self-referenced goals did not differ. The exception, task-avoidance, differed in the

opposite direction, with Polish participants more concerned with avoiding technical errors. H1 is therefore supported, but the country difference was not confined to socially referenced goals.

The context effect fell most heavily on other-approach goals ($\eta^2 = .066$), the largest contextual effect within this instrument, with football players scoring higher than eFootball players. All five remaining subscales also differed by context, though by less ($\eta^2 = .010$ to $.016$). No univariate interaction survived the Bonferroni criterion; the largest, for self-approach, was small and was significant only without correction ($\eta^2 = .005$, $p = .044$). Mean profiles are shown in Figure 7, where the four groups converge on the task and self-based goals and diverge on the other-based goals.

Figure 7. Achievement goal orientations by country and context



5.3. Physical self-concept

Significant multivariate effects emerged for country, Pillai's $V = .166$, $F(11, 786) = 14.22$, $p < .001$, $\eta^2 = .166$, and for context, $V = .132$, $F(11, 786) = 10.83$, $p < .001$, $\eta^2 = .132$. The country effect was the largest multivariate effect obtained anywhere in this chapter. The interaction did not reach significance, $V = .024$, $F(11, 786) = 1.79$, $p = .053$, $\eta^2 = .024$.

Because the eleven PSDQ-S subscales are substantially intercorrelated, with a mean inter-subscale correlation ranging from .38 to .63 across four samples (mentioned in section 6.1; Appendix Table A5-A8), descriptive discriminant function analysis was used alongside the univariate tests (Table 13) to identify the dimensions along which the groups separated, rather than interpreting eleven overlapping measures as though they were independent.

Descriptive discriminant function analysis was used to identify which subscales defined the multivariate country and context effects. The functions were derived from the hypothesis and error matrices of the factorial MANOVA, so each corresponds directly to a MANOVA effect (country: Wilks' $\Lambda = .834$, canonical $r = .41$; context: $\Lambda = .868$, canonical $r = .36$). The two functions shared a physical-capability core but differed in one respect (Table 14). The country function was defined chiefly by endurance ($r = .59$), which ranked first in 94% of bootstrap resamples, followed by strength, sport competence, activity, global physical self-concept and flexibility ($r = .33-.43$); health loaded negatively ($r = -.36$), reflecting higher health ratings among Polish participants, whereas global self-esteem, body fat and coordination did not contribute. The context function was defined chiefly by activity ($r = .81$; ranked first in 92% of resamples), followed by endurance, sport competence, global physical self-concept and strength ($r = .59-.68$), while health did not contribute ($r = -.03$). Group centroids were separated by 0.89 pooled within-cell standard deviations for country and 0.78 for context. Culture and competitive context therefore separated participants along the same broad aspect of physical self-concept, perceived physical capability, with health distinguishing only the country contrast.

The direction of the country effect was contrary to prediction. H3 anticipated higher physical self-concept among Polish participants, on the basis of the self-enhancement and modesty-bias literature and Asghar et al.'s (2013) comparison. Indian participants instead scored higher on six of the eleven subscales after Bonferroni adjustment (endurance, strength, sport competence, activity, global physical self-concept and flexibility), with a smaller

difference in appearance that was significant only without correction ($\eta^2 = .007$, $p \approx .018$ against $\alpha = .005$), Polish participants scored higher on health, and the two countries did not differ on coordination, body fat or global self-esteem. H3 is therefore not supported, and the finding is examined in the discussion.

The context effect was in the predicted direction, with football players scoring higher, and fell largely where H4 anticipated. That hypothesis named activity, sport competence, endurance and body fat. The first three were among the strongest contributors to the context function and carried the largest univariate effects ($\eta^2 = .090$, $.059$ and $.065$). The body fat difference was smaller ($\eta^2 = .013$) and inconsistent across countries: it was clear among Indian players but negligible among Polish players. H4 is therefore largely supported for the capability dimensions, with the qualification that the predicted body fat difference was weak and confined to the Indian sample.

The interaction did not reach significance, and no univariate interaction survived Bonferroni adjustment within this instrument; the largest, for body fat, was small ($\eta^2 = .008$, $p = .013$). Mean profiles are shown in Figure 8, where the four groups are close to parallel across the eleven subscales.

Table 13. *Univariate effects for the twenty subscales*

Subscale	Country	Context	Country $\times$ Context
<i>Achievement goals</i>			
Task-approach	.004	.016***	.001
Task-avoidance	.023***	.010**	.002
Self-approach	.004	.010**	.005*
Self-avoidance	.003	.010**	.001
Other-approach	.047***	.066***	.001
Other-avoidance	.026***	.016***	.003
<i>Physical self-concept</i>			

Subscale	Country	Context	Country × Context
Health	.026***	.000	.000
Coordination	.000	.012**	.001
Activity	.028***	.090***	.000
Body fat	.000	.013**	.008*
Sport competence	.031***	.059***	.001
Global physical	.023***	.052***	.001
Appearance	.007*	.015***	.002
Strength	.035***	.050***	.001
Flexibility	.021***	.034***	.000
Endurance	.064***	.065***	.001
Global esteem	.001	.018***	.003
<i>Competitive anxiety</i>			
Somatic anxiety	.008*	.035***	.000
Worry	.002	.012**	.000
Concentration disruption	.055***	.009**	.000

Note. Values are partial eta-squared. * $p < .05$. ** $p < .01$. *** $p < .001$. Bonferroni-adjusted criteria within instrument are $\alpha = .008$ for achievement goals, .005 for physical self-concept, and .017 for competitive anxiety.

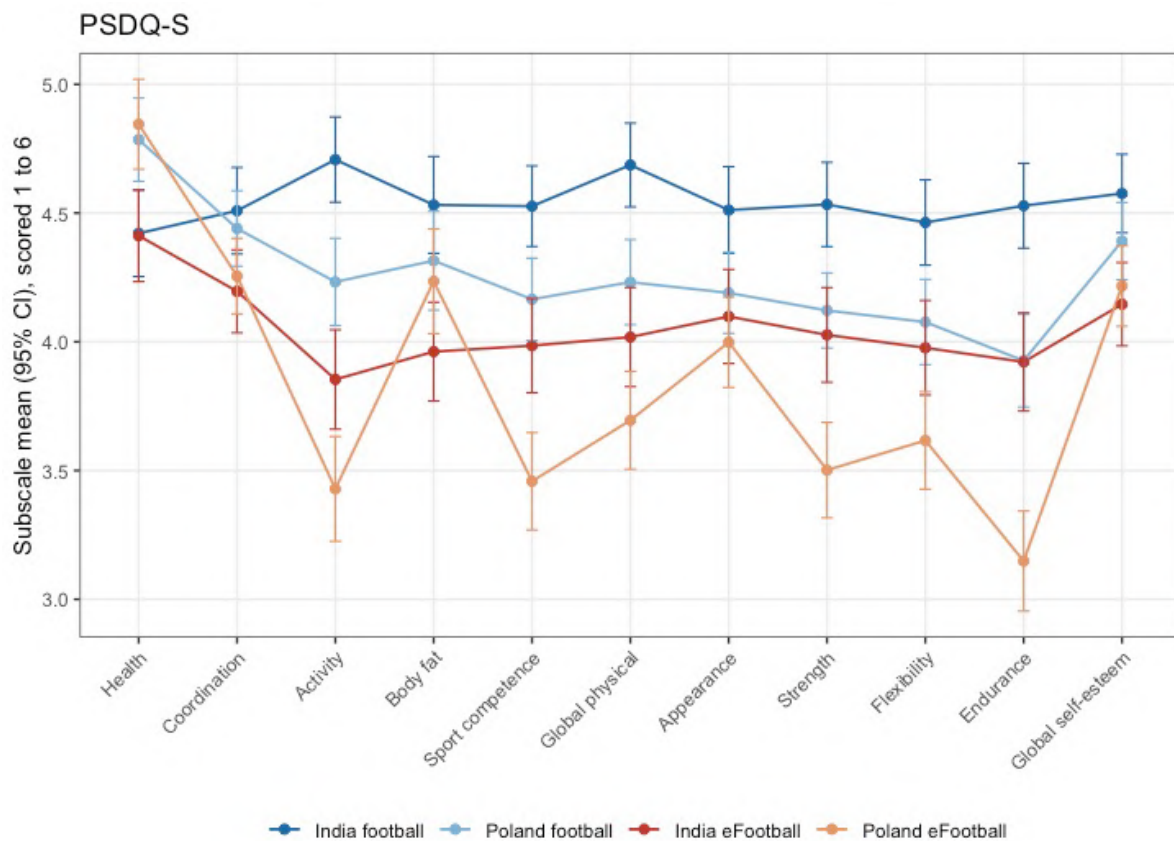
Table 14. *Structure coefficients of the Country and Context Discriminant Functions for the PSDQ-S subscales*

Subscale	Country function			Context function		
	Coefficient r	95% CI	Rank	Coefficient	95% CI	Rank
Endurance	.59	[.43, .68]	1	.68	[.50, .77]	2

Subscale	Country function			Context function		
	Coefficient r	95% CI	Rank	Coefficient	95% CI	Rank
Strength	.43	[.27, .54]	2	.59	[.41, .70]	5
Sport competence	.40	[.25, .52]	3	.65	[.47, .74]	3
Activity	.38	[.22, .50]	4	.81	[.66, .88]	1
Health	−.36	[−.50, −.21]	5	−.03	[−.20, .14]	11
Global physical	.34	[.19, .46]	6	.60	[.43, .71]	4
Flexibility	.33	[.18, .45]	7	.48	[.30, .61]	6
Appearance	.19	[.03, .33]	8	.32	[.14, .46]	8
Global esteem	.06	[−.09, .20]	9	.35	[.16, .49]	7
Body fat	−.02	[−.17, .13]	10	.30	[.12, .45]	9
Coordination	.01	[−.14, .15]	11	.29	[.11, .44]	10
Canonical r	.41			.36		
Wilks' Λ	.834			.868		

Note. Discriminant functions derived from the hypothesis and pooled within-cell error matrices of the 2×2 MANOVA. Structure coefficients are pooled within-cell correlations between each subscale and the function; positive values indicate higher scores among Indian (country) and football (context) participants. 95% percentile CIs from 2,000 bootstrap resamples drawn within cells. Both functions were significant, $F(11, 786) = 14.22$ and $10.83, p < .001$.

Figure 8. *Physical self-concept profiles across the eleven PSDQ-S subscales by country and context*



5.4. Competitive anxiety

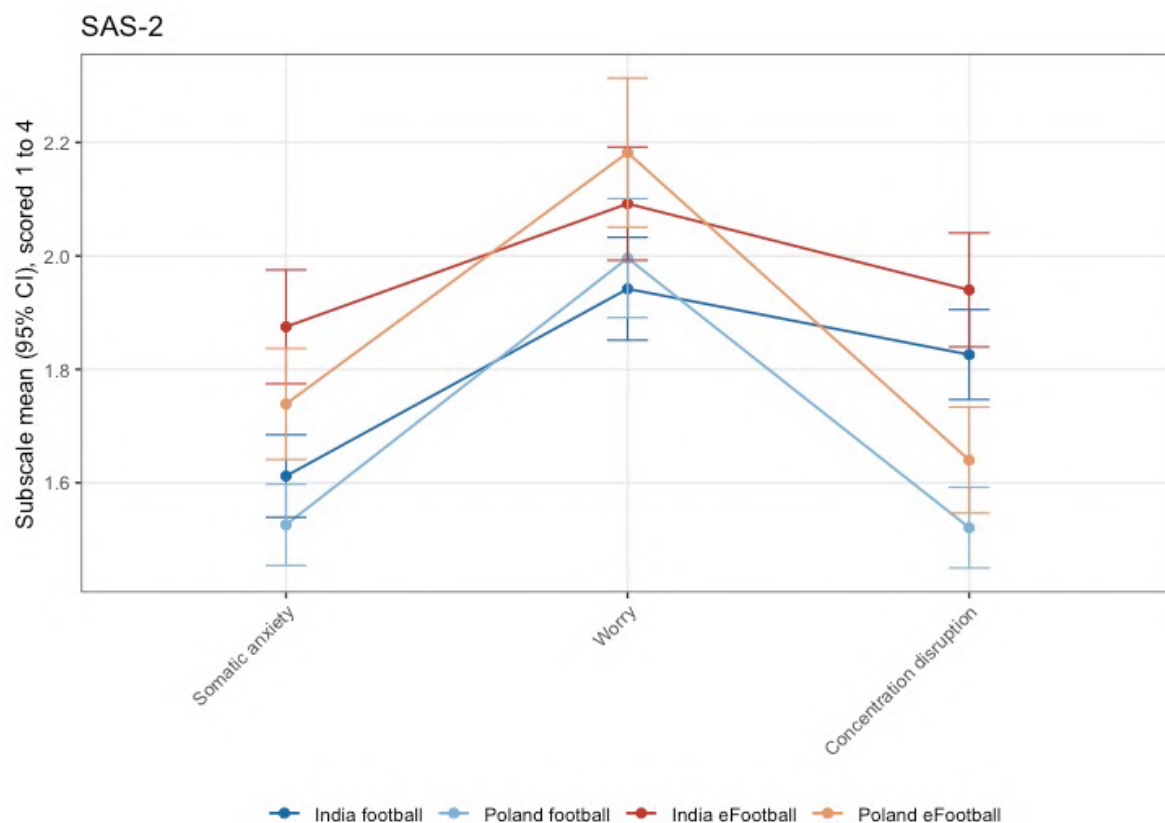
Significant multivariate effects emerged for country, Pillai's $V = .101$, $F(3, 794) = 29.67$, $p < .001$, $\eta^2 = .101$, and for context, $V = .036$, $F(3, 794) = 9.97$, $p < .001$, $\eta^2 = .036$. The interaction was negligible and did not approach significance, $V = .001$, $F(3, 794) = 0.31$, $p = .816$, $\eta^2 = .001$. Univariate follow-up, against a Bonferroni-adjusted criterion of $\alpha = .017$, showed that the country effect was carried predominantly by concentration disruption, $F(1, 796) = 46.63$, $p < .001$, $\eta^2 = .055$, with a smaller effect on somatic anxiety $F(1, 796) = 6.31$, $p = .012$, $\eta^2 = .008$, and none on worry $F(1, 796) = 1.71$, $p = .191$, $\eta^2 = .002$. The context effect was distributed differently, being largest for somatic anxiety $F(1, 796) = 29.00$, $p < .001$, $\eta^2 = .035$, and smaller for worry $F(1, 796) = 9.34$, $p = .002$, $\eta^2 = .012$, and concentration disruption $F(1, 796) = 6.92$, $p = .009$, $\eta^2 = .009$, with eFootball players reporting higher anxiety on all three.

The absence of a country effect on worry is contrary to H2, which predicted that the cultural difference would be most pronounced on precisely this subscale, since worry most

directly reflects concern about evaluation by others. Indian participants reported higher somatic anxiety and concentration disruption, and the multivariate effect was substantial, but on worry the Polish means were marginally higher in both contexts. The difference therefore lies chiefly in the attentional component: the somatic difference was small and did not survive covariate adjustment (section 5.7) or person-mean centring (section 5.6). H2 is partially supported: the predicted overall difference emerged, but not on the predicted subscale.

This dissociation is informative in its own right. Achievement goals differentiated the two cultures on the socially referenced subscales, as the individualism-collectivism account predicts, yet competitive anxiety did not differentiate them on the subscale most explicitly concerned with social evaluation. Mean profiles are shown in Figure 9.

Figure 9. *Competitive anxiety by country and context*



5.5. Nonparametric confirmation

Given the ceiling effects on the task- and self-approach subscales and the floor effect on somatic anxiety, and significant Levene's tests for 15 of the 20 dependent variables, Mann-Whitney U tests were conducted for all twenty subscales within each of the four comparison frames as a distribution-free check. Results are reported in Table 15.

The nonparametric results broadly confirmed the multivariate findings. Cross-culturally, 16 of 20 subscales differed significantly between Indian and Polish football players and 13 of 20 between Indian and Polish eFootball players. Cross-contextually, 14 of 20 differed between Indian football and eFootball players and 12 of 20 within the Polish sample, so the contextual difference was of comparable breadth in the two countries.

One pattern among the achievement goals was not visible in the multivariate analysis. Among football players, all four task- and self-based goals differed by country, with Polish players scoring higher on each (task-approach $p = .005$; task-avoidance $p < .001$; self-approach $p = .004$; self-avoidance $p = .029$). Among eFootball players none of these differed except self-approach, which differed in the opposite direction, with Indian players scoring higher ($p = .046$). The formal test of this pattern was weak; the multivariate interaction for this instrument did not reach significance ($p = .057$), and the largest univariate interaction, for self-approach, did not survive Bonferroni adjustment ($\eta^2 = .005$, $p = .044$). The pattern is therefore reported as suggestive. It indicates that the Polish advantage on the task- and self-based goals is specific to the traditional sport context and the additivity conclusion drawn below is qualified accordingly for the achievement goal instrument.

Table 15. Mann-Whitney U tests for country and context differences on the twenty subscales

Subscale	Football	eFootball	India	Poland
	India vs. Poland (r)	India vs. Poland (r)	FB vs. eFB (r)	FB vs. eFB (r)
<i>AGQ-S</i>				
Task-approach	-.14**	.02	.04	.19***
Task-avoidance	-.22***	-.07	.02	.16**
Self-approach	-.14**	.10*	-.06	.19***

Subscale	Football	eFootball	India	Poland
	India vs. Poland (r)	India vs. Poland (r)	FB vs. eFB (r)	FB vs. eFB (r)
Self-avoidance	-.11*	.05	.01	.18***
Other-approach	.24***	.23***	.21***	.25***
Other-avoidance	.26***	.12*	.17***	.06
<i>PSDQ-S</i>				
Health	-.17**	-.19***	-.01	-.04
Coordination	.06	-.02	.15**	.09
Activity	.21***	.15**	.31***	.28***
Body fat	.08	-.11*	.20***	.02
Sport competence	.16**	.19***	.20***	.27***
Global physical	.20***	.11*	.25***	.20***
Appearance	.15**	.04	.16**	.07
Strength	.20***	.19***	.19***	.23***
Flexibility	.16**	.13**	.18***	.17***
Endurance	.23***	.27***	.22***	.28***
Global esteem	.09	-.03	.19***	.08
<i>SAS-2</i>				
Somatic anxiety	.10*	.10*	-.16**	-.14**
Worry	-.03	-.02	-.10*	-.08
Concentration disruption	.28***	.24***	-.05	-.05

Note. Values are effect sizes $r = Z/\sqrt{N}$ from Mann–Whitney U tests (asymptotic, two-tailed); positive values indicate higher scores in the first-named group (India; football). Columns headed Football and eFootball report

the comparison between Poland and India within that context; columns headed Poland and India report the comparison between football and eFootball within that country. FB = football; eFB = eFootball. * $p < .05$. ** $p < .01$. *** $p < .001$.

5.6. Sensitivity to response patterns and item wording

Exploratory sensitivity analyses examined whether group comparisons were retained after accounting descriptively for overall score level and item-response patterns. Five person-level indices were calculated separately for the PSDQ-S, 3×2 AGQ-S and SAS-2 after reverse-scoring where required: the mean item score, within-person standard deviation, and proportions of scores in the upper two categories, middle category or categories, and endpoints. Because these indices were calculated from scores aligned in the substantive direction, they describe score distributions rather than isolating content-independent response styles. Pooled comparisons and country $\times$ context interaction tests are summarised in Appendix Table A1.

For the PSDQ-S, Indian participants had higher mean item scores than Polish participants ($d = 0.20$, $p = .004$), greater upper-category use ($d = 0.22$, $p = .002$), and lower within-person variability ($d = -0.41$, $p < .001$). Football players likewise had higher mean item scores ($d = 0.45$), greater upper-category use ($d = 0.35$), and lower within-person variability than eFootball players ($d = -0.90$; all $p < .001$). These pooled comparisons concealed variation across cells. The country difference in variability was larger among eFootball players ($d = -0.65$) than football players ($d = -0.20$; interaction $p < .001$), whereas the country difference in upper-category use was larger among football players ($d = 0.34$) than eFootball players ($d = 0.08$; interaction $p = .042$). Interactions were also observed for middle-category use ($p < .001$) and endpoint use ($p = .002$). These p values are nominal and should be interpreted as exploratory.

Subscale scores were then centred by subtracting each participant's mean across the items of the corresponding instrument, and Cohen's d was recomputed (Appendix Table A2). For the PSDQ-S, India-Poland differences in activity, sport competence, global physical self-concept, strength, flexibility and endurance remained positive within both competitive contexts. Endurance differences increased from $d = 0.48$ to 0.54 in football and from 0.56 to 0.70 in eFootball. Negative country differences in health also increased in magnitude, from -0.31 to -0.72 and from -0.34 to -0.49 , respectively. Other comparisons changed more substantially: the pooled appearance difference approached zero ($d = 0.17$ to 0.02), while

coordination and global self-esteem shifted from near-zero pooled differences to negative relative-profile differences.

Football-eFootball differences in activity, sport competence, global physical self-concept and endurance remained positive within both countries, although several decreased appreciably. Among Indian participants, the sport-competence difference decreased from $d = 0.44$ to 0.11 and the endurance difference from 0.47 to 0.19 . Flexibility differences approached zero in both countries, while coordination, appearance and global self-esteem changed direction after centring.

The additional instruments showed a more differentiated pattern than a general tendency for Indian participants to score higher. Pooled country differences in mean item scores were small for the AGQ-S ($d = 0.05$, $p = .470$) and positive for the SAS-2 ($d = 0.20$, $p = .006$). Football players had higher AGQ-S mean scores ($d = 0.37$) but lower SAS-2 mean scores than eFootball players ($d = -0.30$; both $p < .001$). Several football-eFootball differences decreased substantially or changed direction. Country differences in AGQ-S other-approach goals and SAS-2 concentration disruption remained positive in both contexts, while country differences in somatic anxiety approached zero.

The gap between reverse-scored negative and positive global self-esteem items differed by country, $F(1, 796) = 40.14$, $p < .001$, but neither the context effect ($p = .056$) nor the interaction ($p = .508$) reached the nominal .05 threshold. This finding warrants caution, although wording and item content cannot be separated conclusively. These exploratory results identify comparisons retained after centring. Because centring also removes genuine overall construct differences, the resulting effects describe relative profiles and should not be interpreted as bias-corrected estimates.

Figure 10. *PSDQ-S response style*

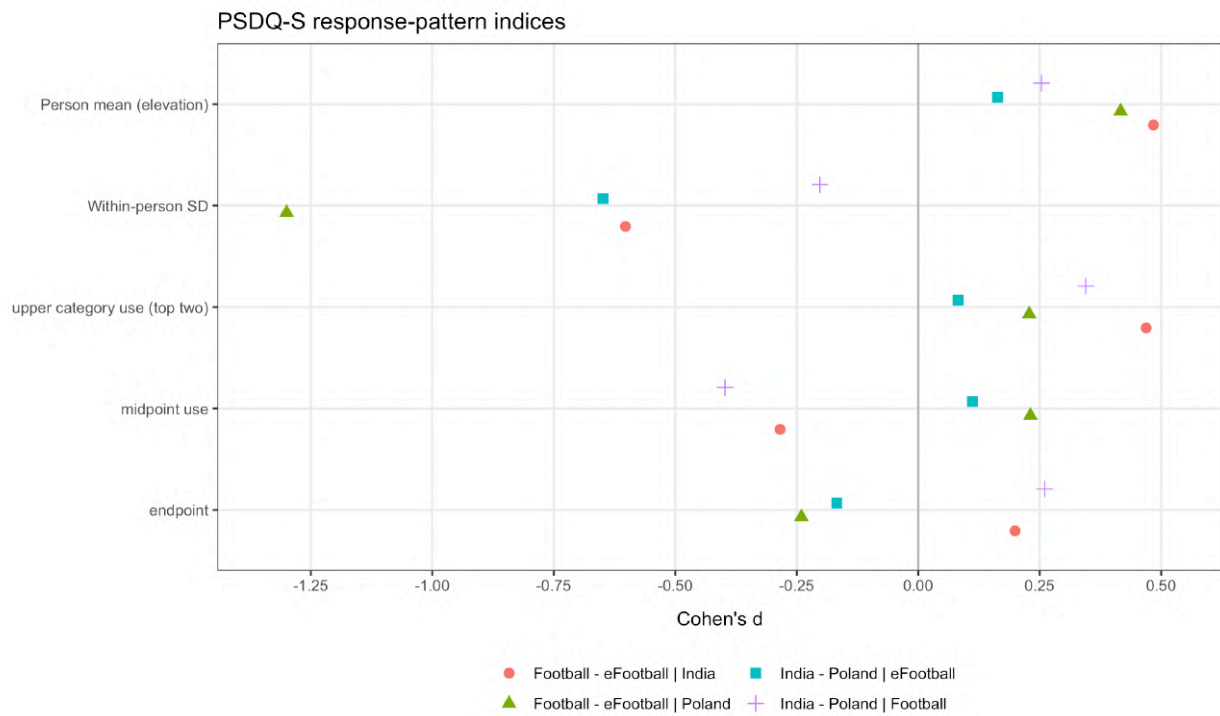
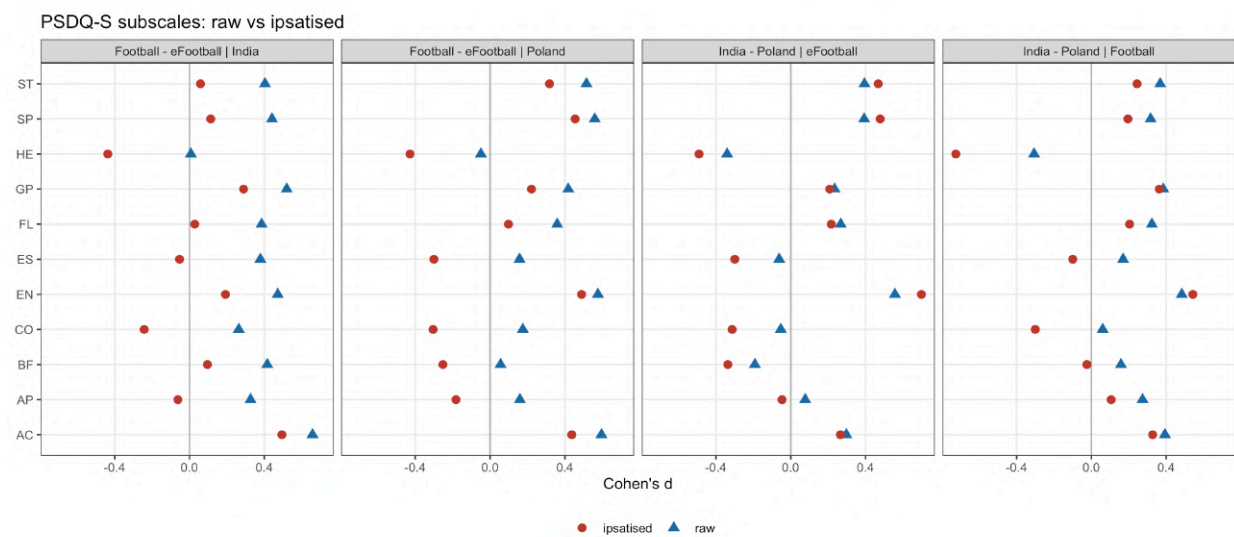


Figure 11. *PSDQ-S raw vs ipsatised scores*



5.7. Sensitivity to sample composition

Because the Indian and Polish samples, and the football and eFootball samples, differed in age, competitive experience, training frequency and competitive standard, two sensitivity analyses were conducted. First, the MANOVAs were repeated with these variables as covariates (Table 16, Panel A). Country effects retained 66 to 92% of their size and remained significant for all three instruments (AGQ-S $\eta^2 = .079$, PSDQ-S $\eta^2 = .153$, SAS-2 $\eta^2 = .067$, all $p < .001$). At the subscale level, only the country difference in somatic anxiety was no longer significant (Appendix Table A3a). Context effects were markedly reduced (AGQ-S $\eta^2 = .013$, PSDQ-S $\eta^2 = .034$, SAS-2 $\eta^2 = .004$). Because experience and training frequency are intrinsic to the difference between the two forms of participation, however, statistical adjustment removes part of the context effect itself (Miller & Chapman, 2001).

Second, the contexts were therefore compared among players with overlapping competitive experience; the distribution of experience in each cell is shown in Appendix Table A3b. Among players with 4-8 years of experience, the multivariate context effects were comparable to those in the full sample (AGQ-S $\eta^2 = .058$, PSDQ-S $\eta^2 = .141$), as they were in the 5–10 year range ($\eta^2 = .063$ and $.160$). Of the 28 context differences significant in the full sample (Welch t tests; Appendix Table A3c), 27 retained their direction and 24 at least half their magnitude (Appendix Table A3c). Weighting eFootball players to reproduce the footballers' experience distribution within each country (coarsened exact matching; Iacus et al., 2012) gave the same conclusion: 27 of the 28 differences retained their direction and 25 at least half their magnitude (median ratio of effect sizes = 1.00), although fewer reached significance because the effective eFootball sample sizes were small (approximately 21 in India and 27 in Poland, although 184 and 119 eFootball players received non-zero weights; Appendix Table A3c). The physical self-concept differences, particularly activity, sport competence, endurance and global physical self-concept, were robust; the context differences in worry and concentration disruption, and in somatic anxiety among Polish players, were not.

The achievement-goal differences were less robust. In the experience-matched Indian sample the other-approach difference, the largest contextual difference among the achievement goals, fell from $d = 0.47$ to 0.06 , and the remaining Indian goal differences changed sign (Appendix Table A3c). The context differences in achievement goals should therefore be interpreted as partly bound up with the longer competitive careers of the football players.

Table 16. *Multivariate effects Before and After adjustment for sample characteristics, and Context Effects within overlapping experience ranges (Partial η^2)*

Panel A: Covariate adjustment (N=800)

Instrument	Effect	Unadjusted	Adjusted
3 × 2 AGQ-S	Country	.105***	.079***
	Context	.071***	.013
	Country × Context	.015	.011
PSDQ-S	Country	.166***	.153***
	Context	.132***	.034**
	Country × Context	.024	.019
SAS-2	Country	.101***	.067***
	Context	.036***	.004
	Country × Context	.001	.001

Panel B: Context effect among players with comparable competitive experience

Instrument	Full sample (n = 800)	4-8 years (n = 435)	5-10 years (n = 429)
3 × 2 AGQ-S	.071***	.058***	.063***
PSDQ-S	.132***	.141***	.160***
SAS-2	.036***	.016	.027**

Note. Multivariate effects tested with Pillai's trace; partial η^2 = Pillai's V (1-df effects). Adjusted models include age and competitive experience (centred), training frequency (four categories) and competitive standard (three bands) as covariates. Cell sizes in the 4-8-year range: Indian football (n= 111), Polish football (n= 41), Indian eFootball (n= 146), Polish eFootball (n= 137); in the 5-10-year range: (n= 147, 85, 113, and 84, respectively). ** $p < .01$. *** $p < .001$.

5.8. Summary

Significant multivariate main effects of both country and context emerged for all three instruments. Country effects were consistently the larger of the two: for physical self-concept the country effect accounted for 16.6% of multivariate variance against 13.2% for context, and the same ordering held for achievement goals (10.5% against 7.1%) and competitive anxiety (10.1% against 3.6%). The margin was narrowest for physical self-concept, where context accounted for nearly as much variance as country, and at the univariate level context effects

were in fact the more widespread, reaching significance after Bonferroni adjustment on 19 of the 20 subscales against 12 of 20 for country.

The interaction was non-significant for competitive anxiety ($p = .816$), for achievement goals ($p = .057$), and for physical self-concept ($p = .053$). No univariate interaction survived adjustment within its instrument. This addresses RQ2 directly: no country $\times$ context interaction reached the nominal .05 threshold. The results were consistent with an additive account, but did not establish equivalence or rule out interactions. The magnitude of the difference between Indian and Polish participants did not depend appreciably on whether they competed in football or eFootball, and the magnitude of the difference between the two contexts did not depend appreciably on country. The qualification noted in section 5.5 for the task- and self-based achievement goals which differed by country among football players but not among eFootball players, is the one qualification to this conclusion.

Of the four hypotheses addressed in this chapter, H1 was supported: Indian participants reported higher other-approach and other-avoidance goals in both contexts, as predicted, although task-avoidance was higher among Polish participants. H2 was partially supported: Indian participants reported higher concentration disruption and, less robustly, somatic anxiety, but not higher worry, the subscale on which the difference was predicted. H3 was not supported, and the direction of the effect was opposite to prediction: Indian participants scored higher on six of the eleven physical self-concept subscales after Bonferroni adjustment (seven without correction), Polish participants scored higher on health, and the countries did not differ on coordination, body fat or global self-esteem. H4 received qualified support. Football players scored higher than eFootball players on activity, sport competence and endurance in both countries, and these differences remained positive after person-mean centring, although several decreased in magnitude. The predicted body-fat difference was less consistent: the raw difference favoured football players in India ($d = 0.42$) but was negligible in Poland ($d = 0.06$). After centring, it decreased in India and reversed in Poland, indicating that this comparison was sensitive to overall score level.

RQ1 is answered affirmatively for both constructs, and because no directional prediction was made, the direction of the differences is itself informative. Football players scored higher than eFootball players on all six achievement goals, with the largest contextual effect on other-approach ($\eta p^2 = .066$), and smaller effects on the remaining five ($\eta p^2 = .010$ to .016). eFootball players reported higher competitive anxiety on all three subscales, most

markedly somatic anxiety ($\eta^2 = .035$), with smaller effects on worry ($\eta^2 = .012$) and concentration disruption ($\eta^2 = .009$). The eFootball context was therefore associated with lower endorsement of all six achievement goals (pooled across countries; within India only the other-referenced goals differed) and with greater competitive anxiety, the latter chiefly in its self-reported somatic symptoms. Both findings were sensitive to competitive experience, however: among players with comparable experience the anxiety differences largely disappeared in Poland, and in the experience-matched Indian sample the other-approach difference fell to near zero (section 5.7). The physical self-concept differences were the most robust contextual finding.

Because 22 cases were identified as multivariate outliers during data screening and retained in the primary analyses (section 3.6), the three multivariate analyses were re-run with these cases excluded as a sensitivity check. The pattern of results was unchanged. Both main effects remained significant on all three instruments, with effect sizes differing from the full-sample values by no more than .011 (achievement goals: country $\eta^2 = .116$, context .068; physical self-concept: country .172, context .124; competitive anxiety: country .101, context .037). The interaction remained non-significant on all three instruments, competitive anxiety ($p = .933$); achievement goals ($p = .060$), and for physical self-concept ($p = .072$). Excluding the flagged cases did not change the significance decisions for the multivariate main effects or interactions.

Chapter 6: Relationships among the constructs

Chapter 5 established that achievement goals, physical self-concept, and competitive anxiety differ in level across cultures and across competitive contexts. This chapter turns from differences in level to differences in relationship: how achievement goals relate to the other two constructs, and whether those relationships are themselves culturally or contextually contingent. It addresses H6 and H7, which concern the direction of those relationships, and RQ3 and RQ4, which concern the association between anxiety and physical self-concept and the moderation of the structural model.

6.1. Intercorrelations among the constructs

Before specifying any structural model, the pattern of association among the twenty subscales was examined within each cell. Pearson correlations were used, consistent with the covariance-based path models in section 6.2. Because several subscales showed marked ceiling or floor effects (section 5.1), Spearman correlations were computed as a check and gave an essentially identical pattern mean absolute difference across all cross-instrument pairs = .03; Appendix Table A4). The full matrices are reported in Appendix A (Tables A5–A8), and average correlations within and between instruments are summarised in Table 17.

Two features are consequential for the models that follow. First, the eleven physical self-concept subscales were substantially intercorrelated in every cell, with average correlations between .38 and .63, and less strongly in the two eFootball samples. Because the eleven subscales are nonetheless distinct, and because the dimensions that differed most between contexts in Chapter 5 are not captured by the global scales, all eleven were retained as outcomes in the structural models.

Second, and more importantly, the associations between instruments were weak. Achievement goals correlated negatively with competitive anxiety, with average correlations between -.09 and -.14 across the four cells. At the level of individual subscales these relationships were modest but consistent: after Benjamini-Hochberg adjustment within each cell, 10 of the 18 goal-anxiety correlations remained significant among Polish football players, 6 among Polish eFootball players and 5 among Indian football players, but none among Indian eFootball players, and no individual correlation exceeded .26 in absolute value. Physical self-concept, by contrast, was essentially unrelated to both competitive anxiety (average correlations between -.08 and .04) and achievement goals (between .01 and .05), and none of the 396 individual correlations involving physical self-concept survived adjustment in any cell.

This bears directly on RQ3, which asked whether competitive anxiety and physical self-concept are related and, if so, whether either mediates the relationship between achievement goals and the other. The answer to the first part is negative: in the pooled sample the correlation between overall competitive anxiety and overall physical self-concept was $r = -.06$, $p = .078$, and it did not reach significance in any of the four cells ($r = -.13$ to $.07$, all $p > .07$). Because the second path of any mediational chain would require a relationship between the two, a mediational pathway was not expected; it was nevertheless tested directly in Section 6.5, and no indirect effect was found. The two constructs are therefore treated as parallel outcomes of achievement goals rather than as elements of a causal chain. This contrasts with existing structural models in which general anxiety predicted lower physical self-concept alongside motivational variables (Melguizo-Ibáñez et al., 2022).

Table 17. *Average Pearson correlations within and between instruments, by cell*

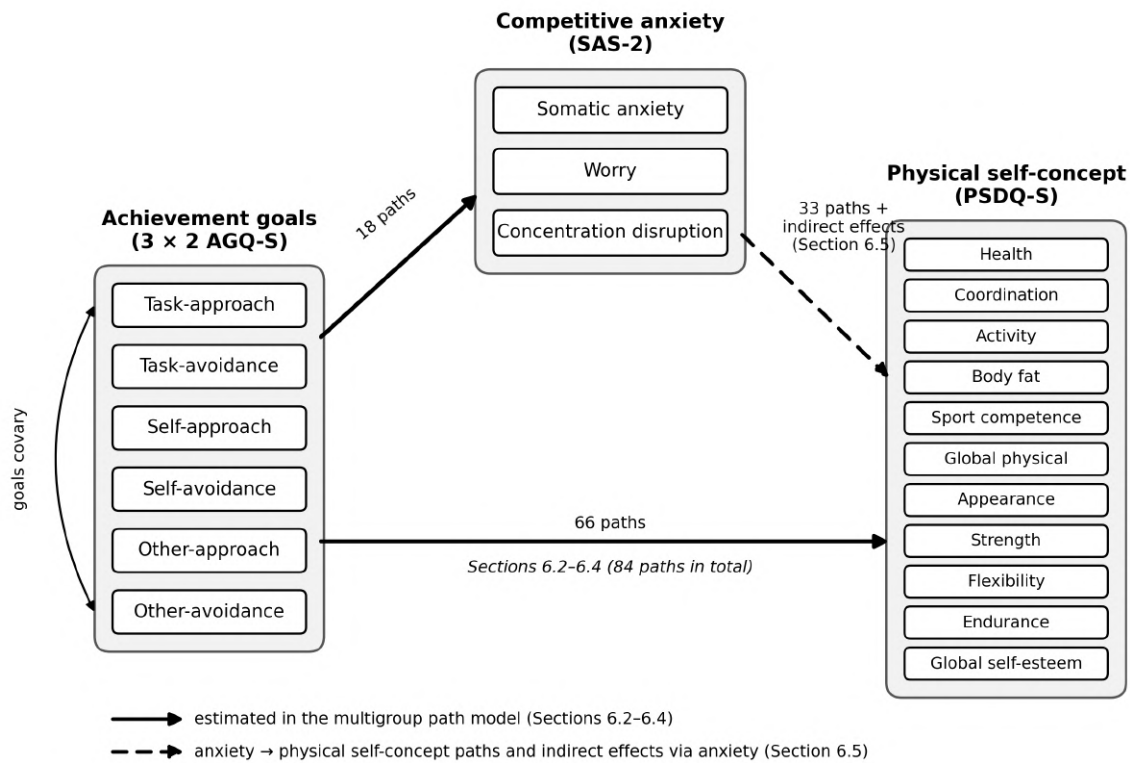
Cell	Within SAS-2	Within AGQ-S	Within PSDQ-S	AGQ-SAS- 2	PSDQ- SAS-2	PSDQ- AGQ
India Football	.53	.50	.63	-.14	.04	.01
India eFootball	.65	.63	.50	-.10	-.08	.05
Poland Football	.56	.45	.60	-.12	-.07	.03
Poland eFootball	.56	.29	.38	-.09	.01	.02

Note. Values are the mean of the relevant off-diagonal Pearson correlations. Within-instrument values average the correlations among that instrument's own subscales; between-instrument values average all cross-instrument pairs. Full matrices are reported in Appendix A.

6.2. Model specification

A multigroup path model examined associations between six achievement goal orientations and fourteen outcomes: the three competitive anxiety subscales and the eleven PSDQ-S subscales. All 84 regression paths were estimated freely in the unconstrained model. The six achievement goals were allowed to covary, and residual variances and covariances were estimated for all outcomes. No directional paths were specified between competitive anxiety and physical self-concept. These paths, and the indirect effects of achievement goals through anxiety that they allow, were tested in a separate model reported in Section 6.5 (Figure 12).

Figure 12. *Path Models Estimated*



Note. Solid arrows show the multigroup path model of Sections 6.2-6.4, in which the six achievement goals predicted the three competitive anxiety and eleven physical self-concept subscales (84 paths). The dashed arrow shows the additional paths from competitive anxiety to physical self-concept (33 per cell) and the indirect effects of achievement goals through anxiety, tested in Section 6.5. Each arrow between blocks represents paths from every variable in one block to every variable in the other. Residual covariances among the outcomes are omitted for clarity. Models were estimated separately in each country × context cell using observed composite scores.

Observed composite scores were used to limit model complexity with 200 participants per group. The measurement invariance findings in Chapter 4 support cross-group comparisons, but the composite-score models do not explicitly account for measurement error, and scalar invariance does not guarantee equal attenuation across groups.

Models were estimated using maximum likelihood (ML) without a mean structure. The unconstrained model was saturated ($df = 0$), so its perfect fit followed from the specification rather than providing evidence for the proposed relationships. Three increasingly constrained models imposed equality on the 84 unstandardised regression coefficients; additionally, the six predictor variances and fifteen covariances; and additionally, the fourteen residual variances and ninety-one residual covariances. A separate analysis tested equality of the achievement-goal variance–covariance matrix without the outcomes.

Four pairwise comparisons were conducted: India versus Poland within each context, and football versus eFootball within each country. Each comparison included 400 participants, with 200 per group. Estimates for the same cell were identical across its two unconstrained comparisons. MLR was used as a sensitivity analysis, providing robust standard errors and scaled model tests. Comparisons against the saturated baseline used the restricted model's scaled fit test. Holm adjustment was applied across the four regression-path equality tests separately for ML and MLR. Individual-path significance indicators use MLR and are unadjusted for multiple testing.

All 48 path and direct covariance models across ML and MLR converged and passed the checks for estimated variances, covariance matrices, finite standard errors and, where applicable, R^2 bounds. The four saturated MLR path models nevertheless produced warnings about the parameter covariance matrix. Its rank was 398 of 420, with negative eigenvalues of approximately -10^{-17} , consistent with a finite-sample rank limitation of the robust covariance estimator. These warnings were retained as a qualification rather than treated as evidence of non-convergence.

6.3. Invariance of the structural model

Table 18 presents the nested comparisons. Under ML, equality of the 84 regression paths was rejected in all four comparisons at the unadjusted .05 level. After Holm adjustment, the country comparison within football and the context comparison within India remained significant (both adjusted $p = .040$), whereas the country comparison within eFootball and the context comparison within Poland did not (both adjusted $p = .078$).

Under MLR, all four regression-path equality tests remained significant after Holm adjustment: India versus Poland in football, scaled $\chi^2(84) = 124.38$, adjusted $p = .011$; India versus Poland in eFootball, scaled $\chi^2(84) = 109.35$, adjusted $p = .046$; football versus eFootball in India, scaled $\chi^2(84) = 122.52$, adjusted $p = .012$; and football versus eFootball in Poland, scaled $\chi^2(84) = 111.83$, adjusted $p = .046$. These omnibus tests indicate differences in regression coefficients considered jointly; they do not identify the particular paths that differ.

The direct ML tests rejected equality of the achievement-goal variance–covariance matrix in all four comparisons: $\chi^2(21) = 75.07$, 175.19, 40.25 and 119.91, respectively ($p < .001$, $p < .001$, $p = .007$ and $p < .001$). Under MLR, the country comparisons within football and eFootball remained significant, as did the context comparison within Poland (scaled $\chi^2(21)$

= 49.96, 138.48 and 90.01, respectively; all $p < .001$). The context comparison within India was no longer significant, scaled $\chi^2(21) = 28.16$, $p = .136$. These direct-test p values are unadjusted.

The cumulative models imposing additional predictor and residual constraints differed significantly from the unconstrained model under both estimators. Because these comparisons combine several sets of constraints, their rejection does not isolate the contribution of the newly added constraints.

For RQ4, evidence of regression-path differences was present under both estimators, although multiplicity-adjusted conclusions differed. Achievement-goal variance–covariance differences were supported under both estimators in three comparisons; the Indian context comparison was sensitive to estimator choice. These covariance tests do not establish differences in goal correlations or organisation specifically, because they constrain variances as well as covariances.

Table 18. *Nested model comparisons for the four multi-group path analyses*

Comparison / model	df	ML χ^2	ML p [Holm]	MLR scaled χ^2	MLR p [Holm]
India-Poland: football					
Equal regression paths	84	117.12	.010 [.040]	124.38	.003 [.011]
+ Predictor variances/covariances	105	192.19	< .001	182.37	< .001
+ Residual variances/covariances	210	370.31	< .001	343.32	< .001
India-Poland: eFootball					
Equal regression paths	84	107.00	.046 [.078]	109.35	.033 [.046]
+ Predictor variances/covariances	105	282.18	< .001	272.43	< .001
+ Residual variances/covariances	210	484.57	< .001	442.62	< .001
Football-eFootball: India					
Equal regression paths	84	117.01	.010 [.040]	122.52	.004 [.012]
+ Predictor variances/covariances	105	157.26	< .001	149.79	.003
+ Residual variances/covariances	210	412.94	< .001	388.41	< .001
Football-eFootball: Poland					

Comparison / model	df	ML χ^2	ML p [Holm]	MLR scaled χ^2	MLR p [Holm]
Equal regression paths	84	108.20	.039 [.078]	111.83	.023 [.046]
+ Predictor variances/covariances	105	228.10	< .001	219.24	< .001
+ Residual variances/covariances	210	578.76	< .001	569.81	< .001

Note. N = 400 per comparison (200 per group). All tests compare the stated model with the saturated unconstrained baseline (df = 0), not with the preceding row. MLR statistics are scaled fit tests against that baseline. Bracketed p values are Holm-adjusted across the four regression-path equality tests within each estimator; other p values are unadjusted. Constraints apply to unstandardised parameters. “+” denotes cumulative additional constraints. Direct achievement-goal covariance tests are reported in Section 6.3.

6.4. Direction and magnitude of the structural paths

Standardised coefficients from the unconstrained models are reported in Table 19. ML and MLR produced the same point estimates; significance markers in the table use MLR standard errors. Associations were generally small: 306 of the 336 unique coefficients were below .20 in absolute magnitude, and the largest was .282. Achievement goals jointly accounted for 3.2-10.2% of the variance in competitive anxiety and 0.5-5.8% in PSDQ-S outcomes. Each coefficient represents an association conditional on the other five goals.

H6 predicted negative associations between approach goals and competitive anxiety, and positive associations between avoidance goals and anxiety. Coefficient directions did not consistently follow this pattern. Task-approach had negative coefficients for somatic anxiety among Polish football and eFootball players ($\beta = -.228$ and $-.263$), but self-avoidance also had negative coefficients ($\beta = -.234$ and $-.232$), contrary to prediction. Self-approach had positive coefficients for somatic anxiety and worry among Polish eFootball players ($\beta = .249$ and $.282$). Overall, H6 was not consistently supported.

H7 predicted positive associations between task-approach and self-approach and physical self-concept. Self-approach was positively associated with flexibility among Polish football players ($\beta = .254$) but negatively associated with flexibility and endurance among Indian football players ($\beta = -.251$ and $-.252$). Task-approach was positively associated with global physical self-concept among Polish eFootball players under MLR ($\beta = .249$, $p = .031$), although this path did not reach .05 under ML ($p = .053$). The findings provided limited, group-specific support rather than consistent support for H7.

Individual-path tests were unadjusted and should be interpreted as exploratory. Of 336 unique paths, 121 (36.0%) showed a sign disagreement between β and the bivariate correlation, or an increase in absolute magnitude exceeding .10. These were descriptive flags for possible suppression, not formal evidence of suppression.

Table 19. *Standardised path coefficients from the unconstrained models*

Outcome / predictor	India football	Poland football	India eFootball	Poland eFootball
Somatic anxiety				
Task-approach	-.034	-.228*	.184	-.263
Task-avoidance	-.053	.040	-.068	.062
Self-approach	-.020	.132	-.211	.249*
Self-avoidance	.048	-.234	-.050	-.232*
Other-approach	-.129	.053	-.089	.030
Other-avoidance	-.053	.178**	.129	-.070
R ²	.041	.102	.040	.068
Worry				
Task-approach	.137	-.130	-.043	-.206
Task-avoidance	-.176	.013	.010	.037
Self-approach	-.207	-.061	-.035	.282*
Self-avoidance	.199	-.092	.052	-.116
Other-approach	-.053	-.014	-.182	.100
Other-avoidance	-.071	.050	.041	-.107
R ²	.063	.059	.032	.044
Concentration disruption				
Task-approach	-.036	-.166	.060	-.254
Task-avoidance	-.173*	.106	.221*	.045
Self-approach	-.086	-.199	-.222	.050
Self-avoidance	-.021	-.038	-.156	-.104
Other-approach	-.076	.025	-.095	-.014
Other-avoidance	.099	.031	.107	-.045
R ²	.073	.083	.056	.069
Health				
Task-approach	-.137	.001	.178	.155

Outcome / predictor	India football	Poland football	India eFootball	Poland eFootball
Task-avoidance	−.093	−.126	.096	−.003
Self-approach	−.063	.100	−.106	−.100
Self-avoidance	.112	.058	−.086	.031
Other-approach	−.106	.046	−.077	.051
Other-avoidance	.117	.002	.110	.029
R ²	.051	.017	.026	.019
Coordination				
Task-approach	−.065	−.020	.142	.133
Task-avoidance	−.025	−.086	.089	−.098
Self-approach	−.160	−.025	−.095	.089
Self-avoidance	.130	.071	.004	−.172
Other-approach	.152	.138	.114	.065
Other-avoidance	−.076	.023	−.091	−.010
R ²	.034	.024	.035	.019
Activity				
Task-approach	.050	.094	−.075	−.054
Task-avoidance	.017	.005	−.023	−.017
Self-approach	−.236	−.209	.204	.083
Self-avoidance	.097	−.044	.062	−.148
Other-approach	−.004	.113	.000	−.062
Other-avoidance	.062	−.031	−.131	.071
R ²	.027	.025	.027	.025
Body fat				
Task-approach	−.006	−.122	.035	.201
Task-avoidance	−.066	−.072	.117	−.030
Self-approach	.008	.239*	.028	−.054
Self-avoidance	.025	.073	−.063	−.039
Other-approach	−.016	−.091	−.082	−.054
Other-avoidance	.099	−.041	.079	.163*
R ²	.007	.035	.017	.036
Sport competence				
Task-approach	.010	.015	−.048	.187

Outcome / predictor	India football	Poland football	India eFootball	Poland eFootball
Task-avoidance	−.068	.011	−.011	−.130
Self-approach	−.065	−.162	.089	.040
Self-avoidance	.179	.177*	−.046	−.088
Other-approach	.022	.004	.120	.054
Other-avoidance	.038	.035	−.172	.028
R ²	.023	.021	.022	.017
Global physical self-concept				
Task-approach	−.042	.017	.059	.249*
Task-avoidance	−.050	−.175*	.047	−.205
Self-approach	−.094	.015	.009	−.111
Self-avoidance	.253*	.116	−.082	−.012
Other-approach	.021	.007	.081	−.048
Other-avoidance	−.015	.069	−.064	.131
R ²	.035	.023	.011	.039
Appearance				
Task-approach	−.204	.021	.136	.192
Task-avoidance	−.003	−.140	−.039	−.022
Self-approach	−.082	−.008	−.002	−.055
Self-avoidance	.187	.013	.090	.005
Other-approach	.050	.168	.014	.035
Other-avoidance	.072	.025	−.124	−.061
R ²	.058	.031	.027	.024
Outcome / predictor	India football	Poland football	India eFootball	Poland eFootball
Strength				
Task-approach	−.033	.096	−.026	−.012
Task-avoidance	.037	−.035	−.067	.039
Self-approach	−.188	−.230*	.201	.002
Self-avoidance	.180	.124	.051	−.068
Other-approach	.033	.116	.000	.000
Other-avoidance	.050	.015	−.158	.037
R ²	.039	.031	.031	.005

Outcome / predictor	India football	Poland football	India eFootball	Poland eFootball
Flexibility				
Task-approach	.112	-.131	.101	.092
Task-avoidance	.019	-.083	.063	-.088
Self-approach	-.251*	.254*	.043	.036
Self-avoidance	.124	-.010	-.135	.048
Other-approach	.074	-.007	.093	-.005
Other-avoidance	-.059	.077	-.115	.173*
R ²	.026	.030	.027	.037
Endurance				
Task-approach	-.021	-.011	-.002	.085
Task-avoidance	.007	-.083	-.001	.039
Self-approach	-.252*	.032	.055	-.096
Self-avoidance	.233*	.208*	.148	-.072
Other-approach	.053	-.010	-.065	.020
Other-avoidance	.034	.044	-.088	.021
R ²	.055	.038	.019	.013
Global self-esteem				
Task-approach	-.095	.067	.125	.194
Task-avoidance	-.129	-.148	.006	-.055
Self-approach	-.116	-.085	-.061	.039
Self-avoidance	.234*	.208*	-.089	-.112
Other-approach	.037	.090	.129	-.008
Other-avoidance	.091	-.012	.035	.016
R ²	.050	.043	.026	.017

Note. n = 200 per cell. Each coefficient controls for the other five goals. * p < .05; ** p < .01; *** p < .001, based on MLR standard errors without multiplicity adjustment. R² is the variance accounted for jointly by the six goals. Individual-path results are exploratory; Coefficients are identical under ML and MLR; stars indicate unadjusted MLR p values. See Section 6.2 for the saturated MLR parameter-covariance qualification.

6.5. Anxiety and physical self-concept: the hypothesised indirect path

The hypothesised model (Figure 1) specified a path from competitive anxiety to physical self-concept (dashed arrow in Figure 12), through which achievement goals could relate indirectly to physical self-perceptions. This path was tested in a separate model in each cell, in which the six achievement goals predicted the three anxiety subscales, and goals and anxiety together predicted the eleven PSDQ-S subscales. A robust Wald test of all 33 anxiety → physical self-concept paths per cell was significant only among Indian eFootball players, $\chi^2(33) = 57.09$, Holm-adjusted $p = .023$, where anxiety added on average 2.5% of explained variance beyond the goals (maximum 6.2%; Table 20). In the other three cells the joint test was not significant (Holm-adjusted $p \geq .151$), and anxiety added on average approximately 1% of explained variance.

Constraining the 33 paths to equality across the four cells did not worsen fit, $\Delta\chi^2(99) = 92.68$, $p = .660$, so the Indian eFootball result should not be interpreted as a group difference. Finally, indirect effects of each achievement goal through the three anxiety subscales on global physical self-concept and global self-esteem were estimated with 2,000 bootstrap resamples per cell ($\leq 2.2\%$ of resamples did not converge). None of the 48 total indirect effects, and none of the 144 specific indirect effects, had a 95% percentile confidence interval excluding zero; all total indirect effects were small ($|\beta| \leq .035$). The hypothesised indirect path from achievement goals through competitive anxiety to physical self-concept was therefore not supported. Because the joint test controls for the achievement goals, it also evaluates anxiety as a parallel predictor of physical self-concept alongside motivation, the structure used by Melguizo-Ibáñez et al. (2022). To allow direct comparison with their single-path estimate ($\beta = -.31$), total competitive anxiety was also entered as a predictor of total physical self-concept with the six achievement goals as covariates: the standardised coefficients ranged from $-.11$ to $.06$ across cells (all $p > .11$), and anxiety added at most 1.2% of explained variance.

Table 20. *Joint Tests of the Paths from Competitive Anxiety to Physical Self-Concept, Controlling for Achievement Goals, by Cell*

Cell	Wald $\chi^2(33)$	p	Holm p	Paths $p < .05$	Max $ \beta $	Mean ΔR^2
Indian football	35.20	.364	.364	0	.16	.012
Polish football	45.62	.071	.151	1	.22	.013

Indian eFootball	57.09	.006	.023	5	.36	.025
Polish eFootball	47.36	.050	.151	1	.25	.011

Note. Each cell $n = 200$. The Wald test evaluates all 33 paths from the three SAS-2 subscales to the eleven PSDQ-S subscales jointly (robust MLR standard errors); Holm adjustment across the four cells. Paths $p < .05$ = number of the 33 individual paths significant without adjustment. Max $|\beta|$ = largest absolute standardised path. Mean ΔR^2 = mean increase in explained variance of the PSDQ-S subscales when anxiety is added to the six achievement goals. Equality of the 33 paths across cells: $\Delta\chi^2(99) = 92.68, p = .660$.

6.6. Summary

Achievement goals had generally small conditional associations with competitive anxiety and physical self-concept. Neither H6 nor H7 received consistent support. For RQ4, all four regression-path equality tests remained significant after Holm adjustment under MLR, compared with two under ML. Direct achievement-goal variance–covariance differences were supported under both estimators in three comparisons; the context comparison within India was not significant under MLR.

Competitive anxiety was largely unrelated to physical self-concept once achievement goals were taken into account (Section 6.5). The joint test of the anxiety $\rightarrow$ physical self-concept paths was significant only among Indian eFootball players, where anxiety added on average 2.5% of explained variance, and the paths did not differ across the four cells. No indirect effect of any achievement goal through anxiety on global physical self-concept or global self-esteem was detected. For RQ3, the proposed association was therefore not supported, and the mediation component of the hypothesised model was tested and not supported. Because the groups also differed in how they used the response scales (section 5.6), shared response tendencies may contribute to the covariance differences reported in section 6.3; this remains a possible explanation rather than a demonstrated mechanism.

Chapter 7: The role of contextual variables

This chapter addresses the third aim by examining contextual correlates of the psychological measures and, subsequently, the intention to pursue the activity professionally. It addresses H5 and H8, and RQ5-RQ7. The analyses examine contextual associations and their variation across countries and competitive contexts; they do not estimate how much of the group differences reported in Chapter 5 is explained by contextual variables.

As specified in Section 3.7, perceived parental support was designated a priori as the confirmatory contextual variable, whereas the remaining contextual analyses were exploratory. Holm adjustment was applied across the 80 four-category parental-support tests. Benjamini-Hochberg (BH) adjustment was applied separately within each cell across the remaining 140 exploratory contextual tests, including the supplementary binary parental-support contrast. The designation of parental support as the confirmatory variable follows the directional hypothesis stated before data analysis (H8, section 2.8), but the adjustment families described here were defined after the original analysis plan and are therefore reported as post hoc (see section 8.7). Counts of unadjusted p values below .05 are reported descriptively; conclusions are based on adjusted results.

The within-cell analyses were supplemented by direct tests of whether contextual associations differed by country or competitive context. Linear models included each contextual variable, country, context and their interactions, using HC3 robust inference. Holm adjustment covered the 40 H8 interaction tests, and BH adjustment covered the 160 RQ5 omnibus tests. These additional analyses were conducted post hoc and are reported in Appendix Tables A9-A11. Neither the within-cell analyses nor the interaction models eliminate potential confounding by other participant characteristics.

7.1. Perceived parental support

Kruskal-Wallis tests compared the twenty subscales across four categories of perceived parental support: No, Yes, Mixed and Indifferent. Fourteen of the 80 tests had unadjusted $p < .05$ (17.5%): eight in Indian football, four in Indian eFootball, none in Polish football and two in Polish eFootball. Table 21 reports the test statistics and Holm-adjusted p values.

Only appearance among Indian football players remained significant after adjustment, $H(3) = 18.50$, unadjusted $p < .001$, Holm-adjusted $p = .028$, rank $\epsilon^2 = .093$. This omnibus result indicates differences across support categories but does not identify which categories differ or

establish that greater support corresponds to more favourable scores. The Mixed category contained only 13 participants in the Polish eFootball cell, limiting the precision of comparisons involving that subgroup.

The direct interaction analyses also identified country moderation for appearance, $F_{HC3}(6, 784) = 4.29$, Holm-adjusted $p = .012$. No other country-moderation or three-way interaction test survived adjustment. The appearance result indicates that the pattern of associations across support categories differed between countries but does not establish that the association was stronger in India.

To address the directional prediction in H8, association strength was operationalised as country-specific partial R^2 for parental support, accounting for context and allowing support associations to vary by context. Bootstrap intervals assessed the India-Poland difference, with adjustment across the twenty outcomes. All adjusted intervals included zero. H8 was therefore not supported: the analyses provided insufficient evidence that parental support was more strongly associated with the psychological measures among Indian participants. Full results are reported in Appendix Table A9.

Table 21. *Kruskal-Wallis tests of the twenty subscales across levels of perceived parental support, by cell*

Subscale	India football	India eFootball	Poland football	Poland eFootball
<i>Achievement goals</i>				
Task-approach	0.05 [1.000]	8.05 [1.000]	1.94 [1.000]	2.44 [1.000]
Task-avoidance	1.79 [1.000]	10.50 [1.000]	2.23 [1.000]	1.51 [1.000]
Self-approach	6.37 [1.000]	4.94 [1.000]	2.77 [1.000]	5.87 [1.000]
Self-avoidance	4.86 [1.000]	4.34 [1.000]	0.95 [1.000]	1.00 [1.000]
Other-approach	0.59 [1.000]	10.44 [1.000]	1.75 [1.000]	11.19 [.807]
Other-avoidance	0.72 [1.000]	9.67 [1.000]	1.41 [1.000]	4.98 [1.000]
<i>Physical self-concept</i>				

Subscale	India football	India eFootball	Poland football	Poland eFootball
Health	12.31 [.496]	1.32 [1.000]	3.68 [1.000]	2.12 [1.000]
Coordination	10.39 [1.000]	3.53 [1.000]	3.55 [1.000]	6.15 [1.000]
Activity	6.35 [1.000]	1.60 [1.000]	4.32 [1.000]	2.97 [1.000]
Body fat	6.63 [1.000]	6.43 [1.000]	6.34 [1.000]	6.15 [1.000]
Sport competence	7.68 [1.000]	3.40 [1.000]	1.25 [1.000]	8.47 [1.000]
Global physical	8.63 [1.000]	1.36 [1.000]	3.65 [1.000]	1.21 [1.000]
Appearance	18.50 [.028]	2.55 [1.000]	6.24 [1.000]	0.75 [1.000]
Strength	5.01 [1.000]	3.10 [1.000]	2.54 [1.000]	1.49 [1.000]
Flexibility	12.32 [.496]	1.88 [1.000]	5.18 [1.000]	0.85 [1.000]
Endurance	12.53 [.456]	2.93 [1.000]	3.21 [1.000]	4.69 [1.000]
Global esteem	10.01 [1.000]	2.50 [1.000]	3.42 [1.000]	2.53 [1.000]
<i>Competitive anxiety</i>				
Somatic anxiety	1.72 [1.000]	3.54 [1.000]	5.23 [1.000]	5.39 [1.000]
Worry	11.31 [.774]	3.93 [1.000]	5.09 [1.000]	0.51 [1.000]
Concentration disruption	7.18 [1.000]	2.66 [1.000]	5.97 [1.000]	0.75 [1.000]

Note. Entries are Kruskal–Wallis H statistics (df = 3) with Holm-adjusted p values in brackets; Holm adjustment covers the 80 parental-support tests. Bold entries have adjusted $p < .05$. $n = 200$ per cell.

7.2. Perceived institutional support

Mann-Whitney U tests compared the twenty subscales between participants who did and did not report support from government bodies or sporting organisations within each cell. Three of the 80 tests had unadjusted $p < .05$ (3.8%): other-avoidance among Polish football players, and coordination and sport competence among Polish eFootball players. None remained significant after BH adjustment (Table 22).

The supplementary models likewise identified no association or country- or context-moderation test that survived BH adjustment (Appendix Table A10). These analyses therefore provided insufficient evidence of associations between perceived institutional support and the psychological measures, or of differences in those associations across countries or contexts.

Table 22. *Mann-Whitney U tests of the twenty subscales by perceived institutional support, by cell*

Subscale	India football	India eFootball	Poland football	Poland eFootball
<i>Achievement goals</i>				
Task-approach	4715 [.931]	3745 [.961]	3868.5 [.350]	4645 [.624]
Task-avoidance	5075.5 [.931]	4348.5 [.670]	3897.5 [.350]	4610 [.639]
Self-approach	4813 [.982]	3441 [.741]	3884.5 [.350]	4447 [.820]
Self-avoidance	5174.5 [.878]	4019.5 [.867]	4468.5 [.981]	4565.5 [.667]
Other-approach	5124.5 [.931]	4146.5 [.788]	4450.5 [.951]	4368.5 [.909]
Other-avoidance	5440 [.554]	3992.5 [.926]	5257 [.321]	4531 [.715]
<i>Physical self-concept</i>				
Health	5388.5 [.636]	4275.5 [.735]	4767 [.639]	4190 [.950]
Coordination	4873.5 [.982]	3644 [.815]	4547.5 [.928]	3490 [.382]
Activity	5062.5 [.931]	3565 [.788]	4760 [.646]	3638.5 [.455]
Body fat	4859.5 [.982]	3921.5 [.968]	5082 [.350]	3803 [.604]
Sport competence	4654 [.931]	3399.5 [.714]	5019 [.401]	3189.5 [.183]
Global physical	4960.5 [.982]	3807.5 [.974]	4907.5 [.474]	3678.5 [.505]
Appearance	4629.5 [.931]	3673.5 [.867]	4526.5 [.951]	3636 [.455]
Strength	5256 [.845]	3434.5 [.741]	4781 [.627]	3794.5 [.604]
Flexibility	4990 [.982]	3371 [.693]	5243 [.321]	3913 [.667]

Subscale	India football	India eFootball	Poland football	Poland eFootball
Endurance	5058.5 [.931]	3456.5 [.752]	5147.5 [.349]	4331 [.919]
Global esteem	5025.5 [.962]	3608.5 [.788]	4136.5 [.567]	3802.5 [.604]
<i>Competitive anxiety</i>				
Somatic anxiety	4565 [.854]	3894.5 [.974]	4779.5 [.627]	4336.5 [.919]
Worry	4901.5 [.982]	3514 [.787]	4744 [.650]	4474 [.794]
Concentration disruption	5038 [.955]	3913 [.968]	4430.5 [.928]	4070.5 [.879]

Note. Entries are U statistics for the Yes group, with BH-adjusted p values in brackets. Tests are two-sided asymptotic tests with continuity correction. Adjustment covers 140 exploratory contextual tests within each cell, not only the 20 tests shown here. No adjusted p value is below .05. Counts (Yes/No): India football 115/85; India eFootball 52/148; Poland football 132/68; Poland eFootball 61/139. Each cell contains 200 participants.

7.3. Perceived standard of the game

Spearman rank correlations examined associations between the twenty subscales and participants' ratings of the development of football or competitive gaming in their country. Ten of the 80 correlations had unadjusted $p < .05$ (12.5%). Only self-avoidance among Indian football players remained significant after BH adjustment, $\rho = -.22$, unadjusted $p = .002$, BH-adjusted $p = .049$ (Table 23). More favourable ratings were associated with lower self-avoidance scores in this cell.

Supplementary models treated perceived standard of the game as a three-category factor, permitting differences that were not necessarily monotonic. None of their omnibus association or moderation tests survived BH adjustment (Appendix Table A11). These models tested different hypotheses and used a different adjustment family from the within-cell correlations. For RQ5, the findings therefore indicate one weak, cell-specific association involving perceived standard of the game, but no adjusted evidence that institutional-support or game-standard associations differed by country or competitive context.

Table 23. *Spearman rank correlations between perceived standard of the game and the twenty subscales, by cell*

Subscale	India football	India eFootball	Poland football	Poland eFootball
<i>Achievement goals</i>				
Task-approach	-.167 [.165]	-.106 [.670]	-.116 [.350]	.101 [.522]
Task-avoidance	-.033 [.931]	-.155 [.660]	-.074 [.502]	.067 [.652]
Self-approach	-.122 [.374]	-.156 [.660]	-.129 [.349]	.082 [.604]
Self-avoidance	-.216 [.049]	-.080 [.742]	-.065 [.562]	.080 [.605]
Other-approach	-.194 [.092]	-.107 [.670]	-.103 [.382]	.024 [.910]
Other-avoidance	-.133 [.299]	-.080 [.742]	.034 [.765]	-.074 [.634]
<i>Physical self-concept</i>				
Health	-.057 [.854]	-.070 [.784]	.027 [.841]	-.027 [.909]
Coordination	-.002 [.982]	.002 [.987]	-.012 [.928]	-.085 [.604]
Activity	-.023 [.974]	.022 [.961]	.040 [.711]	-.115 [.455]
Body fat	-.004 [.982]	.047 [.788]	.081 [.449]	-.059 [.694]
Sport competence	-.011 [.982]	-.008 [.974]	.081 [.449]	-.154 [.314]
Global physical	.029 [.934]	.069 [.784]	.160 [.315]	-.110 [.475]
Appearance	-.024 [.962]	.100 [.670]	.023 [.868]	-.082 [.604]
Strength	.021 [.979]	.050 [.788]	.110 [.350]	-.163 [.314]
Flexibility	-.002 [.982]	.049 [.788]	.165 [.315]	-.090 [.604]
Endurance	-.016 [.982]	.029 [.923]	.107 [.358]	-.158 [.314]
Global esteem	-.026 [.956]	.010 [.974]	-.009 [.939]	-.133 [.389]
<i>Competitive anxiety</i>				

Subscale	India football	India eFootball	Poland football	Poland eFootball
Somatic anxiety	.036 [.931]	-.048 [.788]	.125 [.349]	-.070 [.639]
Worry	-.088 [.636]	-.064 [.787]	.113 [.350]	-.006 [.971]
Concentration disruption	.079 [.697]	-.015 [.968]	-.019 [.901]	-.002 [.994]

Note. Entries are Spearman's ρ with BH-adjusted p values in brackets. Correlations use ascending category codes (Poor = 1, Fair = 2, Good = 3) and asymptotic two-sided tests. Adjustment covers 140 exploratory contextual tests within each cell; bold entries have adjusted $p < .05$. $n = 200$ per cell. Category counts (Poor/Fair/Good): India football 27/37/136; India eFootball 71/65/64; Poland football 44/45/111; Poland eFootball 55/63/82.

7.4. Body mass index

Spearman rank correlations examined associations between body mass index (BMI) category and the twenty psychological subscales within each country-context cell, with particular attention to physical self-concept in relation to RQ6. Twelve of the 80 correlations had unadjusted $p < .05$ (15.0%): four in each football sample and two in each eFootball sample. None remained significant after the BH adjustment described at the beginning of this chapter. Results are reported in Appendix Table A12.

Among Indian eFootball players, BMI category showed weak negative correlations with perceived health ($\rho = -.15$) and sport competence ($\rho = -.14$), whereas correlations with body-fat self-concept ($\rho = -.01$) and global physical self-concept ($\rho = -.05$) were close to zero. Among Polish eFootball players, the correlation with global physical self-concept was positive ($\rho = .21$). None of these associations survived adjustment. Supplementary correlations using continuous BMI likewise yielded no significant findings after BH adjustment.

Age-adjusted regression models subsequently examined continuous BMI in relation to body-fat self-concept, health, global physical self-concept and appearance, including interactions with country and competitive context. HC3 robust tests identified nominal BMI-by-country interactions for health, global physical self-concept and appearance (unadjusted $p = .037$, $.024$ and $.048$, respectively; Table 24). The negative interaction coefficients indicated more negative or less positive BMI slopes in India than Poland, averaged equally across the two contexts; they did not establish negative associations within India. No BMI-by-context or

three-way interaction reached the nominal .05 threshold. For body-fat self-concept, none of the six pairwise slope differences was significant after Holm adjustment.

Overall, the multiplicity-adjusted correlation analyses provided insufficient evidence of associations between BMI and the psychological measures. The regression findings suggested possible country differences for selected physical self-concept dimensions, but these remain exploratory because the interaction tests were unadjusted for multiple comparisons. RQ6 therefore received limited evidence rather than a clear affirmative answer. The analyses do not establish causal effects of BMI on physical self-perception.

Table 24. *Interactions of continuous BMI with country and competitive context in age-adjusted regression models*

Outcome	BMI × Country, <i>B</i> (<i>p</i>)	BMI × Context, <i>B</i> (<i>p</i>)	BMI × Country × Context, <i>B</i> (<i>p</i>)
Body-fat	-.13 (.196)	-.01 (.924)	-.19 (.347)
Health	-.30 (.037)	.26 (.081)	-.32 (.270)
Global physical self-concept	-.20 (.024)	-.03 (.778)	.12 (.492)
Appearance	-.17 (.048)	.02 (.796)	-.15 (.404)

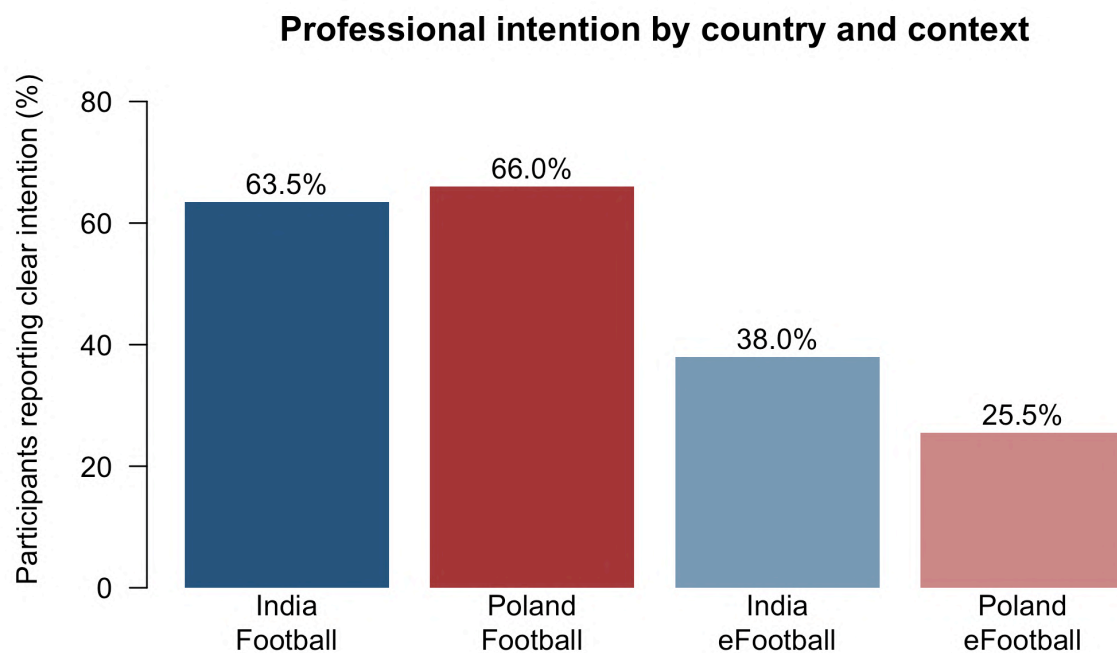
Note. Values are unstandardised coefficients, with unadjusted HC3 robust *p* values in parentheses. Outcomes were subscale means. Models included centred BMI, country, context, all lower-order and three-way interactions, and age. Country was coded India = +0.5 and Poland = -0.5; context was coded football = +0.5 and eFootball = -0.5. Two-way BMI interactions represent slope differences averaged equally over the other grouping variable. These exploratory tests were not adjusted for multiple comparisons.

7.5. Professional aspiration

Professional intention was recorded using a three-category item and dichotomised as Yes versus Maybe/No, for the reasons given in Section 3.4. This distinction identifies a clear intention to pursue the activity professionally; the combined category does not necessarily indicate rejection of a professional career. Across the full sample, 386 of 800 participants (48.25%) reported a clear professional intention.

Professional intention was more frequent among football players than eFootball players (64.8% versus 31.8%), Pearson $\chi^2(1) = 87.23, p < .001, \phi = .33$, supporting H5. The overall country comparison was not significant, $\chi^2(1) = 2.00, p = .157, \phi = .05$. However, the cell proportions suggested that the context difference varied between countries: professional intention was reported by 63.5% of Indian football players and 38.0% of Indian eFootball players, compared with 66.0% and 25.5%, respectively, in Poland (Figure 13).

Figure 13. *Proportion of participants intending to pursue a professional career, by cell*



Exploratory Mann-Whitney U tests were conducted to compare the 20 psychological subscales between participants reporting “Yes” and those reporting “Maybe/No” regarding professional intention, separately within each country-by-context group. Eight of the 80 comparisons showed unadjusted p values below .05 (Table 25). These differences were observed for self-approach (SAp) among Indian football players; task-avoidance (TA_v), self-approach (SAp), other-approach (OA_p), flexibility (FL), and somatic anxiety among Indian eFootball players; and coordination (CO) and sport competence (SP) among Polish eFootball players. However, none of the 80 comparisons remained statistically significant after Benjamini-Hochberg correction for multiple testing. Accordingly, these findings were treated as exploratory and were not used to select predictors for the subsequent regression models (Table 25).

Table 25. *Exploratory Mann-Whitney U Tests with unadjusted $p < .05$ for Professional Intention*

Country/context	Subscale	p	r	BH-adjusted p
India football	Self- approach goals	.022	-.162	.414
India eFootball	Task-avoidance goals	.002	-.225	.060
India eFootball	Self-approach goals	<.001	-.236	.060
India eFootball	Other-approach goals	.046	-.141	.414
India eFootball	Flexibility	.032	-.151	.414
India eFootball	Somatic	.026	.157	.414
Poland eFootball	Coordination	.050	-.139	.414
Poland eFootball	Sport competence	.021	-.164	.414

Note. Only comparisons with unadjusted $p < .05$ are displayed. A total of 80 Mann-Whitney U tests were conducted (20 subscales within each of four country-by-context groups). The Benjamini-Hochberg procedure was applied across all 80 comparisons; none remained statistically significant after adjustment. R represents the effect-size estimate. $r = Z/\sqrt{N}$; negative values indicate lower scores among participants reporting a definite professional intention (Yes) than among those reporting Maybe/No.

Separate logistic models examined each achievement goal orientation, adjusting first for age and then for age and categorical competitive standard. Among Indian eFootball players, task-avoidance and self-approach were negatively associated with professional intention in both specifications. In the age-and-standard-adjusted models, their odds ratios were 0.74 and 0.75, respectively, with both associations surviving BH adjustment across the 24 cell-by-goal tests ($p_{BH} = .022$ for each). Other-approach was also negatively associated with intention in this cell, but survived adjustment only within the six-goal family for that cell, not across all 24 tests. Psychological associations were therefore limited and cell-specific rather than uniformly absent.

A pooled binary logistic regression directly tested whether the football-eFootball difference in professional intention varied by country. The model included age, country, competitive context, categorical competitive standard and the context $\times$ country interaction. Poland, football and non-elite competitive standard were the reference categories. The pooled

model permitted a direct interaction test; separately fitted cell models were used to describe within-cell associations and discrimination. The model improved significantly on the intercept-only model, likelihood-ratio $\chi^2(6) = 134.19, p < .001$, with Nagelkerke pseudo- $R^2 = .206$. At a probability threshold of .50, it correctly classified 67.6% of participants, compared with a majority-category baseline of 51.8%. Sensitivity was 68.9% and specificity was 66.4%. The Hosmer–Lemeshow test was non-significant, $\chi^2(8) = 12.14, p = .145$, although this result alone does not establish adequate calibration. Coefficients are reported in Table 26.

Table 26. *Logistic regression predicting professional intention (N = 800)*

Predictor	B	SE	Wald	p	OR [95% CI]
Age	−.101	.022	20.3	< .001	.90 [.87, .94]
Context (eFootball)	−2.015	.235	73.69	< .001	.13 [.08, .21]
Country (India)	-.432	.224	3.73	.053	.65 [.42, 1.01]
Competitive standard: semi-elite	.386	.194	3.95	.047	1.47 [1.01, 2.15]
Competitive standard: elite	.808	.187	18.6	<.001	2.24 [1.55, 3.24]
Context × Country	1.115	.322	11.95	<.001	3.05 [1.62, 5.74]
Constant	2.747	.554	24.63	< .001	15.60 [5.27, 46.16]

Note. Professional intention was coded 1 = Yes and 0 = Maybe/No. Reference categories were football, Poland and non-elite competitive standard. Age was entered in years. The context coefficient represents the eFootball-football contrast within Poland; the country coefficient represents the India–Poland contrast within football. The interaction OR represents the ratio of the context odds ratios between countries. Confidence intervals are model-based Wald intervals; *p* values are unadjusted. OR = odds ratio; CI = confidence interval.

The context × country interaction was significant, $B = 1.115, SE = 0.322, \text{Wald } \chi^2(1) = 11.95, p < .001$, interaction OR = 3.05, 95% CI [1.62, 5.74]. Adding the interaction improved fit relative to the main-effects model, likelihood-ratio $\chi^2(1) = 12.18, p < .001$. Within Poland, eFootball players had lower odds of professional intention than football players, OR = 0.13, 95% CI [0.08, 0.21], $p < .001$. The corresponding contrast was also significant in India but

smaller, OR = 0.41, 95% CI [0.27, 0.62], $p < .001$. Thus, the adjusted context difference on the odds scale was larger in Poland. Age was negatively associated with professional intention, OR = 0.90, 95% CI [0.87, 0.94], $p < .001$. Compared with non-elite participants, semi-elite participants had higher odds of professional intention, OR = 1.47, 95% CI [1.01, 2.15], $p = .047$, as did elite participants, OR = 2.24, 95% CI [1.55, 3.24], $p < .001$. The country coefficient represented the India-Poland contrast specifically among football players and did not reach the nominal .05 threshold, OR = 0.65, 95% CI [0.42, 1.01], $p = .053$. It should not be interpreted as an overall country effect because the model included a country interaction.

An exploratory extension added body-fat self-concept, endurance and global physical self-concept to the pooled model. None of the three coefficients was significant, and their joint addition did not significantly improve fit, likelihood-ratio $\chi^2(3) = 3.54$, $p = .316$. Apparent AUC increased only from .732 to .735, while mean cross-validated AUC decreased from .727 to .724. A separate supplementary model adding country $\times$ categorical competitive standard improved fit, likelihood-ratio $\chi^2(2) = 8.69$, unadjusted $p = .013$, suggesting that the common competitive-standard associations assumed in Table 26 may also vary by country.

The pooled model's apparent AUC was .732, 95% CI [.697, .766] (Figure 14), and its mean AUC across ten repetitions of ten-fold cross-validation was .727. Separately fitted cell models showed greater variation in discrimination (Table 27). Apparent AUCs ranged from .580 to .757, while cross-validated AUCs were .542 for Indian football, .741 for Polish football, .510 for Indian eFootball and .616 for Polish eFootball. Discrimination was therefore strongest among Polish football players and close to chance in the Indian cells. These results describe internal predictive performance and do not establish generalisability to new samples.

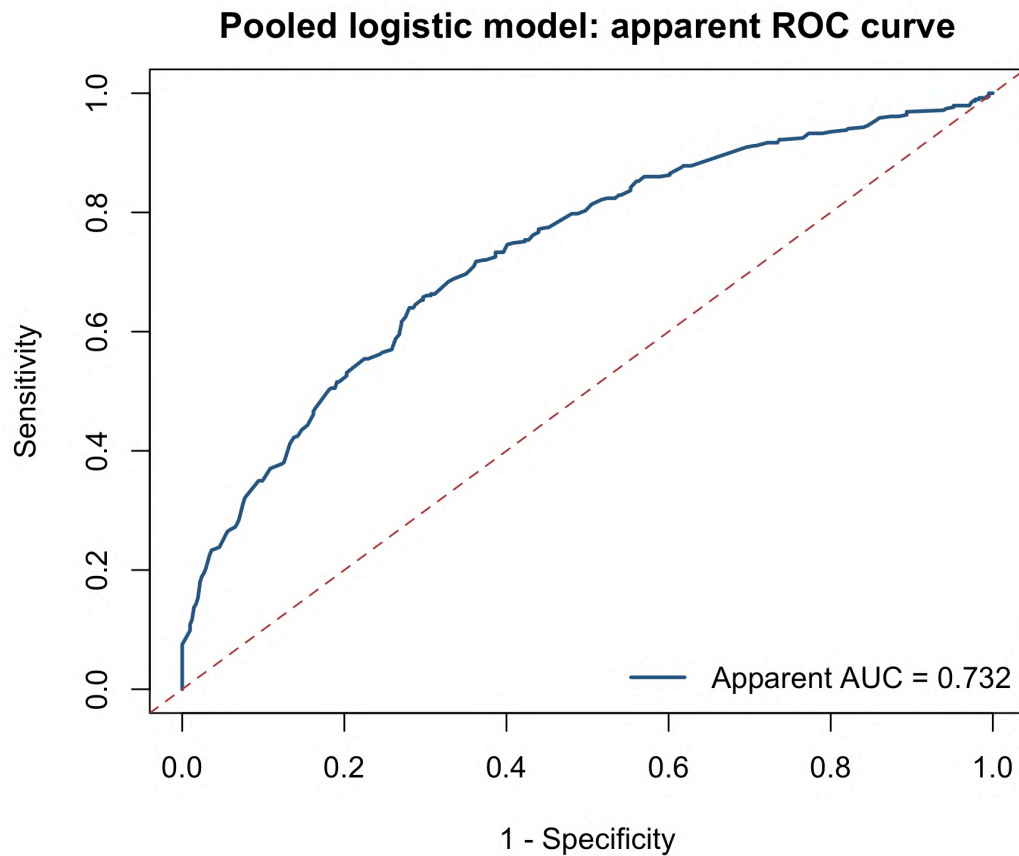
Table 27. *Cell-specific logistic models and discrimination indices*

	India football	Poland football	India eFootball	Poland eFootball
<i>Model fit</i>				
$\chi^2(3)$	5.88	44.89	3.29	18.32
p	.118	< .001	.349	<.001
Nagelkerke R ²	.04	.278	.022	.129

	India football	Poland football	India eFootball	Poland eFootball
<i>Odds ratios [95% CI]</i>				
Age	.91 [.83, 1.00]	.79 [.72, .86] ***	.95 [.86, 1.04]	1.04 [.95, 1.13]
Competitive standard: semi-elite	.91 [0.44, 1.85]	1.99 [.88, 4.51]	.99 [.45, 2.16]	5.86 [1.9, 18.06] **
Competitive standard: elite	1.67 [.83, 3.39]	5.05 [1.99, 12.83] ***	1.44 [.75, 2.78]	7.13 [2.28, 22.34] ***
<i>Discrimination</i>				
Apparent AUC	.585	.757	.58	.669
95% CI	[.503, .667]	[.689, .825]	[.499, .662]	[.588, .751]
Cross-validated AUC	.542	.741	.51	.616

Note. Separate binary logistic models were fitted within each cell, including age and categorical competitive standard. Non-elite was the reference category. Professional intention was coded 1 = Yes and 0 = Maybe/No. Odds ratios have model-based Wald confidence intervals. Significance symbols refer to unadjusted coefficient tests: ** $p < .01$; *** $p < .001$. The age coefficient in Indian football was not significant ($p = .0502$); its upper confidence limit rounds to 1.00. Apparent AUC describes discrimination in the fitting sample, with DeLong 95% confidence intervals. Cross-validated AUC is the mean across ten repetitions of ten-fold cross-validation. AUC = area under the receiver operating characteristic curve.

Figure 14. *Receiver operating characteristic curve for the pooled logistic model*



7.6. Summary

Perceived parental support, the confirmatory contextual variable, showed limited associations after multiplicity adjustment: only appearance among Indian football players survived Holm adjustment across the 80 tests, and the directional analysis provided no evidence that parental support was more strongly associated with the psychological measures in India. H8 was therefore not supported.

Perceived institutional support showed no associations that survived BH adjustment, and perceived standard of the game showed one weak, cell-specific association (lower self-avoidance among Indian football players). Neither variable showed adjusted evidence of country or context moderation, so RQ5 was answered largely in the negative.

Body mass index correlations did not survive BH adjustment. Age-adjusted regressions suggested nominal BMI-by-country interactions for health, global physical self-concept and appearance, but these tests were unadjusted and exploratory; RQ6 therefore received limited evidence rather than a clear affirmative answer.

H5 is supported: football players reported stronger professional intention than eFootball players, and the difference was large. The pooled model showed that the context difference was larger in Poland (OR = 0.13) than in India (OR = 0.41). For RQ7, age and competitive standard also predicted intention, and a supplementary country $\times$ competitive-standard term improved fit ($p = .013$). Psychological associations were limited but not absent: task-avoidance and self-approach goals were negatively associated with intention among Indian eFootball players, whereas adding physical self-concept subscales did not improve the pooled model.

Chapter 8: Discussion

This thesis examined achievement goals, competitive anxiety and physical self-concept among male football and eFootball players in Poland and India. Its crossed design made it possible to examine country differences within two competitive contexts and context differences within two countries, after evaluating measurement comparability. The findings indicate differences in reported psychological characteristics and professional intention, alongside generally weak associations between the psychological constructs. They also show that conclusions depend on the level of analysis: similarities in average group differences do not imply that relationships between variables are invariant across groups.

8.1. Summary of findings

The country and context main effects were significant for all three psychological instruments. Indian participants reported higher other-referenced achievement goals, supporting H1, whereas the higher anxiety scores in India involved concentration disruption and somatic anxiety rather than the predicted difference in worry, providing partial support for H2. The direction of the physical self-concept difference contradicted H3: Indian participants generally reported more favourable scores. Football players reported higher physical self-concept, with activity, sport competence and endurance prominent, providing qualified support for H4. They also reported higher achievement goal scores and lower competitive anxiety than eFootball players, answering RQ1 affirmatively for both constructs.

No multivariate country-by-context interaction reached the conventional significance threshold for the psychological instruments, and no univariate interaction survived adjustment. RQ2 therefore yielded no clear evidence that these mean differences depended on the other grouping variable. However, this does not establish equivalence or a general principle of additivity. In Chapter 6, the robust analyses detected differences in the sets of regression paths across all four comparisons. H6 and H7 were not consistently supported, and competitive anxiety was largely unrelated to physical self-concept once achievement goals were taken into account, so the proposed association in RQ3 was not supported. The mediation component of the hypothesised model was tested directly and was not supported: no indirect effect of achievement goals through anxiety on physical self-concept was detected in any cell.

The contextual analyses provided limited evidence after multiplicity adjustment. H8 was not supported by the directional comparison of parental-support association strength. Institutional support showed no adjusted associations, while perceived standard of the game showed one weak association with self-avoidance goals among Indian football players. BMI

correlations did not survive adjustment, although supplementary regressions identified exploratory country differences for selected physical self-concept outcomes. Professional intention showed the clearest context difference, supporting H5. Its adjusted association with competitive context was stronger in Poland, while selected achievement goals were associated with intention among Indian eFootball players. These findings qualify an exclusively demographic or structural explanation of professional aspiration.

8.2. Country differences

Achievement goals

The empirical findings provide strong empirical support for H1. The higher endorsement of other-approach and other-avoidance goals among Indian participants is consistent with the prediction that socially referenced competence would differ between countries. The distinction between task, self and other standards in the 3×2 framework is useful here because it prevents all approach goals or all avoidance goals from being treated as interchangeable (Mascret et al., 2015). The country difference was nevertheless not confined to other-referenced goals: task-avoidance also showed a country effect. The results therefore support a differentiated pattern rather than a simple separation between culturally sensitive performance goals and culturally neutral mastery goals.

This pattern fits the cross-cultural evidence reviewed in section 2.4.1. King et al. (2017) found that mastery-type goals behaved similarly across nine cultural groups while goals defined by comparison with others did not, and Asghar et al. (2013) reported stronger ego orientation among Chinese and Pakistani than among German adolescent athletes. The present results extend both observations to the 3×2 model and to adult competitors: the two other-referenced goals, the direct successors of the performance and ego goals examined in earlier work, were higher in the Indian samples, whereas most task- and self-referenced goals were not. The Polish advantage on task-avoidance, the aim of not making technical errors, was not anticipated. One reading, offered tentatively in view of the doubts about the dimension (section 2.7.3), is that it reflects the much higher uncertainty avoidance attributed to Poland, which values correct procedure and is uncomfortable with error. Because the difference was largely confined to football players (section 5.5), it may equally reflect the coaching culture of Polish club football, and the present data cannot separate the two explanations.

The individualism–collectivism account provides a possible interpretation of the greater endorsement of socially referenced goals, but it was not directly tested. Participants' values, self-construal and perceived evaluative expectations were not measured. Country also incorporates differences in recruitment, education, training and competitive opportunities. The findings should therefore be described as differences between the Indian and Polish samples, with cultural orientation retained as a candidate explanation. They do not establish that interdependence caused stronger other-referenced goals or that every participant shared the orientation attributed to their country.

Competitive anxiety

H2 was partially supported. The anxiety findings refine rather than fully confirm the original prediction. The clearest country difference concerned concentration disruption, while the predicted difference in worry was not detected. This distinction matters because the SAS-2 differentiates worry, somatic symptoms and interference with concentration instead of treating competitive anxiety as a single undifferentiated response (Smith et al., 2006). A broad claim that Indian participants were more concerned about evaluation would not explain why worry did not differ in the predicted manner.

Training demands, fatigue, preparation and the competitive environment could contribute to attentional disruption, but the analyses do not identify which processes account for the difference. Nor do questionnaire reports demonstrate differences in physiological stress responses or objectively measured attention. The results support examining anxiety dimensions separately and suggest that the attentional component deserves particular attention in subsequent research. They do not justify assigning a characteristic anxiety profile to Indian or Polish athletes generally.

The comparison with Asghar et al. (2013) helps to locate the result. They found higher cognitive anxiety in their Asian samples, but their measure did not separate worry from concentration disruption. The present findings suggest that, in the Indian and Polish samples studied here, the country difference in the cognitive component lies in its attentional facet rather than in evaluative worry, which is precisely the distinction the SAS-2 was designed to draw. The somatic difference should be given little weight: it was small ($\eta^2 = .008$), was no longer significant after adjustment for age, experience, training frequency and competitive standard (section 5.7), and approached zero after person-mean centring (section 5.6). H2 is therefore

best summarised as a robust country difference in concentration disruption, with no difference in worry.

Physical self-concept

The direction of the physical self-concept findings opposed H3. The Indian samples generally reported more favourable physical self-perceptions, and the country discriminant function was most strongly associated with endurance, strength, sport competence and activity. These findings concern perceived capability; they cannot be interpreted as evidence of superior fitness, performance or health. Perceived health was also an important exception to the broader country pattern.

The sensitivity analyses make a single explanation based on either substantive differences or response tendencies inadequate. Group differences in person-level elevation and response dispersion indicate that participants used the instruments differently in ways that may contribute to observed scores. Nevertheless, several capability-related country differences remained after person-mean centring. Conversely, some differences, including appearance, diminished substantially. Centring therefore helps describe how the relative profile differs from the raw profile, but it changes the quantity being compared and is not a correction that recovers an unbiased score.

Reference groups offer another possible explanation. Respondents may evaluate their capability against different peers or competitive standards, an issue identified in cross-cultural self-report research by Heine et al. (2002). Measurement invariance supports comparison under the fitted measurement model but does not independently identify respondents' comparison standards. The present findings consequently challenge the predicted direction of H3 without establishing why that prediction failed. Objective capability measures and information about reference groups would help distinguish differences in physical functioning from differences in self-evaluation.

The contrast with Asghar et al. (2013), whose German athletes described themselves more favourably than Chinese or Pakistani athletes, still requires explanation, and three candidate explanations can be weighed against the present data. The first is the pancultural self-enhancement account of Sedikides et al. (2015) introduced in section 2.5.1: if people in all cultures self-enhance, but in domains their culture treats as legitimate, then physical capability may be such a domain for competitive athletes, for whom describing oneself as fit and strong signals readiness to perform rather than immodesty. The pattern of results is consistent with

this reading, because the Indian advantage was concentrated in capability facets (endurance, strength, sport competence and activity) and was absent from global self-esteem, the domain in which modesty norms should operate most strongly. The second explanation is differential exposure: daily training was far more common among Indian than Polish football players (79.5% versus 29.5%), which could raise perceived endurance and strength. This is weakened, though not excluded, by the covariate analysis, in which the multivariate country effect on physical self-concept retained 92% of its size after adjustment for training frequency, experience, age and competitive standard (section 5.7). The third is response style: Indian participants used the upper response categories more often and varied less across items (section 5.6), yet the capability differences, and endurance in particular, persisted after person-mean centring. No single explanation accounts for the whole pattern, but together the analyses make the modesty account on which H3 was based difficult to sustain for athletes describing their physical capabilities.

8.3. Context differences

The physical self-concept findings supported the capability component of H4. Activity, endurance and sport competence were prominent on the context discriminant function, with global physical self-concept also contributing. The context contrast should therefore be discussed primarily in relation to perceived physical activity and capability. Health and body image did not define the leading context contrast.

This pattern is compatible with the different physical demands of the activities. Football routinely requires running, sustained exertion and the execution of physical skills. However, the design cannot determine whether football participation produced more favourable physical self-perceptions or whether individuals with those perceptions were more likely to enter and remain in football. Nor are the differences simply a product of longer competitive careers: among players with comparable competitive experience (4-8 and 5-10 years), the context differences in physical self-concepts were as large as in the full sample (PSDQ-S $\eta^2 = .141$ and $.160$, compared with $.132$), with activity, sport competence and endurance remaining the most robust. The PSDQ-S also measures physical competence rather than digital football expertise. Lower scores among eFootball players should not be interpreted as lower competence in their own competitive activity. The predicted body-fat component appeared among Indian but not consistently among Polish players, so support for H4 remains qualified.

These findings sit closer to the studies that reported a physical disadvantage among esports players than to those that did not. DiFrancisco-Donoghue et al. (2022) found fewer daily steps and a higher body fat percentage among collegiate esports players, and Kusan et al. (2025) linked longer esports involvement with lower physical activity and body appreciation, whereas Ketelhut et al. (2023) found no objective differences between competitive esports players and matched peers. Because the present study measured self-perception rather than physical status it cannot settle this disagreement, but the location of the differences is informative: eFootball players did not describe themselves less favourably across the board, only on the facets most closely tied to habitual physical activity. The body-fat result also follows the anthropometric data. BMI was higher among Indian eFootball than Indian football players (22.83 versus 21.39) but almost identical in the two Polish groups (23.16 versus 22.84), which mirrors the finding that the body-fat self-concept difference appeared in India but not in Poland.

Football players endorsed achievement goals more strongly, most consistently other-approach goals, which differed in both countries; the task- and self-based differences were confined mainly to the Polish sample. These scores concern standards used to evaluate competence; they do not measure total motivation, persistence or effort. It would therefore be excessive to conclude that eFootball players were generally less motivated. Differences in selection, coaching, practice arrangements or questionnaire relevance could contribute, and these possibilities require direct investigation.

The other-approach difference is the most readily interpreted in structural terms. Football is played within a squad in which selection, playing time and position depend on outperforming teammates as well as opponents, so comparison with others is built into everyday participation; competitive eFootball, played predominantly one against one, places comparison mainly in the result of the individual match. The disappearance of this difference in the experience-matched Indian sample (section 5.7) nevertheless shows that it is partly bound up with the length of competitive careers, so it is better treated as a feature of these samples than of the two activities as such.

Higher competitive anxiety among eFootball players, particularly somatic anxiety, demonstrates that lower physical exertion does not necessarily coincide with fewer reported bodily anxiety symptoms. This difference was, however, less robust than the physical self-concept findings. Among players with comparable competitive experience, the somatic anxiety

difference persisted among Indian players but diminished among Polish players, and the differences in worry and concentration disruption largely disappeared. The anxiety differences, particularly in Poland, may therefore partly reflect the shorter competitive history of eFootball players rather than the activity itself. Nor does the finding establish that physical inactivity caused those symptoms or that exercise buffered anxiety in football players. The finding supports including competitive gaming in research on competitive stress while testing the relevance of sport-psychological constructs within that setting. This approach accords with the research agenda described by Pedraza-Ramirez et al. (2020), without assuming that established sport findings transfer unchanged to esports. The elevated somatic anxiety of eFootball players is also consistent with qualitative accounts in which elite esports players and staff describe stress, mental fatigue and pressure as routine features of competition (Monteiro Pereira et al., 2023; Poulus et al., 2025), although those studies did not use a sport-specific anxiety measure.

8.4. The joint interaction of country and context

The three multivariate interaction tests did not provide clear evidence that country differences in psychological means varied by competitive context. The achievement-goal and physical self-concept results were close to the conventional threshold, however, and should not be interpreted as demonstrating negligible interaction effects. Formal equivalence would require justified bounds and an analysis designed to assess them (Lakens et al., 2018). Similarly, a significant country comparison in one context and a non-significant comparison in another do not establish that the two country contrasts differ.

This conclusion is specific to psychological mean differences. It does not extend to every association examined in the thesis. The robust multigroup path analyses detected differences in regression relationships, and the professional-intention model identified a context-by-country interaction. These findings are compatible: average levels, within-group associations and the odds of reporting an intention are distinct statistical questions. The thesis therefore provides no basis for a general claim that country and competitive context operate independently.

Excluding the 22 multivariate outliers did not change the main MANOVA conclusions. This strengthens confidence that those particular conclusions were not determined by the flagged cases. It does not establish robustness to unmeasured confounding, selection effects or every modelling choice, and it should not be presented as a sensitivity check of all subsequent analyses.

8.5. Relationships among the psychological constructs

Achievement goals were weakly associated with the anxiety and physical self-concept outcomes. Most standardised paths were below .20 in absolute value, and the explained variance was modest. H6 was not consistently supported: avoidance goals did not reliably show the predicted positive anxiety associations, and approach goals did not uniformly show negative associations. H7 was also not consistently supported because the predicted positive relationships of task-approach and self-approach with physical self-concept were not reproduced across outcomes and groups.

These findings limit the proposed explanatory model in these samples, rather than invalidating the achievement-goal framework as a whole. Trait reports collected at one time may capture different processes from goals and emotions measured around a specific competition. The six goal predictors were also correlated, making each path a conditional association after accounting for the others. Suppression flags and differences between zero-order correlations and regression coefficients caution against assigning a direct psychological meaning to every coefficient. The individual path tests were exploratory and unadjusted, so isolated significant paths should not be treated as replicated effects.

The robust analyses provide evidence of group differences in response to RQ4. Equality of the full set of 84 regression paths was rejected in all four comparisons after Holm adjustment under MLR, whereas conventional ML supported fewer rejections. The evidence therefore does not support a largely invariant structural model. At the same time, an omnibus rejection does not show that every path differs, establish which differences are reliable, or imply that the differences are large. Small associations can differ statistically across groups without becoming strong predictors within any group.

The achievement-goal variance–covariance structure also differed, although the robust direct tests did not reject equality in the Indian cross-context comparison. Because these tests constrain variances as well as covariances, their rejection does not by itself demonstrate a different pattern of correlations or a fundamentally different organisation of motivation. Substantive goal relationships, differences in dispersion and shared response tendencies may all contribute. The contrast between the ML and MLR conclusions makes estimator sensitivity part of the substantive interpretation, rather than a technical detail to omit.

The absence of a substantial association between competitive anxiety and physical self-concept, and the absence of indirect effects of achievement goals through anxiety, contrast with

structural models in which anxiety predicted physical self-concept alongside motivational variables. Melguizo-Ibáñez et al. (2022) reported a moderate negative path from anxiety to physical self-concept ($\beta = -.31$), but they used a general measure, the Beck Anxiety Inventory, in a sample of educational sciences students, whereas the present study assessed anxiety as a sport-specific trait among competitive players. Several considerations suggest why the relationship did not hold here. General anxiety overlaps with global self-evaluation, whereas the SAS-2 concerns reactions to competitive performance; associations between self-related constructs tend to be strongest when the constructs correspond in domain and level of generality (Swann et al., 2007). Consistent with this, anxiety that concerns the body itself, social physique anxiety, has been related to physical self-concept and achievement goals in physical activity (Hagger et al., 2011). In sport, competitive anxiety is most consistently linked to state self-confidence, the belief that one can perform well in a forthcoming competition (Ntoumanis & Biddle, 1998), rather than to the stable description of one's physical attributes captured by the PSDQ-S. For eFootball players in particular, the competence at stake in competition is not physical.

The result is also informative in magnitude. The pooled correlation ($r = -.06$, 90% CI $[-.118, -.002]$) indicates that any association is at most small, and anxiety added approximately 1–2.5% of explained variance beyond achievement goals. The joint test of the anxiety $\rightarrow$ physical self-concept paths was significant only among Indian eFootball players, and these paths did not differ across the four cells. Achievement goals were modestly associated with competitive anxiety, explaining between 3% and 10% of its variance across subscales and cells, but anxiety was not in turn associated with physical self-concept; the proposed chain therefore broke at its second link. Mediation was examined directly: none of the indirect effects of achievement goals through anxiety on global physical self-concept or global self-esteem differed from zero. Floor effects on somatic anxiety and ceiling effects on several physical self-concept subscales may have attenuated the observable relationships, and the within-cell samples could reliably detect only correlations of about .20 or larger. The cross-sectional design would in any case not establish the temporal ordering required for a causal mediation account. The findings therefore do not show that competitive anxiety and physical self-concept are unrelated, but they indicate that sport-specific competitive anxiety was related to physical self-concept neither as a parallel predictor, as in models using general anxiety, nor as a mediator of achievement goals.

8.6. Contextual variables and professional aspiration

Perceived support and standard of the game

The multiplicity-adjusted contextual analyses do not support H8. Only appearance among Indian football players survived adjustment across the 80 parental-support tests. The direct country-moderation test for appearance also survived adjustment, indicating a difference in the pattern across support categories. Neither finding establishes the hypothesised greater strength of association in India. In the directional analysis, every multiplicity-adjusted interval for the India–Poland difference in partial R^2 included zero.

This distinction changes the theoretical interpretation. The study does not demonstrate that parental approval has greater psychological importance for Indian competitors or that lower social legitimacy of eFootball produces stronger parental influence on their goals. These remain plausible research questions, but the current evidence cannot explain the results through those mechanisms. A single categorical item, including a small Mixed subgroup in one cell, may capture support imprecisely. Failure to support H8 therefore does not establish that family relationships are unimportant.

For RQ5, institutional support showed no associations that survived adjustment. The one adjusted correlation involving perceived standard of the game was weak and restricted to self-avoidance among Indian football players. The supplementary models provided no adjusted evidence of country or context moderation. These findings offer limited evidence concerning the specific items used; they do not evaluate the effects of particular organisations, funding arrangements or support programmes.

Body mass index

The BMI analyses provided little evidence of a consistent relationship with physical self-concept across the four cells. Neither categorical nor continuous BMI correlations survived the specified BH adjustment. Supplementary age-adjusted regressions suggested country differences for health, global physical self-concept and appearance, but their interaction tests were unadjusted and should remain exploratory. RQ6 therefore received limited evidence rather than a clear affirmative answer.

The study cannot establish that football participation buffers the association between body mass and self-perception. It also cannot treat BMI as a direct measure of adiposity or physical fitness: it was derived from self-reported height and weight and does not distinguish

muscle from fat. These measurement constraints, together with the adjusted null findings, limit conclusions about how body composition relates to physical self-perception in either activity.

Professional aspiration

Professional intention differed clearly by competitive context. Football players were more likely to report a definite intention to pursue their activity professionally, supporting H5. The pooled model additionally showed that the context contrast differed by country. After adjustment for age and competitive standard, the eFootball-to-football odds ratio was approximately .13 in Poland and .41 in India. The significant interaction therefore indicates a larger context difference on the odds scale in Poland; it is not a test of whether competitive standard operates differently between countries.

The smaller context gap in India arose because definite intention was more common among Indian than Polish eFootball players (38.0% versus 25.5%), not because it was less common among Indian footballers (63.5% versus 66.0%). This is compatible with the visible national pathway created in India by the eISL and by the AIFF's selection of the national esports team through eFootball qualifiers (section 2.2.1), although players' perceptions of these pathways were not measured. It sits less comfortably with Bihari and Pattanaik's (2023) account of family disapproval and weak institutional backing as obstacles to esports careers in India; one reconciliation is that such obstacles shape how careers unfold more than whether young players aspire to them.

Younger age and higher competitive standard were associated with professional intention in the pooled model. These associations are consistent with differences in career stage and competitive opportunity, but the study did not measure the pathways through which either operated. The supplementary country-by-standard result suggests that the common standard associations in the main model may require further examination. The negative association with age agrees with Bányai et al. (2020), who found younger competitive gamers more likely to plan a professional career. National cultural characteristics cannot be tested as explanations without participant-level measures, but one pattern is consistent with the framework proposed in section 2.7.2.

In section 2.7.2, uncertainty avoidance was proposed as a possible lens for professional aspiration: where uncertainty is poorly tolerated, committing to an uncertain career should depend more closely on evidence of likely success. The cell-specific models show this pattern. Competitive standard was strongly related to professional intention among Polish players (elite

versus non-elite OR = 5.05 in football and 7.13 in eFootball) but only weakly among Indian players (OR = 1.67 and 1.44) and adding a country $\times$ competitive-standard term improved the pooled model ($p = .013$). In Poland, the country with the higher uncertainty-avoidance score, the intention to turn professional thus appears to depend more on having already reached a high standard. Given the contested status of the dimension (section 2.7.3) and the absence of individual-level measures, this is offered as a hypothesis for future research rather than as an explanation.

Psychological associations were limited but were not uniformly absent. Task-avoidance and self-approach were negatively associated with professional intention among Indian eFootball players in the age-and-standard-adjusted analyses and survived adjustment across the 24 cell-by-goal tests. These were separate models for individual goal orientations; they do not establish independent contributions when all six orientations are considered together. Nor do they imply that reducing those orientations would increase professional intention. Conversely, adding the three selected physical self-concept dimensions did not improve model fit or cross-validated discrimination meaningfully. RQ7 therefore points to a combination of demographic and competitive-context associations, with narrower psychological associations in one cell.

The pooled model's mean cross-validated AUC of approximately .73 indicates useful internal discrimination, but performance varied across the separately fitted cell models and was close to chance in the Indian cells. This limits its use for individual prediction and argues against treating it as a player-selection instrument. Professional intention itself is also an expressed preference, not observed career entry, persistence or success. Combining Maybe and No identifies definite intention but conceals distinctions between uncertainty and rejection of a professional career.

8.7 Methodological contribution and interpretation

The study's principal methodological contribution is its balanced comparison of two countries and two competitive contexts, combined with explicit examination of measurement invariance. This design separates the country and context contrasts more clearly than a comparison in which each country is represented by a different activity. Matching the broad football theme also improves the conceptual focus, although it does not equate the physical demands, recruitment pathways or competitive structures of the activities.

Scalar invariance provides support for the reported comparisons within the specified models. It should not be interpreted as proof that measurement error, reference-group effects or response tendencies are identical across groups. The weaker fit of the physical self-concept model deserves particular attention because that instrument contributes several prominent findings. Similarly, composite-score path models offer a practical way to examine many outcomes but do not model measurement error explicitly. With correlated predictors, measurement error can alter coefficients in more complex ways than uniform attenuation.

The sensitivity analyses improve the transparency of inference. The outlier analysis supports the stability of the main multivariate mean comparisons; the response-pattern analyses qualify physical self-concept interpretation; and MLR shows that the path-invariance conclusion depends on the inferential method. None serves as a universal validation of the study. Convergence and admissibility checks are necessary, while the reported rank limitation in saturated robust models also warrants acknowledgment when interpreting an extensive parameterisation.

Multiplicity adjustment and direct moderation tests replaced conclusions based on counts of nominally significant results. These analyses were specified after the original analysis plan and are identified as post hoc. The original hypotheses retain their stated theoretical status, while the added operationalisations, testing families and supplementary models are reported as post hoc analyses. This distinction prevents retrospective analytical choices from being presented as a fully prespecified confirmatory programme.

8.8 Limitations

Sampling and generalisability

The participants were male competitive players aged 18–35 recruited through accessible clubs and gaming communities. Equal cell sizes improve comparison but do not make the samples representative. The findings may not extend to women, younger or older players, recreational participants, other countries or other esports genres. The highly educated, English-using Indian samples further restrict generalisation. Recruitment through common clubs or communities may also create dependence between observations.

Country and context as broad groupings

Nationality was used as a proxy for cultural setting, and individual values were not measured. Differences attributed to country may also reflect education, resources, training arrangements

or selection into organised competition. Likewise, football and eFootball players were not randomly assigned to their activities. The comparison cannot isolate the effects of physical exertion from the many other features that distinguish participation. Competitive experience in particular differed markedly between contexts and overlapped only partly: few eFootball players had long competitive careers, whereas most footballers had competed for many years. Statistical adjustment for experience therefore removes part of the context difference itself, and comparisons restricted to overlapping experience ranges rest on reduced samples in which footballers remained somewhat more experienced. A full separation of the activity from the length of competitive history would require samples selected for comparable experience. Measures of habitual physical activity outside the focal activity would be needed before characterising eFootball participants as physically inactive.

Temporal and causal limits

All variables were measured cross-sectionally. Neither the direction of psychological associations nor the consequences of perceived support can be determined. Selection, reciprocal relationships and omitted variables remain possible explanations. The arrow direction in the path models expresses a theoretical specification, not demonstrated temporal ordering. Data collected during 2023–2024 also describe a particular period in changing competitive environments and do not establish how aspirations will develop over time.

Measurement and administration

The instruments relied on self-report, with different languages used across countries and both online and paper administration. The use of both modes in every cell does not exclude a mode effect if their proportions or administration conditions differed. Invariance findings reduce some concerns but cannot remove all language, reference-group and common-method influences. Ceiling and floor effects may restrict observable relationships, and the high overlap of some achievement goals limits the interpretation of their unique regression coefficients.

The contextual items were brief and cannot represent every aspect of family or institutional support. The parental-support categories are not an ordered dose of support, and the Indifferent response may reflect the participant's stance as well as parental behaviour. Small categories limit precision. Self-reported BMI does not directly measure body composition, and competitive-standard categories may not represent equivalent achievements across countries and activities. These constraints restrict the strength of substantive conclusions from both significant and non-significant results.

Statistical uncertainty and analytical flexibility

The number of outcomes, comparisons and models creates substantial multiplicity. Adjustments reduce false-positive risk within defined families but do not turn isolated findings into independently replicated evidence. Several analyses were conducted as post hoc sensitivity checks, and the BMI interaction and individual path tests remained exploratory. Non-significant results should therefore be interpreted as insufficient evidence under the stated analyses, not proof of absence. The extensive path models, correlated predictors and differences between ML and MLR conclusions require particular caution when interpreting individual coefficients.

Professional intention and predictive performance

The binary outcome distinguishes definite intention from other responses but does not preserve the difference between Maybe and No. It cannot establish subsequent professional participation. Cross-validation provides internal validation, not evidence of transportability to new clubs, countries or periods. Apparent discrimination and classification statistics are sensitive to sample composition, and weak performance within some cells limits individual applications. The exploratory extension with three physical self-concept subscales also cannot settle the potential predictive contribution of all psychological characteristics.

8.9. Theoretical and practical implications

The findings support using an ecological perspective to organise questions about players and their environments, but they do not test the complete bioecological model. Proximal processes and change over time were not directly measured. Country, competitive activity, perceived support and professional intention identify relevant levels of description; they do not establish how influences are transmitted between those levels. The distinction between mean differences and group-specific relationships is particularly useful for developing more precise ecological hypotheses.

For practice, the results support assessing anxiety dimensions and physical self-perceptions separately rather than assuming that a single motivational profile explains both. They also caution against inferring individual needs from national or activity-group averages. The somatic-anxiety findings justify attention to this experience among eFootball competitors, but treatment choice requires individual assessment and intervention evidence. Weak cross-

sectional associations do not show that goal-setting or self-concept interventions are ineffective.

Three more specific implications follow. First, for coaches and psychologists working with eFootball players, the higher somatic anxiety suggests that arousal-regulation techniques already standard in traditional sport, such as breathing and relaxation routines, deserve a place in esports preparation, a need also described by elite players and support staff (Poulus et al., 2025). Second, the robust country difference in concentration disruption suggests that attentional skills training may be particularly relevant for Indian players, although individual assessment should precede any programme. Third, career guidance for eFootball players, particularly in Poland, where intention was lowest and most closely tied to competitive standard, should give players realistic information about the size and structure of the professional pathway.

Professional-career guidance should distinguish definite intention, uncertainty and realistic opportunities, while recognising that associations differ between countries and contexts. The study does not provide grounds for selecting or excluding players using its logistic model. It also does not establish that parents or institutions have no role: better measures and prospective designs are needed to assess the forms of support that may be useful.

8.10. Directions for future research

A first priority is replication with a prespecified distinction between mean comparisons, moderation and prediction. Including women, participants with varied educational and language backgrounds, and additional countries would test the scope of the present findings. Individual measures of self-construal and cultural values would test the mechanisms currently inferred from country membership.

Longitudinal measurement around competitions could examine whether goal endorsement precedes changes in worry, somatic symptoms or concentration disruption. Repeated measures of physical activity, objective physical capability and self-perception would help distinguish participation effects from selection. Prospective measurement would also provide a stronger basis for testing indirect associations than the present cross-sectional correlations.

Measurement research should investigate reference groups, item interpretation and response tendencies alongside conventional invariance testing. Cognitive interviews and

multiple methods could clarify whether similar scores arise from comparable judgments. More detailed support measures should distinguish encouragement, practical assistance, pressure and disapproval rather than treating parental support as a single category. A method-factor model alone would not identify the source of shared responding conclusively.

Finally, professional intention should be followed through to observed decisions and outcomes. Retaining the three response categories would permit uncertainty to be examined directly, while independent validation would establish whether the predictors perform beyond the present sample. Such work could test the country-by-context pattern without assuming that intention, opportunity and eventual professional success are interchangeable.

8.11. Conclusion

This thesis demonstrates that country and competitive context are associated with reported achievement goals, competitive anxiety, physical self-concept and professional intention among the male competitive players studied. Higher other-referenced goals among Indian participants and more frequent professional intention among football players supported the corresponding hypotheses. Other predictions received partial or inconsistent support, and the expected stronger parental-support associations in India were not established.

The contribution lies in distinguishing several questions that should not be collapsed into a single claim about cultural or contextual influence. Psychological means differed, their country-by-context interactions were not clearly detected, robust analyses identified differences in sets of regression relationships, and professional intention showed a clear context-by-country interaction. Most psychological associations were nevertheless weak, and the adjusted contextual analyses yielded limited evidence.

These findings support further comparative research while setting boundaries on interpretation. They neither establish national psychological types nor show that competitive gaming and football share identical psychological relationships. They provide a measurement-informed account of differences and associations in four samples, and identify the longitudinal, measurement and contextual evidence needed to explain those patterns.

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Table A1. *Response-pattern comparisons across instruments and the global self-esteem item-keying gap*

Instrument and index	India – Poland d (p)	Football – eFootball d (p)	Country × context p
PSDQ-S Mean item score	0.20 (.004)	0.45 (< .001)	.477
PSDQ-S Within-person SD	−0.41 (< .001)	−0.90 (< .001)	< .001
PSDQ-S Upper-category use	0.22 (.002)	0.35 (< .001)	.042
PSDQ-S Middle-category use	−0.15 (.035)	−0.05 (.499)	< .001
PSDQ-S Endpoint use	0.06 (.410)	0.00 (.967)	.002
3 × 2 AGQ-S Mean item score	0.05 (.470)	0.37 (< .001)	.376
3 × 2 AGQ-S Within-person SD	−0.36 (< .001)	−0.20 (.004)	< .001
3 × 2 AGQ-S Upper-category use	0.13 (.069)	0.34 (< .001)	.080
3 × 2 AGQ-S Middle-category use	−0.13 (.076)	−0.08 (.254)	.811
3 × 2 AGQ-S Endpoint use	0.18 (.011)	0.12 (.095)	.020
SAS-2 Mean item score	0.20 (.006)	−0.30 (< .001)	.971
SAS-2 Within-person SD	0.06 (.432)	0.03 (.659)	.014
SAS-2 Upper-category use	0.13 (.071)	−0.35 (< .001)	.638

Instrument and index	India – Poland d (p)	Football – eFootball d (p)	Country × context p
SAS-2 Middle-category use	0.36 (< .001)	−0.13 (.065)	.270
SAS-2 Endpoint use	−0.36 (< .001)	0.13 (.065)	.270
Global self-esteem keying gap Factorial ANOVA: F (p)	40.14 (< .001)	3.67 (.056)	0.44 (.508)

Note. N = 800; n = 200 per cell. Pooled contrasts compare 400 participants with 400 participants. In the first 15 rows, entries are Cohen's d with the unadjusted Welch-test p value in parentheses; the final column gives the exported factorial interaction p value. Positive d indicates higher scores in India or football. The final row instead reports factorial F statistics, each with df = 1, 796, and its p value. The keying gap is the reverse-scored negative-item mean minus the positive-item mean. Exported p values of zero are shown as < .001. All indices were calculated after reverse-scoring where applicable. Upper-category use therefore describes high scores in the construct direction, not agreement independent of content. SAS-2 middle-category and endpoint proportions are complementary and their tests are redundant. Interaction p values are reported once per index; nominal p values do not account for multiple testing.

Table A2. *Raw and person-mean-centred standardized group differences*

Instrument and subscale	India – Poland Pooled	India – Poland Football	India – Poland eFootball	Football – eFootball Pooled	Football – eFootball India	Football – eFootball Poland
PSDQ-S Health	–0.32 → –0.57	–0.31 → –0.72	–0.34 → –0.49	–0.02 → –0.42	0.01 → –0.44	–0.05 → –0.43
Coordination	0.00 → –0.30	0.06 → –0.30	–0.05 → –0.31	0.22 → –0.27	0.26 → –0.24	0.18 → –0.31
Activity	0.33 → 0.28	0.39 → 0.33	0.30 → 0.27	0.62 → 0.46	0.66 → 0.49	0.60 → 0.44
Body fat	–0.02 → –0.20	0.16 → –0.02	–0.19 → –0.34	0.23 → –0.08	0.42 → 0.10	0.06 → –0.25
Sport competence	0.35 → 0.35	0.32 → 0.20	0.39 → 0.48	0.49 → 0.29	0.44 → 0.11	0.56 → 0.45
Global physical self-concept	0.30 → 0.27	0.39 → 0.36	0.23 → 0.21	0.46 → 0.25	0.52 → 0.29	0.42 → 0.22
Appearance	0.17 → 0.02	0.27 → 0.11	0.08 → –0.05	0.24 → –0.13	0.33 → –0.06	0.16 → –0.18
Strength	0.37 → 0.36	0.37 → 0.24	0.39 → 0.47	0.45 → 0.19	0.40 → 0.06	0.52 → 0.32
Flexibility	0.29 → 0.21	0.32 → 0.20	0.27 → 0.22	0.37 → 0.07	0.39 → 0.03	0.36 → 0.10
Endurance	0.50 → 0.62	0.48 → 0.54	0.56 → 0.70	0.51 → 0.33	0.47 → 0.19	0.58 → 0.49
Global self-esteem	0.05 → –0.21	0.17 → –0.10	–0.06 → –0.30	0.27 → –0.18	0.38 → –0.05	0.16 → –0.30
3 × 2 AGQ-S Task-approach	–0.13 → –0.27	–0.22 → –0.31	–0.07 → –0.24	0.25 → –0.07	0.18 → –0.08	0.34 → –0.05
Task-avoidance	–0.30 → –0.55	–0.42 → –0.66	–0.20 → –0.47	0.19 → –0.15	0.10 → –0.21	0.31 → –0.09
Self-approach	–0.13 → –0.30	–0.31 → –0.50	0.01 → –0.13	0.20 → –0.20	0.05 → –0.36	0.39 → –0.05
Self-avoidance	–0.10 → –0.24	–0.19 → –0.28	–0.03 → –0.20	0.20 → –0.14	0.12 → –0.19	0.30 → –0.10
Other-approach	0.43 → 0.56	0.44 → 0.67	0.45 → 0.51	0.52 → 0.37	0.47 → 0.43	0.59 → 0.36
Other-avoidance	0.33 → 0.38	0.46 → 0.62	0.21 → 0.18	0.25 → 0.02	0.34 → 0.23	0.15 → –0.16
SAS-2 Somatic anxiety	0.18 → –0.01	0.17 → –0.08	0.19 → 0.06	–0.38 → –0.18	–0.42 → –0.26	–0.35 → –0.11
Worry	–0.09 → –0.46	–0.08 → –0.45	–0.11 → –0.46	–0.22 → 0.02	–0.22 → 0.07	–0.22 → –0.03
Concentration disruption	0.48 → 0.57	0.56 → 0.65	0.43 → 0.51	–0.18 → 0.17	–0.18 → 0.19	–0.20 → 0.16

Note. Each entry is raw d → centred d. Positive values indicate higher scores in the first named group. Scores were centred on each participant's mean across all items of the corresponding instrument after reverse-scoring where required. Pooled comparisons use n = 400 per group; within-country or within-context comparisons use n = 200 per group. All 20 subscales and all six exported contrasts are included. Estimates are descriptive; confidence intervals were not supplied. Centred effects describe relative profiles and are not corrected estimates of absolute construct differences. Within the PSDQ-S, the 40-item person mean weights subscales according to their item counts.

Table A3a. *Country differences in each subscale before and after adjustment for Age, Competitive Experience, Training Frequency, and Competitive Standard*

Subscale	η^2 unadjusted	η^2 adjusted	d unadjusted	d adjusted	p adjusted	p
Achievement goals						
Task-approach	.004	.000	−0.13	−0.05	.569	.486
Task-avoidance	.023	.009	−0.30	−0.23	.007 ^a	.628
Self-approach	.004	.002	−0.13	−0.09	.278	.341
Self-avoidance	.003	.000	−0.10	0.00	.985	.288
Other-approach	.047	.044	0.44	0.51	< .001 ^a	.716
Other-avoidance	.026	.018	0.33	0.33	< .001 ^a	.021
Competitive anxiety						
Somatic anxiety	.008	.004	0.18	0.14	.097	.429
Worry	.002	.003	−0.09	−0.13	.115	.594
Concentration disruption	.055	.032	0.48	0.43	< .001 ^a	.866
Physical self-concept						
Health	.026	.033	−0.32	−0.44	< .001 ^a	.050
Coordination	.000	.000	0.00	−0.03	.740	.305
Activity	.028	.020	0.34	0.34	< .001 ^a	.209
Body fat	.000	.001	−0.02	−0.08	.338	.179
Sport competence	.031	.021	0.36	0.35	< .001 ^a	.936
Global physical self-concept	.023	.020	0.30	0.34	< .001 ^a	.962
Appearance	.007	.008	0.17	0.22	.011	.327
Strength	.035	.025	0.38	0.38	< .001 ^a	.274
Flexibility	.021	.021	0.29	0.35	< .001 ^a	.195
Endurance	.064	.049	0.52	0.54	< .001 ^a	.367

Subscale	η^2 unadjusted	η^2 adjusted	d unadjusted	d adjusted	p adjusted	p
Global self-esteem	.001	.001	0.05	0.08	.372	.628

Note. d = India minus Poland in pooled-SD units (positive = higher in India), averaged over context. Adjusted models include age and competitive experience (centred), training frequency (four categories) and competitive standard (three bands). Slopes p = test of homogeneity of regression slopes (all covariate $\times$ country interactions).

^a Significant at the within-instrument Bonferroni criterion (AGQ-S .008, PSDQ-S .005, SAS-2 .017). Somatic anxiety met this criterion before adjustment (p = .012) but not after.

Table A3b. *Distribution of years of competitive experience by cell*

Years	India Football	Poland Football	India eFootball	Poland eFootball
1	0	0	1	0
2	0	0	15	11
3	3	0	35	36
4	10	1	36	65
5	14	0	51	34
6	29	4	37	19
7	27	9	15	7
8	31	27	7	12
9	16	15	2	4
10	30	30	1	8
11	9	17	0	0
12	11	18	0	2
13	5	12	0	0
14	7	5	0	0
15	6	16	0	2
16	0	6	0	0
17	0	7	0	0
18	0	8	0	0
19	1	2	0	0
20	1	14	0	0
21	0	3	0	0
22	0	1	0	0
25	0	4	0	0
27	0	1	0	0

Table A3c. *Football-eFootball Differences (Cohen's d) in the Full Sample, Within Overlapping Experience Ranges and After Matching on Experience*

Subscale	India: Full	India: 4-8y	India: 5- 10y	India: Matched	Poland: Full	Poland: 4-8 y	Poland: 5-10y	Poland: Matched
Achievement goals								
Task-approach	0.18	0.26*	0.21	-0.09	0.34***	0.31	0.16	0.30
Task-avoidance	0.10	-0.02	-0.09	-0.43	0.31**	0.30	0.06	0.27
Self-approach	0.05	0.03	0.02	-0.32	0.39***	0.48**	0.40*	0.45
Self-avoidance	0.12	-0.02	0.01	-0.37	0.30**	0.34	0.28	0.27
Other-approach	0.47***	0.45***	0.46***	0.06	0.59***	0.57***	0.46**	0.66*
Other-avoidance	0.34***	0.20	0.17	-0.04	0.15	0.44**	0.21	0.42
Competitive anxiety								
Somatic anxiety	-0.42***	-0.36**	-0.46***	-0.38	-0.34***	-0.16	-0.20	-0.42
Worry	-0.22*	-0.08	-0.27*	-0.43	-0.22*	0.01	-0.02	-0.06
Concentration disruption	-0.17	-0.15	-0.32*	0.10	-0.20*	-0.02	-0.14	-0.22
Physical self-concept								
Health	0.01	0.16	0.15	0.22	-0.05	0.14	0.04	-0.12
Coordination	0.26**	0.42**	0.45***	0.51**	0.17	0.45*	0.42**	0.21
Activity	0.66***	0.77***	0.80***	0.69***	0.60***	0.78***	0.71***	0.49*
Body fat	0.42***	0.69***	0.54***	0.66***	0.06	0.32*	0.02	0.15
Sport competence	0.44***	0.52***	0.55***	0.46**	0.56***	0.77***	0.73***	0.51*
Global physical	0.52***	0.57***	0.59***	0.55***	0.42***	0.66***	0.47**	0.48
Appearance	0.33**	0.44***	0.42**	0.69*	0.16	0.19	0.22	0.22
Strength	0.40***	0.46***	0.48***	0.38**	0.52***	0.55**	0.66***	0.50*
Flexibility	0.39***	0.52***	0.50***	0.63***	0.36***	0.43**	0.22	0.31
Endurance	0.47***	0.53***	0.54***	0.58**	0.58***	0.81***	0.78***	0.47*

Subscale	India: Full	India: 4-8y	India: 5- 10y	India: Matched	Poland: Full	Poland: 4-8 y	Poland: 5-10y	Poland: Matched
Global self-esteem	0.38***	0.50***	0.53***	0.35*	0.16	0.40*	0.28	0.15
nFootball /eFootball	200 / 200	111 / 146	147 / 113	160 / 184	200 / 200	41 / 137	85 / 84	120 / 119

Note. d = football minus eFootball in pooled-SD units (positive = higher among football players). Significance from Welch t tests. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table A4. *Cross-instrument correlations at the subscale level, by cell*

Block	Cell	Tests	Mean r	Mean p	Max $ r $	$p < .05$	Expected by chance	Significant after BH adjustment
Goals × anxiety	India Football	18	-.14	-.11	.23	9	0.9	5
	Poland Football	18	-.12	-.14	.26	11	0.9	10
	India eFootball	18	-.10	-.10	.17	3	0.9	0
	Poland eFootball	18	-.09	-.07	.25	7	0.9	6
Goals x Physical self- concept	India Football	66	.01	.04	.18	3	3.3	0
	Poland Football	66	.03	.03	.18	2	3.3	0
	India eFootball	66	.05	.03	.16	1	3.3	0
	Poland eFootball	66	.02	.004	.16	2	3.3	0
Anxiety x Physical self- concept	India Football	33	.04	.06	.12	0	1.7	0
	Poland Football	33	-.07	-.05	.19	2	1.7	0
	India eFootball	33	-.08	-.07	.19	6	1.7	0
	Poland eFootball	33	.01	.01	.09	0	1.7	0

Note. Tests = number of subscale pairs in each block (goals × anxiety, 6×3 ; goals × physical self-concept, 6×11 ; anxiety × physical self-concept, 3×11). Max $|r|$ = largest absolute Pearson correlation in the block. $p < .05$ = number of correlations significant without adjustment; expected by chance = tests × .05. Significant after BH adjustment = number remaining significant after Benjamini-Hochberg false discovery rate correction within each block and cell. $n = 200$ per cell. Individual correlations are reported in Appendix A (Tables A2-A5).

Table A5. *Pearson correlations among the twenty subscales, India football sample*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. TAp	—																			
2. TAv	.49***	—																		
3. SAp	.77***	.54***	—																	
4. SAv	.53***	.61***	.60***	—																
5. OAp	.39***	.44***	.48***	.42***	—															
6. OAv	.29***	.52***	.39***	.47***	.60***	—														
7. HE	-.18*	-.11	-.16*	-.04	-.11	-.01	—													
8. CO	-.09	-.04	-.10	.01	.05	-.02	.48***	—												
9. AC	-.06	.01	-.11	.02	-.01	.04	.51***	.74***	—											
10. BF	.00	-.00	.01	.03	.03	.07	.61***	.48***	.50***	—										
11. SP	.04	.04	.04	.13	.06	.08	.41***	.74***	.69***	.46***	—									
12. GP	-.00	.03	.00	.14*	.03	.04	.47***	.75***	.71***	.53***	.78***	—								
13. AP	-.13	.03	-.08	.08	.05	.10	.45***	.70***	.68***	.46***	.70***	.74***	—							
14. ST	-.04	.07	-.05	.11	.05	.09	.39***	.69***	.66***	.40***	.66***	.76***	.64***	—						
15. FL	.00	.02	-.07	.05	.02	-.01	.43***	.74***	.70***	.43***	.66***	.74***	.66***	.69***	—					
16. EN	-.06	.05	-.09	.11	.04	.07	.51***	.74***	.74***	.44***	.73***	.74***	.66***	.73***	.74***	—				
17. GSE	-.08	-.03	-.07	.09	.04	.08	.55***	.70***	.71***	.47***	.67***	.70***	.70***	.68***	.65***	.73***	—			
18. Somatic	-.12	-.14	-.13	-.09	-.19**	-.15*	-.04	.03	-.05	-.04	.01	.00	-.02	-.08	.05	-.02	.01	—		
19. Worry	-.05	-.16*	-.13	-.02	-.14	-.14*	.05	.09	.07	.08	.08	.07	.07	-.05	.12	.08	.08	.49***	—	
20. Con dis	-.20**	-.23***	-.22**	-.18**	-.16*	-.09	.12	.12	.08	.03	.08	.02	.05	-.03	.06	.05	.12	.56***	.53***	—

Note. $n = 200$. Variables 1-6: 3 x 2 AGQ-S; 7-17: PSDQ-S; 18-20: SAS-2. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table A6. *Pearson correlations among the twenty subscales, Poland football sample*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. TAp	—																			
2. TAv	.67***	—																		
3. SAp	.74***	.66***	—																	
4. SAv	.55***	.53***	.66***	—																
5. OAp	.45***	.42***	.51***	.46***	—															
6. OAv	.12	.22**	.14	.15*	.44***	—														
7. HE	.04	-.01	.08	.08	.07	.02	—													
8. CO	.01	-.02	.02	.07	.12	.07	.58***	—												
9. AC	-.03	-.05	-.11	-.08	.02	-.00	.50***	.62***	—											
10. BF	.00	-.00	.10	.08	-.04	-.07	.53***	.58***	.46***	—										
11. SP	.01	.02	-.02	.09	.03	.04	.52***	.76***	.69***	.57***	—									
12. GP	-.01	-.07	.00	.06	.03	.05	.54***	.67***	.61***	.68***	.72***	—								
13. AP	.01	-.05	.01	.03	.13	.07	.47***	.50***	.39***	.48***	.54***	.67***	—							
14. ST	.03	-.01	-.04	.06	.09	.06	.47***	.62***	.62***	.42***	.67***	.70***	.42***	—						
15. FL	.00	.01	.10	.05	.06	.07	.51***	.67***	.55***	.48***	.63***	.66***	.53***	.59***	—					
16. EN	.07	.05	.11	.18*	.08	.06	.59***	.70***	.59***	.59***	.73***	.73***	.52***	.66***	.66***	—				
17. GSE	.06	-.02	.05	.15*	.10	.02	.64***	.72***	.56***	.58***	.71***	.74***	.67***	.61***	.63***	.66***	—			
18. Somatic	-.19**	-.09	-.11	-.20**	.01	.17*	-.10	-.06	-.01	-.03	-.05	-.01	-.02	.04	-.01	-.11	-.10	—		
19. Worry	-.22**	-.16*	-.21**	-.20**	-.12	.01	-.16*	-.05	-.03	-.13	-.08	-.10	-.08	-.03	-.11	-.13	-.19**	.51***	—	
20. Con dis	-.25***	-.14*	-.26***	-.19**	-.11	.01	-.13	.01	-.00	-.06	-.03	-.06	-.06	-.04	-.06	-.11	-.10	.50***	.68***	—

Note. $n = 200$. Variables 1-6: 3 x 2 AGQ-S; 7-17: PSDQ-S; 18-20: SAS-2. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table A7. *Pearson correlations among the twenty subscales, India eFootball sample*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. TAp	—																			
2. TAv	.67***	—																		
3. SAp	.80***	.72***	—																	
4. SAv	.65***	.72***	.76***	—																
5. OAp	.62***	.56***	.70***	.64***	—															
6. OAv	.40***	.52***	.48***	.59***	.66***	—														
7. HE	.10	.09	.04	.03	.03	.08	—													
8. CO	.16*	.14	.12	.11	.13	.04	.39***	—												
9. AC	.06	.05	.11	.08	.04	-.04	.16*	.61***	—											
10. BF	.08	.11	.07	.06	.04	.08	.52***	.40***	.28***	—										
11. SP	-.01	-.04	.01	-.04	.00	-.10	.22**	.68***	.73***	.31***	—									
12. GP	.07	.05	.05	.01	.06	-.01	.25***	.60***	.57***	.44***	.69***	—								
13. AP	.13	.06	.10	.08	.05	-.03	.21**	.53***	.46***	.32***	.56***	.65***	—							
14. ST	.06	.01	.09	.05	.02	-.08	.25***	.65***	.64***	.27***	.78***	.69***	.61***	—						
15. FL	.10	.06	.07	-.00	.06	-.04	.12	.55***	.55***	.25***	.63***	.60***	.57***	.66***	—					
16. EN	.06	.06	.08	.09	.01	-.02	.15*	.62***	.63***	.25***	.74***	.67***	.52***	.75***	.64***	—				
17. GSE	.12	.07	.08	.05	.13	.09	.32***	.64***	.48***	.34***	.63***	.65***	.60***	.62***	.53***	.61***	—			
18. Somatic	-.07	-.11	-.15*	-.12	-.11	-.02	-.03	-.07	-.12	-.03	-.06	-.05	.01	-.03	-.03	-.02	-.08	—		
19. Worry	-.13	-.09	-.13	-.09	-.17*	-.08	-.19**	-.18*	-.13	-.10	-.14*	-.18*	-.08	-.12	-.11	-.10	-.16*	.64***	—	
20. Con dis	-.09	-.01	-.15*	-.13	-.12	-.02	.02	-.05	-.17*	.00	-.04	-.07	-.06	-.06	-.05	-.04	-.08	.66***	.66***	—

Note. $n = 200$. Variables 1-6: 3 x 2 AGQ-S; 7-17: PSDQ-S; 18-20: SAS-2. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table A8. *Pearson correlations among the twenty subscales, Poland eFootball sample*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. TAp	—																			
2. TAv	.80***	—																		
3. SAp	.70***	.61***	—																	
4. SAv	.68***	.63***	.78***	—																
5. OAp	-.08	-.05	-.04	.00	—															
6. OAv	-.08	-.04	-.10	-.04	.53***	—														
7. HE	.10	.08	.03	.06	.06	.05	—													
8. CO	-.00	-.05	-.01	-.07	.05	.02	.21**	—												
9. AC	-.11	-.10	-.09	-.13	-.02	.04	.07	.43***	—											
10. BF	.10	.07	.02	.03	.02	.13	.11	.24***	.20**	—										
11. SP	.04	-.02	.02	-.01	.06	.05	.21**	.65***	.58***	.26***	—									
12. GP	-.01	-.08	-.08	-.06	.02	.11	.13	.55***	.45***	.49***	.56***	—								
13. AP	.14*	.10	.07	.08	-.01	-.05	.11	.28***	.07	.32***	.23**	.50***	—							
14. ST	-.03	-.01	-.04	-.05	.02	.04	.27***	.62***	.52***	.10	.70***	.53***	.28***	—						
15. FL	.07	.03	.07	.08	.08	.16*	.08	.50***	.33***	.19**	.52***	.52***	.27***	.53***	—					
16. EN	-.00	.00	-.07	-.07	.03	.04	.32***	.55***	.50***	.23**	.66***	.52***	.22**	.66***	.44***	—				
17. GSE	.10	.05	.05	.02	-.01	-.00	.19**	.58***	.28***	.25***	.52***	.62***	.55***	.51***	.46***	.46***	—			
18. Somatic	-.19**	-.14*	-.07	-.17*	-.00	-.05	-.08	.05	-.01	-.01	.07	.07	-.04	-.02	.04	.09	-.02	—		
19. Worry	-.06	-.03	.08	-.01	.04	-.06	-.02	.04	-.01	-.07	.03	.03	-.05	-.01	-.05	.02	-.04	.52***	—	
20. Con dis	-.25***	-.19**	-.18*	-.21**	-.02	-.04	.07	.05	-.00	.07	.06	.09	.04	-.02	-.03	.07	.01	.66***	.52***	—

Note. $n = 200$. Variables 1-6: 3 x 2 AGQ-S; 7-17: PSDQ-S; 18-20: SAS-2. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table A9. *Additional analyses of parental support for H8***Panel A.** Country differences in association strength

Positive differences indicate a larger partial R^2 in India. All adjusted intervals include zero.

Outcome	India partial R^2	Poland partial R^2	Difference India – Poland	Adjusted interval for the difference
Achievement goals				
Task-approach	.029	.010	.019	[−.074, .087]
Task-avoidance	.036	.008	.028	[−.058, .101]
Self-approach	.029	.021	.008	[−.082, .083]
Self-avoidance	.025	.006	.019	[−.063, .085]
Other-approach	.035	.040	−.005	[−.107, .084]
Other-avoidance	.031	.018	.013	[−.074, .088]
Competitive anxiety				
Somatic anxiety	.012	.029	−.017	[−.096, .094]
Worry	.044	.016	.028	[−.063, .112]
Concentration disruption	.021	.010	.011	[−.058, .076]
Physical self-concept				
Health	.033	.012	.021	[−.049, .094]
Coordination	.034	.026	.008	[−.069, .092]
Activity	.021	.017	.004	[−.063, .071]
Body fat	.033	.037	−.004	[−.090, .085]
Sport competence	.026	.025	.000	[−.072, .080]
Global physical self-concept	.026	.016	.010	[−.055, .083]
Appearance	.048	.014	.034	[−.045, .109]
Strength	.020	.007	.013	[−.048, .077]
Flexibility	.035	.015	.019	[−.054, .095]

Outcome	India partial R ²	Poland partial R ²	Difference India – Poland	Adjusted interval for the difference
Endurance	.036	.020	.016	[−.058, .093]
Global self-esteem	.026	.019	.008	[−.065, .086]

Note. n = 400 per country, including 200 football and 200 eFootball participants. Partial R² compares a context-only model with a model containing parental support, context and their interaction within each country: (SSE_{reduced} – SSE_{full})/SSE_{reduced}. Support has four nominal categories. Intervals are basic bootstrap intervals from 20,000 resamples stratified by country × context × support category. Each interval has nominal 99.75% coverage, giving approximate 95% familywise coverage across the 20 outcomes using Bonferroni adjustment. These are uncertainty intervals for the difference, not for the individual R² values. The measure depends on category frequencies and outcome variability and is not a causal effect. These analyses were added during revision.

Panel B. Direct interaction tests

Entries are HC3 robust F statistics, with Holm-adjusted p values in brackets.

Outcome	Country moderation F(6, 784) [pHolm]	Three-way interaction F(3, 784) [pHolm]
Achievement goals		
Task-approach	1.27 [1.000]	1.95 [1.000]
Task-avoidance	1.36 [1.000]	0.52 [1.000]
Self-approach	0.98 [1.000]	1.37 [1.000]
Self-avoidance	0.75 [1.000]	0.73 [1.000]
Other-approach	2.36 [.665]	3.06 [.665]
Other-avoidance	1.29 [1.000]	1.55 [1.000]
Competitive anxiety		
Somatic anxiety	0.89 [1.000]	1.74 [1.000]
Worry	2.39 [.665]	1.84 [1.000]
Concentration disruption	1.00 [1.000]	0.57 [1.000]
Physical self-concept		
Health	2.78 [.343]	3.16 [.650]
Coordination	3.22 [.139]	4.86 [.087]

Outcome	Country moderation F(6, 784) [pHolm]	Three-way interaction F(3, 784) [pHolm]
Activity	2.40 [.665]	3.68 [.353]
Body fat	3.05 [.187]	4.73 [.102]
Sport competence	2.11 [.957]	3.16 [.650]
Global physical self-concept	2.70 [.373]	3.04 [.665]
Appearance	4.29 [.012]	2.98 [.665]
Strength	1.23 [1.000]	1.77 [1.000]
Flexibility	3.09 [.178]	2.39 [1.000]
Endurance	3.65 [.054]	5.24 [.054]
Global self-esteem	2.75 [.353]	4.42 [.146]

Note. N = 800. Models include parental support $\times$ country $\times$ context, with all lower-order terms. Country moderation jointly tests the three support contrasts between countries in football and in eFootball (six restrictions); it is not restricted to a reference context. The three-way test assesses whether those cross-country differences vary by context (three restrictions). Holm adjustment covers all 40 tests in Panel B; bold indicates adjusted $p < .05$. Appearance shows country moderation (adjusted $p = .012$), but this tests differences in the pattern of category means, not whether association strength is greater in India. The directional comparison in Panel A remains inconclusive.

Table A10. *Perceived institutional support*

Entries are HC3 robust F statistics, with BH-adjusted p values in brackets.

Outcome	Any association F(4, 792) [pBH]	Country moderation F(2, 792) [pBH]	Context moderation F(2, 792) [pBH]	Three-way F(1, 792) [pBH]
Achievement goals				
Task-approach	0.44 [.948]	0.35 [.948]	0.53 [.914]	0.29 [.914]
Task-avoidance	1.32 [.829]	1.50 [.829]	0.83 [.898]	0.00 [.993]
Self-approach	0.38 [.962]	0.50 [.914]	0.25 [.948]	0.36 [.914]
Self-avoidance	0.61 [.928]	0.49 [.914]	0.02 [.993]	0.03 [.978]
Other-approach	0.54 [.948]	0.28 [.948]	0.19 [.962]	0.00 [.993]
Other-avoidance	1.48 [.829]	0.10 [.988]	0.20 [.962]	0.08 [.948]
Competitive anxiety				
Somatic anxiety	0.30 [.980]	0.54 [.914]	0.12 [.980]	0.12 [.948]
Worry	0.36 [.962]	0.67 [.914]	0.18 [.962]	0.32 [.914]
Concentration disruption	0.08 [.993]	0.07 [.993]	0.07 [.993]	0.00 [.993]
Physical self-concept				
Health	0.82 [.914]	0.17 [.964]	0.04 [.993]	0.00 [.993]
Coordination	0.93 [.898]	0.47 [.914]	1.24 [.829]	0.61 [.898]
Activity	0.95 [.898]	0.33 [.948]	1.74 [.829]	0.64 [.898]
Body fat	0.86 [.914]	0.93 [.898]	1.59 [.829]	1.80 [.829]
Sport competence	2.51 [.829]	1.26 [.829]	4.10 [.829]	2.38 [.829]
Global physical self-concept	0.79 [.914]	0.87 [.898]	1.56 [.829]	1.71 [.829]
Appearance	0.62 [.928]	0.44 [.928]	0.62 [.914]	0.84 [.898]
Strength	1.12 [.898]	0.02 [.993]	2.22 [.829]	0.00 [.993]
Flexibility	1.25 [.829]	0.76 [.914]	1.99 [.829]	0.41 [.914]
Endurance	1.07 [.898]	0.82 [.898]	1.16 [.853]	0.01 [.993]

Outcome	Any association F(4, 792) [pBH]	Country moderation F(2, 792) [pBH]	Context moderation F(2, 792) [pBH]	Three-way F(1, 792) [pBH]
Global self-esteem	0.41 [.962]	0.31 [.948]	0.34 [.948]	0.02 [.980]

Note. N = 800. Each outcome was modelled as contextual variable $\times$ country $\times$ context, including all lower-order terms. Institutional support is a two-category factor (No/Yes); game standard is a three-category factor (Poor/Fair/Good). “Any association” jointly tests category differences in all four country–context cells. Country moderation tests cross-country differences in either context; context moderation tests cross-context differences in either country. The three-way test assesses whether country moderation varies by context. BH adjustment covers all 160 tests across both panels (two variables $\times$ twenty outcomes $\times$ four tests). No test survives this adjustment. Game-standard tests assess any category differences, rather than only a monotonic trend. These analyses were added during revision.

Table A11. *Perceived standard of the game*

Entries are HC3 robust F statistics, with BH-adjusted p values in brackets.

Outcome	Any association F(8, 788) [pBH]	Country moderation F(4, 788) [pBH]	Context moderation F(4, 788) [pBH]	Three-way F(2, 788) [pBH]
Achievement goals				
Task-approach	2.84 [.656]	1.39 [.829]	2.56 [.829]	0.56 [.914]
Task-avoidance	1.83 [.829]	1.26 [.829]	1.51 [.829]	0.90 [.898]
Self-approach	2.09 [.829]	1.52 [.829]	1.39 [.829]	0.62 [.914]
Self-avoidance	2.29 [.829]	1.98 [.829]	2.10 [.829]	1.21 [.840]
Other-approach	1.18 [.853]	0.67 [.914]	0.49 [.948]	0.26 [.948]
Other-avoidance	0.92 [.914]	0.76 [.914]	0.94 [.898]	0.83 [.898]
Competitive anxiety				
Somatic anxiety	1.44 [.829]	0.46 [.948]	2.58 [.829]	0.50 [.914]
Worry	0.78 [.914]	1.42 [.829]	0.88 [.914]	1.66 [.829]
Concentration disruption	0.83 [.914]	1.38 [.829]	0.95 [.898]	1.67 [.829]
Physical self-concept				
Health	1.13 [.898]	1.45 [.829]	1.29 [.829]	2.25 [.829]
Coordination	0.50 [.975]	0.22 [.993]	0.15 [.993]	0.25 [.948]
Activity	0.69 [.948]	1.10 [.898]	1.00 [.898]	1.73 [.829]
Body fat	0.85 [.914]	0.83 [.914]	1.25 [.829]	0.58 [.914]
Sport competence	0.72 [.943]	0.80 [.914]	1.35 [.829]	1.51 [.829]
Global physical self-concept	1.46 [.829]	1.62 [.829]	2.00 [.829]	2.52 [.829]
Appearance	0.61 [.948]	1.10 [.898]	0.97 [.898]	1.74 [.829]
Strength	1.23 [.829]	1.47 [.829]	2.07 [.829]	2.70 [.829]
Flexibility	0.95 [.914]	1.25 [.829]	1.46 [.829]	2.25 [.829]
Endurance	0.95 [.914]	1.41 [.829]	1.40 [.829]	1.95 [.829]

Outcome	Any association F(8, 788) [pBH]	Country moderation F(4, 788) [pBH]	Context moderation F(4, 788) [pBH]	Three-way F(2, 788) [pBH]
Global self-esteem	0.65 [.948]	0.58 [.944]	0.38 [.962]	0.48 [.914]

Note. N = 800. Each outcome was modelled as contextual variable $\times$ country $\times$ context, including all lower-order terms. Institutional support is a two-category factor (No/Yes); game standard is a three-category factor (Poor/Fair/Good). “Any association” jointly tests category differences in all four country–context cells. Country moderation tests cross-country differences in either context; context moderation tests cross-context differences in either country. The three-way test assesses whether country moderation varies by context. BH adjustment covers all 160 tests across both panels (two variables $\times$ twenty outcomes $\times$ four tests). No test survives this adjustment. Game-standard tests assess any category differences, rather than only a monotonic trend. These analyses were added during revision.

Table A12. *Spearman rank correlations between body mass index category and the twenty subscales, by cell*

Subscale	India football	India eFootball	Poland football	Poland eFootball
<i>Achievement goals</i>				
Task-approach	0.11	-0.05	0.08	0.00
Task-avoidance	0.01	-0.01	0.10	-0.02
Self-approach	0.08	-0.01	0.04	-0.07
Self-avoidance	-0.12	0.06	0.04	-0.04
Other-approach	-0.08	-0.03	0.15	0.09
Other-avoidance	0.01	0.05	0.06	0.12
<i>Physical self-concept</i>				
Health	-0.11	-0.30	0.12	-0.03
Coordination	-0.11	-0.19	0.15	-0.01
Activity	-0.06	-0.12	0.09	0.03
Body fat	-0.09	-0.33	0.03	-0.21
Sport competence	-0.04	-0.15	0.10	0.01
Global physical	-0.08	-0.26	0.11	-0.02
Appearance	-0.12	-0.15	0.14	0.03
Strength	-0.14	-0.10	0.09	0.03
Flexibility	-0.18	-0.19	0.13	-0.05
Endurance	-0.17	-0.15	0.15	-0.01
Global esteem	-0.14	-0.16	0.06	-0.04
<i>Competitive anxiety</i>				

Subscale	India football	India eFootball	Poland football	Poland eFootball
Somatic anxiety	-0.06	-0.03	-0.02	-0.02
Worry	-0.03	-0.04	-0.08	-0.02
Concentration disruption	-0.03	-0.11	-0.02	0.02

Note. Values are Spearman's ρ . Body mass index was banded into four categories following World Health Organization criteria. * $p < .05$. ** $p < .01$. *** $p < .001$.

Appendix B. Ethical approval

The Research Ethics Committee at the Faculty of Psychology
of Kazimierz Wielki University in Bydgoszcz
(ul. Staffa 1, 85-067 Bydgoszcz)

29.11.2022

OPINION no. 4/17.10.2022

The Research Ethics Committee at the Faculty of Psychology of Kazimierz Wielki University in Bydgoszcz at the meeting on November 29, 2022, composed of:

Dr hab. Elżbieta Kasprzak, prof. UKW (Chair),
Prof. dr hab. Roman Ossowski,
Prof. dr hab. Hanna Liberska,
Dr hab. Małgorzata Basińska, prof. UKW,
Dr hab. Aleksandra Błachnio, prof. UKW,
Dr Anna Szymanik-Kostrzevska

reviewed the application submitted by: Kanupriya Rawat (Principal Investigator), & dr hab. Aleksandra Błachnio, prof. UKW (Supervisor/ Modul Tutor), dr Nabi Nazari

on a research project: *A cross-cultural study on achievement motivation in sports, competitive trait anxiety, and physical self-concept of traditional and virtual football players*

After getting acquainted with the explanations regarding the submitted application and as a result of the discussion and voting, The Research Ethics Committee adopted a resolution to give a positive opinion on the application to conduct research, to the extent specified in the application.

The Principal Investigator was required to store all study documents for a period of five years. The consent granted applies only to the considered application, taking into account the presented project. Each change requires a separate opinion.

Dr hab. Elżbieta Kasprzak, prof. UKW, Chair
The Research Ethics Committee

Received by: the applicant

Appendix C. Informed consent and Questionnaires

Polish football sample (Informed consent and Demographic data)

Prowadzę badania naukowe psychologiczne uwarunkowania funkcjonowania piłkarzy kategorii seniorów (18 lat i więcej). Badanie jest anonimowe, a wyniki zostaną wykorzystane wyłącznie do celów badawczych. Przystępując do badania wyrażasz świadomą, dobrowolną zgodę na wykorzystanie uzyskanych danych. Zgodę na udział w badaniu możesz wycofać w dowolnym momencie przed publikacją bez podawania przyczyny, jeśli uznasz to za stosowne. Wypełnienie kwestionariusza zajmie 15-20 minut. W razie pytań prosimy o kontakt:

kanupriyap196@gmail.com

Kanupriya Rawat (Wydział Psychologii, UKW)

Zgoda uczestnika badania na udział w badaniu badawczym:

Oświadczam, że zostałem poinformowany w szczególności o założeniach, celach, przebiegu i czasie trwania badania, sposobie jego przeprowadzenia, ewentualnych ryzykach i zagrożeniach, wszelkich niedogodnościach związanych z udziałem w tym badaniu oraz o moich prawach i obowiązkach, rozumiem informację o badaniu i otrzymałam wyczerpujące, satysfakcjonujące odpowiedzi na zadane pytania oraz wyrażam świadomą i dobrowolną zgodę na udział w tym badaniu. Przyjmuję do wiadomości, że mogę w każdej chwili i bez podania przyczyny wycofać się z badania, jeżeli uznam to za stosowne. Wiem, że po przesłaniu ankiety nie mogę zrezygnować ze względu na kodowanie wyników i brak możliwości identyfikacji uczestnika badania.

☐ Wyrażam zgodę na udział w badaniu

☐ Nie wyrażam zgody na udział w badaniu

Dane demograficzne

- Wiek _____
- Płeć _____
- Waga (w kg) _____
- Wzrost (w cm) _____
- Wykształcenie:

Podstawowe ☐ Średnie ☐ Zawodowe ☐ Wyższe ☐

- Kierunek studiów/ ukończone szkoła _____

- Miejsce zamieszkania:

Wieś ☐ Małe miasto (poniżej 20 tys. mieszkańców) ☐ Średnie miasto (20-100 tys. mieszkańców) ☐ Duże miasto (powyżej 100 tys. mieszkańców) ☐

- Na jakiej pozycji grasz:

☐	Napastnicy
☐	Pomocnicy
☐	Obrońcy
☐	Bramkarze
☐	Inny

- Częstotliwość uprawiania sportu:

☐	Kilka razy w miesiącu
☐	Raz w tygodniu
☐	Kilka razy w tygodniu
☐	Codziennie

- Liczba lat treningu w Twoim sporcie? _____

- Jakość kariery sportowej:

☐	Poziom lokalny/ powiatowy- w tym lokalne zawody szkolne
☐	Regionalny / wojewódzki
☐	Międzywojewódzki / makroregionalny
☐	Krajowy (seniorzy)
☐	Międzynarodowy

- Wspomnij o ważnych ligach i rozgrywkach, w których grałeś: _____

- Wsparcie rodziców w grze w piłkę nożną:

Tak ☐ Nie ☐ Tylko jeden rodzic ☐ Nie obchodzi mnie to ☐
wsparcie

- Czy będziesz kontynuować grę w piłkę nożną jako zawodowy zawodnik:

Tak ☐ Nie ☐ Może ☐

- Do you receive any support from your organization or from the government of your country?

Tak ☐ Nie ☐

- Jakiego rodzaju wsparcie otrzymujesz od swojej organizacji lub rządu?

-
- Co sądzisz o poziomie piłki nożnej jako sportu w Twoim kraju?

Bardzo dobra ☐ Dobra ☐ Uczciwa ☐ Słaba ☐ Bardzo słaba ☐

Polish virtual football sample (Informed consent and Demographic data)

Prowadzę badania naukowe, aby ocenić psychologiczne uwarunkowania funkcjonowania graczy FIFA/eFootball. Do udziału zapraszam osoby, które ukończyły 18 lat i grają w FIFA lub eFootball. Badanie jest anonimowe, a wyniki zostaną wykorzystane wyłącznie do celów badawczych. Przystępując do badania wyrażasz świadomą, dobrowolną zgodę na wykorzystanie uzyskanych danych. Zgodę na udział w badaniu możesz wycofać w dowolnym momencie bez podawania przyczyny, jeśli uznasz to za stosowne.

Wypełnienie kwestionariusza zajmie 15-20 minut. W razie pytań prosimy o kontakt:

kanupriyap196@gmail.com

Kanupriya Rawat (Wydział Psychologii, UKW)

Zgoda uczestnika badania na udział w badaniu badawczym:

Oświadczam, że zostałem poinformowany w szczególności o założeniach, celach, przebiegu i czasie trwania badania, sposobie jego przeprowadzenia, ewentualnych ryzykach i zagrożeniach, wszelkich niedogodnościach związanych z udziałem w tym badaniu oraz o moich prawach i obowiązkach, rozumiem informację o badaniu i otrzymałam wyczerpujące, satysfakcjonujące odpowiedzi na zadane pytania oraz wyrażam świadomą i dobrowolną zgodę na udział w tym badaniu. Przyjmuję do wiadomości, że mogę w każdej chwili i bez podania przyczyny wycofać się z badania, jeśli uznam to za stosowne. Wiem, że po przesłaniu ankiety nie mogę zrezygnować ze względu na kodowanie wyników i brak możliwości identyfikacji uczestnika badania.

☐ Wyrażam zgodę na udział w badaniu

☐ Nie wyrażam zgody na udział w badaniu

Dane demograficzne

• Wiek _____

• Płeć _____

• Waga (w kg) _____

• Wzrost (w cm) _____

• Wykształcenie:

Podstawowe ☐

Średnie ☐

Zawodowe ☐

Wyższe ☐

• Kierunek studiów/ ukończone szkoła _____

• Miejsce zamieszkania:

Wieś ☐ Małe miasto (poniżej 20 tys. mieszkańców) ☐ Średnie miasto (20-100 tys. mieszkańców) ☐ Duże miasto (powyżej 100 tys. mieszkańców) ☐

• Na jakiej pozycji grasz:

☐	Napastnicy
☐	Pomocnicy
☐	Obrońcy
☐	Bramkarze

	Wszystko
--	----------

- Częstotliwość gry FIFA/eFootball:

	Kilka razy w miesiącu
	Raz w tygodniu
	Kilka razy w tygodniu
	Codziennie

- Gdzie grasz FIFA / eFootball: (zaznacz każda prawdziwa)

W domu ☐ Inne (eSports klub/ organizacji) ☐ U kolegi ☐

- Na czym zwykle grasz w FIFA/eFootball:

Telefon komórkowy ☐ Komputer ☐ Xbox ☐ PS (dowolna wersja) ☐

- Ile godzin grasz w FIFA/eFootball? : _____

- Liczba lat gry w FIFA/eFootball: _____

- Jakość gry FIFA/ eFootball:

	Poziom lokalny/ powiatowy- w tym lokalne zawody szkolne
	Regionalny / wojewódzki
	Międzywojewódzki / makroregionalny
	Krajowy (seniorzy)
	Międzynarodowy

- Jeśli grasz dla klubu eSports, podaj nazwę: _____

- Wymień ważne ligi i rozgrywki, w których grałeś: _____

- Wsparcie rodziców dla gry w FIFA/eFootball:

Tak ☐ Nie ☐ Tylko jeden rodzic ☐ Nie obchodzi mnie to ☐
wsparcie

- Czy zamierzasz grać w FIFA / eFootball jako profesjonalny gracz:

Tak ☐ Nie ☐ Może ☐

- Do you receive any support from your organization or from the government of your country?

Tak ☐ Nie ☐

- Jakiego rodzaju wsparcie otrzymujesz od swojej organizacji lub rządu?

- Co sądzisz o poziomie e-sportu w Twoim kraju?

Bardzo dobra ☐ Dobra ☐ Uczciwa ☐ Słaba ☐ Bardzo słaba ☐

Indian football sample (Informed consent and Demographic data)

Ladies and Gentlemen,

I am conducting scientific research to assess the levels of achievement motivation, competitive anxiety and physical self-concept of Senior category Indian football players (18 years and above). The research is anonymous and the results will be used for research purposes only. By joining the study, you give your informed voluntary consent to use the obtained data. You can withdraw your consent to participate in the study at any time prior to publication without giving a reason if you deem it appropriate.

It will take you 15-20 minutes to complete the questionnaire. If you have any questions please contact: kanupriyap196@gmail.com Kanupriya Rawat (Faculty of Psychology, U.K.W.)

Consent of the participant of the study to participate in the research study:

I declare that I have been informed in particular about the assumptions, goals, course and duration of the study, the method of its conduct, possible risks and threats, any inconvenience related to participating in this study and about my rights and obligations, I understand information about the study and I have received comprehensive, satisfactory answers to the questions asked, and I give my informed and voluntary consent to participate in this study. I acknowledge that I may withdraw from the study at any time, without giving any reason, if I deem it appropriate. I know that after submitting the questionnaire, I cannot resign due to the coding of the results and the inability to identify the research participant.

☐ I give my consent to participate in the study

☐ I do not agree to participate in the study

Demographic data

- Age _____
- Gender _____
- Weight (in kg) _____
- Height (in cm) _____
- Education:

Primary ☐ Secondary ☐ High School ☐ Graduation ☐

- Field of study _____
- Place of living:

Village ☐ Town ☐ City ☐ Metropolitan city ☐

- Which position you play for:

☐	Forward
☐	Midfield
☐	Defence
☐	Goalkeeper
☐	Other

- The frequency of training your sport

	Several times a month
	Once a week
	A few times a week
	Daily

- Number of years of training your sport? _____
- Quality of sports career

	District / local / school-regional
	State / regional premier
	Second-tier national
	Top-tier national (senior)
	International (representative / international club)

- Mention important leagues and competitions you have played: _____
- Support from parents for playing football:

Yes ☐ No ☐ Maybe ☐ I don't care ☐

- Will you continue football as a professional player:

Yes ☐ No ☐ Maybe ☐

- Do you receive any support from your organization or from the government of your country?

Yes ☐ No ☐

- What kind of support you get from your organization, or government?

- What do you think about the level of football as a sport in your country?

Very good ☐ Good ☐ Fair ☐ Poor ☐ Very poor ☐

Indian virtual football sample (Informed consent and Demographic data)

Consent of the participant of the study to participate in the research study:

I declare that I have been informed in particular about the assumptions, goals, course and duration of the study, the method of its conduct, possible risks and threats, any inconvenience related to participating in this study and about my rights and obligations, I understand information about the study and I have received comprehensive, satisfactory answers to the questions asked, and I give my informed and voluntary consent to participate in this study. I acknowledge that I may withdraw from the study at any time, without giving any reason, if I deem it appropriate. I know that after submitting the questionnaire, I cannot resign due to the coding of the results and the inability to identify the research participant.

☐ I give my consent to participate in the study

☐ I do not agree to participate in the study

Demographic data

- Age _____
- Gender _____
- Weight (in kg) _____
- Height (in cm) _____
- Education:
Primary ☐ Secondary ☐ High School ☐ Graduation ☐ Post-graduation ☐
- Field of study _____
- Place of living:
Village ☐ Town ☐ City ☐ Metropolitan city ☐
- Which position you play for:

☐	Forward
☐	Midfield
☐	Defence
☐	Goalkeeper
☐	All
- The frequency of playing FIFA/eFootball game:

☐	Several times a month
☐	Once a week
☐	A few times a week
☐	Daily

- What mode you usually use for playing FIFA/eFootball:

☐	Mobile phone
☐	PC (Computer)
☐	Xbox
☐	PS (any version)

- Where do you play FIFA / eFootball:

At home ☐ In café / other organization ☐ Both ☐

- Number of years of playing FIFA/eFootball:
- How many hours do you play FIFA/eFootball? :

- Quality of playing FIFA/ eFootball:

☐	District / local / school-regional
☐	State / regional premier
☐	Second-tier national
☐	Top-tier national (senior)
☐	International (representative / international club)

- Mention important leagues and competitions you have played:
- Support from parents for playing football:

Yes ☐ No ☐ Maybe ☐ I don't care ☐

- Will you continue football as a professional player:

Yes ☐ No ☐ Maybe ☐

- Do you receive any support from your organization or from the government of your country?

Yes ☐ No ☐

- What kind of support you get from your organization, or government?

- What do you think about the level of football as a sport in your country?

Very good ☐ Good ☐ Fair ☐ Poor ☐ Very poor ☐

Questionnaire (Polish participants)

SAS-2

Reakcje podczas uprawiania sportu

Wielu sportowców jest spiętych lub zdenerwowanych przed rywalizacją sportową: meczami, zawodami, klasyfikacjami. Zdarza się to nawet profesjonalnym sportowcom. Przeczytaj każde pytanie, a następnie zakresł cyfrę, która mówi, jak ZWYKLE czujesz się przed lub podczas rywalizacji sportowej. Nie ma dobrych ani złych odpowiedzi. Proszę, bądź tak prawdomówny, jak tylko możesz.

S. No.	Przed lub w trakcie rywalizacji sportowej:	Wcale	Trochę	Średnio	W dużym stopniu
1	Trudno jest mi skoncentrować się na grze.	()	()	()	()
2	Moje ciało jest spięte.	()	()	()	()
3	Martwię się, że nie zagram dobrze.	()	()	()	()
4	Trudno mi się skupić na tym, co mam zrobić.	()	()	()	()
5	Martwię się, że zawiodę innych.	()	()	()	()
6	Czuję ucisk w żołądku.	()	()	()	()
7	Tracę koncentrację na grze.	()	()	()	()
8	Martwię się, że nie zagram najlepiej jak mogę.	()	()	()	()
9	Martwię się, że źle zagram.	()	()	()	()
10	Czuję drżenie mięśni.	()	()	()	()
11	Obawiam się, że zawiodę podczas gry.	()	()	()	()
12	Mam rozstrój żołądka.	()	()	()	()
13	Nie mogę jasno myśleć podczas gry.	()	()	()	()
14	Moje mięśnie są napięte, ponieważ jestem zdenerwowana/-y.	()	()	()	()
15	Trudno mi się skupić na poleceniach, które daje trener.	()	()	()	()

PSDQ-S

To okazja, aby przyjrzeć się samemu sobie. To nie jest test. Nie ma tutaj dobrych ani złych odpowiedzi, każdy może odpowiedzieć inaczej. Ważne jest, aby Twoje odpowiedzi odzwierciedlały to, jak postrzegasz i czujesz się ze sobą. W poniższych pytaniach zostaniesz poproszony(-a) o zastanowienie się nad sobą pod względem fizycznym. Kiedy będziesz gotowy(-a), przeczytaj każde zdanie i wybierz odpowiedź, która najlepiej Cię opisuje. Do wyboru jest sześć możliwych odpowiedzi: „**Prawda**”, „**Falsz**” oraz **cztery odpowiedzi pośrednie**. Obok każdego zdania znajduje się sześć pól odpowiadających poszczególnym odpowiedziom. Odpowiedzi są podane nad polami. Wybierz odpowiedź najlepiej pasującą do danego zdania i zaznacz odpowiednie pole.

S.No	Stwierdzenie	Falsz	Raczej falszywe	Więcej falszywych niż prawdziwych	To bardziej prawda niż fałsz	Raczej prawda	Prawda
1	Czuję się pewnie podczas wykonywania skoordynowanych ruchów.	()	()	()	()	()	()
2	Jestem osobą silną fizycznie.	()	()	()	()	()	()
3	Sprawnie się schylam, wykonuję skrety oraz obroty.	()	()	()	()	()	()
4	Potrafię długo biec bez zatrzymywania się.	()	()	()	()	()	()
5	Ogólnie rzecz biorąc, osiągam pozytywne rezultaty w większości rzeczy, które robię.	()	()	()	()	()	()
6	Często łapię różne choroby (grypę, wirus, przeziębienie itp.).	()	()	()	()	()	()
7	Kontrolowanie ruchów mojego ciała przychodzi mi z łatwością	()	()	()	()	()	()
8	Często wykonuję ćwiczenia lub czynności, które powodują, że ciężko oddycham.	()	()	()	()	()	()
9	Moja talia jest za szeroka.	()	()	()	()	()	()
10	Jestem dobra/-y w większości sportów.	()	()	()	()	()	()
11	Fizycznie jestem z siebie zadowolona/-y.	()	()	()	()	()	()
12	Mam ładną twarz.	()	()	()	()	()	()
13	Mam silne ciało.	()	()	()	()	()	()
14	Moje ciało jest elastyczne.	()	()	()	()	()	()
15	Choruję tak często, że nie mogę robić wszystkiego, co chcę.	()	()	()	()	()	()
16	Potrafię dobrze skoordynować ruchy.	()	()	()	()	()	()

S.No .	Stwierdzenie	Falsz	Raczej falszywe	Więcej falszywych niż prawdziwych	To bardziej prawda niż fałsz	Raczej prawda	Prawda
17	Mam za dużo tkanki tłuszczowej na moim ciele.	()	()	()	()	()	()
18	Wyglądam lepiej niż większość moich znajomych.	()	()	()	()	()	()
19	Potrafię płynnie wykonywać ruchy w większości aktywności fizycznych.	()	()	()	()	()	()
20	Jestem aktywna/-y fizycznie co najmniej trzy razy w tygodniu (uprawiam np. jogging, taniec, rower, aerobik, siłownia, pływanie).	()	()	()	()	()	()
21	Mam nadwagę.	()	()	()	()	()	()
22	Mam dobre umiejętności sportowe.	()	()	()	()	()	()
23	Fizycznie czuję się dobrze ze sobą.	()	()	()	()	()	()
24	Ogólnie rzecz biorąc, nie jestem dobry.	()	()	()	()	()	()
25	Często choruję.	()	()	()	()	()	()
26	Moje ciało z łatwością radzi sobie ze skoordynowaniem ruchów.	()	()	()	()	()	()
27	Uprawiam dużo sportu, tańczę, chodzę na siłownię lub na inne zajęcia fizyczne.	()	()	()	()	()	()
28	Jestem atrakcyjna / jestem przystojny.	()	()	()	()	()	()
29	Poradziłbym sobie dobrze w teście siłowym.	()	()	()	()	()	()
30	Mogę być aktywna/-y fizycznie przez długi czas bez zmęczenia.	()	()	()	()	()	()
31	Większość rzeczy, które robię, robię dobrze.	()	()	()	()	()	()
32	Kiedy zachoruję, powrót do zdrowia zajmuje mi dużo czasu.	()	()	()	()	()	()
33	Niemal codziennie jestem aktywny/a fizycznie, uprawiam sport, ćwiczę lub tańczę.	()	()	()	()	()	()

S.No .	Stwierdzenie	Falsz	Raczej falszywe	Więcej falszywych niż prawdziwych	To bardziej prawda niż fałsz	Raczej prawda	Prawda
34	Jestem dobry w sporcie.	()	()	()	()	()	()
35	Czuję się dobrze z tym, jaki jestem fizycznie.	()	()	()	()	()	()
36	Myślę, że dobrze bym sobie poradził/a w teście elastyczności (ciała).	()	()	()	()	()	()
37	Jestem dobra/-y w aktywnościach wytrzymałościowych, takich jak bieganie długodystansowe, aerobik, jazda na rowerze, pływanie, biegi przełajowe lub narciarstwo.	()	()	()	()	()	()
38	Ogólnie mam się czym pochwalić.	()	()	()	()	()	()
39	Muszę chodzić do lekarza z powodu choroby częściej niż większość moich rówieśników.	()	()	()	()	()	()
40	Nic, co robię, nie wydaje się właściwe.	()	()	()	()	()	()

3x2 AGQ-S

Wskazówki:

Nie ma dobrych lub złych odpowiedzi na pytania, a ich odpowiedzi będą traktowane jako poufne. Podczas wypełniania kwestionariusza uczestnicy zostali poinstruowani, aby podczas udzielania odpowiedzi na poszczególne zapytania na pozycje rozważyli swoje obecne myśli i uczucia dotyczące ich głównego sportu. Zostali także poinformowani, że mogą wycofać się z badania w dowolnym momencie bez żadnych negatywnych konsekwencji.

S. No.	Stwierdzenie	Zdecydowanie się nie zgadzam	Nie zgadzam się	Nie zgadzam się do pewnego stopnia	Nie mam zdania	Zgadza m się do pewnego stopnia	Zgadza m się	Zdecydowanie się zgadzam
1	Dążę do prawidłowego realizowania swoich umiejętności.	()	()	()	()	()	()	()
2	Staram się stosować właściwą taktykę i strategię.	()	()	()	()	()	()	()
3	Chcę z powodzeniem wykonać każdą technikę.	()	()	()	()	()	()	()
4	Unikam popełniania wielu błędów technicznych.	()	()	()	()	()	()	()
5	Unikam stosowania złych taktyk i strategii.	()	()	()	()	()	()	()
6	Unikam popełniania wielu błędów.	()	()	()	()	()	()	()
7	Chcę, by mój występ był lepszy niż poprzednie starty.	()	()	()	()	()	()	()
8	Dążę by radzić sobie dobrze w porównaniu z tym, jak radziłam/-em sobie w przeszłości z podobnymi wyzwaniami.	()	()	()	()	()	()	()
9	Moim celem jest działać lepiej niż zwykle.	()	()	()	()	()	()	()
10	Unikam osiągnięcia wyników gorszych niż zwykle.	()	()	()	()	()	()	()

S. No.	Stwierdzenie	Zdecydowanie się nie zgadzam	Nie zgadzam się	Nie zgadzam się do pewnego stopnia	Nie mam zdania	Zgadzam się do pewnego stopnia	Zgadzam się	Zdecydowanie się zgadzam
11	Chcę uniknąć słabych wyników w porównaniu z moim typowym poziomem startowym.	()	()	()	()	()	()	()
12	Moim celem jest unikanie uzyskiwania gorszych wyników niż w poprzednich podobnych wyzwaniach.	()	()	()	()	()	()	()
13	Ważne jest dla mnie, żebym osiągał/a lepsze wyniki niż inni	()	()	()	()	()	()	()
14	Ważne jest dla mnie, abym radził/-a sobie dobrze w porównaniu z innymi osobami.	()	()	()	()	()	()	()
15	Moim celem jest by działać lepiej niż większość innych zawodników.	()	()	()	()	()	()	()
16	Chcę tylko uniknąć gorszych wyników niż inni	()	()	()	()	()	()	()
17	Moim celem jest unikanie osiągania wyników gorszych niż pozostałe osoby.	()	()	()	()	()	()	()
18	Ważne jest dla mnie, aby nie być jednym z najgorszych zawodników w grupie.	()	()	()	()	()	()	()

Dziękuję bardzo za udział.

Jeśli masz jakieś pytania lub potrzebujesz porady, skontaktuj się ze mną poprzez e-mail lub WhatsApp.

Informacje kontaktowe:

Kanupriya Rawat
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Department of Psychology
Kazimierz Wielki University, Bydgoszcz, Poland
Email- kanupriyapl96@gmail.com

Questionnaire (Indian participants)

SAS-2

REACTIONS TO PLAYING SPORTS

Many athletes get tense or nervous before or during games, meets or matches. This happens even to pro athletes. Please read each question. Then, circle the number that says how you USUALLY feel before or while you compete in sports. There are no right or wrong answers. Please be as truthful as you can.

S.N.	Before or while I compete in sports:	Not At All	A Little Bit	Pretty Much	Very Much
1	It is hard to concentrate on the game.	()	()	()	()
2	My body feels tense.	()	()	()	()
3	I worry that I will not play well.	()	()	()	()
4	It is hard for me to focus on what I am supposed to do.	()	()	()	()
5	I worry that I will let others down.	()	()	()	()
6	I feel tense in my stomach.	()	()	()	()
7	I lose focus on the game.	()	()	()	()
8	I worry that I will not play my best.	()	()	()	()
9	I worry that I will play badly.	()	()	()	()
10	My muscles feel shaky.	()	()	()	()
11	I worry that I will mess up during the game.	()	()	()	()
12	My stomach feels upset.	()	()	()	()
13	I cannot think clearly during the game.	()	()	()	()
14	My muscles feel tight because I am nervous	()	()	()	()
15	I have a hard time focusing on what my coach tells me to do	()	()	()	()

PSDQ-S

This is a chance to look at yourself. **It is not a test.** There are no right answers and everyone will have different answers. Be sure that your answers show how you feel about yourself. In the following questions you will be asked to think about yourself physically. When you are ready to begin, please read each sentence and decide your answer (You may read quietly to yourself). There are six possible answers for each question – “True”, “False”, and four answers in between. There are six boxes next to each sentence, one for each of the answers. The answers are written at the top of the boxes. Choose your answer to a sentence and put a tick in the box for the answer you choose.

No.	Statements	False	Mostly False	More false than true	More true than false	Mostly true	True
1	I feel confident when doing coordinated movements.	☐	☐	☐	☐	☐	☐
2	I am a physically strong person.	☐	☐	☐	☐	☐	☐
3	I am quite good at bending, twisting and turning my body.	☐	☐	☐	☐	☐	☐
4	I can run a long way without stopping.	☐	☐	☐	☐	☐	☐
5	Overall, most things I do turn out well.	☐	☐	☐	☐	☐	☐
6	I usually catch whatever illness (flu, virus, cold etc) is going around.	☐	☐	☐	☐	☐	☐
7	Controlling movements of my body comes easily to me.	☐	☐	☐	☐	☐	☐
8	I often do exercise or activities that make me breathe hard.	☐	☐	☐	☐	☐	☐
9	My waist is too large.	☐	☐	☐	☐	☐	☐
10	I am good at most sports.	☐	☐	☐	☐	☐	☐
11	Physically, I am happy with myself.	☐	☐	☐	☐	☐	☐
12	I have a nice-looking face.	☐	☐	☐	☐	☐	☐
13	I have a lot of power in my body.	☐	☐	☐	☐	☐	☐
14	My body is flexible.	☐	☐	☐	☐	☐	☐
15	I am sick so often that I cannot do all the things I want to do.	☐	☐	☐	☐	☐	☐
16	I am good at coordinated movements.	☐	☐	☐	☐	☐	☐

No.	Statements	False	Mostly False	More false than true	More true than false	Mostly true	True
17	I have too much fat on my body.	()	()	()	()	()	()
18	I am better looking than most of my friends.	()	()	()	()	()	()
19	I can perform movements smoothly in most physical activities.	()	()	()	()	()	()
20	I do physically active things (e.g. joga, dance, bicycle, aerobics, gym, swim) at least three times a week	()	()	()	()	()	()
21	I am overweight.	()	()	()	()	()	()
22	I have good sports skills.	()	()	()	()	()	()
23	Physically, I feel good about myself.	()	()	()	()	()	()
24	Overall, I am no good.	()	()	()	()	()	()
25	I get sick a lot.	()	()	()	()	()	()
26	I find my body handles coordinated movements with ease.	()	()	()	()	()	()
27	I do lots of sports, dance, gym, or other physical activities.	()	()	()	()	()	()
28	I am good looking.	()	()	()	()	()	()
29	I could do well in a test of strength.	()	()	()	()	()	()
30	I can be physically active for a long period of time without getting tired.	()	()	()	()	()	()
31	Most things I do, I do well.	()	()	()	()	()	()
32	When I get sick, it takes me a long time to get better	()	()	()	()	()	()
33	I do sports, exercise, dance or other physical activities almost every day.	()	()	()	()	()	()
34	I play sports well.	()	()	()	()	()	()
35	I feel good about who I am physically.	()	()	()	()	()	()

No.	Statements	False	Mostly False	More false than true	More true than false	Mostly true	True
36	I think I would perform well on a test measuring flexibility.	☐	☐	☐	☐	☐	☐
37	I am good at endurance activities like distance running, aerobics, bicycling, swimming, or cross-country, skiing.	☐	☐	☐	☐	☐	☐
38	Overall, I have a lot to be proud of.	☐	☐	☐	☐	☐	☐
39	I have to go to the doctor because of illness more than most people my age.	☐	☐	☐	☐	☐	☐
40	Nothing I ever do seems to turnout right.	☐	☐	☐	☐	☐	☐

Thank you so much for your participation. If there is any question or you need counselling, please feel free to contact me through email.

Contact info:

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Appendix D. *Under review article: the short form of Physical self-description Questionnaire (PSDQ-S)*

Psychometric Evidence for the Polish and Indian Versions of the PSDQ-S: Summary

The Polish and Indian adaptations of the short form of the Physical Self-Description Questionnaire (PSDQ-S) are reported in full in a manuscript that is currently under peer review (Rawat et al., under review). Because that manuscript has not yet been published, this appendix summarises only the psychometric evidence needed to justify the use of the instrument in the present study; the substantive analyses of the manuscript are not reproduced here. The adaptation data were collected between December 2022 and February 2023 from samples independent of the 800 participants analysed in Chapters 4 to 7. Table E1 summarises the factor structure, reliability and measurement invariance of the two versions. The published article will replace this summary as the citable source once it becomes available.

Table D1. *Summary of the Psychometric Properties of the Polish and Indian PSDQ-S in the Adaptation Samples*

Evidence	Polish version	Indian version
Sample	596 athletes; 331 men, 265 women; age M = 23.28 (SD = 4.46); 352 high-performance, 244 recreational	616 athletes; 377 men, 239 women; age M = 22.23 (SD = 3.38); 376 high-performance, 240 recreational
Eleven-factor CFA: χ^2 (df)	1805.11 (685)	1491.62 (685)
CFI / TLI	.932 / .922	.953 / .946
RMSEA [90% CI]	.057 [.054, .060]	.048 [.045, .052]
SRMR	.045	.039
Standardised loadings (range)	.71–.91	.69–.94
Cronbach's α (range)	.84–.92	.81–.95
McDonald's ω (range)	.84–.92	.82–.96
Composite reliability (range)	.84–.92	.80–.95
Invariance across gender	Scalar (largest $ \Delta\text{CFI} = .001$)	Scalar (largest $ \Delta\text{CFI} = .000$)
Invariance across participation level	Scalar (largest $ \Delta\text{CFI} = .008$)	Scalar (largest $ \Delta\text{CFI} = .000$)
Invariance across country (India vs Poland)	Scalar: $\Delta\text{CFI} = -.003$ (metric), $-.009$ (scalar); $\Delta\text{RMSEA} \leq .003$	
Invariance across country $\times$ participation level (four groups)	Metric supported; partial scalar with the intercepts of items 38 and 40 (Global Self-Esteem) freed: $\Delta\text{CFI} = -.009$, $\Delta\text{RMSEA} = .002$	

Note. CFA = confirmatory factor analysis; robust maximum likelihood (MLR) estimation. Invariance was evaluated against $\Delta\text{CFI} \leq .010$ and $\Delta\text{RMSEA} \leq .015$; Δ values are relative to the preceding, less constrained model. Participation level = high-performance versus recreational athletes. Full results are reported in Rawat et al. (under review).

Appendix E. Publications

The measurement instruments used in this dissertation were adapted and validated for the Polish and Indian contexts in the following publications:

- Rawat, K., Błachnio, A., & Suppan, K. (2023). Psychometric properties of the Polish version of the Sport Anxiety Scale-2 (SAS-2). *International Journal of Environmental Research and Public Health*, 20(14), 6429. <https://doi.org/10.3390/ijerph20146429>
- Rawat, K., Błachnio, A., & Krishna, N. R. (2024). Cross-cultural adaptation and psychometric properties of the Achievement Goal Questionnaire 3×2-Sport among Polish athletes. *Polskie Forum Psychologiczne*, 29(4), [pages]. <https://doi.org/10.34767/PFP.2024.04.06>
- Rawat, K., Błachnio, A., Krishna, N. R., & Tewari, P. (2026). Psychometric properties of the Sport Anxiety Scale-2 (SAS-2) in Indian athletes. *Acta Neuropsychologica*, 24(1), [pages]. <https://actaneuropsychologica.com/article/556315/en>
- Rawat, K. (2026). Psychometric properties of the 3×2 Achievement Goal Questionnaire-Sport among Indian athletes. In A. Łabuz & S. Bręcz-Kupiec (Eds.), *Młodzi Naukowcy 2.0* (Vol. 5, pp. 464–478). Fundacja Centrum Badań Socjologicznych. <https://doi.org/10.14254/978-83-979051-2-2/2026>
- Rawat, K., Błachnio, A. (under review). Psychometric Evidence for the Polish and Indian Versions of the PSDQ-S. [Manuscript submitted for publication]. Department of Psychology, Kazimierz Wielki University. Note: This manuscript reports the Polish and Indian adaptations of the PSDQ-S and is currently under peer review; its psychometric results are summarised in Appendix D.

Related publication:

- Rawat, K., Błachnio, A., & Liberska, H. (2025). Mirror within: Exploring the impact of physical activity on body image and anxiety in youth. *Journal of Clinical Medicine*, 14(23), 8484. <https://doi.org/10.3390/jcm14238484>

The results of the dissertation and its preparatory studies were presented at the following conferences:

- Poster: "An explanatory model of achievement goals, physical self-concept, and competitive anxiety in Indian eFootball players" - 18th FEPSAC Congress, Timișoara, Romania, 2026.
- Presentation: "Mirror within: Exploring the impact of physical activity on body image and anxiety in youth" - 9th National Symposium of Sports Psychology, Bydgoszcz, Poland, 2026.
- Presentation: "A cross-cultural study on achievement motivation in sports, competitive trait anxiety, and physical self-concept of traditional and virtual football players" - 6th EFSPA Scientific Conference, Gdańsk, Poland, 2025.
- Presentation: "Achievement motivation, physical self-concept, and competitive anxiety in esports: A pilot study" - FROG: Future and Reality of Gaming, Vienna, Austria, 2025.
- Presentation: "Psychometric properties of the 3×2 Achievement Goal Questionnaire–Sport among Indian athletes" - International Multidisciplinary Doctoral Students' Conference MKDUS 2.0, University of Szczecin, Poland, 2025.
- Poster: "Assessment of achievement goals among Indian football players" - 17th FEPSAC Congress, Innsbruck, Austria, 2024.
- Presentation: "Psychometric properties of the Sport Anxiety Scale-2 (SAS-2) in the Indian population" - Singapore Conference on Applied Psychology (SCAP), Singapore, 2023.
- Presentation: "Comparison of achievement motivation in Indian and Polish players" - 26th International Congress of the International Association for Cross-Cultural Psychology (IACCP), 2022.
- Presentation: "Critical review and bibliometric analysis of achievement motivation measurement" - XVI International Conference on Sport Performance and Self-Efficacy (ICSPSE), Vienna, Austria, 2022.
- Presentation: "Methodological challenges in cross-cultural research in sports psychology: A review" - 5th International Conference on Research in Humanities and Social Sciences (ICRHS), Berlin, Germany, 2021.



Article

Psychometric Properties of the Polish Version of the Sports Anxiety Scale-2 (SAS-2)

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Abstract: The main aim of the study was to assess the psychometric properties of the Polish version of the Sports Anxiety scale-2 (SAS-2). The study covered 396 athletes, ages ranging from 18 years to 35 years. The task and ego orientation in sport questionnaire (TEOSQ) and State and Trait Anxiety Inventory (STAI) were used for validation of the scale. Cronbach's alpha for the somatic anxiety subscale was 0.88, for the worry subscale was 0.95, and for the concentration disruption was 0.86, respectively. The three-factor model and hierarchical model fits perfectly as CFI > 0.95, TLI > 0.95, and RMSEA < 0.08. Satisfactory results in measurement invariance show the use of the tool for any gender or athlete (high-performance, recreational) group. The internal consistency ($\alpha = 0.86\text{--}0.95$) and the test–retest reliability (ICC = 0.87–0.90) were satisfactory. There was a statistically significant negative correlation between task orientation and total anxiety along with its three subscales, and a weak positive correlation between ego orientation and worry subscale. Meanwhile, a weak to moderate positive correlation was exhibited between total anxiety and its subscales with the STAI-T and STAI-S. Additionally, female, recreational, and female recreational athletes' groups had weak negative associations between worry and concentration disruption trait anxiety and task orientation, and a weak positive association between somatic anxiety and ego orientation.

Keywords: cross-cultural adaptation; psychometrics; anxiety; athletes



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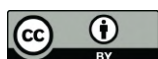
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1. Introduction

Sports is a context in which an athlete intensively develops himself, competes, strives to win, and improves his skills. This process of self-growth exposes him to experiencing anxiety. The importance of sports anxiety is documented by a large number of studies conducted [1–3]. Athletes frequently feel excessive anxiety when competing [4]. In addition, 63% of competitors feel anxious before a competition [5]; hence, the construct of pre-competitive anxiety has also been tested [6]. The multidimensional anxiety theory [7] asserts that competitive anxiety, including state and trait anxiety, can occur at the somatic and cognitive level. Competitive anxiety (CA) is an emotional response that frequently manifests before or during sporting events. The multidimensional construct of anxiety in sports is made up of two components: somatic and cognitive. According to Martens et al. [6], the two main causes of cognitive anxiety are “negative expectations about success or negative self-evaluation”. Cognitive dimensions include the content of thoughts, such as poor performance, unfavourable evaluation, social comparison, expectations, etc. [8,9], all of which can have a significant negative impact on an athlete's performance. While many reports indicate the costs associated with experiencing sports anxiety, there are also fewer studies showing the benefits of anxiety in sports [10]. The physiological and affective aspects of anxiety that stem directly from autonomic arousal are referred to as somatic anxiety [6]. The somatic dimension includes a variety of physiological reactions, such as muscle tension, tremors, sweating, etc. Each component has a distinct relationship to athletic performance.

CROSS-CULTURAL ADAPTATION AND PSYCHOMETRIC PROPERTIES OF THE ACHIEVEMENT GOAL QUESTIONNAIRE 3X2-SPORT AMONG POLISH ATHLETES

Kanupriya Rawat¹, Aleksandra Błachnio², Nibu Rkrishna³

Summary. Aim. This study examined the reliability and validity of the Achievement Goal Questionnaire 3x2-Sport (3x2 AGQ-Sport) among Polish athletes ($N = 396$; aged 18–35 years) in different sports. **Tools.** The study used a metric that collected basic data, Task Orientation and Ego in Sport Questionnaire (TEOSQ) and State-Trait Anxiety Inventory (STAI). **Results.** Statistical analyses confirmed the validity of the scale. A 6-factor model best fit the 3x2 AGQ-Sport, with measurement invariance across gender, level of sport participation (high-performance vs. recreational athletes), and type of sport (individual vs. team). Cronbach's alpha for the total scale was .93, and subscale alphas ranged from .83 to .91. Test-retest reliability ($ICC = .89-.97$) was satisfactory. Task-oriented goals and self-oriented goals (3x2 AGQ-Sports) had moderately positive correlations with task orientation (TEOSQ), whereas other-oriented goals (3x2 AGQ-Sports) had moderately positive correlations with ego orientation (TEOSQ), which is consistent with the literature. However, weak correlations between 3x2 achievement goals and state or trait anxiety suggest that increased physical activity may alleviate anxiety symptoms. Analysis of sports participation levels between high-performance and recreational athletes revealed significant differences in other-approach orientation, with high-performance athletes showing higher levels compared to recreational athletes. These results are consistent with research indicating higher performance approach goals among high-performance athletes. **Conclusions.** The study demonstrates

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Psychometric properties of the 3x2 Achievement Goal Questionnaire-Sports among Indian athletes

Właściwości psychometryczne kwestionariusza osiągnięć i celów w sporcie (3×2 AGQ-Sports) wśród indyjskich sportowców

Abstract

The aim of the article is to examine the psychometric properties, reliability and validity of the 3x2 Achievement Goal Questionnaire-Sports (3x2 AGQ-Sports) among Indian athletes across various sports disciplines.

A total of 402 Indian athletes aged 18-35 participated in the study. The 3x2 AGQ-Sports was validated using the Anxiety, Depression, and Stress Scale (ADSS) and the Achievement Motivation Scale (AMS). Statistical analyses tested internal consistency, test-retest reliability, and factorial structure, including measurement invariance across gender, performance level, and sport type.

The results confirmed a six-factor model with strong internal consistency (Cronbach's $\alpha = 0.93$) and high subscale reliability ($\alpha = 0.88-0.92$). Test-retest reliability was also satisfactory ($ICC = 0.89-0.97$). Task-based and self-based goals correlated positively with achievement motivation and negatively with anxiety, depression, and stress. High-performance athletes scored significantly higher in achievement goals than recreational athletes, indicating that the level of sports participation has a substantial impact on this orientation, which also align with previous literature. Also, other-approach goal was the only statistically significant dimension between individual and team-based sports.

The validated scale can be used by sport psychologists and coaches to assess goal orientation and psychological well-being among Indian athletes, facilitating tailored training and mental health interventions.

This study validates the 3x2 AGQ-Sports within the Indian athlete population. It contributes to cross-cultural validation of sport psychology tools and provides insights into the motivational and emotional profiles of athletes in diverse sporting contexts. In international cooperation, it ensures the sameness of measured indicators and implemented solutions. In practice, especially with multicultural teams, it gives practitioners effective tools for daily work with athletes. Our work facilitates a better understanding of achievement motivation in the sports domain and successfully establishes the high factorial validity and reliability of the 3x2 Achievement Goal Questionnaire in the Indian sports context.

Keywords: Psychometrics; achievement motivation; Indian athletes; type of sports.

Streszczenie

Celem artykułu jest zbadanie właściwości psychometrycznych, rzetelności i trafności Kwestionariusza Celów Osiągnięć 3×2 w Sporcie (3×2 AGQ-Sports) wśród indyjskich sportowców reprezentujących różne dyscypliny sportowe.

W badaniu wzięło udział 402 indyjskich sportowców w wieku od 18 do 35 lat. Do walidacji 3x2 AGQ-Sports wykorzystano Skalę Lęku, Depresji i Stresu (ADSS) oraz Skalę Motywacji Osiągnięć (AMS). Analizy statystyczne obejmowały ocenę spójności wewnętrznej, rzetelności test-retest oraz struktury czynnikowej, w tym niezmienności pomiarowej w zależności od płci, poziomu sportowego oraz typu sportu.

Wyniki potwierdziły sześcioczynnikowy model z wysoką spójnością wewnętrzną (alfa Cronbacha=0.93) oraz wysoką rzetelnością podskal ($\alpha = 0.88-0.92$). Rzetelność test-retest również była zadowalająca ($ICC=0.89-0.97$). Cele zadaniowe i ukierunkowane na siebie dodatnio korelowały z motywacją osiągnięć, a ujemnie z poziomem lęku, depresji i stresu. Sportowcy wyczynowi uzyskali istotnie wyższe wyniki w zakresie celów osiągnięć niż sportowcy rekreacyjni, co wskazuje, że poziom uczestnictwa w sporcie ma istotny wpływ na tę orientację, co jest zgodne z wcześniejszą literaturą. Dodatkowo, cel "inne-podejście" był jedynym wymiarem wykazującym istotne różnice pomiędzy sportami indywidualnymi a zespołowymi.

Zwalidowany kwestionariusz może być wykorzystywany przez psychologów sportowych i trenerów do oceny orientacji na cel oraz dobrostanu psychicznego wśród indyjskich sportowców, co umożliwia dostosowanie treningów i interwencji psychologicznych.

Niniejsze badanie potwierdza trafność 3x2 AGQ-Sports w populacji indyjskich sportowców. Przyczynia się do walidacji międzykulturowej narzędzi psychologii sportu oraz dostarcza wiedzy na temat profili motywacyjnych

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A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

PSYCHOMETRIC PROPERTIES OF THE SPORTS ANXIETY SCALE-2 (SAS-2) ON THE INDIAN ATHLETES

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SUMMARY

Background:

Competitive anxiety is a key psychological factor influencing athletic performance, and its accurate assessment is essential for both research and applied sport psychology. The Sports Anxiety Scale-2 (SAS-2) is one of the most widely used instruments for measuring somatic anxiety, worry, and concentration disruption in athletes. Although the scale has been validated across several cultural contexts, evidence from South Asian populations remains limited. Cultural differences in emotional expression, competitive environments, and sport participation patterns highlight the need for localized validation. This study therefore aimed to examine the psychometric properties of the SAS-2 among Indian athletes, evaluating its reliability, factorial structure, measurement invariance, and convergent validity with established psychological measures.

**Material/
Methods:**

A total of 416 athletes aged 18 to 35 years ($M=22.83$; $SD=3.38$) participated in the study in India. Validity was examined through associations with the Anxiety, Depression, and Stress Scale (ADSS-BSPSA) and the Self-Perception Measuring Scale (SPMS-A), allowing for an assessment of both convergent and divergent constructs. Internal consistency was high, with Cronbach's alpha values of 0.90 for the total scale and 0.78, 0.79, and 0.77 for the somatic anxiety, worry, and concentration disruption subscales, respectively, indicating strong reliability across all dimensions of the SAS-2.

Results:

It was found that the three-factor and hierarchical models demonstrated good fit indices ($CFI > 0.90$, $TLI > 0.90$, $RMSEA < 0.08$), confirming that the underlying structure of the SAS-2 is stable and theoretically coherent within this population. Measurement invariance analyses further supported the scale's applicability across genders and athlete groups. Test-retest reliability was satisfactory ($ICC = 0.79-0.84$). A weak but statistically significant negative correlation was observed between self-perception and anxiety measures, while moderate positive correlations were found between total anxiety and ADSS-BSPSA subscales. Strong correlations were also observed among total anxiety and its subscales ($r = 0.86-0.88$).

Conclusions:

The findings indicate that the SAS-2 demonstrates strong reliability, a stable factorial structure, and consistent performance across different athlete groups, supporting its suitability for use in India. The confirmed measurement invariance, satisfactory test-retest reliability, and meaningful associations with related psychological constructs collectively show that the scale effectively captures key dimensions of competitive anxiety in this cultural context. These results highlight the SAS-2 as a robust instrument for both research and applied sport psychology among Indian athletes.

Key words: emotions, anxiety, anxiety measurement, behaviour mechanisms, microgenetic theory, sports, athletes, psychometrics, reliability



Article

Mirror Within: Exploring the Impact of Physical Activity on Body Image and Anxiety in Youth

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Abstract

Background: Body image, physical self-concept and anxiety are closely intertwined aspects of psychological well-being among youth. The growing influence of social media and appearance-focused culture has intensified self-evaluation pressures, making it essential to understand whether physical activity fosters protective effects or, conversely, contributes to anxiety. **Methods:** The study examined the relationship between body appreciation, physical self-concept, self-esteem, and anxiety among 246 young adults aged 18–35 years (47.6% athletes, 52.4% non-athletes). Participants completed the Rosenberg Self-Esteem Scale (RSES), Body Appreciation Scale-2 (BAS-2), State-Trait Anxiety Inventory (STAI), and the short form of Physical Self-Description Questionnaire (PSDQ-S). Group differences were analyzed using the Mann–Whitney U and Kruskal–Wallis H tests, and associations were explored with Spearman’s correlations. Moderation analyses (PROCESS Model 1) tested whether physical activity buffered BMI-related effects, and structural equation modeling (SEM) evaluated direct and indirect pathways. **Results:** Athletes reported higher self-esteem and body appreciation and scored higher on all PSDQ-S subscales, alongside lower trait anxiety but higher state anxiety than non-athletes. Higher BMI predicted lower self-esteem, body appreciation, and less favorable self-perceptions. Physical activity moderated the BMI–self-esteem and BMI–body appreciation relationships, buffering negative effects among athletes. SEM showed that physical activity positively influenced physical self-concept and body appreciation, which in turn reduced trait anxiety. Gender differences were minimal. **Conclusions:** Regular sport participation supports psychological resilience by enhancing self-esteem and body appreciation while reducing anxiety. However, the findings also highlight the complexity of body–mind dynamics where individuals with strong body appreciation may still experience transient anxiety in evaluative contexts. Promoting body functionality, self-compassion, and positive physical self-concept in educational and sport settings may help prevent maladaptive behaviors and foster lasting mental well-being among youth.

Keywords: body appreciation; self-esteem; anxiety; physical self-concept; BMI; athletes; youth; mental health



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1. Introduction

Physical activity plays a fundamental role in promoting holistic health among youth. It strengthens cardiovascular efficiency, builds musculoskeletal fitness, enhances self-esteem, and contributes to better academic and emotional functioning [1,2]. Yet, this generation