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Reprogramming the Psychology of Success: The Reflections of Wearable Technologies in Athletes' Emotional and Motivational Dynamics[1]

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Abstract

This study explores how wearable technologies are integrated into athletes' emotional and motivational experiences through a qualitative approach grounded in the psychology of success. Interviews were conducted with professional athletes from various disciplines, and the data were categorized under five main themes: adoption of wearable technologies and initial motivations, training planning and habit formation through wearable technologies, the role of feedback in motivation and self-confidence, technological dependence and critical awareness, and future expectations and long-term motivation. The findings reveal that wearable devices go beyond merely tracking physiological data and play a role in enhancing self-awareness, self-discipline, self-esteem, and intrinsic motivation. Moreover, real-time data was found to support athletes' self-regulation skills, although potential risks such as technology addiction, data privacy concerns, and the over-quantification of self-perception were not sufficiently recognized. The study positions wearable technologies as significant digital companions that reshape athletes' psychology of success and offers an original contribution to the literature.

Keywords: Wearable Technologies, Professional Athletes, Motivation, Emotional Regulation, Success Psychology.

JEL Codes: J24, M10, M15

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1. Introduction

The documented history of sport extends over more than 3,000 years, evolving in parallel with the development of human civilization. Within this historical continuity, the first Olympic Games held in Ancient Greece in 776 BCE represent not merely a sporting event but a significant threshold where the systematic testing of individual physical capabilities and the institutionalization of societies' tendencies to valorize bodily competence emerged (Softić, Hundur, Spahić, Ašić & Pokvić, 2024).

Over time, however, sport has evolved beyond being a field where physical adequacy alone is displayed; it has transformed into a multi-layered phenomenon that integrates sociocultural, psychological, and technological components. In contemporary practice, athletic success is no longer solely rooted in physiological foundations but is increasingly shaped by the integration of mental processes, emotional flexibility, and self-regulatory skills. Accordingly, athletes who aspire to reach high-performance standards are expected to demonstrate advanced competencies not only in physical terms but also in cognitive and emotional functionality (MacNamara, Button, & Collins, 2010).

At the core of this transformation lies sport psychology—an interdisciplinary research field that systematically investigates how fundamental psychological processes such as attention, motivation, self-efficacy, emotional regulation, and self-perception influence athletic performance (Weinberg & Gould, 2018).

Although the use of scientific methods to enhance athletic performance has a long-standing history, these efforts often fell short due to methodological limitations and insufficient data. However, technological developments over the past decade and the widespread application of big data analytics in sports settings have laid the groundwork for a more systematic, objective, and measurable approach to performance science (Baca & Kornfeind, 2012).

The interaction between sport psychology and digital technologies has opened a new paradigm—one that enables not only the objective evaluation of performance through measurable parameters but also a deeper understanding of athletes' psychosocial development. Wearable technologies, AI-based analytical systems, and mobile data platforms have become psychotechnological components that monitor physiological outputs while simultaneously reshaping athletes' intrinsic motivation patterns, perceptions of self-efficacy, and subjective constructions of success (Grady, 2023; McCullagh, 2021).

This transformation has significantly contributed to optimizing training processes both in terms of quality and quantity (Softić et al., 2024). In this context, wearable technologies have emerged as critical instruments in the digital transformation of sport. Typically designed as accessories, garments, or devices worn on the body with wireless communication capabilities, these technologies enable real-time monitoring of key physiological parameters such as heart rate, pulse, respiration, and sleep quality (Chidambaram et al., 2022). Consequently, athletic performance can be evaluated in a more comprehensive and objective manner.

Moreover, these devices extend beyond passive data collection by utilizing AI-supported analyses to generate personalized performance profiles. As a result, real-time feedback mechanisms have evolved into behavioral stimuli that increase athletes' awareness of their physical limits and activate intrinsic motivation. For instance, notifications indicating the completion of daily training goals or in-app rewards can enhance the sense of achievement and support sustainable motivation (Scudds & Lasikiewicz, 2024).

The current literature predominantly focuses on the relationship between wearable technologies and physiological performance outputs (Li et al., 2016; James & Petrone, 2016; Adesida et al., 2019; Grady, 2023; da Silva, 2024; Yang, 2024). However, psychological processes are often treated as secondary concerns or overlooked entirely (McCullagh, 2021).

Addressing this gap, the present study is designed to explore the following central research question:

"How do wearable technologies reshape athletes' psychology of success and motivational patterns?". This study positions wearable technologies not merely as tools for monitoring physical performance but as digital companions that actively restructure athletes' psychology of achievement. In doing so, it aims to contribute an original perspective to the field of sport psychology. Employing qualitative research methods, this study draws upon semi-structured interviews conducted with professional athletes (n = 10) to investigate how they interpret their relationships with these technologies, how they develop self-regulatory motivational patterns, and how their sense of self is shaped in the process.

Within this framework, the study seeks to reveal the critical turning points where athletes shift from asking "How many steps did I take?" to asking "Which step helped me grow?" Furthermore, the study takes a multidimensional and critical stance by not only highlighting the advantages of wearable technologies but also addressing potential concerns related to emotional integrity, data privacy, and identity perception.

2. Conceptual Framework

This section outlines the fundamental concepts related to wearable technologies, athlete motivation, and the psychology of success.

2.1. Wearable Technologies in Sports

In recent years, there has been a significant increase in interest in monitoring individuals' physiological functions and performance data in real time within the fields of sports and health. This trend has led wearable and portable devices integrated with sensor technology to emerge as reliable tools in both scientific research and commercial applications. Although traditional optical motion analysis systems offer high accuracy, their use is limited to laboratory environments due to complex setups, making them unsuitable for field applications (Adesida, Papi & McGregor, 2019). In contrast, modern wearable devices have overcome the limitations of electrical signal-based monitoring, enabling the effective tracking of athletes' health status within natural training environments. As a result, these technologies have evolved beyond being mere measurement tools and have become strategic components accelerating the digital transformation of sports environments, particularly in terms of performance monitoring and health analytics (da Silva, 2024).

Wearable technologies have made performance management more accessible, practical, and personalized by enabling uninterrupted, real-time data tracking in natural training settings. Sensors such as pedometers, heart rate monitors, portable electrocardiogram (ECG) devices, and accelerometers have been designed for individual use and are effectively employed in various application areas. In line with growing public awareness of health and physical exercise habits, smartwatches, fitness bands, smart glasses, helmets, and smart garments provide users with instant access to physiological data, thus accelerating the transformation in this domain (Yang, 2024).

Internet of Things (IoT) technologies and wearable devices offer significant contributions to critical areas in sports such as enhancing athletic performance, ensuring safety, and improving fan engagement. Through sensor systems integrated with IoT, coaches can instantly access athletes' performance metrics and analyze opponents' weaknesses to gain strategic advantages. Additionally, embedded sensors and microchips enable the real-time monitoring of athletes' health, allowing sports physicians and physiotherapists to make well-informed decisions. This is particularly valuable in endurance events, where traditional training and competition methods fall short in developing athletic capabilities. For instance, completing endurance exercises such as long-distance running requires a high degree of willpower and psychological resilience (Raad, 2021).

2.2. Enhancing Athletic Performance Through Wearable Technologies

Athletes, particularly during preparation for high-risk sporting events, are exposed to intense mental and physical stress (Chidambaram et al., 2022). To achieve optimal sports performance, training programs must be structured in alignment with the specific demands of competition. The accurate analysis of physiological responses to high-intensity workloads is critical for understanding sport-specific requirements. In this context, wearable technologies enable the comprehensive monitoring of professional athletes throughout both training and competition processes. The ability to track internal load indicators—such as heart rate, lactate levels, oxygen consumption, and perceived exertion—alongside external load parameters—including running distance, speed, and acceleration—in real time allows for a holistic and objective assessment of training load (Şahin, 2021).

Moreover, wearable technologies facilitate not only the collection of physiological data but also behavioral and psychological metrics (e.g., anxiety, stress, and fatigue levels), enabling the comprehensive monitoring of athletes' emotional and motivational states. Artificial intelligence-supported systems analyze these multilayered datasets to contribute to the development of personalized performance strategies tailored to individual needs (Chidambaram et al., 2022).

One illustrative example of such technology is Adidas's miCoach system. This system helps manage training processes more effectively and reduces injury risk by tracking professional football players' heart rates and physical workload levels. Additionally, sensors embedded into athletes' garments collect and analyze critical data such as speed, direction, acceleration, and blood pressure, providing valuable insights for coaches and medical staff (Raad, 2021).

In summary, the ability to gather physiological data in dynamic, field-based environments—once limited to controlled laboratory settings—has transformed training management into a more informed, data-driven, and individualized practice. This transformation not only supports performance optimization but also enhances athletes' motivational processes (James & Petrone, 2016). In particular, the "marginal gains" approach—which suggests that incremental improvements in multiple domains can lead to significant overall advancement—has become increasingly applicable with the detailed data provided by wearable technologies (Migliaccio, Padula & Russo, 2024).

2.3. Wearable Technologies and the Psychological Dynamics of Success in Athletes

Athletes' perception of success is directly related to how they define it. This perception is a key psy-

chological variable that shapes their self-confidence, motivation, and capacity to focus on tasks. The psychology of success is a holistic approach aimed at understanding the internal and external dynamics that emerge during the process of realizing one's potential. This approach regards not only performance outcomes but also the athlete's goal-oriented development, task effort, and psychological resilience as indicators of success (Waitley, 2015).

According to Waitley's model, the core components of success include psychological factors such as self-awareness, self-discipline, intrinsic motivation, self-esteem, self-direction, positive thinking, and constructive relationships (Waitley, 2015). Figure 1 illustrates these components. Among them, this study focuses on four psychological variables with the highest potential to be supported by wearable technologies: self-awareness, self-discipline, self-esteem, and intrinsic motivation.

Figure 1. Core Components of Success
Source: (Waitley, 2015)

Self-awareness plays a critical role in skill development, the regulation of arousal levels, and emotional control, making it one of the fundamental elements of athletic performance (Chow & Luzzeri, 2019). Without awareness of their ideal performance state, athletes may not recognize the need for control in high-pressure situations. Wearable technologies offer athletes a rich source of data to monitor their own activities and exertion. McCormack et al. (2022) found that wearable devices significantly enhance awareness not only of activity levels but also of habits and inactivity.

Intrinsic motivation can be classified into two goal orientations: task/mastery orientation and ego/competition orientation. Task-oriented athletes value skill improvement and personal progress. They ask, 'Where did I improve?' or 'When was I most motivated?' Ego-oriented athletes evaluate success by comparison with others. Studies show that task-oriented goals produce more sustainable and positive outcomes. Coaches may not change athletes' motivations immediately, but can guide them using strategies that emphasize personal progress (Weinberg, 2009).

Self-esteem reflects a person's sense of adequacy, worth, and acceptance. In sports, it is linked to competence perception, satisfaction with performance, and coping strategies. Gotwals and Wayment's (2002) Sport-SSES study found strong links between athletes' self-perceived competence and their self-esteem. Athletes with high personal standards and less fear of failure tend to report higher self-esteem.

Self-discipline is essential for achieving elite performance, especially under pressure. Rapp and Tirabeni's (2020) qualitative study suggests that wearable technologies support the development of self-discipline in amateur athletes through reflection, scenario simulation, and learning from community-based experiences. Wearables also provide external motivation; however, to sustain intrinsic motivation, devices must align with the athlete's personal goals.

In this respect, wearable technologies emerge as powerful tools that support motivation toward success. Features such as real-time feedback, goal tracking, and gamification encourage sustainable motivation. For example, success journals that document personal progress enhance task orientation and promote long-term development.

Key contributions of wearable technologies to motivation (Scudds & Lasikiewicz, 2024):

- Goal tracking and feedback: Monitoring progress increases motivation.
- Gamification and competition: Social comparison activates extrinsic motivation.
- Self-monitoring and awareness: Real-time trac-

king promotes reflection and behavioral change.

When used appropriately, wearable technologies can increase motivation and encourage healthy habits. However, there are risks associated with the constant monitoring of emotional states and defining the self through quantitative data such as step counts or heart rate. As Turkle (2023) and Han (2023) note, quantitative metrics cannot capture the complexity of human experience or replace narrative-based self-understanding.

Additionally, factors such as data accuracy, user comfort, data privacy, and security remain key barriers to the wider adoption of these technologies. Protecting users' personal health information is especially crucial in AI-integrated systems. Continued research is necessary to improve data safety and usability. Further exploration of the psychological and motivational effects of wearable technologies will enable more informed and sustainable strategies for both professional and amateur athletes (Yang, 2024).

3. Research Methodology

In this study, a qualitative research methodology was adopted, with semi-structured interviews employed as the primary data collection method. As Creswell & Poth (2018) emphasize, qualitative research aims to provide an in-depth understanding of human behaviors, experiences, attitudes, beliefs, interactions among social groups, and broader societal dynamics. In line with the objectives of the study, a qualitative approach was deemed the most appropriate method, as it allowed for the collection of rich and detailed data concerning athletes' personal experiences and subjective motivational processes. Understanding how wearable technologies are perceived by athletes in the context of emotional and motivational dynamics necessitates the exploration of complex psychosocial processes that cannot be fully captured through quantitative measurements alone. Therefore, the study utilized semi-structured interviews to comprehensively examine individual perceptions, experiences, and meanings. Detailed information regarding the study's design is presented below.

3.1. Purpose of the Study

This study seeks to examine the influence of wearable technologies on athletes' emotional and motivational processes through the lens of achievement psychology. Within this framework, the primary objective of the study is to examine the multilayered experiences and meaning-making processes that emerge at the intersection of contemporary sport psychology and sports technologies. Based on the assumption that wearable technologies are not confined solely to monitoring physical performance, the research investigates how these technologies are interpreted by athletes within their subjective experiences, particularly in relation to psychological processes such as motivation, emotion regulation, and the perception of success. Accordingly, the study addresses the following research questions:

- What kind of experiences do athletes have regarding the motivational processes of wearable technologies?
- How do wearable technologies play a role in athletes' emotion regulation processes?

In the context of achievement psychology, what kind of meanings do athletes attribute to wearable technologies?

3.2. Study Group

The study group consists of professional athletes aged 18 and above who actively use wearable technologies in their training and performance processes. In line with the aim of exploring diverse experiences related to motivation, emotion regulation, and achievement psychology, attention was paid to including participants with varying demographic and athletic backgrounds. Factors such as age, gender, sport discipline, years of athletic experience, and duration of wearable technology use were considered to enrich the variety of perspectives obtained.

A total of 10 professional athletes were recruited for the study. Participants were selected using maximum variation sampling (Baltacı, 2018), ensuring diversity in terms of age, gender, sport discipline, athletic experience, and wearable technology usage duration. Although the target group was accessible, the number of interviews was determined based on the principle of data saturation, rather than convenience.

In line with Creswell's (2018) suggestion that 5 to 25 participants are typically sufficient for qualitative studies, the study continued interviews until it was observed that no new codes or themes were emerging in the final interviews. After the eighth interview, data began to repeat itself, and interviews nine and ten confirmed the existing thematic structure. Therefore, it was concluded that thematic saturation had been achieved, and the existing data set provided sufficient depth and richness to address the research questions.

3.3. Data Collection Method

In line with the literature review and the objectives of the study, an interview form was developed to explore athletes' lived experiences with wearable technologies in relation to motivation, emotion regulation, and achievement psychology. The form included questions regarding participants' demographic chara-

cteristics (e.g., age, gender, sport discipline, athletic background, and duration of wearable technology use), as well as 11 open-ended questions designed to encourage rich and detailed narratives.

All core questions were structured as open-ended to allow participants to freely express their experiences in their own words. Some questions included optional sub-questions or parenthetical examples, which were not presented directly during the interviews. Instead, these elements were used selectively by the interviewer only when participants' responses were insufficient or unclear, to support elaboration and encourage deeper reflection. This flexible approach ensured the collection of rich data without leading or constraining participants' narratives.

In qualitative research, the development of an interview form requires attention to question clarity, adaptability to participants' perspectives, and adherence to ethical guidelines (Patton, 2015). Accordingly, the questions were designed to be clear, reflective, and responsive to the lived meanings expressed by participants. The form aimed to elicit subjective accounts of wearable technologies and explore how athletes construct meaning in psychological contexts related to motivation, emotional regulation, and success (Bryman, 2016). Informed consent was obtained from all participants, and ethical standards, including confidentiality, were rigorously upheld throughout the data collection process (Creswell & Creswell, 2017).

The interview form, prepared within this framework, included the following open-ended questions:

1. What was the most significant factor that influenced your decision to start using wearable technology? Why did you choose to adopt it?

2. Which wearable device did you initially decide to use, and why did you choose that particular device? What were your expectations, and were they met?

3. In general, what innovations or changes do you believe wearable devices have brought to your sports and training routines?

4. During which periods or situations do you tend to use the technology more frequently (e.g., competition periods, intense training days)? Is there a specific reason for this?

5. Which features of the device (e.g., sleep tracking, heart rate monitoring, detailed training data) do you find most beneficial? Can you evaluate how these features influence your motivation?

6. How do goal achievement notifications provided by wearable devices (e.g., step count targets or heart rate goals) affect your motivation towards training?

7. Does the ability of the device to display your daily progress increase your desire to achieve personal goals? For example, how has this influenced your sporting habits?

8. Have you modified your training methods based on the data provided by the device? If so, what have been the effects of these changes?

9. If you were required to train without technology, how would this affect you? Would your motivation or performance change?

10. Do you believe that the positive or negative feedback provided by wearable devices has influenced your self-confidence? Has this feedback specifically affected your morale?

11. In your opinion, in which areas could wearable technologies become more effective for athletes in the future? What innovations do you think could contribute to motivation and performance?

3.4. Validity, Reliability, and Ethical Framework of the Study

In this study, methods recommended in the literature to enhance the validity and reliability of qualitative research were applied (Yıldırım, & Şimşek, 2021). To ensure internal validity, a draft version of the interview form was reviewed by subject matter experts. The relevance, clarity, and content adequacy of the questions were evaluated and revised based on expert feedback. The time and location of the interviews were determined according to participant preferences, and face-to-face interviews facilitated sufficient interaction. With participants' consent, the interviews were audio recorded and conducted between March 10, 2025, and April 15, 2025. The audio recordings were transcribed, and the transcripts were shared with the participants for verification. The documents approved by the participants confirmed that their views had been accurately and comprehensively represented.

To enhance the transferability of the findings, detailed descriptions of the participants and research context were provided, allowing readers to assess the relevance of the study to their own settings (Christensen et al., 2015). To strengthen the reliability of the research, all interviews were audio-recorded to ensure accurate documentation and prevent data loss. Furthermore, two researchers independently coded the qualitative data. Upon completion of the initial coding, the codes were compared, and any discrepancies were resolved through discussion. The final coding framework was developed collaboratively based on mutual evaluation. The findings were reported without personal interpretation by the researcher, using direct quotations that reflected the participants' perspectives. Participant confidentiality was maintained through data coding. Furthermore, the study adhered to the principles of scientific research ethics and was approved by the Non-Interventional Research Ethics Committee of Hitit University (approval number 2025-04, dated March 6, 2025).

3.5. Data Analysis Process

The data obtained in this study were analyzed using MAXQDA 2020 software. The analysis process was conducted in four main stages. First, participants' responses were examined in detail, and meaningful themes were identified through an inductive, data-driven approach. After the emergence of the thematic structure, codes were developed in alignment with relevant theoretical frameworks from the literature. Specifically, the coding process was guided by the theories of success psychology (Waitley, 2015), self-determination theory (Ryan & Deci, 2017), self-awareness (Chow & Luzzeri, 2019), self-discipline (Rapp & Tirabeni, 2020), and self-esteem (Gotwals & Wayment, 2002). The data were subsequently organized within a hierarchical structure of codes and themes, and the findings were presented with the support of tables and visual figures.

3.6. Research Findings

In order to uncover athletes' experiences with wearable technologies and their perspectives on these technologies in relation to motivation, emotion regulation, and achievement psychology, semi-structured interviews were conducted with a total of 10 participants from various sports disciplines. An analysis of the participants' demographic characteristics revealed that the majority were male (70%), their ages ranged from 22 to 50, and a significant proportion (60%) were over the age of 28. Most participants had more than eight years of athletic experience (70%), and they had been using wearable technologies for an average of five years. Among the participants, 40% held national or international rankings in their respective sports, including achievements in Turkish, European, and/or Balkan competitions. The sports disciplines represented among the participants included swimming, darts, volleyball, gymnastics, weightlifting, running, and wrestling. Additionally, 30% of the participants were coaches.

A detailed analysis of the interviews led to the identification of five main themes, with corresponding subcodes developed based on the codes derived from the data. The results of the analysis—including code trees related to the themes and codes, along with representative participant statements—are presented in this section.

3.7. Themes Based on Athletes' Perceptions of Wearable Technologies in Relation to Motivation, Emotion Regulation, and Achievement Psychology

The themes identified based on the frequency of use of the data obtained from the interviews are summarized in Figure 2.

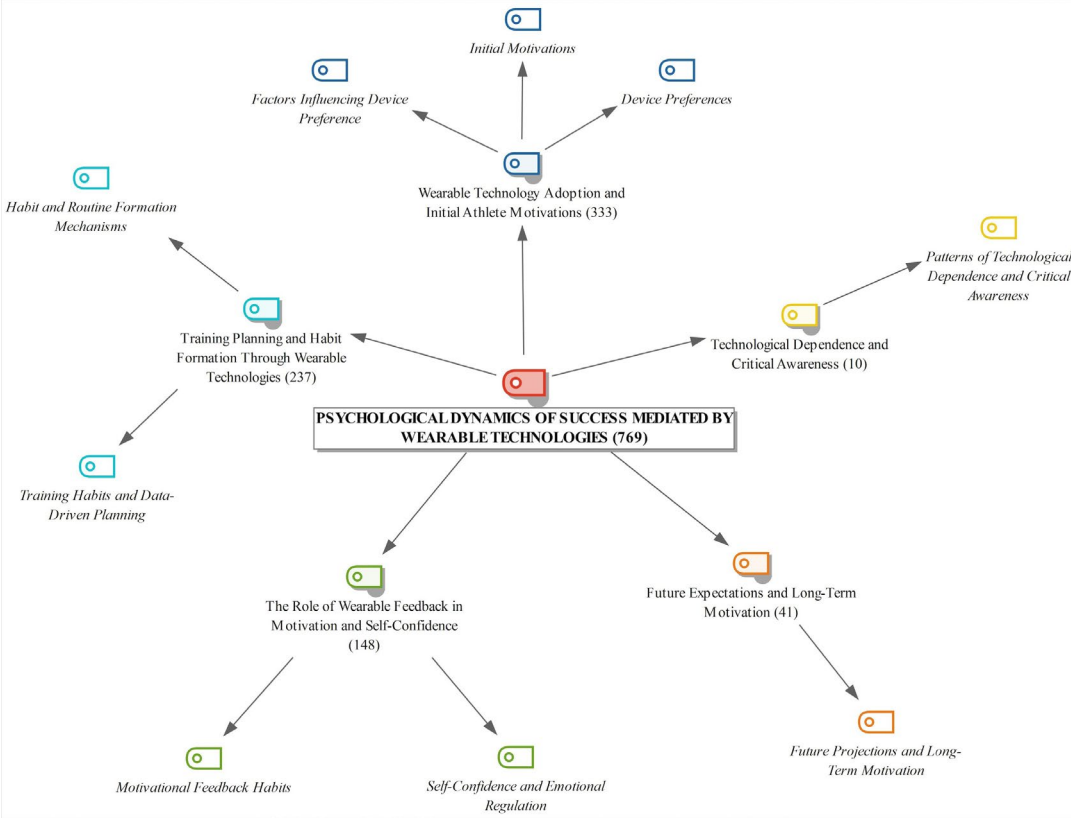

Figure 2. Themes Based on Athletes' Perceptions of Wearable Technologies in Relation to Motivation, Emotion Regulation, and Achievement Psychology

Five themes were identified based on athletes' perceptions of wearable technologies in relation to motivation, emotion regulation, and achievement psychology. These themes were titled as follows: wearable technology adoption and initial athlete motivations, training planning and habit formation through wearable technologies, the role of feedback from wearable technologies in motivation and self-confidence, technological dependence and critical awareness, and future expectations and long-term motivation. The numbers shown alongside the themes in Figure 1 indicate the frequency of coding for each theme based on participants' responses. A total of 769 meaningful statements were identified. These statements primarily focused on the themes wearable technology adoption and initial athlete motivations (333) and training planning and habit formation through wearable technologies (237). The fewest statements were coded under the theme technological dependence and critical awareness (10).

3.8. Code Trees and Participant Statements Related to the Main Themes

In this section, the code trees developed for the five main themes, along with participant statements supporting these themes, are presented.

3.8.1. Wearable technology adoption and initial athlete motivations

The first prominent theme derived from participant interviews was titled Wearable Technology Adoption and Initial Athlete Motivations. This theme encapsulates the reasons athletes began using wearable devices, along with their preferences for specific technologies. Three sub-codes were identified under this theme: Device Preferences, Initial Motivations, and Factors Influencing Device Preference. Among these, "Factors Influencing Device Preference" emerged as the most frequently emphasized, whereas "Device Preferences" was the least discussed.

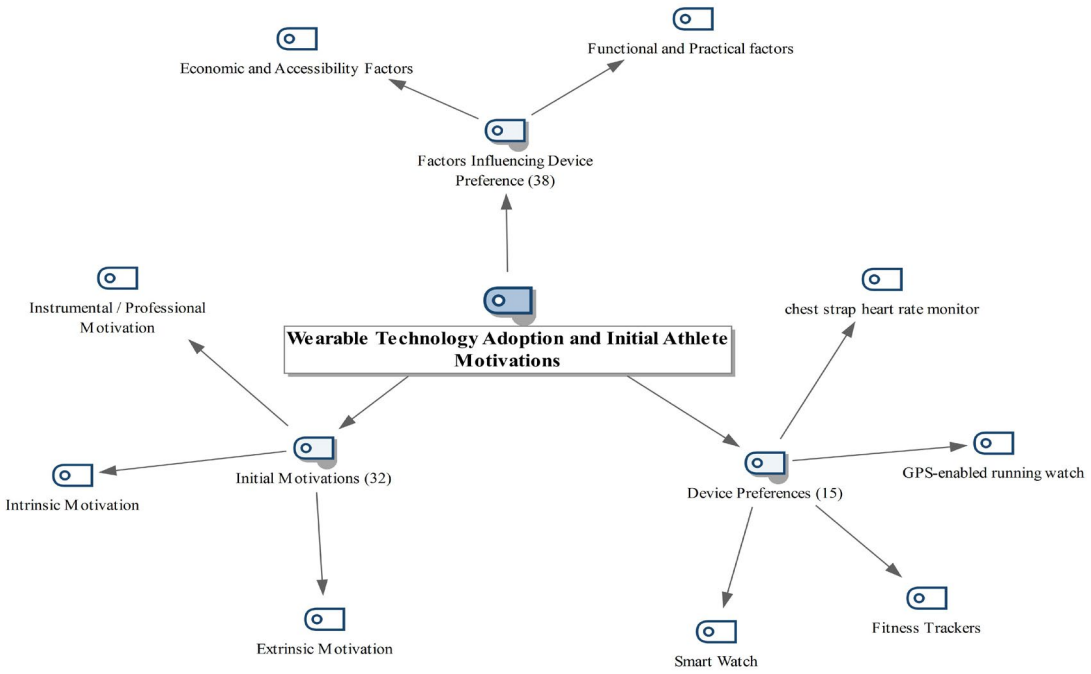

Figure 3. Codes and Participant Statements Related to the Theme "Wearable Technology Adoption and Initial Athlete Motivations"Achievement Psychology

Participants' initial motivations for adopting wearable technologies were grouped into three main categories: intrinsic, extrinsic, and professional (instrumental) motivations.

Under intrinsic motivations, many participants stated that they adopted wearable technologies to monitor their health, improve their physical performance, manage weight, and establish personal routines and self-discipline. A recurring theme was the desire to track and control one's own progress. As one participant expressed:

> *"Being able to monitor my health... My reason for choosing it was to track my health and fitness." (K1)*

This sentiment was echoed by several others (K2, K3, K4, K9), emphasizing self-monitoring as a key motivational driver. In terms of extrinsic motivations, participants frequently cited social influences, such as peer recommendations and social media advertising. For example, one participant noted:

> *"I started using it based on a friend's recommendation." (K2)*

Such statements highlight the impact of external social and media-driven stimuli in prompting initial use. Professional motivations were also influential for some, particularly those engaged in structured physical activities or training with specific performance goals. Participants in this category empha-

sized time management, staying connected during workouts, or fulfilling professional obligations. As one participant explained:

> *"My involvement in sports activities has mostly been focused on weight loss and staying fit." (K1)*

Similar motivations were shared by others (K4, K7), reinforcing the goal-oriented use of technology.

In line with these motivations, most participants indicated that the first wearable device they adopted was a smartwatch. This trend was observed across a wide range of participants (K1, K3, K4, K5, K6, K7, K9). As one of them stated:

> *"I first started using an iWatch." (K1)*

Others, however, initially preferred different types of devices, including fitness trackers, GPS-enabled running watches, and chest strap heart rate monitors. For instance:

> *"At first, I decided to use this smart bracelet." (K1, K2, K7)*

> *"It was a running watch with advanced GPS features." (K8)*

> *"Initially, a heart rate monitor belt." (K6)*

The factors influencing device preference were broadly categorized into two groups: functional and practical factors and economic and accessibility considerations. Functional features were clearly prioritized, especially those that provided direct benefits to athletic performance. Participants frequently mentioned tools for tracking calories, steps, distance, heart rate, pace, muscle fatigue, and biometric performance indicators. They also valued GPS functionality, ease of use, and support for planning routines. One participant detailed their use as follows:

> *"During periods when I felt I was overtraining, I used the data to extend my rest time and reduce the risk of injury. The blood oxygen level and VO2max values were indicators I consistently monitored. The features I found most useful were the step counter and heart rate monitoring. I also kept track of the maximum calories I burned and monitored muscle fatigue." (K1)*

Similar usage patterns and priorities were reflected across nearly all participants (K1–K9), underscoring the centrality of functionality. In contrast, some participants emphasized economic and accessibility constraints as barriers to adoption or as factors in their purchasing decisions. Price sensitivity and the perceived affordability of devices were commonly cited. As one participant explained:

> *"It was both simple and affordable... The price of the devices is a negative factor for me. If accessibility improves, more athletes could use these products and enhance their sports performance." (K5, K9)*

3.8.2. Training planning and habit formation through wearable technologies

The second prominent theme identified from participants' accounts was titled Training Planning and Habit Formation Through Wearable Technologies. This theme addresses athletes' approaches to structuring their training using wearable technologies, as well as the mechanisms through which they develop and maintain consistent exercise habits. The sub-codes associated with this theme Training Habits and Data-Driven Planning and Habit and Routine Formation Mechanisms are presented in Figure 4.

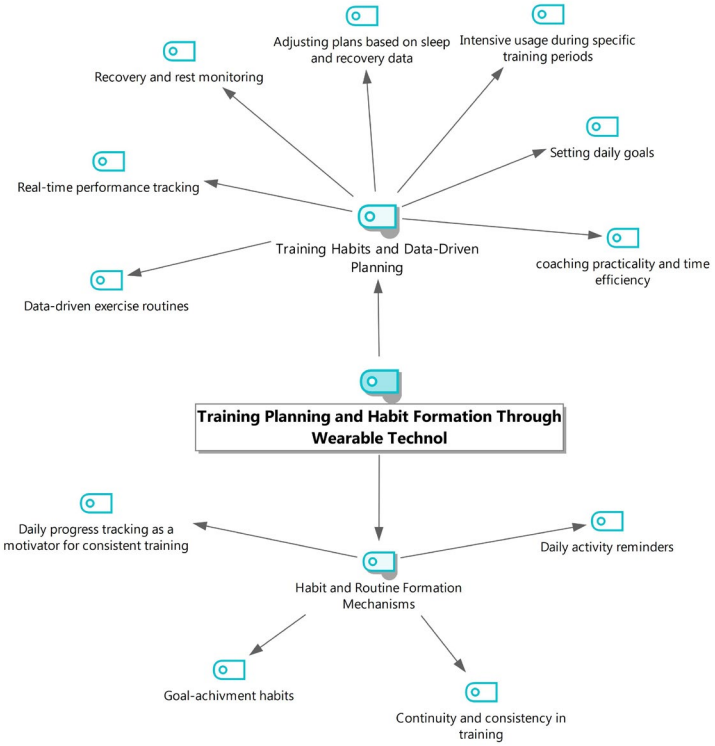

Figure 4. Codes and Participant Statements Related to the Theme "Training Planning and Habit Formation Through Wearable Technologies"

Analysis of participant statements underscored the significant role of wearable technologies in fostering data-informed training habits. Devices were widely described as tools that facilitated real-time performance monitoring, allowing athletes to continuously evaluate key variables such as form deterioration, recovery status, sleep quality, and training load. As one participant explained,

> *"It was the idea of monitoring athlete performance in real time and keeping a record of the data... Gymnastics requires a lot of detail and technique; even a slight loss of form or conditioning can affect outcomes... Providing data such as sleep quality was also important." (K5, K6, K7, K8, K9)*

Such insights reflect how real-time feedback became essential for self-regulation and technical precision in athletic contexts. Closely linked to this was the monitoring of recovery and rest patterns, which participants reported using to avoid overtraining and to calibrate the intensity of their sessions. By analyzing their own recovery data, athletes were able to manage fatigue more effectively and improve sleep hygiene. As K1 remarked:

> *"This makes it easier for me to avoid improper loading or excessive fatigue... By tracking my sleep, I improve its quality and maintain a more regular sleep pattern." (K1, K4, K5, K6, K7, K8)*

Similarly, adjusting training plans based on daily physiological insights emerged as a frequent strategy. For example, recovery metrics were used to inform day-to-day decisions about intensity and rest. As K5 noted:

> *"These data tell me things like, 'Okay, you're not at your best today, work a bit more gently,' or 'You're doing great today, you can push your limits,' which positively influences my motivation." (K5, K6, K7, K8, K9)*

Athletes also emphasized that their use of wearable technologies tended to intensify during specific training periods, such as competitive seasons or intensive camp schedules. As one participant described:

> *"In my weekly summary, I try not to let my activity level drop below a certain threshold whenever possible... I tend to use it more frequently during intense training days and periods when I'm working with specific goals." (K1–K8)*

Additionally, several participants described the coaching practicality and time-saving functions of these devices particularly among those who also served as coaches. Wearable technologies supported dual roles by streamlining data collection and improving session efficiency. One such coach-athlete shared:

> *"While coaching, I prefer using its stopwatch feature for a more practical approach. It helps me better understand both my own performance and the condition of my athletes." (K3, K4, K5, K6)*

Across multiple accounts, athletes highlighted the benefit of structuring data-driven exercise routines, which they described as offering a more scientific and objective alternative to intuitive or experience-based planning. For instance, K5 noted:

> *"It helped me use my time more efficiently during sports and training... I thought I could base my workouts on more scientific foundations, which led me to adopt a data-driven approach." (K3, K5, K6, K7, K8, K9)*

This scientific framing contributed to perceptions of credibility and precision in performance enhancement.

Under the second sub-code Habit and Routine Formation Mechanisms participants described how wearable technologies supported sustainable training routines. The ability to set daily goals was cited as a key behavioral anchor. These goals served not only as performance benchmarks but also as motivational tools. For instance, a long-distance runner explained:

> *"I define my daily goals more clearly. Having precise numerical values helps me set my goals more effectively. In long-distance running, managing weekly mileage, tempo workouts, and rest periods with fine adjustments is very important." (K1, K4, K6, K7, K8)*

Participants also valued daily progress tracking and the psychological reinforcement offered through small, reward-based achievements. This was reported to enhance consistency and discipline in training behavior:

> *"The system motivates you by offering small rewards... As long as you don't become obsessed with it and feel like you must keep moving or constantly collect rewards, these small incentives are actually quite effective." (K1–K9)*

Several participants shared that this regular feedback helped cultivate goal-achievement habits, giving them better insight into their performance levels and whether daily objectives were met. As K2 noted:

> *"In the past, on some days, I wasn't sure if I had trained enough. Now, when I see the data, I can more easily tell whether I've met my goals or fallen short. It has helped me become more goal-oriented in my sports and training routines." (K1, K2, K5, K7, K8, K9)*

Additionally, daily activity reminders were highlighted as simple yet powerful prompts that encouraged regular movement and discouraged sedentary behavior. K5 described how even minor notifications could serve as motivational nudges:

> *"When goal notifications appear, thoughts like 'Almost there, come on, move a bit more!' help me motivate myself." (K5)*

Finally, the continuity and consistency offered by wearable technologies were seen as fundamental to

long-term training success. Participants emphasized that sustained access to structured, personalized data enabled them to adopt a more disciplined and sustainable approach to physical activity:

> *"It had a positive effect on my sports habits because reaching small daily goals helped me train more regularly." (K1, K2, K3, K6, K8)*

The role of feedback from wearable technologies in motivation and self-confidence

The third key theme emerging from participant interviews was titled The Role of Feedback from Wearable Technologies in Motivation and Self-Confidence. This theme explores how feedback obtained through wearable technologies influenced athletes' motivational dynamics and contributed to the development of self-confidence throughout their training journeys. The sub-codes associated with this theme are presented in Figure 5.

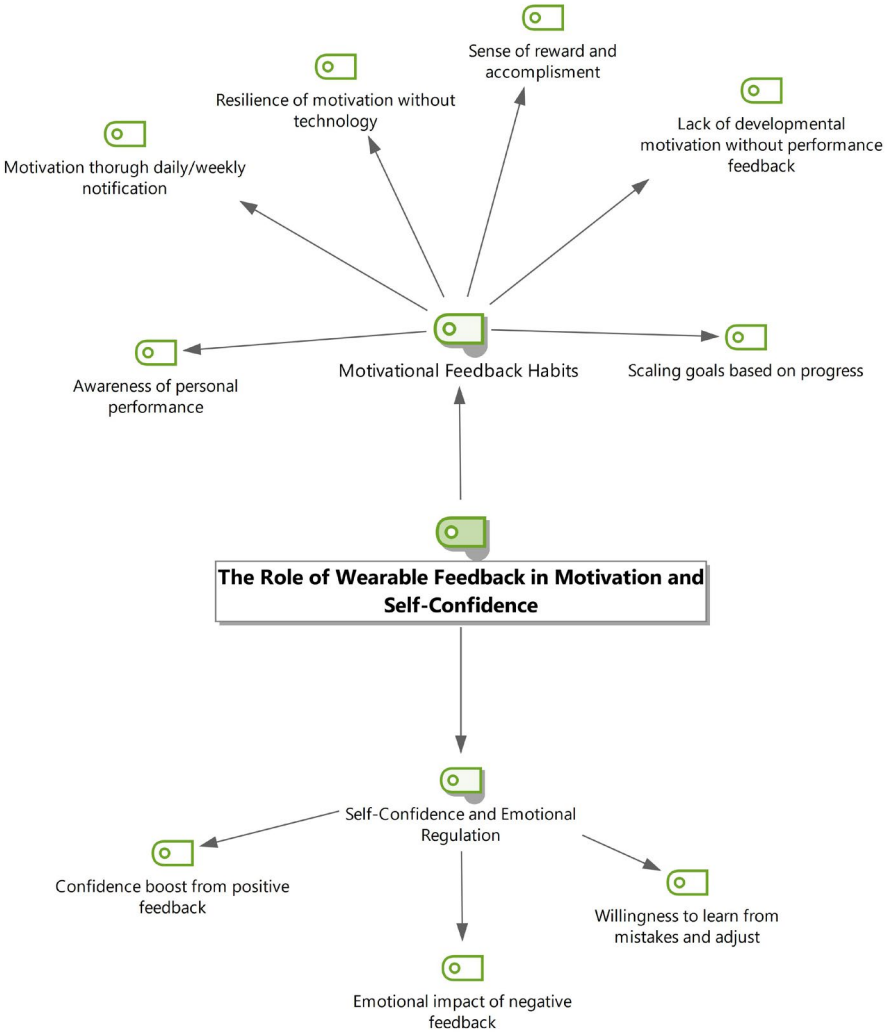

Figure 5. Codes and Participant Statements Related to the Theme "The Role of Feedback from wearable technologies in Motivation and Self-Confidence"

Participants consistently emphasized the importance of feedback as a motivational driver, particularly in sustaining consistent training behavior. Many athletes reported a significant decrease in developmental motivation when performance data was unavailable or insufficient. In these situations, they described feeling as if they were training blindly. For instance, one participant reflected:

> *"I would definitely feel more 'uncertain'... It would be like training blindly. In terms of motivation, since I wouldn't have any retrospective data, I might worry, thinking, 'What if I'm not on the right track right now?'" (K4, K5, K6, K7)*

The absence of data appeared to disrupt motivation and confidence in the training process. In contrast, other participants expressed a high degree of resilience in maintaining motivation without technological input, suggesting they could uphold goal-oriented routines independently. As one noted:

> *"If I couldn't easily determine whether I had reached my goal, I would continue with the same training... There wouldn't be a significant drop in my motivation because I would still have a goal." (K3–K9)*

Despite these differences, performance-based notifications—especially those received daily or we-

ekly—were widely perceived as powerful tools for maintaining motivation. These alerts served both as reminders of ongoing goals and as reinforcers of progress. For example:

> *"Measuring my performance helped me increase my motivation and work in a more goal-oriented way... I always strive to maintain a certain level." (K1, K2, K5–K8)*

Additionally, participants described a strong sense of reward and accomplishment upon receiving success notifications. These small victories were likened to personal competitions, which significantly boosted intrinsic motivation. As one athlete explained:

> *"The alert saying 'You have reached 80% of your weekly training goal' gives me a sense of completion. Trying to meet daily goals feels like small competitions for me. I feel as if I'm engaging in little contests with myself." (K1, K5–K8)*

Several participants further described how scaling goals in accordance with observed progress reinforced their motivation and commitment to long-term objectives. They noted that setting increasingly challenging targets helped them visualize growth more clearly. One participant shared:

> *"Feeling successful and seeing my progress encourages me to put in more effort... Engaging in challenges provides strong motivation for me to push beyond what I've already accomplished." (K1, K2, K4, K6)*

Moreover, feedback was reported to increase awareness of personal performance, prompting more deliberate and informed training decisions. Athletes explained that by reviewing their data, they developed greater attentiveness and training discipline. As articulated by one:

> *"It helped me become more attentive and increased my awareness. It contributed to performing more conscious training. It also boosted my motivation to do more and led me to improve myself further every day." (K1, K3–K6, K8, K9)*

In terms of self-confidence and emotional regulation, participants indicated that positive feedback not only supported performance improvement but also elevated their confidence levels. Receiving achievement-based notifications after reaching training targets strengthened their belief in their capabilities. As several participants noted:

> *"The achievement notifications I receive from the devices significantly boost my motivation... Feeling successful and seeing my progress encourage me to put in even more effort." (K1–K9)*

However, the emotional impact of negative feedback was also acknowledged. While falling short of goals or receiving poor-performance alerts occasionally led to disappointment, most participants described using such feedback constructively. One athlete recounted:

> *"If my rest quality has declined or I haven't met my goal, it can be a bit discouraging. However, I take it as a warning signal and see it as an opportunity to quickly correct my mistakes or shortcomings... For instance, when I get a notification like 'Your sleep quality is low, you might struggle today,' I view it as a proactive warning and adjust my training plan accordingly." (K3–K8)*

This perspective was often associated with a willingness to learn from mistakes and make adjustments, reflecting a growth-oriented approach to self-improvement. Feedback provided clarity on areas of weakness and allowed for strategic modification of training behaviors. As K6 observed:

> *"In some workouts where I thought I was performing efficiently, by checking my calorie burn and heart rate, I realized there were areas I had underperformed and corrected those sessions accordingly. In the past, I would roughly evaluate my runs by thinking, 'Today went well' or 'That didn't work at all.' But now, by reviewing the charts, I can clearly see which days I performed better and which days I was more fatigued." (K2, K4, K6–K8)*

Overall, the findings suggest that feedback from wearable technologies plays a multifaceted role—not only in strengthening motivation and refining training behaviors but also in cultivating emotional resilience, enhancing self-awareness, and facilitating adaptive performance strategies.

3.8.3. Technological dependence and critical awareness

The fourth major theme identified from participant narratives was titled Technological Dependence and Critical Awareness. This theme explores the nuanced relationship athletes have with wearable technologies, focusing on their perceived reliance on such devices and their ability to reflect critically on that reliance. The sub-code Patterns of Technological Dependence and Critical Awareness structures this theme, as presented in Figure 6.

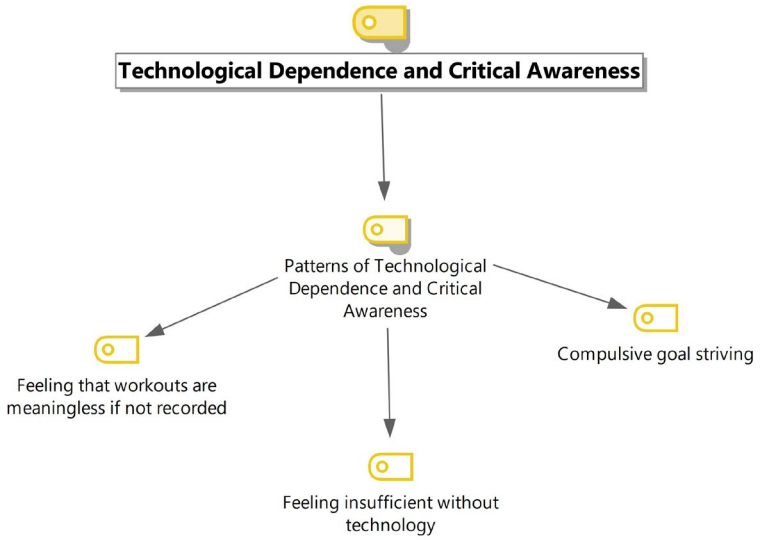

Figure 6. Codes and Participant Statements Related to the Theme "Technological Dependence and Critical Awareness"

Participants offered varied perspectives on the psychological and behavioral consequences of continuous wearable technology use. One of the most frequently expressed experiences was the perception that workouts lacked meaning or value if they were not digitally recorded. Several athletes described feeling that the absence of data disrupted their sense of completion or validation after exercise. For instance, one participant reflected:

> *"Actually, when I first started sports, technological devices weren't as common. Back then, I used to train based on instincts and my coach's observations. Now that I'm used to technology, running without it might feel like losing a part of myself." (K1, K7)*

This sentiment illustrates how digital tracking has become embedded in participants' routines to the point of shaping their subjective experience of physical activity. Closely related to this, participants expressed a growing sense of insufficiency or incompleteness when devices were unavailable. In some cases, the inability to monitor progress or log activity was experienced as demotivating, even irrationally so. As one athlete explained:

> *"There were even times when I felt, irrationally, as if I hadn't burned any calories if the activity wasn't recorded... Training without the device would lower my motivation because I wouldn't be able to track my progress, and reaching goals would become more difficult." (K1, K2)*

This reflection highlights how performance data had become central not only to tracking outcomes but also to validating effort and maintaining motivation. Perhaps most strikingly, one participant shared a case of compulsive goal striving, where the continuous loop of feedback, goals, and reward cues led to obsessive behaviors. In this case, the pursuit of digital milestones transitioned into an unhealthy fixation with productivity and self-optimization:

> *"I had started to develop an exercise addiction — that's a fact. Hitting daily goals and maintaining the streak by closing all the activity rings became an obsession, which led me to work out 3 to 3.5 hours every day... Being constantly exposed to data about yourself can also make you overly fixated on yourself." (K1)*

This admission reveals a critical tension in wearable technology use—where a tool initially intended to support health and motivation may inadvertently encourage overtraining, self-comparison, and obsessive self-monitoring.

Overall, this theme captures a spectrum of participant experiences, ranging from subtle reliance to overt dependence on digital tracking tools. While most athletes acknowledged the functional benefits of wearable technologies, they also demonstrated growing critical awareness of the psychological dependencies that might emerge from prolonged use. This reflective dimension adds depth to the broader analysis, emphasizing not just how wearable technologies shape training practices, but also how they intersect with athletes' mental frameworks, self-regulation strategies, and identity formation.

3.8.4. Future expectations and long-term motivation

The fifth major theme derived from participant interviews was titled Future Expectations and Long-Term Motivation. This theme examines athletes' forward-looking perspectives on wearable technology and their projections regarding how such technologies may influence long-term motivation and performance outcomes. The sub-code associated with this theme is presented in Figure 7.

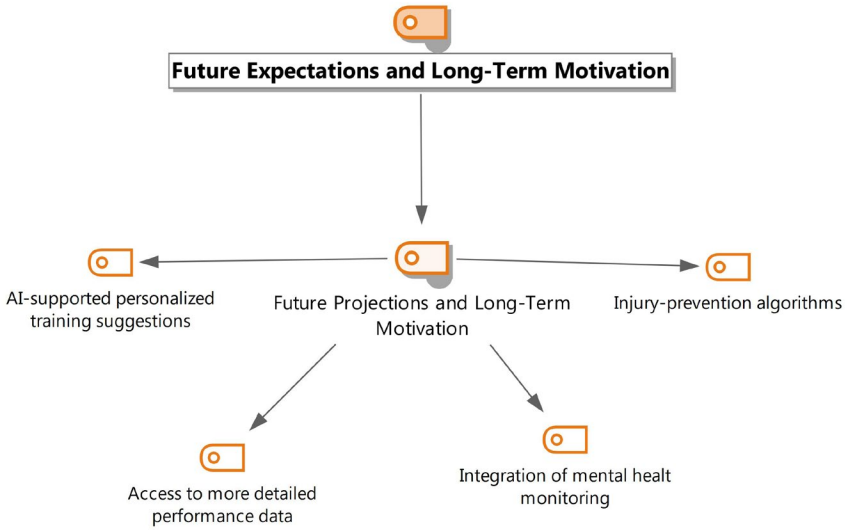

Figure 7. Codes and Participant Statements Related to the Theme "Future Expectations and Long-Term Motivation"

Participants conveyed optimistic and reflective insights about the future development of wearable technologies. A recurring theme in their projections was the belief that access to more detailed and precise performance data would significantly enhance both the efficiency of training and the sustainability of motivation. One participant noted:

> *"It can increase efficiency during training. As wearable technology advances, it will provide athletes with more detailed information, which will lead to increases in both motivation and performance." (K3, K30)*

This perspective underscores the idea that richer, more granular data could help athletes better understand and optimize their training efforts over time. A particularly salient future expectation involved the integration of artificial intelligence into wearable technologies to generate personalized training programs. Several participants envisioned systems that would adapt dynamically to individual performance profiles and physiological markers. K2 highlighted this vision, stating:

> *"Measurements related to mental training and stress management will also become more common. They will integrate with AI-based solutions to offer personalized training programs." (K2, K3, K5, K7, K8, K9)*

This view reflects a growing anticipation that AI-supported recommendations could make training more tailored, strategic, and scientifically grounded. In addition to performance tracking, participants emphasized the importance of mental health monitoring as a future component of wearable technology. Athletes expressed that real-time monitoring of psychological variables—such as stress, fatigue, or mental resilience—could serve both preventive and motivational purposes. One participant explained:

> *"In the future, these devices could provide more precise data for athletes and personalize training sessions. For example, data such as step counts and body temperature could help create more efficient training plans... When athletes approach exhaustion during workouts, this technology could offer notifications or motivation, providing immediate support and helping them push themselves further." (K1, K2, K4, K6, K8)*

This outlook frames wearable devices not only as physical performance tools, but also as instruments for holistic athlete development, encompassing both the physical and psychological dimensions of training. Another frequently cited projection was the future use of injury-prevention algorithms, particularly relevant for high-impact or endurance sports. Participants suggested that real-time biomechanical analysis could play a crucial role in preventing long-term injuries. As one long-distance runner stated:

> *"For long-distance runners especially, injury risk analysis and running technique monitoring technologies will be important for maintaining motivation. Correcting improper foot strikes or imbalanced running form through real-time alerts could play a crucial role." (K5, K7, K8)*

This insight reflects a future-oriented interest in preserving athlete well-being and ensuring the continuity of training by minimizing physical setbacks.

Taken together, the findings within this theme reveal that participants view wearable technologies not merely as tools for present-day performance enhancement, but as evolving systems with the potential to transform long-term training strategy, injury resilience, mental well-being, and personalized athlete support. The aspirational nature of these insights suggests a high level of technological literacy and expectation among the participants, coupled with a strategic mindset oriented toward sustained athletic growth.

4. Discussion and Conclusion

This study was conducted with the aim of qualitatively examining the impact of wearable technologies on athletes' emotional and motivational processes within the context of achievement psychology. The findings indicate that these technologies function not merely as tools for physiological monitoring, but also as digital companions that support athletes' psychological capacities such as self-regulation, intrinsic motivation, self-awareness, self-discipline, and self-esteem. In this respect, the study offers an original contribution by revealing how key psychological components of success are reshaped and reinforced through technological mediation. Participants frequently described wearable technologies as "development partners," emphasizing their role in structuring consistent training routines, enabling goal tracking, and making progress visible. These outcomes are in line with Self-Determination Theory (Ryan & Deci, 2017), which posits that fulfillment of the needs for competence, autonomy, and relatedness strengthens intrinsic motivation. The experiences reported by participants demonstrate that data-driven decision-making processes not only improve physical performance but also enhance athletes' psychological self-regulation capacities.

The data obtained through these technologies increased athletes' self-awareness by fostering insights into stress levels, fatigue, sleep quality, and training intensity. This aligns with Chow and Luzzeri (2019), who emphasize the importance of self-awareness for emotional regulation and performance control. The quantification of such parameters enabled athletes to manage their mind–body connection more consciously and cultivate greater mental flexibility. Most participants noted that practices such as setting daily goals, receiving regular reminders, and engaging with real-time feedback were instrumental in developing self-discipline. This finding is consistent with Rapp and Tirabeni's (2020) research, which highlights the role of wearable technologies in reinforcing discipline through habit formation and self-monitoring. While these technologies may offer extrinsic prompts, their alignment with athletes' personal goals helps sustain intrinsic motivation and behavioral consistency.

Self-esteem was also strengthened through feedback mechanisms that recognized success and progress. Athletes reported that even small achievements, when acknowledged through feedback, increased their sense of competence and reinforced self-confidence. These outcomes are in accordance with Gotwals and Wayment's (2002) findings on the relationship between perceived competence and self-esteem in sports contexts. Conversely, some participants stated that negative feedback could occasionally result in demotivation. However, many interpreted such experiences as learning opportunities and demonstrated a growth mindset (Dweck, 2006), using setbacks as occasions for adaptation and improvement.

A few participants reported that training without data tracking felt meaningless, suggesting a tendency toward technological dependence. This resonates with Turkle's (2023) and Han's (2023) critiques of digital selfhood and the reduction of subjective experience to quantifiable metrics. While the majority of participants remained focused on the practical benefits of technology, there was limited reflection on potential psychological costs, such as emotional externalization or overreliance on performance data. This finding echoes the broader literature on "technological optimism," where anticipated benefits overshadow critical engagement with potential risks.

Looking ahead, participants expressed expectations for more advanced wearable technologies, including AI-powered personalized training recommendations, psychological resilience tracking, and holistic performance analytics. These expectations are aligned with current developments in sports technology literature, which increasingly emphasize integrated psychophysiological support (Grady, 2023; Yang, 2024). Accordingly, the study not only captures current experiences but also reflects emerging trends in athlete–technology interaction.

Taken together, the findings demonstrate that wearable technologies contribute meaningfully to athletes' psychology of success across four key psychological domains: self-awareness, self-discipline, self-esteem, and intrinsic motivation. However, the sustainability of this contribution depends on athletes' ability to use these tools consciously, reflectively, and in balance with internal motivational structures. It is therefore essential that athletes avoid neglecting their internal processes in favor of external data; coaches and sport psychologists must design support systems that consider both performance metrics and emotional well-being. From the perspective of developers, integrating features that support psychological processes—such as self-awareness journals, mood tracking, and narrative-based progress reports—constitutes both an ethical and functional imperative. Such a holistic approach ensures that the influence of technology on athletic development is not only measurable but also meaningful and enduring.

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