Gamification on Strava
An Empirical Study on User Motivation, Engagement, and Continued Platform Use

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Abstract

This master's thesis examines the influence of gamification on the usage behaviour of runners on the digital fitness platform Strava. The focus is on the relationships between gamification, motivation, perceived social pressure, user engagement, and the willingness to continue using the platform and to use premium features. Theoretically, the thesis is based on Self-Determination Theory (SDT) and Social Comparison Theory (SCT).

Methodologically, the study follows a sequential exploratory mixed-methods design. In a qualitative preliminary study, guided interviews were conducted with active Strava users to capture key perceptions and usage patterns of gamified elements and to support the development of the conceptual model and hypotheses. Building on this, a quantitative online survey was conducted with 94 active runners, whose data was evaluated using correlation and regression analyses.

The results show that gamification has a significant positive influence on user motivation, which in turn is strongly related to higher engagement on the platform. Engagement proves to be a key predictor of continued use of Strava and willingness to use premium features. In contrast, no significant correlation between competitive gamification elements and perceived social pressure could be established. Similarly, social pressure did not have a negative impact on user engagement.

Overall, the results illustrate that gamification on Strava primarily works through motivation- and engagement-related mechanisms rather than through negative comparison or pressure effects. The study thus contributes to a better understanding of how gamification works in digital fitness platforms and provides both theoretical and practical implications for the design of user-centered platforms.

Keywords: Gamification, User Motivation, Strava, Engagement, Continued Use, Social Pressure

Título: Gamificação no Strava. Um estudo empírico sobre a motivação, o envolvimento e a utilização contínua da plataforma pelos utilizadores.

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Resumo

Esta tese de mestrado investiga a influência da gamificação no comportamento de utilização dos corredores na plataforma digital de fitness Strava. O estudo concentra-se nas relações entre gamificação, motivação, pressão social percebida, envolvimento do utilizador e a intenção de continuar a utilizar a plataforma, bem como de utilizar funcionalidades premium. A base teórica assenta na teoria da autodeterminação (SDT) e na teoria da comparação social (SCT). Em termos metodológicos, o estudo segue uma abordagem exploratória sequencial com métodos mistos. Na fase qualitativa, foram realizadas entrevistas semiestruturadas com utilizadores ativos do Strava para compreender as perceções e experiências relacionadas com elementos gamificados e apoiar o desenvolvimento do modelo conceptual e das hipóteses. Com base nestes resultados, foi realizado um inquérito quantitativo online a 94 corredores ativos, tendo os dados sido avaliados através de análises de correlação e regressão. Os resultados mostram que a gamificação tem um impacto positivo significativo na motivação dos utilizadores, que está fortemente associada a um maior envolvimento na plataforma. O envolvimento revela-se um fator central para a utilização contínua do Strava e para a intenção de utilizar funcionalidades premium. Em contrapartida, não foi encontrada uma relação significativa entre os elementos competitivos da gamificação e a pressão social percebida, nem um efeito negativo da mesma no envolvimento dos utilizadores. No geral, os resultados indicam que a gamificação no Strava atua principalmente através de mecanismos relacionados com a motivação e o envolvimento, contribuindo para uma melhor compreensão do funcionamento da gamificação em plataformas digitais de fitness.

Palavras-chave: Gamificação, Motivação do utilizador, Strava, Envolvimento, Utilização contínua, Pressão social

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1.Introduction

Digital fitness platforms have become an integral part of modern health and lifestyle practices. They enable users to track athletic activities, analyze performance data, and interact within digital communities. In the context of running in particular, these platforms combine technological data collection with social and playful elements to promote motivation, regularity, and long-term use.

In this context, gamification has become increasingly important. By integrating playful elements such as challenges, rankings, or progress visualizations, digital fitness platforms aim to increase user motivation and promote consistent training behavior. However, the effects of gamification are controversially discussed in the existing literature. While numerous studies highlight positive effects on motivation and engagement (Deci & Ryan, 2000; Hamari & Koivisto, 2015), others point to potentially stressful social comparison processes, especially with regard to competitive elements (Hamari, & Koivisto, 2015; Sailer et al., 2017). How these mechanisms affect user engagement and what role motivation, and perceived social pressure play in this process has not yet been sufficiently investigated empirically.

Against this background, this master's thesis focuses on the digital fitness platform Strava. As one of the world's largest social sports platforms, Strava combines activity tracking, data-driven performance analysis, social networking, and various gamification elements within a freemium business model. This makes the platform particularly well suited for investigating the effects of gamification mechanisms. The aim of this thesis is to analyze how gamification elements on Strava influence the usage behavior of runners, with a focus on motivation, perceived social pressure, engagement, and the intention to continue using the platform and premium features. Based on self-determination theory and social comparison theory, a conceptual model is developed and empirically tested using a mixed-methods approach.

Overall, this study contributes to a deeper understanding of how gamification in digital fitness platforms promotes long-term use and how motivation and social comparison processes influence user engagement.

2.Industry Analysis

2.1 Health and wellness sector: From prevention to digitalization

In recent years, the global health and wellness sector has undertaken profound change, driven largely by an increasing focus on prevention, technological innovations, and changing lifestyles

(Statista, 2025). The global digital health market was estimated at around US$211 billion in 2022 and, according to current forecasts, is expected to continue growing at a compound annual growth rate (CAGR) of 18.6 percent between 2023 and 2030 (Kasoju et al., 2023). This growth illustrates the deep integration of digital technologies into the wellness economy. At the same time, this change represents a shift from a disease-centered approach to a preventive and holistic understanding of health that encompasses the physical, mental, and social aspects of well-being (Statista, 2025, Smits et al., 2022). This development is driven by the population's increasing health awareness. According to recent surveys, 58 percent of respondents say they prioritize health and well-being more than in previous years (McKinsey & Company, 2024). This represents a clear sign of a cultural shift towards a healthier and more conscious lifestyle. At the same time, new forms of individual responsibility for one's own health are emerging that go beyond the traditional concept of fitness (Smits et al., 2022).

Another key driver is technological progress. The increasing prevalence of smartphones, which are now used by 57.8 percent of the world's population, together with growing internet connectivity, forms the basis for the collection, analysis, and sharing of health data. In addition, the COVID-19 pandemic has acted as a catalyst for digitalization in the healthcare sector. Restrictions on public life have led consumers to make greater use of smartwatches, fitness trackers, and health apps to independently monitor their physical activity and well-being (Statista, 2025).

This trend towards digital self-optimization is increasingly associated with the so-called ‘quantified self’ movement, also known as self-tracking. The concept was developed in 2007 by Gary Wolf and Kevin Kelly and describes the idea of ‘self-knowledge through numbers’, in which users continuously record and analyze their health and performance data and use it to improve their behavior (Feng, Mäntymäki, Dhir, & Salmela, 2021). Digitalization and self-optimization have become defining features of the modern wellness economy. Within this development, fitness and activity tracking have emerged as the most dynamic sub-sectors of the digital health industry, as they form the interface between personal health management, technology and lifestyle (Statista, 2025).

At the same time, this increasing digitalization of well-being is also viewed critically, as it gives rise to new forms of self-monitoring and social comparison. By continuously recording and sharing health and activity data, users increasingly compare their performance with others (Feng et al. 2021), which on the one hand can strengthen motivation and a sense of belonging, but on the other hand can also create pressure to perform and psychological stress (Ruckenstein & Schüll, 2017). Nevertheless, it is clear that the combination of growing health awareness,

technological infrastructure and cultural aspirations for self-improvement forms the basis for the success of data-driven fitness platforms.

2.2 Digital Fitness & Well-being: Apps and Data Tracking

The digital fitness and well-being sector represents one of the most dynamic segments of the global digital health market. In 2023, the market reached a volume of approximately US$50.01 billion, accounting for 33.8 percent of total digital health revenue. Forecasts indicate a compound annual growth rate (CAGR) of 7.3 percent until 2029, increasing the market volume to an estimated US$83.43 billion. Prominent platforms in this market include Strava, Garmin Connect, and Nike Run Club, which combine activity tracking, data analysis and motivational features to support an active lifestyle (Statista, 2025).

This trend is also visible at the national level: In Germany, the fitness app market generated revenues of US$456.8 million in 2024, highlighting the relevance of digital fitness applications in one of the core markets of the DACH region. According to the report “Germany Fitness App Market Size & Outlook 2024-2033”, the market will grow to US$1.44 billion by 2033, representing an average annual growth rate of 13.5 percent. While “Exercise & Weight Loss” currently accounts for the largest revenue share, “Activity Tracking” is the fastest-growing segment, reflecting an increasing focus on the collection and analysis of personal movement data (Horizon Databook, 2024).

Wearables, particularly fitness trackers and smartwatches, play a central role in this development. Around half of consumers already own a wearable device, while 75 percent are open to using one in the future, these devices serve as an essential interface between activity tracking and digital fitness platforms such as Strava (McKinsey & Company, 2024; Statista, 2025). This integration of data and connectivity forms the foundation for personalized and gamified fitness experiences.

2.3 Personalization, Social Connectivity & Gamification

2.3.1 Personalization

A key trend in the digital fitness industry is the increasing personalization of user experiences enabled by data-driven technologies and artificial intelligence. Platforms use automated analysis systems to create training plans, recommendations, and user profiles that are individually tailored to progress, performance, and preferences (Statista, 2025). This development reflects consumers' growing need for tailor-made fitness offerings that can be flexibly integrated into their everyday lives (McKinsey & Company, 2024). Studies indicate that personalization increases user satisfaction and perceived well-being by enhancing the

relevance of digital health applications and strengthening user loyalty (Avanesova & Lieldidža-Kolbina, 2022).

Strava is increasingly integrating personalized data analysis to improve user interaction and motivation. The platform analyzes activity data to generate personalized statistics, progress insights, and training-related feedback. Goal setting and progress tracking features, such as Strava's integrated goal feature, allow users to define personal performance goals and visually track their progress (Strava, 2024b). With the introduction of Athlete Intelligence in 2024, Strava further expanded this approach by offering AI-powered, personalized insights and adaptive feedback based on individual training patterns (Strava, 2024c).

2.3.2 Social Connectivity

In addition to personalization, social connectivity plays a central role in the digital fitness market. Users are increasingly seeking interaction, recognition, and belonging, thereby transforming sporting activities into a shared, digital experience (Statista, 2025). This development is often described by the term “social fitness,” which refers to the practice of sharing personal fitness data and engaging in online communities (Lupton, 2018). It is not just about data collection, but also about the motivation, support, and social connection that come from sharing progress and achievements (Avanesova & Lieldidža-Kolbina, 2022).

Strava is considered one of the best-known examples of this social dimension of digital sports (Statista, 2025). Strava promotes social interaction through features such as activity feeds, clubs, comments, and praise, allowing users to share their activities and recognize the achievements of others (Strava, 2024). These interactions create a form of collaborative self-tracking, in which the voluntary sharing of personal performance data becomes part of a collective experience (Lupton, 2018). At the same time, features such as leaderboards and public segments encourage social comparison, which can enhance motivation and performance through visibility and recognition within the community (Lupton, 2018; Strava, 2024).

Building on these social dynamics, fitness platforms are increasingly integrating gamification mechanisms that transform participation, competition, and progress into measurable and rewarding experiences. Strava shows this development by translating social interaction into playful elements such as challenges, leaderboards, and achievement badges (Strava, 2024).

2.3.3 Gamification

Gamification refers to the use of game elements in non-game contexts with the aim of making activities more motivating and experience-oriented (Deterding, Dixon, Khaled & Nacke, 2011). In the digital fitness industry, Gamification is based on mechanisms that increase motivation

and make athletic progress more attractive and measurable through playful, feedback-oriented interaction patterns (Hamari & Koivisto, 2015

Strava is a prime example of the integration of gamification in the fitness sector. The platform combines performance measurement with playful mechanisms that link training and competition. On Strava, gamification manifests itself through challenges, leaderboards, segment rankings, and badges that make athletic progress visible and comparable. In addition, feedback and reward systems continuously visualize individual progress, thereby strengthening engagement over time (Strava, 2024a). These elements create a structure in which physical activity is experienced as a playful and collaborative process (Deterding et al., 2011). Gamification thus acts as an important driver of engagement and user retention by integrating performance feedback, competition, and social recognition into a coherent digital experience (Hamari & Koivisto, 2015).

Overall, the market for digital fitness platforms is characterized by increasing fragmentation and diversification. In addition to specialized tracking apps such as Strava, holistic ecosystems such as Garmin Connect and Fitbit integrate fitness data with wearables and more comprehensive health platforms. At the same time, lifestyle-oriented providers such as Nike Run Club appeal to a broader target group by linking fitness with brand identity, motivation, and social interaction. These providers differ in terms of functionality, user engagement, and social components, which makes Strava's community-oriented positioning between performance-oriented data analysis and social networking particularly distinctive (Strava, 2024a). Moreover, the fitness industry is increasingly operating according to the principles of the platform economy. Providers such as Strava act as intermediary platforms that combine user activities, data analysis, and social interactions in a data-driven ecosystem (Kasoju et al., 2023). This platform logic enables exchange between individuals while creating new forms of value creation through the algorithmic processing of user data (Lupton, 2018). This development is transforming sport into a digital, measurable, and socially visible experience.

Building on these developments, the following section examines how Strava is positioning itself in this highly competitive market environment.

3. Competitor Analysis

3.1 Overview of the competitive environment

The market for digital fitness platforms is characterized by increasing fragmentation and diversification, with providers responding to different user needs with different strategic approaches (Kasoju et al., 2023; Statista, 2025). While some platforms focus on precise tracking

and data-driven performance analysis, others concentrate on social interaction or brand-oriented lifestyle experiences (Avanesova & Lieldidža-Kolbina, 2022). The leading players in the digital fitness market include Strava, Garmin Connect, and Nike Run Club, which differ distinctly in terms of functionality, user engagement, and brand positioning (Statista, 2025).

- Strava positions itself as a social fitness platform that combines activity tracking with gamification and community features, enabling users to share, compare, and discuss their athletic achievements (Avanesova & Lieldidža-Kolbina, 2022; Lupton, 2018).
- Garmin Connect is an integrated health ecosystem that connects hardware and software to enable detailed biometric analysis. It is primarily aimed at performance-oriented and ambitious athletes (Statista, 2025; Garmin, 2024).
- Nike Run Club combines running with brand identity and social motivation by using audio coaching, challenges, and community features to create an emotional, brand-oriented training experience that appeals to a broader audience (Nike, Inc., 2024).

These three providers illustrate different strategic orientations within the fitness app market: Strava focuses on community and competition, Garmin Connect concentrates on data depth and technological integration, and Nike Run Club prioritizes brand loyalty and lifestyle experience. Overall, providers are increasingly pursuing hybrid strategies that combine data analysis, gamification, and social components to motivate and retain users in the long term (Statista, 2025).

3.2 Strava: Community driven-data and gamified performance platform

Strava positions itself as the leading social fitness platform that combines athletic performance analysis with a strong community focus (Statista, 2025). The platform is primarily aimed at endurance athletes and combines activity tracking, social interaction, and gamification mechanisms to promote motivation and long-term engagement (Strava, 2024a). A key distinguishing feature is segment tracking, which allows users to compare their performance on predefined sections of a route and compete with each other via leaderboards. This mechanism translates training performance into a continuous system of comparison and reward, promoting both individual progress and competitive engagement (Statista, 2025; Strava, 2024a). In addition, Strava supports over 30 activity types, including running, cycling, swimming, and rowing, allowing users to combine multiple sports into individualized training goals (Statista, 2025. Strava, 2024b).

Community features such as clubs, challenges, and leaderboards form the core of Strava's platform logic. Over 300,000 clubs illustrate the extent of user interaction on the platform.

These playful mechanisms promote social interaction and sustained activity by making achievements within the community visible and comparable (Strava, 2024a). With the introduction of Athlete Intelligence in 2024, Strava expanded its platform to include AI-based, personalized insights that analyze training data and support performance improvement (Strava, 2024c). Although Strava offers free basic access, the company follows a freemium business model, whereby advanced analytics and goal-setting features are restricted to paid subscriptions (Strava, 2024b). This positioning allows Strava to combine broad accessibility with a data-driven premium experience that integrates gamification, social interaction, and performance-based motivation.

3.3 Nike Run Club: Brand-driven motivation and coaching

The Nike Run Club (NRC) positions itself as a brand-driven running platform that combines athletic activity with motivation and brand loyalty. Unlike Strava, NRC focuses exclusively on running and aims to support users from beginners to marathon runners through guided coaching and gamified motivation. (Nike, Inc. 2024).

A key distinguishing feature is the use of audio-guided runs, in which Nike trainers provide real-time training instructions and motivational support, underscoring the app's coaching-oriented positioning. The app records important running data such as pace, distance, and heart rate and visualizes it so that users can track their progress on various devices, including the Apple Watch, Social and playful features complement this coaching approach by allowing users to share activities, complete challenges with friends, and receive social recognition through virtual “high fives,” integrating social interaction into the training experience. NRC is largely free to use, which means there is a low barrier to entry (Nike, Inc., 2024). However, its exclusive focus on running and coaching limits its multisport functionality, which sets it apart from Strava and Garmin Connect.

3.4 Garmin Connect: Data Ecosystem and Hardware Integration

Garmin Connect is a comprehensive, hardware-based ecosystem that collects, analyzes, and visualizes sports and health data via patented devices. The platform serves as the digital core of the Garmin ecosystem and is primarily aimed at performance-oriented and tech-savvy users (Garmin, 2024).

Garmin offers a wide range of specialized devices for various sports and niche applications, including endurance sports and outdoor activities. Garmin Connect serves as a central analysis interface that brings together detailed performance metrics, biometric data, and training insights across devices. Additional features such as Garmin Coach and integrated map and navigation

functions further enhance the seamless integration between hardware and software, enabling personalized training and precise performance monitoring (Garmin, 2024). Garmin's business model is primarily based on hardware sales, supplemented by subscription-based services. While this dependence on hardware creates a higher barrier to entry, it enables deeper data integration and more accurate performance analysis compared to purely software-based platforms (Garmin, 2024).

3.5 Comparative Analysis: Strategic Positioning

A comparison between Strava, Nike Run Club, and Garmin Connect reveals clear differences in strategic orientation, target group orientation, and user retention mechanisms.

- Strava combines data-driven performance analysis with strong community and gamification elements and is primarily aimed at ambitious endurance athletes. By integrating competition and progress tracking into a social environment, Strava positions itself as a hybrid social fitness platform that increasingly sets itself apart from other providers through innovations such as AI-based performance analysis (Strava, 2024c).
- Nike Run Club (NRC) pursues a brand- and coaching-oriented strategy that focuses on motivation and emotional connection. By concentrating exclusively on running and integrating guided training programs, challenges, and social recognition, NRC promotes strong user loyalty through its close connection to the Nike brand and lifestyle ecosystem (Nike, Inc., 2024).
- Garmin Connect pursues a technology-oriented precision strategy that focuses on data quality and hardware integration. The platform is closely linked to the Garmin device ecosystem and is aimed at performance-oriented users who are looking for detailed performance analyses and a professional training environment (Garmin, 2024).

These strategic differences reflect the diversity of the digital fitness market: while Garmin focuses on technological precision and Nike Run Club emphasizes emotional brand loyalty, Strava occupies a middle ground by combining data-driven performance measurement with social motivation and playful engagement. This hybrid positioning is in line with key trends in digital fitness platforms and sets Strava apart at the intersection of technical analysis and community-based motivation (Statista, 2025).

4. Problem Statement and Objectives

Digital fitness platforms such as Strava integrate performance measurement, social interaction, and gamification elements to promote user motivation and sustained engagement. With over 150 million athletes in 185 countries, Strava is one of the world's leading social fitness platforms (Statista, 2025; Strava, 2024). Features such as leaderboards, challenges, and badges are designed to motivate users by encouraging regular use, goal setting, and social interaction. However, previous research suggests that while gamification can increase motivation, it can also reinforce social comparison and competitive dynamics, the effects of which on user engagement have not yet been fully explored (Hamari & Koivisto, 2015).

Although previous research has largely focused on the relationship between gamification and motivation, there is still limited understanding of how specific gamification mechanisms influence user engagement within digital fitness platforms (Hamari & Koivisto, 2015). This gap is particularly relevant given that the long-term success of platforms such as Strava depends on sustained engagement and continuous use.

Against this backdrop, this study focuses primarily on runners in the DACH region to examine how gamified elements, such as challenges, leaderboards, and reward systems, influence user engagement on Strava and contribute to continued use of the platform. Based on this objective, the following research questions arise, which examine the influence of gamification on engagement and use of Strava in more detail:

- **RQ 1:** How does gamification influence runners' engagement on Strava?
- **RQ 2:** To what extent does gamification influence runners' willingness to continue using the app or to use premium features?

5. Theoretical Framework

Building on the research questions outlined above, this chapter develops the theoretical framework of the study by drawing on established psychological and motivational theories. These theories help explain how and why gamified mechanisms influence user engagement and continued use of the platform in digital fitness contexts such as Strava. While the previous chapters focused on market developments and platform features, the following section shifts the focus to the theoretical foundations that explain user behavior and guide empirical analysis.

5.1 Gamification: Theoretical perspective

Gamification refers to the use of game elements in non-game contexts with the aim of increasing motivation and engagement (Deterding, 2011). While gamification is often presented as a functional design feature of digital fitness platforms such as Strava, this section takes a theoretical perspective and conceptualizes gamification as a psychological mechanism that shapes user behavior through motivational and emotional processes.

Digital health technologies, and gamification in particular, influence user behavior through psychological mechanisms based on established motivation theories (Sethi, 2024). By integrating game elements into non-game contexts, gamification attempts to transfer the motivation and emotional involvement typically associated with games to other areas of everyday life (Deterding, 2011). Building on principles of behavioral and motivational psychology, gamification integrates elements such as goal setting, immediate feedback, social recognition, and reward systems to promote behavioral change and support long-term engagement (Sethi, 2024; Seaborn & Fels, 2015). In digital fitness environments, these principles manifest themselves in mechanisms such as progress bars, leaderboards, and virtual badges (Sethi, 2024). These elements not only make performance measurable, but also address fundamental psychological needs, including competence, social connectedness, and self-determination (Seaborn & Fels, 2015). Gamification therefore works through both intrinsic and extrinsic motivation processes. While fun and challenge can increase intrinsic motivation, external incentives such as status, recognition, or rewards activate extrinsic motivation (Hamari & Koivisto, 2015).

At the same time, research findings increasingly show that gamification does not exclusively produce positive results (Seaborn & Fels, 2015). While elements such as leaderboards and competition can promote performance motivation and social comparison, they can also create pressure or demotivation, especially among lower-performing users (Feng et al., 2021). These ambivalent effects suggest that the impact of gamification depends on individual, social, and situational conditions (Seaborn & Fels, 2015).

To systematically explain this dynamic, the following section draws on established motivation theories that provide the psychological basis for understanding how gamification influences user engagement.

5.2 Motivational fundamentals

5.2.1 Self-Determination Theory (SDT)

The self-determination theory (SDT) developed by Deci and Ryan provides a widely used framework for explaining how different motivational processes influence human behavior and well-being. In the context of digital fitness platforms, SDT is particularly relevant because it explains why gamified features can either promote or undermine user motivation and engagement, depending on how they address fundamental psychological needs (Deci & Ryan, 2000). A central component of SDT is the theory of basic psychological needs (BPNT), which assumes that the satisfaction of three universal needs, autonomy, competence, and relatedness, is essential for intrinsic motivation and sustained engagement (Deci & Ryan, 2008). When these needs are satisfied, people are more likely to remain engaged in the long term; when they are frustrated, motivation and well-being tend to decline (Deci & Ryan, 2000; 2008).

- Autonomy refers to the experience of volition and psychological freedom, meaning that individuals perceive their behavior as self-chosen rather than externally controlled (Ryan et al., 2021). In the context of digital fitness, autonomy can be supported through customizable goals and optional challenges that allow users to decide for themselves how, when, and to what extent they engage in physical activity. On Strava, features such as self-defined performance goals and voluntary challenges can support autonomous motivation when they align with users' personal values and training goals (Strava, 2024b; Sailer et al., 2017).
- Competence describes the experience of effectiveness and mastery in dealing with the environment (Deci & Ryan, 2000). Gamified feedback mechanisms such as progress indicators, badges, or performance summaries can reinforce this feeling by making improvements visible and measurable. Importantly, competence is most strongly promoted when feedback emphasizes personal progress rather than constant comparison with others (Sailer et al., 2017). At the same time, research shows that competence can also be undermined. When people repeatedly feel that they are not competent enough because challenges are too difficult, feedback is discouraging, or comparisons become overwhelming, this can lead to a decline in intrinsic motivation and feelings of insecurity or reduced well-being (Deci & Ryan, 2000). Strava's “Athlete Intelligence” feature addresses these risks by providing individualized performance information that focuses on personal development rather than competitive rankings (Strava, 2024c).

- Social Relatedness: The need for social connectedness reflects the desire to feel connected, valued, and supported by others (Sailer et al., 2017). On social fitness platforms such as Strava, this need is addressed through interactions such as praise, comments, and club membership, which promote social recognition and a sense of belonging (Strava, 2024a). However, when competitive elements such as public leaderboards dominate social interactions, they can undermine connectedness by increasing social pressure and leading to negative comparisons (Seaborn & Fels, 2015).

Overall, SDT offers a useful perspective for understanding how gamification can promote or hinder user engagement by influencing satisfaction in terms of autonomy, competence, and relatedness. When gamification features support these needs, they can promote intrinsic motivation and sustained engagement; when they undermine these needs, they can lead to pressure, disinterest, or reduced well-being (Deci & Ryan, 2000; Hamari & Koivisto, 2015). This perspective is particularly relevant for digital fitness platforms, where long-term engagement depends on users' sustained motivation to remain active over an extended period of time.

5.2.2 Social Comparison Theory (SCT)

Social comparison theory (SCT), originally proposed by Festinger (1954), explains the tendency of individuals to evaluate their abilities and achievements by comparing themselves with others, especially when no objective standards are available. Such comparisons serve as a source of self-evaluation and orientation (Buunk & Gibbons, 2007). According to SCT, people are often motivated by an upward drive, which means that they tend to compare themselves with others who perform better in order to improve themselves. These comparison processes often take place spontaneously and can have a strong influence on motivation and self-perception (Suls & Wheeler, 2012).

In digital fitness environments such as Strava, social comparison is a core element of the user experience. Features such as leaderboards, segment rankings, badges and performance statistics enable explicit and implicit comparisons with other users, while social interactions such as kudos and comments provide recognition and feedback (Strava, 2024; Hamari & Koivisto, 2015). Social comparisons can have both motivating and demotivating effects. Upward comparisons can encourage self-improvement if the performance standard is perceived as achievable but can lead to frustration or pressure if it is considered unrealistic (Buunk & Gibbons, 2007; Brown et al., 2007). Downward comparisons, on the other hand, can

temporarily protect self-esteem, but offer only limited potential for long-term motivation and development (Buunk & Gibbons, 2007).

The effect of social comparisons strongly depends on contextual factors and perceived control. Users respond less negatively to upward comparisons when they believe they can influence their own performance, whereas highly competitive environments such as public rankings, increase the risk of perceived weakness and reduced social integration (Corcoran, Crusius, & Mussweiler, 2011; Suls & Wheeler, 2012)

The integration of SCT into gamification research illustrates that competitive features can influence not only competence but also autonomy and relatedness. While moderate competition can foster engagement, overly controlling or exclusionary designs may undermine these psychological needs. In contrast, cooperative elements that emphasize shared goals tend to support both competence and relatedness (Hamari, & Koivisto, 2015; Sailer et al., 2017).

In summary, SCT highlights that social comparison processes in digital fitness environments can generate both motivational and stressful effects. Their influence on user engagement depends on individual perception and on how comparison mechanisms are designed within the platform (Buunk & Gibbons, 2007; Suls & Wheeler, 2012). Balanced, autonomy-supportive designs are more likely to sustain engagement, whereas highly competitive structures may undermine intrinsic motivation.

Building on these theoretical foundations, this study assumes that engagement with digital fitness platforms such as Strava is shaped by two interrelated mechanisms: the satisfaction of psychological needs and social comparison processes. While SDT explains how autonomy, competence, and relatedness create motivation and continued use, SCT illustrates how social interactions and comparison can either reinforce or weaken these motivational effects. Together, the theories form the basis for the conceptual model developed in the following chapter.

6. Conceptual Model and Hypotheses Development

6.1 Conceptual Model

Building on the theoretical foundations presented above, Figure 1 illustrates the conceptual model of this study. It integrates the central assumptions of Self-Determination Theory (SDT; Deci & Ryan, 2008) and Social Comparison Theory (SCT; Buunk & Gibbons, 2007) into the context of digital fitness platforms. Both theories describe complementary psychological mechanisms through which gamification elements can influence user behavior. While SDT emphasizes the satisfaction of basic psychological needs as the basis for intrinsic motivation,

SCT explains how social comparison processes can promote or inhibit motivation. Together, they provide a theoretical framework for understanding why gamification can have both positive and potentially stressful effects on the use of digital fitness platforms.

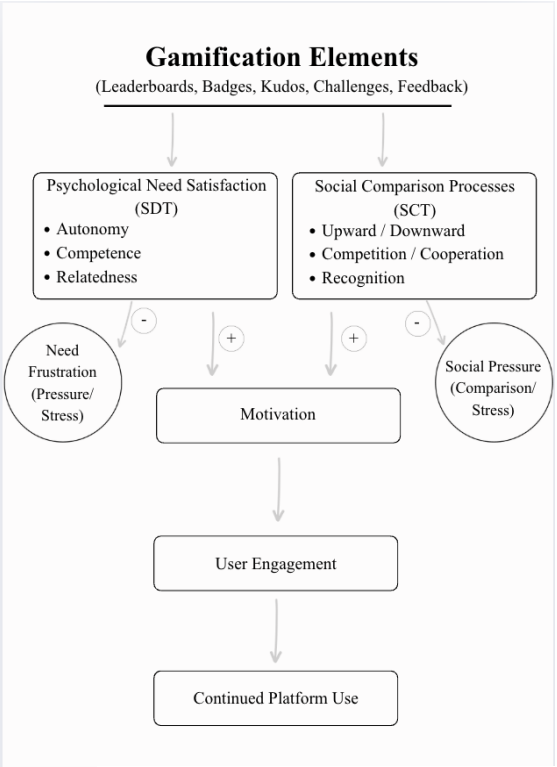

Figure 1: Conceptual Model

In the model, gamification elements, such as leaderboards, badges, kudos, challenges, and feedback, are considered the starting point. These features activate two central mechanisms: psychological need satisfaction (SDT) and social comparison processes (SCT). According to SDT, perceived autonomy, competence, and social connectedness increase motivation, whereas insufficient need satisfaction may result in need frustration and perceived pressure or stress (Hamari & Koivisto, 2015; Ryan et al., 2021).

At the same time, SCT describes how social comparison processes can have both positive and negative effects (Corcoran et al., 2011). Comparisons that are perceived as inspiring, achievable, or community-building can strengthen motivation and commitment. However, if comparison mechanisms are experienced as controlling, competitive, or overwhelming, they can trigger social pressure, i.e., perceived pressure to perform or comparison stress (Buunk & Gibbons, 2007).

Both theoretical pathways, need satisfaction (SDT) and social comparison processes (SCT), influence user motivation, which serves as a central link between psychological mechanisms and platform behavior (Ryan et al., 2021). Higher Motivation fosters user engagement, reflected in active, regular, and emotionally involved use, which in turn contributes to continued platform use and long-term loyalty (Deci & Ryan, 2000; Seaborn & Fels, 2015).

Figure 1 thus illustrates that gamification mechanisms in digital fitness environments such as Strava can trigger both beneficial and stressful psychological processes. The positive effect results from the satisfaction of central needs and motivating comparative experiences, while the negative side is characterized by perceived control, pressure, or excessive competition. The model thus forms the basis for the subsequent development of hypotheses and the empirical investigation of the underlying causal relationships.

6.2 Hypotheses Development

Based on the conceptual model presented above, the following hypotheses are derived. In this study, gamification on Strava is conceived as a holistic system composed of playful platform features such as goals, challenges, badges, leaderboards, segment rankings, kudos and progress feedback. These elements are not treated as separate independent variables, but rather as interconnected components of a broader gamification construct that shapes users' motivational and social experiences on the platform. Based on self-determination theory (SDT) and social comparison theory (SCT), gamification mechanisms can trigger both motivational processes by promoting competence, autonomy, and relatedness, as well as comparison-based processes that can trigger social pressure. Accordingly, the hypotheses examine how gamification influences user motivation, perceived social pressure, engagement, and continued use of the platform.

Gamification elements are designed to support psychological needs by providing feedback, goals, and opportunities for social interaction, which can strengthen feelings of competence, autonomy, and connectedness. It is therefore assumed that gamification has a positive influence on user motivation:

H1: Gamification increases user motivation on Strava.

Competitive gamification elements, such as leaderboards or segment rankings, emphasize visibility and performance comparison. These features can trigger social evaluation anxiety and performance pressure. Therefore, the following assumption is made:

H2: Competitive gamification elements increase the perceived social pressure that users experience on Strava.

Motivation is considered an important factor for active and regular usage behavior. If gamification increases user motivation, this should be reflected in higher engagement:

H3: Increased motivation through gamification leads to greater user engagement on Strava.

However, social pressure can undermine feelings of autonomy and trigger negative emotional reactions, which can reduce willingness to continue actively engaging. Therefore:

H4: Social pressure triggered by competitive gamification elements decreases user engagement on Strava.

Finally, engagement is a key predictor of long-term use of digital fitness platforms. Highly engaged users are generally more likely to continue using the platform or take advantage of expanded services:

H5: Increased user engagement leads to a higher likelihood of continued platform use or subscription to premium features on Strava.

These hypotheses form the basis for the subsequent empirical investigation of the mechanisms of gamification on Strava.

7. Methodology

7.1 Research Design

This study follows a sequential exploratory mixed-methods design, in which qualitative interviews were conducted first and subsequently followed by a quantitative survey. This approach was chosen to first gain in-depth insights into runners' subjective perceptions of Strava's gamified features and subsequently test the theoretically derived relationships between gamification, motivation, perceived social pressure, user engagement, and continued or premium platform use. The combination of qualitative and quantitative methods enables a comprehensive examination of both the experiential and behavioral aspects of platform use.

The qualitative phase consisted of short, semi-structured interviews that were closely aligned with the two research questions. The interviews focused on users' experiences with gamified features on Strava, such as challenges, leaderboards, progress feedback, and social recognition, as well as their perceived impact on motivation, engagement, and continued use. Rather than exploring topics outside the defined scope of the research, the qualitative phase served as an exploratory step to deepen understanding of the key constructs and support the development of the conceptual model and hypotheses. The results of the qualitative interviews are used to contextualize the quantitative results in the discussion.

Building on these qualitative findings, the quantitative phase aimed to statistically test the proposed hypotheses. To this end, a standardized online survey was conducted among runners who actively use Strava. By collecting data from a larger sample, the relationships between gamification, motivation, perceived social pressure, engagement, and continued or premium use of the platform could be empirically examined and quantified. The sequential research design ensures that the quantitative analysis is based on real user experiences while remaining consistent with the theoretical framework and research questions.

7.2 Qualitative Study

7.2.1 Sampling & Participants

For the qualitative phase of this study, a total of ten Strava users were interviewed. All participants were active runners from the DACH region and used Strava regularly to record their running activities. The sample was selected according to the research questions, focusing

exclusively on runners in order to capture users' experiences with gamified features in a consistent and relevant usage context.

Participants were recruited through personal networks and Strava-affiliated contacts. This recruitment approach ensured that users with varying levels of running experience, from beginners to marathon runners, as well as varying levels of engagement on the platform, including both free and premium users, were included. As a result, the sample reflects a broad spectrum of relevant user perspectives without exceeding the boundaries of the defined target group.

All participants were between 22 and 33 years old, which roughly corresponds to the core user group examined in this study. The sample was characterized based on important usage-related variables such as running experience, training frequency, and duration of Strava use. No sensitive or personal data was collected, as the focus of the qualitative phase was on user experiences with gamified platform features rather than individual personal characteristics.

Overall, participants were selected through targeted sampling based on predefined criteria, including active use of Strava, primary participation in running activities, and residence in the DACH region.

7.2.2 Interview Procedure & Guide

Qualitative data was collected through short, semi-structured individual interviews, each lasting approximately 10 to 15 minutes. The interviews were designed to be open-ended in order to capture the individual perceptions and experiences of the participants, while closely following the two research questions. The interview guide focused on users' perceptions of the gamification elements on Strava, their influence on motivation and engagement in running, and their relevance for continued use of the platform.

The interview guide consisted of four thematic blocks: (1) general running and Strava usage characteristics of the participants, (2) perception and personal relevance of selected gamification elements such as challenges, segment times, leaderboards, and kudos, (3) perceived impact of these elements on motivation and engagement, and (4) their role in the decision to continue using the platform or consider premium features. The questions were open-ended to allow participants to describe their own experiences in detail and provide individual examples, while the structured design of the guide ensured that all relevant aspects of the research questions were systematically covered.

No sensitive or personal data was collected during the interviews. Instead of full transcripts, brief written summaries were prepared immediately after each interview to document the most

important statements and findings. These summaries, which are included in the appendix, served as the basis for identifying initial patterns related to the research questions and were incorporated into the subsequent development of the quantitative survey and analysis.

7.2.3 Qualitative Findings – Key Insights

The analysis of the ten qualitative interviews reveals several recurring patterns in users' perceptions and experiences of gamification elements on Strava. Although individual experiences vary, six key qualitative findings have emerged that are particularly relevant to the subsequent quantitative phase.

Firstly, participants often reported that playful elements such as challenges, badges, and visible progress indicators had a motivating effect, especially for less experienced or newer runners. Small successes and milestone badges were often described as helpful in maintaining a running routine or increasing regularity. Among more experienced users, this motivational effect tended to be more strongly associated with specific performance-related goals.

Secondly, the interviews suggest that social comparison mechanisms, particularly split times, rankings, and comparisons with friends, can have ambivalent effects. While some participants found performance-oriented competition motivating, others reported feelings of pressure or reduced enjoyment, particularly when their performance was perceived as weaker or when the comparison standards were perceived as difficult to achieve.

Thirdly, community-related features such as kudos, joint activities, and participation in running clubs proved to be important social motivators. Many participants emphasized that the feeling of recognition, belonging, and social connection enriched their user experience and contributed to their regular use of the platform.

Fourth, the results show that gamification elements do not appeal to all user types equally. Advanced runners tended to be motivated by competitive elements such as segment rankings, while less experienced users sometimes found these elements less relevant or even discouraging. This suggests that certain gamification mechanisms may only elicit limited engagement among certain user groups.

Fifth, the interviews show that decisions regarding premium subscriptions are only minimally influenced by gamification elements. Instead, participants primarily associated premium use with functional benefits such as advanced performance analysis, route planning, or detailed training metrics.

Finally, continued use of Strava seemed to be motivated less by individual gamification features and more by the formation of routines, engagement in the community, and the overall perceived

usefulness of the platform. Several participants stated that they would continue to use Strava regardless of how relevant certain gamification elements were to them personally.

7.3 Quantitative Study

Building on the exploratory interview findings, the subsequent quantitative phase aims to empirically test the relationships proposed in the conceptual model. While the qualitative insights identified and refined key constructs such as gamification, motivation, social pressure, user engagement, and premium intention, the survey enables their systematic measurement and the statistical testing of the hypothesized relationships.

The following section therefore outlines the research design, sampling procedure, and measurement instruments applied in the quantitative study.

7.3.1 Sampling & Participants

A standardized online survey was conducted for the quantitative phase of this study. Participants were recruited using a non-probabilistic convenience sample, a common approach in digital research that allows efficient access to specific target groups (Hague & Hague, 2024). The questionnaire was distributed via personal networks, social media, and online communities related to running and training. Participation was voluntary, anonymous, and without incentives. The complete questionnaire is included in the Appendix 2.

A total of 123 people participated in the survey. To ensure the relevance of the sample, two screening questions were asked to verify that respondents actively use Strava and primarily use the app for running activities. In addition, incomplete responses, test entries, and cases that did not pass the attention check were excluded. After data cleansing, a final sample of 94 valid responses remained, which were included in the following analyses.

The average age of participants was 29.7 years (SD = 5.4). Most respondents were between 25 and 34 years old (74.5%), followed by the 18 to 24 age group (14.9%) and a smaller proportion of 35-44-year-olds (9.6%) and 45-54-year-olds (1.1%). In terms of gender, 65.6% identified as female and 33.3% as male; one participant did not provide any information on this. The majority of respondents were based in Germany (88.3%), with a small proportion of participants from Austria (3.2%), Portugal (3.2%), the United States (1.1%), the United Kingdom (1.1%), Turkey (1.1%), Indonesia (1.1%), and the Netherlands (1.1%) (Appendix 3.1). Although the study was primarily aimed at runners in the DACH region, these additional participants met all predefined selection criteria and were therefore included in the sample. Since nationality is theoretically not of central importance for the psychological constructs examined in this study, this minor

international deviation is not expected to systematically influence the analyses in any meaningful way.

The running behavior of the participants showed a diverse but consistent usage profile. Most respondents said they ran once or twice a week (56.4%) or three to four times a week (33.0%). Smaller proportions run less than once a week (9.6%) or more than five times a week (1.1%). Running experience was predominantly described as intermediate (44.7%), followed by beginner (27.7%) and advanced (22.3%). A small proportion of 5.3% identified themselves as competitive or performance oriented. Regarding platform usage, most respondents had been using the app for one to two years (34.0%) or six to twelve months (29.8%). Smaller groups reported using Strava for less than six months (18.1%), two to four years (14.9%), or more than four years (3.2%). 80.9% of participants use the free version, while 19.1% have an active Premium subscription (Appendix 3.1).

7.3.2 Measures and Operationalization

To test the hypotheses developed in the theoretical framework, several latent constructs were measured using standardized 7-point Likert scales (1 = strongly disagree, 7 = strongly agree). The measurement items were adapted from established literature on gamification, motivation, social comparison, and user engagement and tailored to the context of Strava.

The internal consistency of all constructs with multiple items was assessed using Cronbach's alpha coefficient. In line with standard practice in social science research, values above 0.70 were considered acceptable indicators of reliability. Overall, the reliability analysis revealed satisfactory to high internal consistency of all constructs, confirming their suitability for subsequent correlation and regression analyses (Hague & Hague, 2024).

Gamification Perception (GAM): The perception of gamification was operationalized as a holistic construct capturing the extent to which users experience Strava's playful and competitive features as engaging, motivating, and performance-enhancing. The construct was measured using five items and demonstrated satisfactory internal consistency ($\alpha = .709$) (Appendix 3.2.1).

Motivation (MOT): Motivation was conceptualized based on Self-Determination Theory (SDT) and measures the extent to which Strava supports user's needs for competence, autonomy, and social connectedness. The construct was measured using five items and showed good internal consistency ($\alpha = 0.781$) (Appendix 3.2.2).

Social Comparison (SOC): Perceived social pressure captures the extent to which users feel pressure due to their social visibility, competition, and comparison with others on the platform.

The construct was measured using four items and showed very good internal consistency (α = 0.836) (Appendix 3.2.3).

Engagement (ENG): User interaction reflects both behavior and emotional attachment to the Strava platform, including participation in activities, interaction, and overall intensity of use. The construct was measured using five items and showed high internal consistency (α = 0.824) (Appendix 3.2.4).

Premium / Intention to continue using (PI): Continued use and premium intention were measured using four items that reflect users' willingness to continue using Strava and their interest in premium features. Reliability analysis yielded a Cronbach's alpha of 0.613, which is slightly below the commonly used cut-off point. Given the exploratory character of this construct and the small number of items, all items were retained in order to capture the full conceptual scope of continued use and premium intent. Overall, the scale was considered appropriate for exploratory analysis in the context of this study (Appendix 3.2.5).

7.3.3 Data Analysis

To test the proposed hypotheses, several complementary statistical analyses were conducted. First, descriptive statistics were calculated to provide an overview of the central variables and to examine the distribution of the constructed scales. This included means, standard deviations, as well as minimum and maximum values.

In the next step, Pearson correlation analyses were performed to identify bivariate correlations between the constructs and to obtain initial indications of the direction and strength of the relationships. The correlation matrix further serves as a basis for deciding whether further regression analyses are useful and statistically appropriate.

To formally test the hypotheses, linear regression analyses were conducted. This method is well suited to the research objectives, as it allows us to assess the extent to which independent variables predict changes in dependent variables. The regression models provide standardized coefficients (β), significance levels, and explained variance (R^2), which enables a systematic evaluation of the proposed relationships between gamification, motivation, perceived social pressure, engagement, and intentions to continue using the platform.

In addition, an independent t-test was conducted to examine possible differences between free and premium users in terms of motivation, engagement, and intention to continue using Strava. Although this analysis was not explicitly formulated as a hypothesis, it provides additional insights into possible differences between the user groups.

All statistical analyses were conducted using SPSS, applying a significance level of $p < 0.05$.

7.4 Results

This chapter presents the results of the quantitative data analysis. First, descriptive statistics of the constructed scales are reported, followed by correlation analyses to identify initial correlations between the key constructs. Subsequently, the hypotheses are tested using linear regression analyses. An exploratory comparison between free and premium users is presented as a supplementary analysis.

7.4.1 Descriptive Statistic

The descriptive analyses provide an overview of the central constructs of the study. Overall, the mean values indicate moderate to high levels of gamification (M = 5.26, SD = 0.80), motivation (M = 5.45, SD = 0.75), engagement (M = 5.01, SD = 1.08), and intention to continue using Strava (M = 5.05, SD = 0.79) (Appendix 3.1). Given that values above 5 on a 7-point Likert scale indicate relatively high agreement, the results suggest generally high levels of perceived gamification, motivation, engagement, and continued use intention among the participants.

In contrast, perceived social pressure shows a more moderate mean value (M = 4.43, SD = 1.19) (Appendix 3.1). The comparatively high standard deviation shows that individual perceptions of social or performance-related pressure vary much more significantly than with the other constructs. This indicates that social or performance-related pressure is experienced less consistently on Strava and plays a greater role for some users than for others. To further investigate this heterogeneity, individual items on the social pressure scale were examined.

The results show that competition and performance-related features are particularly associated with perceived pressure. A majority of respondents (67%) agreed that the performance of other Strava users puts pressure on them to perform better (M = 4.61, SD = 1.48), while 57.5% said they feel evaluated by leaderboards and segment rankings (M = 4.44, SD = 1.41). In addition, 68.1% said that Strava's competitive mechanisms motivate them to run faster or more often (M = 4.69, SD = 1.42), which is the highest mean value within the “social pressure” dimension (Appendix 3.1). At the same time, emotional stress appears to be less pronounced. The item measuring stress when one's own performance is worse than that of friends has the lowest mean value on the scale (M = 3.97, SD = 1.53), with 66% of respondents choosing neutral or negative response options. This suggests that social comparison on Strava does not necessarily lead to negative emotional stress for most users (Appendix 3.1).

Overall, the descriptive results show a consistently high level of gamification perception, motivation, and engagement, while social pressure is perceived more selectively and varies

considerably among users. These results form a meaningful basis for the subsequent correlation and regression analyses.

7.4.2 Correlation Analysis

Pearson's correlation analysis were conducted to examine the bivariate relationships between the central constructs of the study. The results reveal clear and theoretically consistent patterns. Gamification shows a strong and highly significant positive correlation with motivation ($r = 0.711$, $p < 0.001$). Motivation, in turn, is strongly and positively correlated with engagement ($r = 0.662$, $p < 0.001$). Furthermore, gamification is also directly correlated with engagement ($r = 0.596$, $p < 0.001$) (Appendix 3.3).

Similar patterns can be seen in relation to intention to use. Engagement shows a strong positive correlation with the intention to continue using Strava or to upgrade to premium features ($r = 0.654$, $p < 0.001$). Motivation also has a significant positive correlation with intention to use ($r = 0.551$, $p < 0.001$). The results indicate a moderate positive correlation between gamification and intention to use, which is statistically significant ($r = 0.445$, $p < .001$) (Appendix 3.3).

In contrast, perceived social pressure shows only weak correlations with the other constructs. Its correlations with gamification ($r = 0.153$, n.s.), engagement ($r = 0.164$, n.s.), and intention to use ($r = –0.006$, n.s.) are not statistically significant. Only the relationship between social pressure and motivation reaches statistical significance, although the effect remains comparatively small ($r = 0.289$, $p < 0.01$) (Appendix 3.3).

Overall, the correlation analysis suggests that gamification, motivation, and engagement are closely related, while perceived social pressure at the bivariate level is less directly related to behavioral effects. These results provide initial indications of the relative strength of the relationships and serve as a basis for the subsequent regression analyses.

7.4.3 Hypotheses Testing

A series of linear regression analyses were conducted to empirically test the proposed relationships between the central constructs of the study. Each hypothesis was tested individually to analyze the extent to which gamification, motivation, social pressure, and engagement predict the respective dependent variables.

To test H1, which states that gamification has a positive influence on user motivation, motivation was regressed on gamification. The model was highly significant ($F(1,92) = 94.001$, $p < 0.001$) and explained 50.5% of the variance in motivation ($R^2 = 0.505$, adj. $R^2 = 0.500$). Gamification proved to be a strong and significant predictor ($\beta = 0.711$, $p < 0.001$), suggesting

that a stronger perception of gamification elements is associated with higher user motivation (Appendix 3.4.1). Hypothesis 1 is therefore confirmed.

H2 indicated that competitive gamification elements increase perceived social pressure. However, the regression analysis did not yield a significant result. The model was not statistically significant ($F(1,92) = 2.203$, $p = .141$) and explained only a small portion of the variance in social pressure ($R^2 = .023$, adj. $R^2 = .013$). The regression coefficient was also not significant ($\beta = .153$, $p = .141$) (Appendix 3.4.2). Hypothesis 2 is therefore not supported.

To test H3, engagement was traced back to motivation. The results show a strong and statistically significant relationship. The model explained 43.8% of the variance in engagement ($R^2 = 0.438$, adj. $R^2 = 0.432$) and was highly significant ($F(1,92) = 71.822$, $p < 0.001$) . Motivation proved to be a strong predictor of engagement ($\beta = 0.662$, $p < 0.001$) (Appendix 3.4.3). Hypothesis 3 is clearly confirmed.

H4 assumed that perceived social pressure negatively influences user engagement. The regression analysis did not confirm this assumption. The model was not statistically significant ($F(1,92) = 2.550$, $p = 0.114$) and explained only 2.7% of the variance in engagement ($R^2 = 0.027$, adj. $R^2 = 0.016$). The effect of social pressure was not significant ($\beta = 0.164$, $p = 0.114$) (Appendix 3.4.4). Hypothesis 4 is therefore not confirmed.

Finally, H5 hypothesized that higher engagement would lead to a stronger intention to continue using Strava or to use premium features. The results clearly support this assumption. The regression model was highly significant ($F(1,92) = 68.646$, $p < 0.001$) and explained 42.7% of the variance in intention to use ($R^2 = 0.427$, adj. $R^2 = 0.421$). Engagement proved to be a strong and significant predictor ($\beta = 0.654$, $p < 0.001$) (Appendix 3.4.5). Hypothesis 5 is confirmed.

7.4.5 Premium vs. Free-User (T-Test)

In addition to the regression analyses, an independent t-test was conducted to explore potential differences between free and premium users. The mean differences were examined for the three central constructs: motivation, engagement, and intention to continue using the platform.

The results show that premium users report significantly higher motivation than free users ($M_{premium} = 5.76$ vs. $M_{free} = 5.38$), $t = 2.74$, $p = 0.009$ (Appendix 3.5). The effect size is moderate (Cohen's $d = 0.51$), suggesting that the difference is not only statistically significant but also meaningful in practical terms.

Significant differences can also be observed in terms of engagement. Premium users show significantly higher engagement than free users ($M_{premium} = 5.63$ vs. $M_{free} = 4.87$), $t =$

4.89, $p < 0.001$ (Appendix 3.5). The corresponding effect size is large ($d = 0.74$), indicating significantly greater participation and interaction with the platform among premium users.

The biggest difference is in the intention to continue using Strava or to retain premium features. Premium users score significantly higher than free users ($M_{premium} = 5.94$ vs. $M_{free} = 4.84$), $t = 8.02$, $p < 0.001$, with a very large effect size (Cohen's $d = 1.66$) (Appendix 3.5). This indicates marked differences between the two user groups in terms of their intention to use the app in the long term.

Overall, the t-test results indicate systematic differences between premium and free users, with premium users reporting higher levels of motivation, engagement, and continued usage intention.

8. Discussion

8.1 Summary of Key Findings

The aim of this study was to investigate how gamification elements on the digital fitness platform Strava influence runners' user behavior, particularly in terms of motivation, perceived social pressure, engagement, and willingness to continue platform use or premium intention. Based on the theoretical framework of Self-Determination Theory (SDT) and Social Comparison Theory (SCT), five hypotheses were formulated and empirically tested using quantitative data.

Overall, the results show a clear and consistent pattern. Three of the five hypotheses (H1, H3, and H5) were confirmed, while two hypotheses (H2 and H4) did not receive empirical support. The findings suggest that gamification on Strava primarily operates through motivational mechanisms rather than through pressure-related effects associated with social comparison.

The results show that gamification elements have a positive influence on user motivation. Higher motivation, in turn, goes hand in hand with greater engagement, which is reflected in more active, regular, and intensive use of the platform. Engagement proves to be a key driver for continued use of the platform and premium intent, supporting a sequential pattern in which gamification indirectly contributes to long-term use through motivation and engagement.

In contrast, the hypotheses assuming a negative influence of competitive gamification elements via perceived social pressure were not supported. No significant correlation was found between gamification and perceived social pressure, nor was there any evidence of social pressure having a negative impact on engagement. This suggests that although Strava does offer competitive and comparative features, these do not necessarily affect user engagement within this sample.

In summary, gamification in the context of Strava primarily acts as a motivating and engagement-enhancing mechanism. The dominant pathway identified in this study runs from gamification to motivation, from motivation to engagement, and from engagement to continued platform use. Perceived social pressure plays a much smaller role and does not appear to act as an inhibiting factor for engagement. These findings provide the basis for the following section, which discuss the individual hypotheses in greater theoretical depth.

8.2 Discussion of Hypotheses

Gamification and Motivation (H1)

The quantitative results show that gamification elements on Strava have a positive and significant impact on user motivation, which clearly confirms hypothesis H1. This finding underscores the central role of gamification mechanisms in shaping motivation processes within digital fitness platforms.

From a theoretical perspective, this strong relationship can be explained by self-determination theory (SDT). Gamification elements on Strava appear to support the satisfaction of basic psychological needs by enabling autonomy, competence, and relatedness. Instead of forcing participation, features such as optional challenges, individual goal setting, and flexible use allow users to engage with the platform in a self-determined manner, thereby promoting autonomy. At the same time, visible progress indicators, performance feedback, and personal achievements are perceived by users as supporting feelings of competence, while social interactions such as kudos and comments are associated with higher perceived social connectedness.

In line with the quantitative results, the qualitative interviews show that gamified features are perceived as motivating, especially when they are aligned with personal goals and individual progress rather than direct competition.

Overall, the results suggest that gamification on Strava primarily increases motivation by supporting intrinsic motivational processes rather than relying on external pressure or control. This confirms the assumptions of self-determination theory and demonstrates its relevance for understanding the dynamics of motivation in digital fitness platforms.

Gamification and Social Pressure (H2)

Contrary to the theoretical assumption, the quantitative analysis did not reveal any significant correlation between competitive gamification elements and perceived social pressure. Hypothesis H2 is therefore not confirmed.

One possible explanation for this result is that social pressure is not perceived as a stable or uniform phenomenon, but rather as a situation-dependent and highly individual experience. Although the descriptive results suggest that performance-related and competitive features may be perceived as pressure-inducing by some users, this perception appears to be context-dependent and does not lead to a consistently perceived social pressure.

From the perspective of social comparison theory (SCT), this finding is plausible, as social comparisons do not automatically lead to negative experiences. Rather, how comparisons are perceived depends on individual evaluation and situation. Therefore, comparisons can be motivating, neutral, or only temporarily stressful without necessarily leading to a lasting feeling of social pressure.

The qualitative interviews illustrate this variability, as comparison functions such as segment times or rankings were described as motivating in some situations and only occasionally as stressful.

Overall, the results show that gamification on Strava makes social comparison processes visible, but these processes aren't necessarily seen as social pressure that negatively affects user engagement.

Motivation and Engagement (H3)

The results demonstrate that motivation plays a central role in shaping user engagement on Strava. H3 is therefore supported, confirming that motivational processes strongly influence how actively and intensively users interact with the platform.

This relationship can be explained using self-determination theory (SDT). When users perceive their physical activity as self-determined and personally meaningful, they are not only more motivated to run, but also more willing to actively engage with the platform. Motivation thus acts as an important link between internal drive and actual usage behavior, translating intentions into sustained engagement.

The qualitative interviews illustrate this mechanism, as higher motivation was often accompanied by more regular use and increased interaction with the platform.

Overall, these results highlight motivation as a key mechanism through which gamification contributes to higher user activity on Strava and reinforce the role of motivational processes as an important driver for active use of the platform.

Social Pressure and Engagement (H4)

The analysis shows no significant correlation between perceived social pressure and user activity on Strava. Hypothesis H4 is therefore not confirmed, suggesting that social pressure does not play a decisive role in how actively users engage with the platform.

Building on the discussion in H2, this result can be explained by the situational nature of social pressure. Social comparison appears to be more temporary and is not perceived as a permanent aspect of the user experience. Short-term moments of comparison or perceived pressure do not seem to be sufficient to reduce engagement over time, especially since use of the platform is largely determined by personal goals, established routines, and self-determined decisions.

The qualitative interviews illustrate this pattern, as feelings of situational pressure were rarely associated with a conscious reduction in commitment.

Overall, the results suggest that although social comparison mechanisms exist within the Strava environment, they do not have an inhibiting effect on user engagement. Engagement appears to be influenced more by motivational factors than by pressure-inducing comparison processes.

Engagement and Continued Use / Premium Intention (H5)

The results clearly show that higher user interaction is associated with a greater willingness to continue using Strava and to use premium features. Hypothesis H5 is therefore confirmed, underlining the central role of interaction in long-term platform loyalty.

The results suggest that gamification alone does not directly lead to continued use or the adoption of premium features. Instead, engagement reflects the extent to which Strava is perceived as a useful and integrated part of users' training routines. This interpretation is supported by the group comparison between free and premium users, which shows significantly higher motivation and stronger engagement among premium users.

Overall, it is clear that engagement is the key factor for long-term use of the platform. Rather than directly encouraging users to sign up for premium features, gamification appears to work in a more subtle way by encouraging regular use and helping Strava become an integral part of users' training routines.

8.4 Implications

Based on the empirical results of this study, both theoretical and practical implications can be derived, which are outlined below.

8.4.1 Theoretical Implications

The findings of this study contribute to research on gamification, motivation, and user behavior in digital fitness platforms in several important ways. First, they highlight the central role of motivational processes as described by Self-Determination Theory (SDT). The results show that gamification is particularly effective when it strengthens user motivation, which in turn translates into higher engagement. The results suggest that the effectiveness of gamification is

not primarily due to isolated game features, but rather to how these features are experienced in terms of autonomy, competence, and social connectedness.

Second, the study offers a more differentiated perspective on social comparison processes within the framework of Social Comparison Theory (SCT). While previous research often assumes that competitive elements inherently lead to social pressure and negative user experiences, the present findings suggest a more nuanced relationship. Social comparison mechanisms are perceived by users, but they do not necessarily result in increased social pressure or reduce engagement. Instead, perceived social pressure appears to be predominantly situation-dependent and does not have a stable negative influence on engagement in the context of Strava. The work contributes to a more balanced understanding of competitive and comparative dynamics in gamified environments.

Finally, the study extends existing gamification literature by conceptualizing gamification not as a direct driver of behavioral outcomes, but as part of an indirect causal mechanism. The results indicate that gamification has an impact on long-term platform use and willingness to adopt premium features primarily through increase motivation and engagement, rather than through immediate purchase-oriented decision-making. This highlights the importance of engagement as a key mediating variable linking platform design mechanisms to actual usage behavior.

Overall, the results contribute to refining theoretical models of gamification and digital engagement by showing that both motivational and social comparison processes are highly context dependent. It is the interplay of these processes, rather than their isolated effects, that explains how and why gamification can promote sustained interaction and long-term use of digital fitness platforms.

8.4.2 Managerial Implications

The results of this study provide clear managerial implications for Strava and similar digital fitness platforms. They suggest that the long-term success of a platform depends less on the mere presence of gamification features and more on how these features are designed to promote motivation, engagement, and perceived functional value.

First, Strava should make gamification elements more motivational and user-friendly. Instead of focusing on rankings or direct performance comparisons, it could concentrate more on personalized goals, adaptive challenges, and the visualization of individual progress. Such features allow users to focus on their personal improvement rather than competing with others

and may be particularly beneficial for less experienced runners, who are more likely to feel discouraged by highly competitive structures.

Secondly, the results show that strengthening user loyalty should be a key strategic priority. Loyalty seems to be promoted primarily through the integration of Strava into users' daily training routines. Features such as weekly goals, streaks, training summaries, or progress overviews could therefore be made more prominent to encourage regular use and the formation of long-term habits. By promoting consistency rather than short-term competition, Strava can further establish itself as an indispensable training companion.

Third, the results show that willingness to use premium features is mainly determined by perceived functional value and not only by gamification. This means that premium offerings should be more clearly positioned and communicated in terms of their specific training and analysis benefits. An effective approach could be to offer free users' temporary access to selected premium features at no cost so that they can experience the added value firsthand before deciding to subscribe. Such trial use can lower the barriers to entry and increase conversion rates based on actual usage experiences.

Overall, the findings suggest that gamification is most effective when it is not viewed as an end in itself, but rather as a supporting mechanism that strengthens motivation, promotes engagement, and highlights the functional advantages of the platform. Aligning gamification strategies more closely with these mechanisms can help Strava improve both long-term user retention and monetization in a sustainable manner.

9. Limitations and Future Research

Despite the findings provided by this study, several limitations should be considered when interpreting the results.

First, the quantitative analysis is based on a convenience sample of active Strava users recruited via online channels. As a result, individuals with a higher interest in digital fitness platforms and running may be overrepresented. This self-selection bias may limit the generalizability of the findings to more casual or less engaged users.

Secondly, although the study was primarily aimed at runners in the DACH region, a small proportion of participants came from other regions. Although it is not to be expected that the psychological mechanisms examined, such as gamification, motivation, perceived social pressure, and engagement, vary systematically depending on nationality, this regional heterogeneity slightly limits the strict generalizability of the results to the DACH context.

Third, the study follows a cross-sectional design and relies on self-reported data. While this approach is suitable for capturing subjective perceptions and motivational states, it does not allow for causal conclusions. Furthermore, self-reported measurements can be influenced by social desirability or memory distortions, especially with regard to motivation and usage behavior.

Another limitation concerns the scope of the study. The analysis focuses exclusively on the Strava platform and on running as a single sport. Therefore, the results cannot be directly transferred to other digital fitness platforms or sports contexts, which may differ in terms of usage logic, user motivation, and gamification design.

Finally, the qualitative interviews conducted in this study primarily served an exploratory and supportive function. They were used to validate the conceptual model and support hypothesis development, rather than to generate independent empirical findings. Therefore, the qualitative findings were not systematically integrated into the statistical analysis and should be interpreted as contextual rather than confirmatory evidence.

Based on these limitations, several approaches for future research emerge. Future studies could conduct longitudinal investigations to examine how motivation, engagement, and usage behavior develop over time and whether the effects of gamification persist or change with continued use of the platform. The inclusion of objective behavioral data, such as actual training frequency or app usage records, could further strengthen the validity of the results and reduce reliance on self-reported measures.

Furthermore, comparative studies between different digital fitness platforms or sports could provide deeper insights into how different gamification strategies influence user behavior in different contexts. Further differentiation between user segments, for example based on experience level, training goals, or competitive orientation, could also help explain why gamification is more effective for some users than others.

Finally, future research could examine the interaction between gamification and functional value in more detail, exploring the conditions under which playful elements increase motivation and engagement without creating social pressure. Such research would contribute to the refinement of existing theoretical models while providing actionable guidelines for the design of sustainable and user-centered digital fitness platforms.

10. Conclusion

The aim of this master's thesis was to investigate how gamification elements on the digital fitness platform Strava influence the usage behavior of runners, with a particular focus on

motivation, perceived social pressure, user engagement, and continued platform usage, including premium intentions.

The findings show that gamification on Strava primarily works through motivational pathways. A stronger perception of gamification features is associated with higher user motivation, which in turn leads to greater loyalty to the platform. Loyalty proves to be an important factor for long-term use and willingness to use premium features. In contrast, no significant correlations were found between gamification and perceived social pressure or between social pressure and loyalty, suggesting that social comparison mechanisms play a minor and largely situational role in shaping user behavior.

Overall, this study shows that gamification in digital fitness platforms such as Strava is most effective when it supports motivation and promotes sustained engagement. Rather than individual game elements determining behavior on their own, the long-term success of the platform seems to depend on how well gamification is integrated into users' training routines and offers meaningful functional value. These findings contribute to a deeper understanding of the mechanisms through which gamification can support long-term engagement and platform loyalty in the digital fitness context.

AI Disclaimer: This document has been reviewed for linguistic accuracy and clarity using AI tools.

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Appendices

Appendix 1: Interview Resumes

Interview 1 (25 years old, advanced runner)

Has been using Strava for two years and trains regularly. Gamification elements such as kudos and group runs are perceived as motivating, but have little influence on engagement. Segment times and rankings play a minor role, as training is mainly tracked via Garmin. Continued and premium use is not motivated by gamification; social comparison is perceived as both positive and overly competitive.

Interview 2 (25 years old, beginner)

Has been using the free version of Strava for six months. Kudos, challenges, and visible progress are found to be very motivating and support continuity in training. Continued use is likely, while premium features are not considered relevant. Community elements and connections to running clubs are particularly appreciated.

Interview 3 (26 years old, advanced)

Has been using Strava for two years. Gamification elements are perceived as both motivating and occasionally stressful, depending on the performance context. Social comparison can reduce engagement on bad days. Continued use depends mainly on community aspects; premium features are not perceived as providing sufficient added value.

Interview 4 (33 years old, marathon runner)

Has been using Strava for three years and has a premium account. Challenges, leaderboards, and advanced analytics are highly motivating and encourage positive competition. Engagement is very high, and continued use and premium usage are evident. While gamification is perceived as supportive, the comprehensive features and device connectivity are the main drivers.

Interview 5 (24 years old, beginner)

Has been using Strava for a year. Gamification plays a minor and largely neutral role in training behavior. Continued use is mainly motivated by personal discipline and social contacts. Premium features are not considered necessary; community aspects are perceived as most important.

Interview 6 (28 years old, advanced)

Has been using Strava for two years and has a premium account. Challenges, badges, and leaderboards are seen as motivating, with the focus on self-comparison. Gamification increases engagement primarily through measurability and analysis functions. Premium features play an important role, although gamification itself is not the main reason for using the app.

Interview 7 (22 years old, beginner)

Has been using Strava for three months. Milestone badges and small achievements are found to be very motivating and encourage regular training. Continued use is likely, while premium features are not relevant.

Interview 8 (26 years old, half marathon)

Has been using Strava for two years. Segment times are perceived as both motivating and stressful, depending on performance phase. Engagement fluctuates over time. Continued use is mainly motivated by community aspects; premium features are seen as potentially useful for route planning.

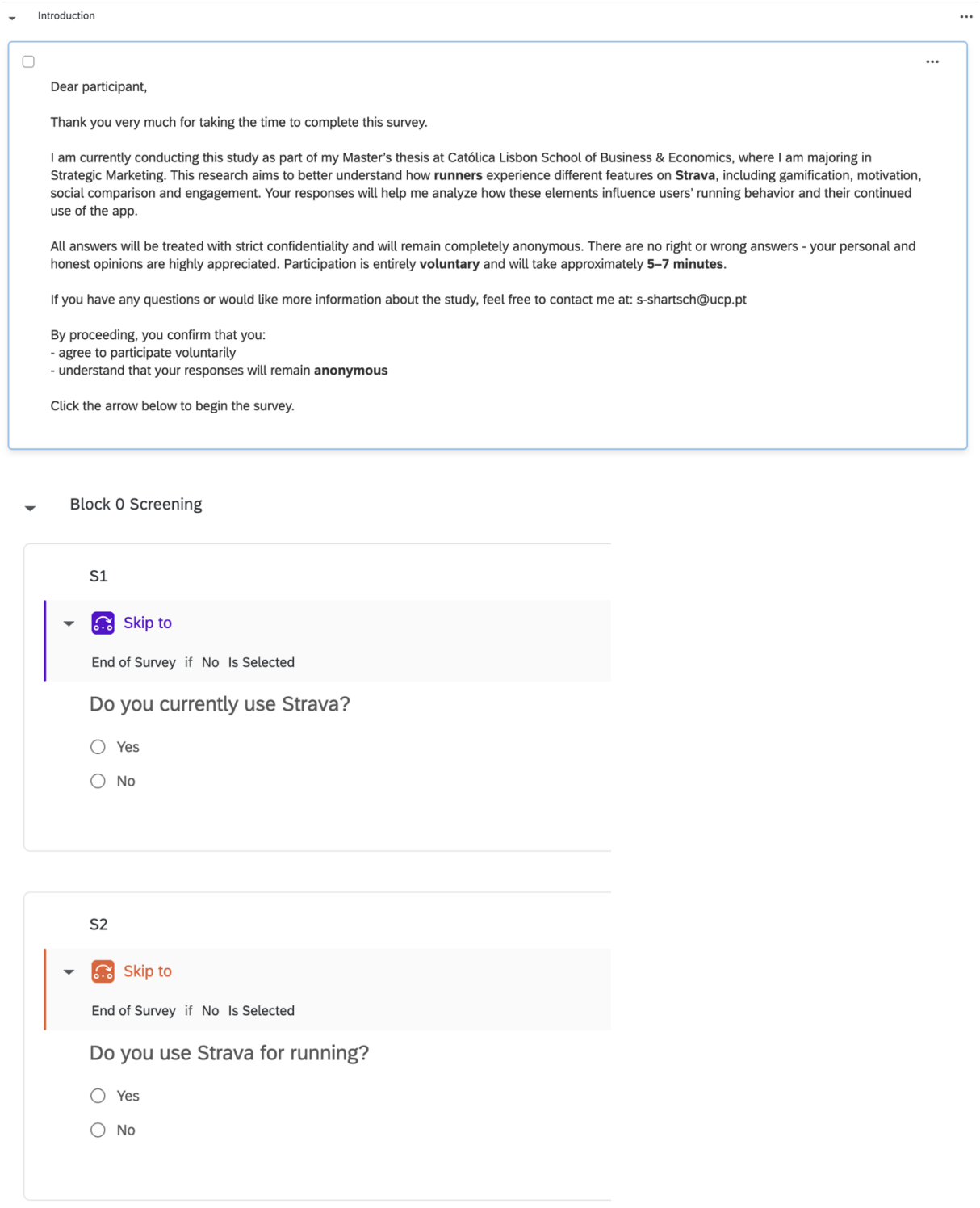
Interview 9 (27 years old, advanced)

Has been using Strava for a year and a half. Challenges and praise easily increase motivation, especially when friends are active. Social comparisons are noticeable but are not perceived as stressful. Engagement is encouraged by joint activities; gamification has a moderate influence on continued use. Premium features are not relevant.

Interview 10 (28 years old, advanced)

Has been using Strava for two years. Training takes precedence over app-based features. Gamification has little influence on usage, while community elements are perceived as motivating. Continued use is very likely; premium features are not needed.

Appendix 2: Survey Questionnaire



Block 1 - Running & Strava Profil

Q1

Do you currently use Strava Premium?

- ◯ Yes, I have an active subscription
- ◯ No, I use the free version

Q2

How long have you been using Strava?

- ◯ Less than 6 months
- ◯ 6-12 months
- ◯ 1-2 years
- ◯ 2-4 years
- ◯ More than 4 years

Q3

How would you describe your running experience?

- ◯ Beginner (0–1 year)
- ◯ Intermediate (1–3 years)
- ◯ Advanced (3+ years)
- ◯ Competitive / performance-oriented runner

Q4

How often do you run per week?

- ◯ Less than once per week
- ◯ 1-2 times per week
- ◯ 3-4 times per week
- ◯ 5 or more times per week

Block 2 - Gamification

Please indicate how much you agree or disagree with the following statements.

Q5

Strava's challenges, badges and progress features make the app feel engaging.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q6

The competitive elements (leaderboards, segment rankings) on Strava make my running experience more exciting.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q7

Receiving kudos or comments increases the sense of fun when using Strava.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q8

Visible progress indicators (badges, monthly recaps) motivate me to use Strava more regularly.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q9

Gamified features on Strava make running feel more playful and interactive.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Block 3 - Motivation

Q10

Using Strava makes me feel competent in tracking and improving my performance.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q11

Strava allows me to set and pursue running goals in a way that feels self-directed.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q12

I feel connected to others when using Strava.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Q13

Strava encourages me to stay motivated in my running routine.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Q14

I enjoy using Strava because its features support my personal goals.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Block 4 - Perceived Social Pressure

Q15

Seeing other runners' performance on Strava makes me feel pressured to perform better.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q16

Leaderboards and segment rankings sometimes make me feel judged or evaluated.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q17

I sometimes feel stressed when my performance is worse than that of my friends on Strava.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q18

Competitive features on Strava create pressure to run more or run faster.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Block 5 - Engagement

Q19

I actively check my Strava feed and my running statistics.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Q20

I regularly upload and document my runs on Strava.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Q21

I interact with others on Strava (e.g., kudos, comments).

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Q22

Using Strava feels like an important part of my running routine.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Q23

I feel emotionally engaged with the running community on Strava.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q24

To ensure data quality, please select "Agree" for this statement.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Block 6 - Continued Use/ Premium Intention

Q25

I intend to continue using Strava regularly in the future.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

Q26

Strava is my preferred app for tracking my runs.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Q27

I am interested in using (or continuing to use) Strava's premium features.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Q28

If Strava introduced new advanced features, I would consider subscribing to (or continuing with) Premium.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neither agree nor disagree
- ◯ Somewhat agree
- ◯ Agree
- ◯ Strongly agree

Block 7 - Demographics

Q29

What is your age?

- ○ Under 18
- ○ 18 - 24
- ○ 25 - 34
- ○ 35 - 44
- ○ 45 - 54
- ○ 55 - 64
- ○ 65 - 74
- ○ 75 - 84
- ○ 85 or older

Q30

What is your gender?

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

Q31

Where do you currently live?

Germany

Q32

What is your nationality?

Click here to edit choices

Germany

Appendix 3: Survey Results / SPSS Output

Appendix 3.1: Descriptive Statistic

Frequencies

Statistics

		Do you currently use Strava Premium?	How long have you been using Strava?	How would you describe your running experience?	How often do you run per week?	What is your age?	What is your gender?	Where do you currently live?	What is your nationality?
N	Valid	94	94	94	94	94	93	94	94
	Missing	0	0	0	0	0	1	0	0
Mean		1.81	2.55	2.05	2.26	2.97	1.69	43.34	42.02
Std. Deviation		.396	1.054	.847	.638	.538	.531	14.929	12.368
Minimum		1	1	1	1	2	1	9	9
Maximum		2	5	4	4	5	4	92	92

Frequency Table

Do you currently use Strava Premium?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, I have an active subscription	18	19.1	19.1	19.1
	No, I use the free version	76	80.9	80.9	100.0
	Total	94	100.0	100.0	

How long have you been using Strava?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 6 months	17	18.1	18.1	18.1
	6-12 months	28	29.8	29.8	47.9
	1-2 years	32	34.0	34.0	81.9
	2-4 years	14	14.9	14.9	96.8
	More than 4 years	3	3.2	3.2	100.0
	Total	94	100.0	100.0	

How would you describe your running experience?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Beginner (0-1 year)	26	27.7	27.7	27.7
	Intermediate (1-3 years)	42	44.7	44.7	72.3
	Advanced (3+ years)	21	22.3	22.3	94.7
	Competitive / performance-oriented runner	5	5.3	5.3	100.0
	Total	94	100.0	100.0	

How often do you run per week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than once per week	9	9.6	9.6	9.6
	1-2 times per week	53	56.4	56.4	66.0
	3-4 times per week	31	33.0	33.0	98.9
	5 or more times per week	1	1.1	1.1	100.0
	Total	94	100.0	100.0	

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 - 24	14	14.9	14.9	14.9
	25 - 34	70	74.5	74.5	89.4
	35 - 44	9	9.6	9.6	98.9
	45 - 54	1	1.1	1.1	100.0
	Total	94	100.0	100.0	

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	31	33.0	33.3	33.3
	Female	61	64.9	65.6	98.9
	Prefer not to say	1	1.1	1.1	100.0
	Total	93	98.9	100.0	
Missing	System	1	1.1		
Total		94	100.0		

Where do you currently live?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Austria	4	4.3	4.3	4.3
	Germany	79	84.0	84.0	88.3
	Portugal	6	6.4	6.4	94.7
	Spain	2	2.1	2.1	96.8
	Switzerland	1	1.1	1.1	97.9
	Turkey	1	1.1	1.1	98.9
	United States	1	1.1	1.1	100.0
	Total	94	100.0	100.0	

What is your nationality?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Austria	3	3.2	3.2	3.2
	Germany	83	88.3	88.3	91.5
	Indonesia	1	1.1	1.1	92.6
	Netherlands	1	1.1	1.1	93.6
	Portugal	3	3.2	3.2	96.8
	Turkey	1	1.1	1.1	97.9
	United Kingdom	1	1.1	1.1	98.9
	United States	1	1.1	1.1	100.0
	Total	94	100.0	100.0	

Frequencies

Statistics

		Seeing other runners' performance on Strava makes me feel pressured to perform better.	Leaderboards and segment rankings sometimes make me feel judged or evaluated.	I sometimes feel stressed when my performance is worse than that of my friends on Strava.	Competitive features on Strava create pressure to run more or run faster.
N	Valid	94	94	94	94
	Missing	0	0	0	0
Mean		4.61	4.44	3.97	4.69
Std. Deviation		1.475	1.411	1.527	1.422
Minimum		1	1	1	1
Maximum		7	7	7	7

Frequency Table

Seeing other runners' performance on Strava makes me feel pressured to perform better.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	3.2	3.2	3.2
	Disagree	10	10.6	10.6	13.8
	Somewhat disagree	8	8.5	8.5	22.3
	Neither agree nor disagree	10	10.6	10.6	33.0
	Somewhat agree	35	37.2	37.2	70.2
	Agree	25	26.6	26.6	96.8
	Strongly agree	3	3.2	3.2	100.0
	Total	94	100.0	100.0	

Leaderboards and segment rankings sometimes make me feel judged or evaluated.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	3.2	3.2	3.2
	Disagree	10	10.6	10.6	13.8
	Somewhat disagree	7	7.4	7.4	21.3
	Neither agree nor disagree	20	21.3	21.3	42.6
	Somewhat agree	34	36.2	36.2	78.7
	Agree	17	18.1	18.1	96.8
	Strongly agree	3	3.2	3.2	100.0
	Total	94	100.0	100.0	

I sometimes feel stressed when my performance is worse than that of my friends on Strava.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	4.3	4.3	4.3
	Disagree	16	17.0	17.0	21.3
	Somewhat disagree	12	12.8	12.8	34.0
	Neither agree nor disagree	30	31.9	31.9	66.0
	Somewhat agree	16	17.0	17.0	83.0
	Agree	11	11.7	11.7	94.7
	Strongly agree	5	5.3	5.3	100.0
	Total	94	100.0	100.0	

Competitive features on Strava create pressure to run more or run faster.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	2.1	2.1	2.1
	Disagree	9	9.6	9.6	11.7
	Somewhat disagree	7	7.4	7.4	19.1
	Neither agree nor disagree	12	12.8	12.8	31.9
	Somewhat agree	38	40.4	40.4	72.3
	Agree	20	21.3	21.3	93.6
	Strongly agree	6	6.4	6.4	100.0
	Total	94	100.0	100.0	

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
GAM_mean	94	2.40	7.00	5.2596	.80152
MOT_mean	94	1.00	7.00	5.4532	.75073
SOC_mean	94	1.00	6.50	4.4255	1.19465
ENG_mean	94	1.00	6.80	5.0128	1.08194
PI_mean	94	2.50	7.00	5.0532	.78961
Valid N (listwise)	94				

Appendix 3.2: Reliability Analysis

Appendix 3.2.1: Gamification

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.709	.706	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Strava's challenges, badges and progress features make the app feel engaging.	21.01	11.516	.521	.287	.645
The competitive elements (leaderboards, segment rankings) on Strava make my running experience more exciting.	21.21	10.234	.509	.433	.643
Receiving kudos or comments increases the sense of fun when using Strava.	20.78	13.272	.204	.100	.753
Visible progress indicators (badges, monthly recaps) motivate me to use Strava more regularly.	21.09	10.767	.510	.312	.643
Gamified features on Strava make running feel more playful and interactive.	21.11	9.343	.615	.498	.591

Appendix 3.2.2: Motivation

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.781	.780	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Using Strava makes me feel competent in tracking and improving my performance.	21.46	10.961	.464	.293	.769
Strava allows me to set and pursue running goals in a way that feels self-directed.	21.71	9.777	.520	.380	.752
I feel connected to others when using Strava.	21.95	8.373	.637	.414	.711
Strava encourages me to stay motivated in my running routine.	22.11	9.408	.547	.407	.743
I enjoy using Strava because its features support my personal	21.84	9.039	.623	.443	.717

Appendix 3.2.3: Social Pressure

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.836	.836	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Seeing other runners' performance on Strava makes me feel pressured to perform better.	13.10	14.389	.560	.340	.839
Leaderboards and segment rankings sometimes make me feel judged or evaluated.	13.27	13.251	.739	.552	.761
I sometimes feel stressed when my performance is worse than that of my friends on Strava.	13.73	12.670	.720	.551	.767
Competitive features on Strava create pressure to run more or run faster.	13.01	13.882	.654	.462	.798

Appendix 3.2.4: Engagement

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.824	.827	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I actively check my Strava feed and my running statistics.	20.00	20.237	.573	.391	.802
I regularly upload and document my runs on Strava.	19.40	20.458	.563	.442	.805
I interact with others on Strava (e.g., kudos, comments).	20.40	17.233	.729	.565	.754
Using Strava feels like an important part of my running routine.	19.65	20.918	.661	.472	.784
I feel emotionally engaged with the running community on Strava.	20.80	18.916	.596	.418	.798

Appendix 3.2.5: Premium Intention

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.613	.624	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I intend to continue using Strava regularly in the future.	14.43	8.011	.345	.299	.591
Strava is my preferred app for tracking my runs.	14.66	7.496	.276	.292	.618
I am interested in using (or continuing to use) Strava's premium features.	16.03	4.504	.504	.413	.458
If Strava introduced new advanced features, I would consider subscribing to (or continuing with) Premium.	15.52	5.327	.518	.413	.438

Appendix 3.3: Correlation Matrix

Correlations

		GAM_mean	MOT_mean	SOC_mean	ENG_mean	PI_mean
GAM_mean	Pearson Correlation	1	.711**	.153	.596**	.445**
	Sig. (2-tailed)		<.001	.141	<.001	<.001
	N	94	94	94	94	94
MOT_mean	Pearson Correlation	.711**	1	.289**	.662**	.551**
	Sig. (2-tailed)	<.001		.005	<.001	<.001
	N	94	94	94	94	94
SOC_mean	Pearson Correlation	.153	.289**	1	.164	-.006
	Sig. (2-tailed)	.141	.005		.114	.956
	N	94	94	94	94	94
ENG_mean	Pearson Correlation	.596**	.662**	.164	1	.654**
	Sig. (2-tailed)	<.001	<.001	.114		<.001
	N	94	94	94	94	94
PI_mean	Pearson Correlation	.445**	.551**	-.006	.654**	1
	Sig. (2-tailed)	<.001	<.001	.956	<.001	
	N	94	94	94	94	94

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

Appendix 3.4: Hypothesis Testing

Appendix 3.4.1: H1

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	GAM_mean[b]	.	Enter

a. Dependent Variable: MOT_mean

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.711[a]	.505	.500	.53084	.505	94.001	1	92	<.001	1.708

a. Predictors: (Constant), GAM_mean

b. Dependent Variable: MOT_mean

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.489	1	26.489	94.001	<.001[b]
	Residual	25.925	92	.282		
	Total	52.414	93			

a. Dependent Variable: MOT_mean

b. Predictors: (Constant), GAM_mean

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.951	.365		5.341	<.001					
	GAM_mean	.666	.069	.711	9.695	<.001	.711	.711	.711	1.000	1.000

a. Dependent Variable: MOT_mean

Appendix 3.4.2: H2

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	GAM_mean[b]	.	Enter

a. Dependent Variable: MOT_mean
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.711[a]	.505	.500	.53084	.505	94.001	1	92	<.001	1.708

a. Predictors: (Constant), GAM_mean
b. Dependent Variable: MOT_mean

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.489	1	26.489	94.001	<.001[b]
	Residual	25.925	92	.282		
	Total	52.414	93			

a. Dependent Variable: MOT_mean
b. Predictors: (Constant), GAM_mean

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.951	.365		5.341	<.001					
	GAM_mean	.666	.069	.711	9.695	<.001	.711	.711	.711	1.000	1.000

a. Dependent Variable: MOT_mean

Appendix 3.4.3: H3

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	MOT_mean[b]	.	Enter

a. Dependent Variable: ENG_mean
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.662[a]	.438	.432	.81519	.438	71.822	1	92	<.001	2.013

a. Predictors: (Constant), MOT_mean
b. Dependent Variable: ENG_mean

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47.728	1	47.728	71.822	<.001[b]
	Residual	61.137	92	.665		
	Total	108.865	93			

a. Dependent Variable: ENG_mean
b. Predictors: (Constant), MOT_mean

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.191	.620		-.308	.759					
	MOT_mean	.954	.113	.662	8.475	<.001	.662	.662	.662	1.000	1.000

a. Dependent Variable: ENG_mean

Appendix 3.4.5: H4

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	SOC_mean[b]	.	Enter

a. Dependent Variable: ENG_mean

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.164[a]	.027	.016	1.07303	.027	2.550	1	92	.114	1.867

a. Predictors: (Constant), SOC_mean

b. Dependent Variable: ENG_mean

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.936	1	2.936	2.550	.114[b]
	Residual	105.929	92	1.151		
	Total	108.865	93			

a. Dependent Variable: ENG_mean

b. Predictors: (Constant), SOC_mean

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	4.355	.427		10.203	<.001					
	SOC_mean	.149	.093	.164	1.597	.114	.164	.164	.164	1.000	1.000

a. Dependent Variable: ENG_mean

Appendix 3.4.6: H5

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	ENG_mean[b]	.	Enter

a. Dependent Variable: PI_mean

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.654[a]	.427	.421	.60079	.427	68.646	1	92	<.001	2.171

a. Predictors: (Constant), ENG_mean

b. Dependent Variable: PI_mean

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.777	1	24.777	68.646	<.001[b]
	Residual	33.207	92	.361		
	Total	57.984	93			

a. Dependent Variable: PI_mean

b. Predictors: (Constant), ENG_mean

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.662	.295		9.016	<.001					
	ENG_mean	.477	.058	.654	8.285	<.001	.654	.654	.654	1.000	1.000

a. Dependent Variable: PI_mean

Appendix 3.5: T-Test

T-Test

[DataSet2] /Users/sophiahartsch/Downloads/Strava & Gamification (Thesis)_December 8, 2025_13.51.sav

Group Statistics

	Do you currently use Strava Premium?	N	Mean	Std. Deviation	Std. Error Mean
MOT_mean	Yes, I have an active subscription	18	5.7556	.43144	.10169
	No, I use the free version	76	5.3816	.79342	.09101
ENG_mean	Yes, I have an active subscription	18	5.6333	.36461	.08594
	No, I use the free version	76	4.8658	1.14328	.13114
PI_mean	Yes, I have an active subscription	18	5.9444	.47400	.11172
	No, I use the free version	76	4.8421	.69743	.08000

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean	Std. Error	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Difference	Difference	Lower	Upper
MOT_mean	Equal variances assumed	1.314	.255	1.928	92	.028	.057	.37398	.19398	-.01128	.75923
	Equal variances not assumed			2.740	48.139	.004	.009	.37398	.13647	.09960	.64835
ENG_mean	Equal variances assumed	16.250	<.001	2.804	92	.003	.006	.76754	.27369	.22397	1.31111
	Equal variances not assumed			4.895	84.499	<.001	<.001	.76754	.15679	.45577	1.07932
PI_mean	Equal variances assumed	3.760	.056	6.354	92	<.001	<.001	1.10234	.17349	.75777	1.44691
	Equal variances not assumed			8.022	36.715	<.001	<.001	1.10234	.13741	.82384	1.38083

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval Lower	Upper
MOT_mean	Cohen's d	.74000	.505	-.015	1.023
	Hedges' correction	.74610	.501	-.015	1.015
	Glass's delta	.79342	.471	-.049	.989
ENG_mean	Cohen's d	1.04409	.735	.209	1.258
	Hedges' correction	1.05270	.729	.207	1.248
	Glass's delta	1.14328	.671	.144	1.194
PI_mean	Cohen's d	.66185	1.666	1.095	2.229
	Hedges' correction	.66730	1.652	1.086	2.211
	Glass's delta	.69743	1.581	1.004	2.149

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control (i.e., the second) group.