The Contribution of Self-Compassion and Social Support to the Mental Health of Coaches and Athletes in Elite Sport

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There is no health without mental health.

World Health Organization, 2005

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Summary

The mental health of athletes and coaches in elite sports has become a growing focus in both research and practice, yet there remains a gap in understanding how key psychosocial factors, such as self-compassion and social support, contribute to mental health and well-being in this high-performance context. This dissertation addresses this gap by examining the roles of self-compassion and social support in promoting mental health among athletes and coaches, adopting a comprehensive approach grounded in established psychological models. The research explores three primary questions, utilizing two longitudinal designs for coaches and a mixed-methods approach for transitioning elite athletes.

The first research question investigates the long-term stability of burnout, self-compassion, and social support in sports coaches. This was explored through a longitudinal study, revealing high interindividual, intraindividual, and structural stability over six months. The findings demonstrate that, at each measurement point, self-compassion and social support were negatively associated with burnout, providing important insights into the psychological resilience of coaches.

The second research question expands the literature on positive mental health (PMH) in coaches by focusing on the longitudinal measurement of emotional, psychological, and social well-being using the Mental Health Continuum Short Form (MHC-SF). This study confirms the stability of PMH in coaches, highlighting the validity of the MHC-SF as an instrument for tracking PMH over time in sports contexts.

The third research question focuses on elite athletes, exploring the role of self-compassion and social support during the junior-to-senior transition. A mixed-methods study investigates how these psychosocial resources help athletes navigate the stress of this transition, as well as the strategies and challenges they encounter. The results demonstrate that self-compassion plays a critical role in managing anxiety, depression, and well-being, while the role of social support requires further exploration, as it serves as both a major resource and a potential challenge when not adequately provided.

The results of this dissertation are integrated into the broader research field, and practical implications for mental health interventions in elite sports are offered. The dissertation also acknowledges the strengths and limitations of the research and suggests avenues for future investigation to enhance mental health support structures in high-performance sports environments.

Publications included in the present dissertation

1) **Ackeret, N**., Röthlin, P., Allemand, M., Krieger, T., Berger, T., Znoj, H., Kenttä, G., Birrer, D., & Horvath, S. (2022). Six-month stability of individual differences in sports coaches' burnout, self-compassion and social support. *Psychology of Sport and Exercise*, *61*, 102207. https://doi.org/10.1016/j.psychsport.2022.102207

2) **Ackeret, N**., Röthlin, P., Horvath, S., & Allemand, M. (2024). Positive mental health among sports coaches: A 6-month longitudinal study. *Sport, Exercise, and Performance Psychology, 13*(1), 76–88. https://doi.org/10.1037/spy0000335

3) **Ackeret, N**., Röthlin, P., & Horvath, S. (2024). Factors contributing to elite athletes' mental health in the junior-to-senior transition: A mixed methods study. *Psychology of Sport and Exercise*, *73*, 102645. https://doi.org/10.1016/j.psychsport.2024.102645

List of abbreviations

[IOC]	International Olympic Committee
[JST]	Junior-to-senior transition
[PMH]	Positive mental health
[WHO]	World Health Organization

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1 Introduction

Mental health is increasingly recognized as a critical factor in athlete development within high-performance sports, serving as a vital resource both during an athlete's career and in their post-athletic life (Henriksen et al., 2019). Several national sports federations and international professional associations have issued position statements calling for a greater emphasis on athletes' mental health in both practice and research (Schinke et al., 2024; Vella et al., 2021). Simultaneously, world-renowned athletes such as Simone Biles, Michael Phelps, and Naomi Osaka have spoken openly about their mental health struggles (Bachynski, 2021; Bleinder, 2021; Longman, 2021), driving public awareness on the challenges faced by elite athletes. This growing recognition marks a shift from the traditional 'winning-at-all-costs' mindset. Instead, mental health is now seen as a vital part of a culture of excellence in sports (Henriksen et al., 2019; Stambulova et al., 2020).

According to the WHO, mental health is "a state of well-being in which an individual realizes their own abilities, can cope with the normal stresses of life, can work productively, and is able to contribute to their community" (WHO, 2014). This broad definition underscores that mental health is an integral part of overall health, incorporating physical, psychological, and social well-being (Keyes & Annas, 2009; Keyes et al., 2002; Westerhof & Keyes, 2010). Two key principles follow from this perspective: First, there is no health without mental health, and second, mental health is more than just the absence of mental disorders. In recent years, the focus has shifted from a predominantly pathogenic model, which looks at disease and dysfunction, toward a more salutogenic approach that emphasizes resilience, well-being, and psychological resources (Keyes, 2014). This shift encourages not only the prevention of mental illness (e.g., anxiety, depression, or burnout) but also the active promotion of well-being through factors that support mental health. Recognizing the complexity and multidimensionality of mental health, it is essential to adopt models that reflect this broader perspective (Henriksen et al., 2019).

In the context of high-performance sports, maintaining mental health is crucial for sustaining both performance and long-term well-being (Henriksen et al., 2019). Elite athletes face unique pressures, including constant performance demands, the risk of injuries, and public scrutiny (Purcell et al., 2019). Moreover, perfectionism, fear of failure, identity foreclosure, injuries, and career transitions are common risk factors that exacerbate mental health challenges in this context (Kuettel & Larsen, 2020; Stambulova et al., 2020). While discussions about mental health in sport often focus primarily

on athletes, it is equally important to recognize the mental health of coaches (Frost et al., 2024). Like athletes, coaches are exposed to significant context-specific stressors and pressures—such as long, irregular working hours, job insecurity, work-family conflicts, and high emotional investment (Fletcher & Scott, 2010; Frey, 2007)—making them vulnerable to mental health symptoms and disorders at rates that are comparable to or even higher than those in the general population (Baumann et al., 2024). Stambulova (2020) introduced the concept of "career excellence", which refers to the ability to sustain a healthy, successful, and long-lasting career in both sports and life. While this concept was initially applied to athletes, it is equally relevant to coaches, as their mental health is crucial not only for their personal fulfillment and career longevity but also for the athletes they guide, as a coach's mental health directly impacts the performance and mental health of their athletes (Stebbings et al., 2012). Thus, promoting the mental health of coaches is not only critical for their personal and professional development but also integral to nurturing their own athletes' thriving.

As the importance of mental health in elite sport has become more widely recognized, there has been a growing focus on psychosocial resources that can help mitigate the negative effects of the pressures associated with high-performance environments (Bryan et al., 2023). Two such resources—self-compassion and social support—have emerged as key protective factors that enable individuals in elite sport to manage stress and maintain mental health (Mosewich et al., 2019; Purcell et al., 2022). While the role of self-compassion and social support in athletes' mental health has been increasingly explored (e.g., Cormier et al., 2023; Röthlin et al., 2019), research on the mental health benefits of self-compassion for coaches remains in its early stages (Hägglund, Kenttä, Wagstaff, et al., 2024). Specifically, how self-compassion, social support, and mental health in coaches behave over time or during critical athlete transitions remains underexplored. This dissertation seeks to address these gaps by investigating the longitudinal trajectories of self-compassion, social support, and mental health in coaches as well as the role of self-compassion and social support in the stress process of athletes in the JST. The following section delves into the key theoretical foundations of mental health, self-compassion, and social support, providing the conceptual framework for this dissertation.

2 Theoretical Background

2.1 Understanding of Mental Health

Mental health is a multifaceted construct, shaped by a combination of biological, psychological, social, and lifestyle factors (Braveman & Gottlieb, 2014). Researchers have employed

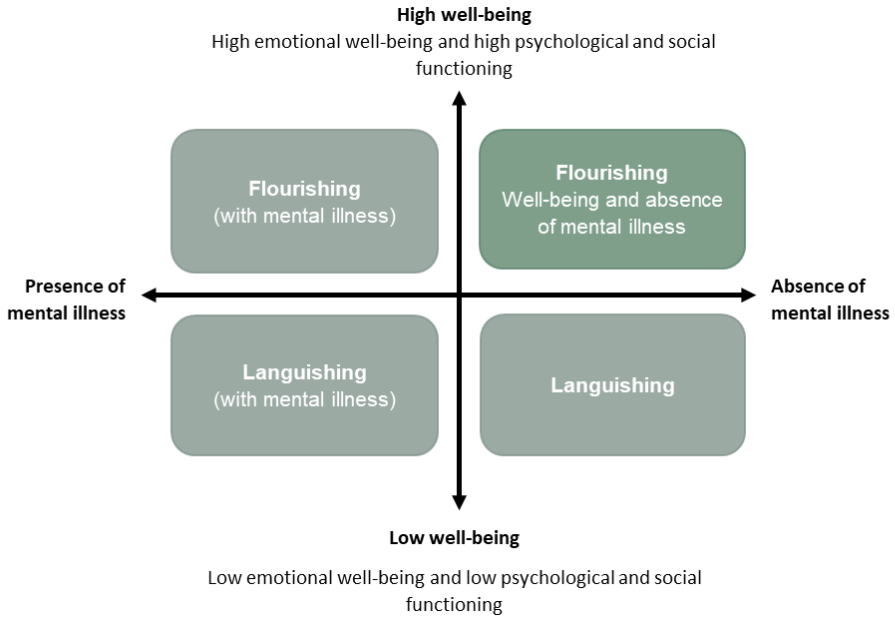
various definitions and frameworks to conceptualize mental health in high-performance contexts, and it appears unlikely that a consensus on a single, uniform definition will be reached in the near future (Lundqvist & Andersson, 2021). While this diversity poses challenges—such as the difficulty in comparing studies that, based on different conceptual understandings, use different measurement tools—it underscores the importance of explicitly stating the theoretical perspectives that guide one's research.

In this dissertation, the WHO's (2014) definition of mental health is adopted, which emphasizes well-being, personal growth, and optimal functioning, aligning with the principles of positive psychology (Seligman, 2004, 2008). This definition transcends the absence of mental illness, focusing instead on the holistic nature of well-being as integral to mental health. This holistic definition fits well with modern approaches in sport psychology, where well-being is considered central to optimal mental health, especially in high-performance environments (Henriksen et al., 2019; Schinke et al., 2024).

However, the demands and pressures of high-performance environments introduce unique challenges that differ from those in everyday contexts, making it essential to adopt a more nuanced understanding of mental health. Keyes' dual-continuum model of mental health (Keyes, 2002; Figure 1) provides a valuable framework that complements the WHO’s definition by distinguishing between mental health and mental illness as distinct but interrelated dimensions (Huppert & Whittington, 2003; Keyes, 2005; Lamers et al., 2011; Weich et al., 2011; Westerhof & Keyes, 2010). With this distinction, on one axis, mental health ranges from languishing (low well-being) to flourishing (high well-being), while on the other axis, mental illness spans from low to high symptom severity.

Figure 1

Dual-Continuum Model of Mental Health



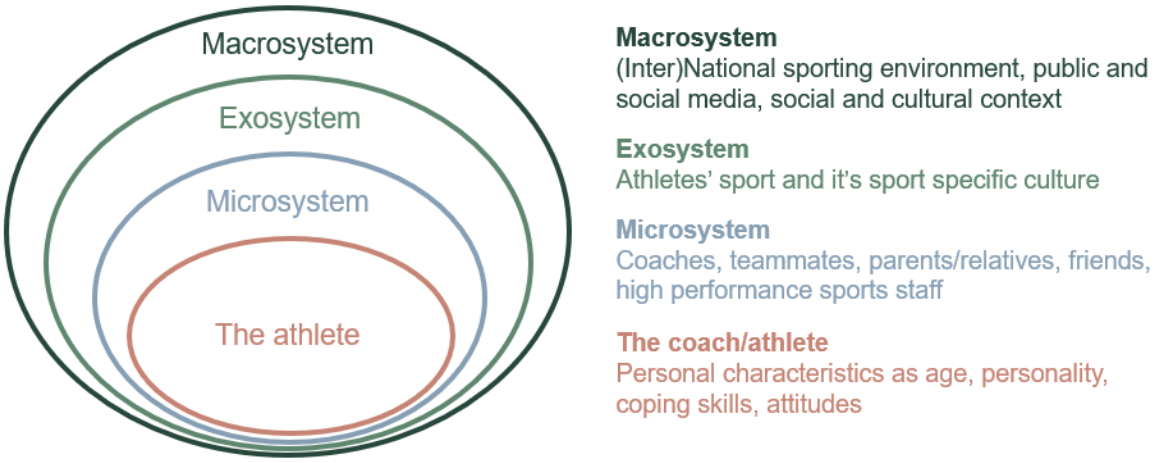
Note. Adapted from (Schuler et al., 2020), based on Keyes (2005, 2007) and Westerhof and Keyes (2010).

The dual-continuum model of mental health challenges the traditional view that mental health is either the absence of illness or the presence of good health (Henriksen et al., 2019; Schinke et al., 2017). Athletes and coaches often face high-performance demands, which can lead to simultaneous occurrences of positive (e.g., well-being and motivation) and negative psychological experiences (e.g., performance anxiety; Gorczynski et al., 2020; Kuettel & Larsen, 2020; Rice et al., 2016). The dual-continuum model captures this complexity by illustrating that well-being and psychological distress can coexist, offering a more comprehensive understanding of mental health in high-performance environments (Henriksen et al., 2020; Lundqvist & Andersson, 2021; Schinke et al., 2024). Further, the model highlights the need to not only prevent negative mental health outcomes but also actively promote well-being (Keyes, 2002). Keyes (2005) emphasizes that well-being cannot be achieved solely by addressing an individual's problems, and evidence indicates that promoting well-being differs from preventing mental illness (MacDonald, 2006; Westerhof & Keyes, 2010; WHO, 2004), with well-being playing a protective role against psychopathology (Grant et al., 2013; Keyes et al., 2010; Lamers et al., 2015; Wood & Joseph, 2010). The dual-continuum model is thus particularly applicable in elite sports, as it acknowledges the dynamic and fluctuating nature of mental health.

Understanding mental health in elite sports further requires considering the broader environmental context (Schinke et al., 2024). Purcell et al. (2019) proposed an ecological systems model that expands the understanding of mental health by emphasizing how athletes are influenced by multiple layers of their environment (Figure 2). While the model was initially centered around athlete mental health, it is noteworthy to say that it can also be adapted to other stakeholders in performance sports, such as coaches, support staff, administrators, and parents. To illustrate the model, the case of athletes will be used for further explanation.

Figure 2

An Ecological Systems Model for Elite Athlete Mental Health



Note. Adapted from Purcell et al. (2019).

Based on Bronfenbrenner's ecological systems theory (1992), the model suggests that athletes' mental health is shaped not only by internal factors such as personal characteristics, coping skills, or attitudes, but also by their interactions within and across different systems (Purcell et al., 2019). The microsystem involves the direct social interactions that athletes engage in daily. This includes relationships with coaches, teammates, peers, and family members, which have a profound impact on mental health. Positive, supportive relationships in this context can foster resilience and well-being, while negative interactions can exacerbate stress and contribute to mental health issues (DeFreese & Habeeb, 2023). In contrast, the exosystem includes indirect influences, such as organizational policies, which, although not part of the athlete's daily interactions, still shape the broader environment that affects their mental health. For example, a coach's philosophy and how it aligns with family support or organizational values can indirectly affect the athlete's mental health and

well-being (O'Donnell et al., 2022). Finally, the macrosystem encompasses societal and cultural values and expectations, such as the pressure to succeed at the highest levels of sport, often at the cost of mental health. These broader societal norms can create additional stressors for athletes, influencing their perception of success, failure, and self-worth (Walton, Purcell, Pilkington, et al., 2024).

Together, Keyes' dual-continuum model and Purcell's ecological systems model provide a comprehensive understanding of mental health, highlighting both individual psychological states and external social and environmental influences. These two models are helpful for developing effective interventions because they encourage a holistic approach that targets both internal factors, such as building on psychological resources like self-compassion and promoting PMH, and external factors, such as fostering supportive environments and promoting healthy systems. In the coming two sub-chapters, the two resources important to this thesis—self-compassion and social support—are being introduced.

2.2 Self-Compassion

Self-compassion, as defined by Neff (2003b), consists of three bipolar components, including self-kindness, mindfulness, and common humanity. Self-kindness refers to treating oneself with the same warmth and care one would offer a close friend during difficult times, instead of self-criticizing oneself. Mindfulness entails maintaining an open and non-judgmental awareness of one's experiences, allowing individuals to neither suppress nor amplify their emotions, contrary to over-identifying with thoughts and feelings of suffering or becoming absorbed in one's reaction to this negative emotion. Common humanity emphasizes understanding that suffering is a universal part of the human experience, reminding us that we are not alone in facing challenges, instead of adopting an isolated 'this only happens to me' approach.

2.2.1 Self-Compassion and Mental Health in the Broader Research Field

Self-compassion has garnered significant scientific attention since Kristin Neff's pioneering work in the early 2000s (2003a, 2003b). In a recent bibliometric review, Swami et al. (2021) analyzed over 2,100 scientific articles on self-compassion in various settings and identified four general themes in the self-compassion literature: (1) mental health and well-being, (2) clinical outcomes, (3) self-perceptions, and (4) physical health and family issues. Relevant to this thesis, a meta-analysis by Zessin et al. (2015) demonstrated a positive relationship between self-compassion and well-being in

various samples, while a systematic review by Kotera and Van Gordon (2021) found that self-compassion interventions have a beneficial impact on well-being in workplace settings. Furthermore, in their systematic review, Querstret et al. (2020) identified self-compassion as a protective factor against anxiety and depression, as supported by both cross-sectional and intervention studies in non-clinical samples. Additionally, Lathren et al. (2021), in a scoping literature review including family, parent-child, romantic, and friendship samples, found that self-compassion is associated with numerous interpersonal relationship benefits, including adaptive parenting behaviors, constructive conflict resolution, and secure attachment.

On the other hand, Muris and Petrocchi (2017), in their meta-analysis, highlighted the negative dimensions of self-compassion—self-judgment, isolation, and over-identification, as conceptualized in Neff's multidimensional model (Neff, 2003a, 2003b)—as being positively associated with psychopathology, suggesting these constructs may increase vulnerability to mental health disorders.

In summary, while acknowledging that mental health is multifactorial, this body of evidence suggests that self-compassion is one significant factor influencing mental health in non-sports contexts. Moreover, self-compassion appears particularly applicable and relevant in high-performance contexts, where it helps athletes and coaches manage the intense pressures, setbacks, and self-criticism inherent in elite sports (for reviews on self-compassion in high-performance athletes, see Cormier et al., 2023; Röthlin et al., 2019; for coaches, see Hägglund, Kenttä, Wagstaff, et al., 2024). Unlike the general population, individuals in high-performance environments face unique stressors, such as performance expectations and public scrutiny, making self-compassion a crucial tool for maintaining mental resilience and fostering emotional recovery.

Integrating this body of literature into the theoretical framework of this thesis, self-compassion can be understood through Keyes' dual-continuum model: (a) as a mechanism that can prevent or reduce mental illness and (b) as a promoter of well-being. Moreover, the connection between self-compassion and interpersonal relationship benefits resonates with Purcell's ecological systems model, further highlighting the role of self-compassion in fostering supportive environments for mental health.

2.3 Social Support

Social support, defined as "social interactions aimed at inducing positive outcomes" (Bianco & Eklund, 2001), is a multi-dimensional concept that includes both quantitative structural (i.e., number of and different relationship types) and qualitative-functional (i.e., emotional, informational, instrumental, and tangible support) aspects (Barrera, 2000; Uchino, 2004; Wills & Shinar, 2000). Qualitative-

functional aspects further can be divided into perceived support (i.e., the belief that support will be available if needed) and received support (i.e., actual instances of support; Sarason et al., 1990). Perceived social support tends to be a stable characteristic, largely unaffected by the behavior of individual network members (e.g., Newcomb, 1990; Sarason et al., 1987). In contrast, received social support refers to the retrospective reporting of actual support interactions with specific members of one's social network (Knoll & Kienle, 2007; Uchino, 2009).

2.3.1 Social Support and Mental Health in the Broader Research Field

Social support has long been acknowledged as a critical psychosocial resource that significantly contributes to both physical and mental health (House et al., 1988). Across various settings—including workplaces, educational environments, and healthcare systems—research consistently identifies social support as a protective factor against mental health issues, particularly in preventing depressive symptoms and disorders (Wickramaratne et al., 2022), burnout (Halbesleben, 2006), and anxiety (Wang et al., 2018). Beyond its protective function, social support is essential in fostering well-being (Chu et al., 2010), which involves more than just the absence of mental illness (Keyes, 2010). Further, social support also plays a significant role in encouraging the use of mental health services. Systematic reviews suggest that individuals with strong social networks are more likely to seek and engage with mental health care, further emphasizing the importance of cultivating robust support systems (Terry & Townley, 2019). Strong social networks not only encourage individuals to seek help but also provide continued encouragement, reinforcing PMH outcomes over time (Gorczynski et al., 2020).

While social support is beneficial, its effectiveness depends on several factors, including the type of support provided, the context in which it is delivered, and the specific needs of the individual (Freeman et al., 2014). Studies have shown that mismatches between the support needed and the support received can diminish its impact (e.g., Schwarzer & Leppin, 1991). For instance, providing informational support when emotional support is required can lead to dissatisfaction and reduced well-being (Cutrona & Russell, 1990; Feeney & Collins, 2015). Addressing these nuances is critical in optimizing social support interventions, ensuring that the type of support offered aligns with the individual’s needs.

Although the benefits of social support are well-established, its conceptualization remains complex. Definitions vary across studies, and it is essential to align the understanding of social

support with specific research questions and contexts (Jolly et al., 2021). For example, perceived and received social support have been shown to positively impact mental health, but they may operate differently depending on the individual's context and experiences (e.g., Haber et al., 2007). Recognizing this complexity helps in designing interventions that address both immediate needs and longer-term mental health support.

Due to the highly dynamic and demanding nature of elite sports, it is evident that close and positive relationships, such as the coach-athlete or parent-athlete relationships, are integral to maintaining good mental health over time (Bryan et al., 2023). On the other hand, a lack of supportive behaviors or direct negative social interactions like conflicts can enhance athletes' or coaches' stress, which in turn can also nourish mental ill-health (DeFreese & Habeeb, 2023). Thus, social support as an external resource seems critical for promoting individual mental health, aligning with Keyes' focus on fostering well-being even in the presence of psychological distress. Moreover, these resources are vital within Purcell's ecological systems model, as they reflect the importance of supportive environments (microsystem) and healthy interactions with other important systemic stakeholders.

3 Article Overview and Aim of this Dissertation

Given the significant pressures faced by both athletes and coaches in elite sports, understanding the role of psychosocial resources in mitigating mental illness and fostering well-being is a key step in developing effective mental health interventions and support systems tailored to the unique demands of elite sports environments (Bryan et al., 2023). This dissertation focuses on two important psychological resources—self-compassion and social support—and how they contribute to the mental health of both athletes and coaches. By examining these resources through the frameworks of Keyes' dual-continuum model and Purcell's ecological systems model, this dissertation aims to address the central question:

"How do self-compassion and social support contribute to the mental health of coaches and athletes in elite sport?"

This research question is addressed through three distinct articles:

1. **Six-month stability of individual differences in sports coaches' burnout, self-compassion and social support**

Elite sports coaching is a highly demanding profession, characterized by long, irregular working hours, frequent conflicts between work and family life, and a high emotional investment, all compounded by the instability of short-term contracts and job performance being directly tied to team or athlete success (Fletcher & Scott, 2010; Frey, 2007). Due to the emotional toll that builds up from ongoing stress, some coaches are at risk of facing mental health challenges, such as burnout, which manifests as emotional exhaustion, reduced personal accomplishment, and depersonalization (Apostlidis, 2012; Olusoga et al., 2019; Schaffran et al., 2016). Burnout not only affects the well-being of coaches but also impacts the quality of their coaching and the mental health of their athletes (Baumann et al., 2024; Stebbings et al., 2012). While some coaches are vulnerable to burnout, others remain resilient due to protective factors such as self-compassion and social support (Hägglund et al., 2021; Olusoga et al., 2019). However, as stated in Ackeret et al. (2022), most of the research on self-compassion and social support in sports settings is cross-sectional and does not address the issue of coach burnout. Therefore, the first article (Ackeret et al., 2022) explores how burnout, self-compassion, and social support in sports coaches behave over time. The primary research question addressed is: "How stable are self-compassion, social support, and burnout in sports coaches over a period of six months?"

This longitudinal study followed a sample of 422 high-performance sports coaches (M_{age} = 44.48, SD = 11.03) across three measurement points over a six-month period. Burnout was assessed using the Coach Burnout Questionnaire (CBQ; Harris & Ostrow, 2008), self-compassion was measured with the Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011), and perceived social support was evaluated using the Brief Perceived Social Support Questionnaire (BPSSQ; Kliem et al., 2015). Structural equation modeling was applied to assess multiple aspects of stability, including measurement invariance, mean-level change, rank-order stability, and structural stability.

With this study, Ackeret et al. (2022) contribute to the literature by providing valuable insights into how self-compassion, social support, and coach burnout behave over time. A notable contribution lies in the longitudinal assessment of self-compassion in sports coaches, as to our knowledge, no study has done this before. The results of the three articles are being integrated and discussed in the next chapter.

2. Positive Mental Health Among Sports Coaches: A 6-Month Longitudinal Study

Building on the first study, which explored the stability of self-compassion, social support, and burnout, the second study shifts its focus on PMH. PMH, which encompasses emotional, psychological, and social well-being, is essential for sports coaches as it supports their well-being and ability to function optimally in the face of high demands and stressors common in their profession (Fletcher & Scott, 2010; Keyes, 2002; Keyes & Annas, 2009). By maintaining strong PMH, coaches are better equipped to handle these challenges, fostering a healthier work environment for themselves and their athletes. Despite its importance, research on PMH in this context, including its assessment and how it changes over time, remains limited (Hill et al., 2021; Pankow et al., 2023). Therefore, in the second article, Ackeret, Röthlin, Horvath, and Allemand (2024) examine the longitudinal stability and change in coaches' PMH. Although not directly addressing the overarching research question, this study provides crucial insights into PMH stability over time, specifically examining the question: "How stable is PMH in sports coaches over a six-month period?"

A sample of 422 sports coaches (M_{age} = 44.48, *SD* = 11.03) was assessed at three time points over six months using the Mental Health Continuum Short-Form (MHC-SF; Keyes, 2009). The study focused on multiple stability dimensions, including measurement invariance, rank-order stability, mean-level change, and structural stability.

While self-compassion and social support were not included in this study, Ackeret, Röthlin, Horvath, and Allemand (2024) provide important insights into the longitudinal stability of PMH in coaches. The study's use of a multidimensional PMH model, encompassing emotional, psychological, and social well-being, represents a significant contribution, as previous studies have typically focused on single aspects of PMH (e.g., emotional well-being, Lundqvist, 2011; Pankow et al., 2023).The investigation of the MHC-SF's measurement invariance further offers a significant contribution to the research field.

3. Factors contributing to elite athletes' mental health in the junior-to-senior transition: A mixed methods study

While the first two studies focus on the mental health of coaches, the third study shifts its attention to adolescent athletes, specifically examining the JST—a critical developmental phase in an athlete's career. Adolescence is marked by cognitive, social, physiological, and emotional changes (Holder & Blaustein, 2014), and is a pivotal period for the onset of most mental illnesses (Solmi et al., 2022). Beyond these developmental challenges, young athletes face a further decisive hurdle on their

path to senior elite sports: the JST. This transition introduces additional sport-specific mental and physical demands, such as adapting to new coaches and teams, coping with increasing training and competition requirements, handling selection pressure, and balancing the demands of both academics and sports (Franck et al., 2018; Stambulova et al., 2020; Wylleman, 2019; Wylleman et al., 2013). The JST is considered the most difficult transition in an athlete's career, as evidenced by the fact that only 20–30 % of athletes pass the JST, and the majority drop out or switch to recreational sports (Franck et al., 2018; Stambulova, 2009; Vanden Auweele et al., 2004). Identifying factors that support mental health during this period is crucial to help athletes manage stress and succeed both in sports and in their overall development. Therefore, the third article (Ackeret, Röthlin, & Horvath, 2024) investigates the mental health of athletes during the JST, as well as the perceived barriers and helpful strategies during this period. The specific research question of this article is: "How do self-compassion and social support influence stress mechanisms during the JST in athletes and what are key facilitators and challenges athletes encounter during the JST?"

This mixed-methods study involved two distinct samples: current JST athletes (N = 394) for the quantitative analysis and athletes who had already completed the transition (N = 371) for the qualitative part. Quantitative data were gathered from current athletes using the General Anxiety Disorder Questionnaire (GAD-7; Spitzer et al., 2006), the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), the MHC-SF (Keyes, 2009), the Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011), and the Athletes' Received Support Questionnaire (ARSQ; Freeman et al., 2014). Mediation and moderation analyses were conducted to assess how stress, self-compassion, and social support influence mental health outcomes, such as anxiety, depression, and well-being. For the qualitative part, two open-ended questions were used to explore the facilitators and challenges experienced by athletes who successfully completed the JST: (a) "What/who has helped you the most during the JST?" and (b) "What have you found difficult during the JST?" Responses were analyzed using thematic content analysis.

Ackeret, Röthlin, and Horvath (2024) contribute to the literature in two key ways. First, they examine how self-compassion and social support modulate the relationship between stress and mental health in the specific group of athletes undergoing the JST. Second, they investigate factors that facilitate or challenge athletes' adaptation to the demands of the JST using a broader qualitative sample, addressing a gap in the literature that has so far relied primarily on smaller qualitative

samples (e.g., Andronikos et al., 2021; Franck & Stambulova, 2020) or predefined answer choices (e.g., Stambulova et al., 2012).

While these three studies share the overarching theme of mental health in elite sports, they differ in both their methodological approach and thematic focuses. The first two studies (Ackeret et al., 2022; Ackeret, Röthlin, Horvath, & Allemand, 2024) are part of a research project that specifically investigates the benefits of self-compassion for athletes and coaches (Birrer, 2019–2022). Although both studies used the same sample of sports coaches, their objectives differed: Study 1 focused on the stability and relationships between self-compassion, social support, and coach burnout, whereas Study 2 assessed the longitudinal stability of coaches' PMH using the MHC-SF. The transparency and openness of these studies are documented in the second study's corresponding chapter. In contrast, Study 3 (Ackeret, Röthlin, & Horvath, 2024) is part of the *Mental Health of Swiss Elite Athletes'* project (Röthlin, 2022–present). This shift in focus highlights the thematic breadth of the dissertation while maintaining a consistent emphasis on mental health in elite sports contexts.

In Chapter 4, current research on how self-compassion and social support contribute to mental health in the high-performance sports context is presented, and the findings from the three studies included in this dissertation are integrated and discussed. Finally, future perspectives on the roles of self-compassion and social support for athletes and coaches in this context are offered.

4 Advancing the Field: Integration of Scientific Contributions

4.1 Self-Compassion

4.1.1 Self-Compassion and Mental Health in Athletes

Elite sport can be highly rewarding, offering athletes numerous benefits such as increased self-confidence (Brown et al., 2018), positive health consequences (Runacres et al., 2021), or opportunities for meaningful experiences (Oblinger-Peters et al., 2024). However, it also comes with significant challenges, including frequent setbacks, injuries, performance pressure, and career transitions, all of which can negatively impact mental health (Kuettel & Larsen, 2020). In this context, self-compassion has emerged as an important psychological resource, enabling athletes to navigate these sport-specific challenges more constructively (Mosewich et al., 2019).

By being self-compassionate, athletes have a means to manage emotional stress without resorting to harsh self-criticism (Mosewich et al., 2013). Instead of compounding stress through self-

condemnation, self-compassion allows athletes to accept setbacks and learn from them, ultimately facilitating both emotional recovery and, in some cases, improved performance (Mosewich et al., 2019). Cross-sectional studies have shown that athletes with higher levels of self-compassion report higher well-being, with findings consistent across both female (Ferguson et al., 2014, 2015) and male athletes (Reis et al., 2019). These studies underscore the potential of self-compassion to protect athletes from mental health challenges such as anxiety and depression.

One particularly valuable application of self-compassion is during career transitions, such as the shift from junior to senior levels of competition. In one paper of this dissertation, Ackeret, Röthlin, and Horvath (2024) suggest that self-compassion plays a critical role in managing stress during such transitions. Their findings indicate that stress negatively affects anxiety, depression, and well-being, while also reducing self-compassion, which exacerbates negative mental health outcomes. In this sense, self-compassion may act as both a mediator and buffer in the relationship between stress and mental health. However, Ackeret, Röthlin, and Horvath (2024) also note that while self-compassion helps athletes manage stress more effectively, its buffering effect does not extend to well-being—a finding that contrasts with other research (e.g., Stutts et al., 2018). Walton et al. (2020) further emphasize that athletes with lower levels of self-compassion tend to experience higher levels of psychological stress. This suggests that athletes with greater self-compassion are better equipped to manage the inherent pressures of elite sports, reinforcing the idea that self-compassion is a crucial tool for maintaining mental health in high-pressure environments. In their intervention study, Kuchar and colleagues (2023) demonstrated that incorporating self-compassion practices into NCAA athletes' schedules led to significant reductions in depression, anxiety, and stress.

Athletes and performance. While self-compassion has demonstrated clear mental health benefits, its relationship with performance outcomes in sport presents a more nuanced picture. Some studies have shown positive relationships between self-compassion and performance (Barczak & Eklund, 2020; Killham et al., 2018), while others have found no significant association (Alipour Ataabadi et al., 2022; Mazahereh & Al Awamleh, 2016). These mixed results suggest that the impact of self-compassion on performance may depend on factors such as the type of sport, performance measurement, or individual athlete characteristics (for further elaboration, see Cormier et al., 2023).

Taken together, self-compassion may serve as an adaptive coping mechanism for athletes, helping them to accept and manage crises and stress more effectively. As such, it may be highly

relevant for athletes low in self-compassion when it comes to risk factors for mental health, such as injuries, career transitions or performance pressure. Aligned with Keyes' Dual Continuum model, self-compassion in athletes appears to protect against mental ill-health (e.g., anxiety, depression), though it shows mixed results in its impact on well-being. Ultimately, the context surrounding an athlete should not be overlooked, as coaches, teammates, and non-sport individuals (e.g., parents, friends, fans) play a significant role in shaping whether an athlete adopts a self-compassionate or self-critical perspective (e.g., Frentz et al., 2020; Ingstrup et al., 2017).

4.1.2 Self-Compassion and Mental Health in Coaches

While the majority of research has focused on athletes, it is equally important to consider the role of self-compassion in the mental health of coaches, who face the dual pressure of maximizing their athletes' performance while also managing their own professional and personal challenges (Leprince et al., 2024). In a scoping review about mindfulness and self-compassion among sport coaches, Hägglund, Kenttä, Wagstaff, et al. (2024) identified only 14 relevant publications—10 focused on mindfulness, two on self-compassion, and two on a combination of both—highlighting the limited research in this area. Notably, only one study (Ackeret et al., 2022), which is part of this dissertation, specifically measured self-compassion as defined and conceptualized by Neff (2003a, 2003b). Ackeret and colleagues (2022) examined the stability of self-compassion and coach burnout over a six-month period, as well as the relationships between these constructs, providing a foundation for future research (e.g., differential change in the constructs) and applied research (e.g., interventions to reduce burnout by promoting self-compassion). The results revealed that self-compassion and burnout remained stable during the study period, with no significant mean-level changes and high rank-order and structural stability. These findings demonstrated coaches with high self-compassion are likely to sustain those levels over time, while those with lower levels are expected to maintain low self-compassion. A similar pattern is observed with burnout. This suggests that coaches with low self-compassion are unlikely to develop this quality without targeted interventions aimed at cultivating it. Moreover, the negative correlation between self-compassion and burnout across all three measurement points indicates that coaches with higher levels of self-compassion tend to be less prone to burnout (Ackeret et al., 2022). This aligns with findings in the athletes' context (e.g., Casali et al., 2021; Stamatis et al., 2020), suggesting that self-compassion may act as a protective factor, helping coaches and athletes manage the significant pressures and stressors associated with elite sport. Unlike other psychological resources that may fluctuate more with external demands, self-

compassion seems to offer a stable foundation that tends to buffer against the emotional toll of burnout (Ackeret et al., 2022).

Recently, Hägglund, Kenttä, Bentzen, et al. (2024) demonstrated the potential of a mindful self-reflection intervention to improve self-compassion in coaches. However, the current body of research on the connection between self-compassion and coaches' mental health remains sparse. In particular, the mechanisms by which self-compassion influences coaches' well-being have yet to be thoroughly investigated.

4.1.3 Future Perspectives of Self-Compassion and Mental Health in Athletes and Coaches

Despite the promising evidence for self-compassion's role in improving mental health, interventions aimed at cultivating self-compassion in athletes and coaches are not yet widely implemented in sports (Cormier et al., 2023; Röthlin et al., 2019), unlike in other settings (for a review on RCTs on self-compassion outside sports, see Ferrari et al., 2019). One major barrier appears to be psychological resistance, rooted in beliefs that self-compassion may hinder performance, foster complacency, or lead to stigmatization (Ferguson et al., 2014; Reis et al., 2019; Sutherland et al., 2014). For instance, an athlete in Sutherland et al. (2014) expressed concern, stating, “If you are too self-compassionate you are always going to be fine with good enough. You are never going to strive to be better, and for an elite athlete that shouldn’t be okay. I need to be hard on myself, because if I’m not then I am just going to settle for mediocrity; which I personally don’t want.” This view reflects a common fear in high-performance sport environments, where athletes and coaches often associate success with self-criticism and relentless pushing beyond limits (Frentz et al., 2020). These cultural norms of toughness and the pursuit of excellence may inhibit the adoption of self-compassion as a psychological tool. Taken together, this opens several avenues for future research and practical applications.

First, to overcome these barriers, future research and applied work could focus on destigmatizing self-compassion by highlighting its positive effects on mental health. Incorporating self-compassion training into athlete development programs early in their careers could challenge harmful beliefs and reshape the narrative around resilience. Promoting self-compassion as a strength, rather than a weakness, could shift the culture in elite sports (Kuchar et al., 2023).

Second, beyond addressing these barriers, expanding the evidence base for self-compassion interventions is crucial to solidifying their mental health benefits, particularly in helping athletes and coaches navigate critical life events such as career transitions, injuries, or interpersonal violence (e.g., Ackeret, Röthlin, & Horvath, 2024; Huysmans & Clement, 2017; Zhang et al., 2024). While initial intervention studies (e.g., Hägglund, Kenttä, Bentzen, et al., 2024; Kuchar et al., 2023) have shown promising results, large-scale randomized controlled trials across various sport contexts (e.g., individual vs. team sports) are needed to further clarify self-compassion's impact on both mental health and performance outcomes. These studies could explore how self-compassion interventions aid emotional recovery from injuries or support athletes in navigating the difficult transition out of competitive sport.

Third, to further solidify the case for self-compassion interventions, it is essential to explore the causal relationship between self-compassion and mental health outcomes. In their scoping review, Cormier and colleagues provide a comprehensive overview of self-compassion being used as a predictor, outcome, mediator, or moderator of mental health (see Cormier et al., 2023). Longitudinal studies could be particularly valuable in clarifying this relationship by tracking athletes and coaches over time. For example, Krieger et al. (2016) used cross-lagged panel analyses in a clinical sample of patients with depression to investigate the reciprocal effects between self-compassion and depressive symptoms over a 12-month period. Their findings revealed that self-compassion consistently predicted reductions in depressive symptoms, whereas depressive symptoms did not predict changes in self-compassion. Both Ackeret et al. (2022) and Krieger et al. (2016) emphasize the stability of self-compassion over time, highlighting its potential as a long-term resource in promoting resilience and preventing mental health issues, not only in high-performance settings but also in clinical populations. Applying similar methodologies in sports contexts could reveal whether self-compassion acts as a precursor to improved mental health or as a response to changes in mental health.

Fourth, research into the systemic factors influencing self-compassion, using frameworks such as Purcell et al.'s ecological systems model, could shed light on how social environments either encourage or inhibit its development. For example, an athlete's self-compassion may be encouraged or inhibited by a coach's leadership style or the team culture. A coach who fosters a compassionate environment may help athletes develop a more balanced self-assessment and healthier responses to failure (Ingstrup et al., 2017). Similarly, a sports culture that emphasizes the importance of mental

health alongside performance could facilitate greater acceptance of self-compassion practices (Frentz et al., 2020). By investigating these systemic influences, future research could identify pathways to promote self-compassion through holistic interventions targeting both athletes and coaches.

Finally, in addition to understanding systemic influences, it's crucial to address another gap in the literature: the holistic mental health of coaches. Although the literature on athletes' mental health and the role of self-compassion has rapidly evolved, there remain major gaps in our understanding of what keeps coaches in good mental health. Comparing studies investigating well-being in coaches can be difficult due to varying conceptualizations of well-being (see Pankow et al., 2022, for further detail). For example, the MHC-SF (Lamers et al., 2011), which aligns with the WHO's (2014) definition of mental health, measures well-being holistically (i.e., psychological, emotional, and social well-being; referred to as PMH). Although the MHC-SF has been used in several studies involving athletes (e.g., Röthlin et al., 2023; Stamatis et al., 2020; Walton, Lewis, et al., 2024), it has been applied in only one study with a small sample of coaches (Pankow et al., 2022). With our second study (Ackeret, Röthlin, Horvath, & Allemand, 2024), we contributed to the scientific field of coaches' mental health by demonstrating strong measurement invariance of the MHC-SF, implicating that it is a useful tool to measure PMH in coaches over time. Our findings revealed that PMH in coaches remained stable, with those reporting low well-being continuing to score low, and those with high well-being maintaining their higher scores. Given the integrative definition of mental health (Keyes et al., 2002), future intervention studies could target PMH as a key outcome variable. From a practical standpoint, coaches with lower PMH should be actively supported by sports associations and health professionals, as their mental health is unlikely to improve naturally.

In summary, existing research demonstrates that self-compassion plays a critical role in maintaining mental health and resilience in both athletes and coaches. Addressing the identified gaps will help to further integrating self-compassion into mental health interventions within high-performance sports.

4.2 Social Support

4.2.2 Social Support and Mental Health in Athletes

In the performance context, social support is widely recognized as a key factor in enhancing athletes' mental health (Kuettel & Larsen, 2020; Purcell et al., 2019; Walton, Purcell, Henderson, et al., 2024). Conversely, a lack of strong social connections has been linked to lower self-esteem,

depression, psychological distress, and burnout (Baumeister & Leary, 1995; Gouttebarge et al., 2015; Hartley & Coffee, 2019). In its *Mental Health Action Plan*, the IOC (2023) asserts that "the mental health of athletes exists within the context of the wider sports system [and that] the athlete is inseparable from their teammates/ colleagues, coaches and support staff, and family or primary supports, as well as their sporting organisation" (p. 12). Using Purcell's ecological systems model, social support plays a critical role at multiple levels, from personal relationships in the microsystem to the broader influence of organizational policies at the macrolevel. These interactions shape athletes' mental health throughout their sporting careers, with social support being particularly critical during pivotal moments such as career transitions (Brown et al., 2018; Stambulova & Wylleman, 2014). These transitions are recognized as particularly stressful periods that challenge athletes' mental health (Stambulova, 2009; Wylleman & Rosier, 2016). This dissertation highlights the impact of social support on mental health during a specific transition in elite sport: the JST. The following section explores how social support during the JST is related to athletes' mental health across different levels of Purcell's ecological systems model.

Core-level: Role of Social Support on Athletes' Mental Health in the JST. The JST is a critical phase, characterized by increased performance demands, selection pressure, changes in training environments, and balancing academic or professional obligations with sport (Franck et al., 2018; Stambulova et al., 2020; Wylleman, 2019; Wylleman et al., 2013). Social support plays a pivotal role during these transitions by helping athletes navigate new challenges and adapt to higher levels of competition (Morris et al., 2016; Pehrson et al., 2017; Sanders & Winter, 2016).

In the third study of this dissertation, Ackeret, Röthlin, and Horvath (2024) found that higher stress levels during the JST were associated with a reduction in received social support, contributing to diminished well-being. However, this decrease in support did not correlate with increased levels of anxiety or depression, suggesting a nuanced relationship between social support and various dimensions of mental health. While speculative in nature, these findings could suggest that received social support may be more closely associated with day-to-day emotional satisfaction and well-being, while more severe mental health issues, such as anxiety or depression, could potentially be linked to prolonged or intensified stressors (Bianco & Eklund, 2001; Hartley & Coffee, 2019).

One possible explanation for these findings is that athletes under stress may withdraw from their social networks, resulting in less received support (Rosenfeld et al., 1989). This withdrawal can

lower their sense of connection and well-being, though it may not trigger anxiety or depression if athletes maintain a sense of perceived support—the belief that support is available if needed (Sarason et al., 1990). In the qualitative part of Ackeret, Röthlin, and Horvath (2024), athletes mentioned social support to be a central resource for navigating the JST, while a lack of or inadequate support was mentioned as a barrier. Thus, social support appears crucial for mental health during transitional periods, though the precise mechanisms through which it affects mental health warrant further investigation.

As noted earlier, another possible explanation may be the mismatch between needed and provided support. Athletes may require specific forms of support depending on the stressor they face. For example, following poor performance, emotional support may be more beneficial than informational support (Rees & Freeman, 2007). A mismatch between the support needed and the support received can lead to dissatisfaction and reduced well-being, as the support does not meet the athlete's psychological needs (Cutrona & Russell, 1990). Beyond matching support types, Freeman et al. (2014) emphasized that the effectiveness of social support depends on several factors, including the timing of support**,** the relationship with the provider, and the alignment between the recipient's needs and the type of support offered. In some cases, social support can even have unintended negative effects, particularly when it undermines the recipient's sense of competence or autonomy (Schwarzer & Leppin, 1991). Excessive or misaligned support can lead to dependency or frustration, highlighting the need for tailored support**.**

Micro-level: The Athlete-Coach and Athlete-Parents Relationship and Mental Health. Within the microsystem of Purcell et al.'s (2019) ecological systems model, the athlete-coach relationship is one of the most influential sources of social support in sports (Newman & Weiss, 2018; Shanmugam et al., 2014). A high-quality relationship characterized by trust, respect, and open communication can significantly enhance athletes' well-being and performance (Isoard-Gautheur et al., 2012; Jowett & Shanmugam, 2016). Coaches who provide appropriate emotional and esteem support can help athletes cope with stressors more effectively, particularly during critical periods like career transitions or injuries (Hartley et al., 2020). Moreover, coaches play a crucial role in fostering a supportive team environment that promotes social cohesion and peer support among athletes (Hague et al., 2021; Tamminen & Gaudreau, 2014). By creating a culture that values mental health and encourages help-seeking, coaches can contribute to the destigmatization of mental health issues in sport (Bissett et al.,

2020; Hebard et al., 2023). However, there also is evidence that a lack of support from coaches or inadequate support leads to dropout (Back et al., 2022; Schmid et al., 2023). While coaches' support during the JST is essential within the immediate sports environment, athletes' support systems extend beyond the field to include significant others such as family, friends, and psychologists (Ackeret, Röthlin, & Horvath, 2024).

Parents, in particular, play a pivotal and ongoing role throughout an athlete's career, shaping their sports experiences by providing crucial support in time, finances, and emotional backing, all of which can positively influence the athlete's mental health (Baxter-Jones & Maffulli, 2003; Knight et al., 2016; Kramers et al., 2023). However, certain parental actions—such as applying too much pressure to succeed, offering negative feedback, or prioritizing winning above all else—can result in mental health difficulties for athletes, such as heightened anxiety, burnout, unhealthy eating habits, and dissatisfaction with their bodies (Francisco et al., 2013; Gustafsson et al., 2016; Harwood et al., 2019; Lydecker et al., 2021). Findings from Ackeret et al. (in preparation) further suggest that, beyond athletes, parents also face several difficulties during the JST. These challenges include balancing the fine line between "doing everything" for their child and maintaining a "healthy" distance, providing support during injuries, dual-career decisions, and poor performance, while also managing other family responsibilities, such as caring for siblings and handling finances. Additionally, parents report experiencing stigmatization from others and losing friendships as a result, adding further emotional strain during this transitional phase. These findings indicate that (a) parents can provide both support and potential stress, which, according to Keyes' Dual Continuum of Mental Health, can either support well-being and protect against mental health problems, or, in case of inadequate support, may exacerbate mental health symptoms. Additionally, (b) parents themselves encounter significant stressors themselves during the JST, a fact corroborated by other studies (Harwood & Knight, 2009; Lienhart et al., 2020).

Macro-level: Organizational Support and Policy Integration. Beyond the microsystem, organizational support is essential in promoting athletes' mental health (Henriksen et al., 2019; IOC, 2023). Sports organizations can implement policies and programs that facilitate access to mental health resources and promote a culture of support (Gorczynski et al., 2020). For example, providing education on mental health for athletes and staff, offering confidential counseling services, and establishing protocols for managing mental health concerns are effective strategies (Biggin et al.,

2017; Purcell et al., 2022). In the context of the JST, athletes have reported difficulties managing the transition, citing a lack of information and structure (Ackeret, Röthlin, & Horvath, 2024). To address this gap, sports organizations should offer more targeted and transparent informational support about the challenges athletes are likely to encounter during the JST, along with strategies for effectively addressing those challenges (Pilkington et al., 2024). Integrating social support into organizational policies and practices ensures that support is available at multiple levels in athletes' sporting and non-sporting lives (Purcell et al., 2022).

In summary, social support is a multifaceted construct that plays a vital role in athletes' mental health. Its effectiveness depends on various factors, including the type of support, the timing, the relationship between provider and recipient, and the alignment with the athlete's needs (Haber et al., 2007).

4.2.3 Social Support and Mental Health in Coaches

Social support is equally critical for coaches' mental health. Coaches have identified several key risk factors for their mental health, including excessive workload, often job losses, media scrutiny, and feelings of isolation (Schweizer Radio und Fernsehen, 2024a, 2024b; Hill et al., 2021). In contrast, a positive organizational culture, transformational leadership, and access to high-quality social support have been recognized as protective factors that can enhance their well-being (Hill et al., 2021). According to a review by Norris et al. (2017), coaches who lack social support report higher levels of stress and reduced performance. Thus, social support appears essential for maintaining the mental health of both athletes and coaches.

In a longitudinal qualitative study, Norris et al. (2022) followed six female and four male coaches over six weeks to investigate their use of social support resources. The study found that the coaches utilized all four types of social support—emotional, informational, instrumental, and appraisal—during this time, with informational support (i.e., advice, feedback) being the most frequently used type. Social support helped coaches alleviate stress through both stress-buffering and main-effect mechanisms. For example, esteem support was important in buffering the effects of stressors, while emotional support enhanced overall well-being (Norris et al., 2022).

Given the vital role of social support in reducing stress, it is also a key factor in preventing burnout among coaches. In the first paper of this dissertation, Ackeret et al. (2022) found that social

support was consistently negatively correlated with burnout at three timepoints across a six-month period. Furthermore, both burnout and social support showed high intraindividual stability, indicating that coaches who reported low levels of perceived social support remained low over time, while those who reported high levels remained high. This lack of natural change underscores the importance of targeted interventions to address low perceived social support and burnout.

In summary, these findings reinforce the idea that social support operates on multiple levels within the ecological systems model, from immediate social interactions (microsystem) to broader organizational and societal structures (exosystem and macrosystem). Moreover, the dual-continuum model of mental health underscores how social support not only alleviates distress but actively promotes well-being, making it a critical factor in the integrative mental health of athletes and coaches.

4.2.4 Future Perspectives of Social Support and Mental Health in Athletes and Coaches

Based on the current state of research, several interesting avenues could deepen our understanding of how social support affects the mental health of athletes and coaches.

First, future studies should investigate the exact mechanisms of action of social support on the mental health of athletes and coaches. Employing a theoretically informed framework (e.g., Brinkmann, 2021, p. 151) that distinguishes between functional and structural mechanisms of social support, as well as between perceived and received support, would enable a more detailed examination of which mechanisms have the greatest influence on the mental health of athletes and coaches. For instance, future research could investigate whether perceived and received social support influence different aspects of mental health (e.g., anxiety, depression, or well-being) and how discrepancies between the two affect mental health outcomes. Bianco and Eklund (2001) have called for simultaneous examinations of perceived and received support to better understand their reciprocal effects. This line of inquiry could also explore potential mediating or moderating variables, such as the quality of the athlete-coach relationship or social cohesion within teams, and how these factors contribute to mental health outcomes.

Second, there is a need for more longitudinal studies to capture the dynamic nature of social support over time (Freeman, 2021). Although perceived social support was found to be highly stable over six months (Ackeret et al., 2022), it does not imply that perceived social support is static. For example, it could fluctuate depending on the context, relationships, and life phases of both athletes and coaches. Future research could benefit from longitudinal mixed-method designs that track

athletes and coaches over extended periods, especially during key transitions (e.g., injury recovery, career transitions, or major competitions). Shorter time intervals, such as daily ambulatory assessments, could also be useful in capturing immediate changes. Additionally, this research could capture variations in social support across different levels of the athlete's or coach's microsystem, exosystem, and macrosystem, integrating the ecological systems model more explicitly.

Third, while digital forms of social support (e.g., social media groups, online communities) are common in non-sports contexts—such as youth and adolescents seeking guidance on topics around mental health (CIAO.ch, n.d.; Pro Juventute, n.d.)—these forms are not prevalent in Switzerland's elite sports world. Future research could benefit from adopting participatory approaches, collaborating with both athletes and coaches to develop interactive, sport-specific digital support tools. These tools could address key challenges in elite sports, such as injury recovery, career transitions, balancing dual careers, and managing the pressures of high-performance environments. For coaches, in particular, these platforms could provide peer networks to share experiences, seek advice on managing athlete mental health, and navigate personal stressors like balancing coaching demands with personal well-being. By fostering shared experiences and peer guidance, these tools would offer both athletes and coaches a space to exchange strategies for managing stress and maintaining mental health.

Finally, besides athletes and coaches, other stakeholders in the sports system—such as parents—are directly impacted by the mental health problems of athletes or coaches. While guidelines exist on how to enhance the mental health of coaches and athletes (e.g., Henriksen et al., 2019; Schinke et al., 2024), parents remain underrepresented in this research. Future studies should focus on understanding the role of parents in supporting athletes, particularly during critical transitions, and how best to include them in interventions designed to foster a more supportive environment.

5 General Discussion

Mental health is a crucial resource that athletes and coaches rely on, not only during their sports careers but also long after retirement (Stambulova et al., 2020). It's importance in sports is increasingly recognized, with the International Olympic Committee (IOC) acknowledging that "athletes' (and coaches') mental health needs are as important for their performance and well-being as their physical health needs, and that good mental health means much more than the absence of a mental health symptom or disorder" (IOC, 2023). In response, the IOC has introduced its *Mental Health Action Plan for 2026*, aimed at fostering better mental health support structures within elite sports. Central to

advancing this agenda is conducting evidence-based research that addresses the diverse needs of athletes and coaches.

This dissertation contributes to this ongoing conversation by adopting a holistic approach to mental health, grounded in Keyes' dual-continuum model and Purcell's ecological systems model. By exploring the contribution of self-compassion and social support influence to coaches' and athletes' mental health, this thesis addresses both individual and environmental factors affecting mental illness and well-being. Through this lens, the research recognizes mental health as encompassing more than the absence of illness—it involves actively promoting well-being.

Ackeret et al. (2022) demonstrated that burnout, self-compassion, and social support remained stable over six months among coaches, highlighting the importance of actively promoting self-compassion and social support, particularly for coaches with low levels in these areas. Since natural change is unlikely to occur within this timeframe, targeted interventions are crucial for coaches experiencing high burnout or low levels of self-compassion and social support. Additionally, Ackeret, Röthlin, Horvath, and Allemand (2024) revealed a similar pattern of stability in coaches' PMH, which points to the need to actively address low PMH in coaches. Their findings showed that PMH remained stable over a six-month period at both the within-person and between-person levels, suggesting that without targeted intervention, natural improvement in PMH is unlikely. Importantly, their research also demonstrated that the MHC-SF is a suitable tool for measuring PMH in coaches over time, indicated by strong measurement invariance. Furthermore, Ackeret, Röthlin, and Horvath (2024) examined athletes transitioning from junior to senior competition levels, demonstrating that self-compassion plays a key role in mitigating stress-related mental health issues such as anxiety and depression. However, the relationship between received social support and mental health proved to be more complex, warranting further investigation.

Collectively, while acknowledging that mental health is multifactorial, these studies offer valuable insights into two psychosocial factors influencing mental health in elite sports, emphasizing the importance of fostering self-compassion and enhancing social support to safeguard the mental health of athletes and coaches.

By integrating a holistic perspective, this thesis highlights the potential of interventions that foster strengths-based approaches, such as positive coping strategies like self-compassion. Rather than solely focusing on reducing symptoms of anxiety, depression, or burnout—though these remain critical—strengths-based interventions aim to build psychological resources that can enhance overall

mental health. In doing so, they may serve a broader range of individuals, providing athletes and coaches with the tools to navigate the inherent pressures of elite sports (Poucher et al., 2019). Moreover, as athletes and coaches progress through different phases of their careers, their mental health is shaped by various dynamic factors (Schinke et al., 2024). This fluidity highlights the value of self-compassion not only as a preventative measure but also as an ongoing mechanism for maintaining mental health.

Additionally, the thesis underscores the importance of interventions that extend beyond the individual and target the broader social network, including peers, teammates, coaches, and family members. By improving the quality and availability of social support, these interventions can foster environments that not only buffer the impact of stress but also actively promote mental well-being. This systemic approach aligns with the ecological systems model, which underscores the interconnectedness of individual and environmental factors in shaping mental health outcomes.

Ultimately, this comprehensive approach offers a pathway for more effective mental health strategies in elite sport, benefiting both athletes and coaches in the long term. While this thesis has outlined future perspectives for research, it also points to several practical implications that arise from these findings.

5.1 Practical Implications

The findings across the three studies offer valuable practical insights into improving the mental health of both coaches and athletes, particularly in high-performance environments. While practical implications specific to each research question are detailed in the respective research papers, this section extends the discussion to broader takeaways that arise from the overall findings.

First, this dissertation emphasizes the importance of adopting a holistic approach to mental health interventions, addressing both individual and systemic factors. Effective mental health strategies must go beyond focusing solely on the athlete or coach, considering the influence of environmental factors at the micro-, exo-, and macro-levels. For example, mental health responsibilities should be clearly defined within sports organizations and federations (Horvath et al., in preparation; Schinke et al., 2024). Federations should incorporate mental health initiatives as part of their structural frameworks, ensuring that key stakeholders are accountable for the mental health of athletes and coaches (see IOC; 2021, for a toolkit).

Second, proactive mental health monitoring is critical. The observed stability in burnout and PMH underscores the importance of early detection and ongoing monitoring to enable timely

intervention. Regular mental health check-ins can help to identify potential issues before they become more severe (Schinke et al., 2024), allowing for tailored and targeted interventions. These check-ins don’t need to be formal psychometric assessments; even casual conversations, like asking, "How are you doing?" when someone seems to be struggling, can have a meaningful impact on well-being.

Third, fostering an institutional and cultural environment that prioritizes mental health is essential (IOC, 2023; Schinke et al., 2024). Creating a culture of openness around mental health concerns and providing easy access to resources, such as counseling or workshops, are vital for maintaining long-term mental health for both athletes and coaches. Building strong, supportive relationships between coaches, athletes, and other important stakeholder within elite sports can further enhance mental health, contributing to a healthier and more resilient sporting environment.

Fourth, tailored interventions for career transitions are essential for both coaches and athletes. For coaches, programs like career development workshops can provide strategies to manage new responsibilities while maintaining mental health. For athletes, particularly during the JST, stress management programs focused for example on balancing sports and education are crucial. Additionally, self-compassion strategies can help athletes and coaches handle setbacks and maintain well-being during these challenging phases. Supporting both groups through these transitions ensures better long-term mental health outcomes.

Finally, interprofessional collaboration is vital for sustaining mental health initiatives over the long term (Birrer et al., 2023). Collaborating with mental health professionals and integrating their expertise into sports organizations ensures that both athletes and coaches receive evidence-based, comprehensive mental health support throughout their careers.

5.2 Own Transitions

Transitions are a key theme in my thesis, and I would like to integrate a chapter about my own transitions, reflecting on how my research approach has evolved over time. At the start of my PhD journey, I operated under the assumption that my methodological choices were neutral, unaware of the existence of philosophical assumptions. As a result, I didn't realize how my philosophical stance was shaping not only the research design but also the interpretation of data. In particular, I implicitly adopted a postpositivist stance, believing that objective reality could be approximated through repeated empirical observations, with error control ensuring the capture of 'truth.' However, as I progressed—especially during the mixed-methods study—I began to question these assumptions. Despite efforts to reduce researcher influence on participants by using an online survey to add

objectivity to qualitative data, I gradually realized that this "objectivity" was itself shaped by philosophical biases.

This insight aligned with what (Bhaskar, 1978) describes as the "epistemic fallacy" in critical realism, where there is a confusion between knowledge of reality and reality itself. At the time, I was unaware that my research was influenced by both ontological assumptions (beliefs about the nature of reality) and epistemological assumptions (beliefs about how we can know that reality). As Danermark et al. (2019) explain, these philosophical underpinnings are not always explicitly recognized but profoundly influence how researchers frame their questions, choose methods, and interpret results.

Through deeper engagement with critical realism, I began to understand that reality is stratified and cannot be fully captured by empirical observation alone. Social phenomena, in particular, are influenced by underlying causal mechanisms that are often unobservable but real nonetheless (Bhaskar, 1978). This realization shifted my understanding of knowledge production, revealing that no methodology is entirely neutral and that all research is influenced by philosophical stances. As I came to appreciate the layered and socially constructed nature of reality, I recognized that my earlier studies might have been constrained by the assumption that longitudinal observation alone could fully capture the complexity of mental health in athletes and coaches. For example, reflecting on my first publication (Ackeret et al., 2022), I would now enhance the quantitative focus on stability by integrating qualitative methods, such as focus groups or interviews. This would allow me to explore coaches' perceptions of their work environment, personal coping mechanisms, and the social and organizational structures that help explain why stability and change occur in this population.

Embracing a critical realist perspective allowed me to see mental health as a multifaceted phenomenon shaped by both observable behaviors and deeper, often hidden, mechanisms. This shift has significantly informed my current research (Ackeret et al., in preparation), where I now employ a more pluralistic, participatory research design to explore how parents can support their children through the JST.

This transition in thinking has enriched my research, encouraging a more nuanced exploration of mental health in elite sports, recognizing that reality is shaped not just by individual experiences but also by broader social structures and causal mechanisms. It has also made me more reflective about my earlier work, where I may have underestimated the complexity of the phenomena I was studying. Acknowledging the influence of my philosophical assumptions, I now approach research with a more

critical and reflective stance, embracing a broader range of methods and frameworks to capture the intricate realities of athletes' and coaches' mental health.

5.3 Strengths and Limitations

5.3.1 Strengths

One of the key strengths of this dissertation is its comprehensive approach to understanding the mental health of coaches and athletes in elite sport through the lens of both self-compassion and social support. By integrating Keyes' dual-continuum model and Purcell's ecological systems model, this research offers a holistic framework that captures the dynamic and multifaceted nature of mental health. By incorporating both psychological and environmental influences, this research moves beyond approaches that focus solely on the individual, offering a broader understanding of how mental health is influenced by social interactions, stressors, and support systems.

Another strength is the longitudinal design employed in two of the studies (Ackeret et al., 2022; Ackeret, Röthlin, Horvath, & Allemand, 2024). This approach offers valuable insights into the stability and variability of key constructs such as self-compassion, social support, burnout, and PMH. Specifically, the observation of stability within individuals over time is not yet widely used in sports psychology, but it should be considered more in future research, as it offers a deeper understanding of which individuals might be at higher risk for diminished mental health. Such longitudinal research designs also offer information about how factors interact and influence one another, which is often missed in cross-sectional studies.

The use of a mixed-methods approach in the third study (Ackeret, Röthlin, & Horvath, 2024) further strengthens this dissertation by adding qualitative depth and context to the quantitative findings. By combining quantitative data with qualitative insights, this method allows for a more nuanced exploration of the experiences of athletes during the JST.

Finally, the practical implications of the findings contribute to the overall strength of this dissertation. The research offers actionable insights that can inform the development of interventions aimed at enhancing mental health in high-performance environments. Whether through targeted self-compassion training or the development of social support systems within teams and organizations, the findings offer a roadmap for improving mental health outcomes in high-performance environments, benefitting both athletes and coaches. It is important to note, however, that the research was conducted with coaches and athletes within the Swiss high-performance context. According to Purcell

et al.'s (2019) ecological systems model, the exosystem—which includes factors such as sports federations, institutional policies, and the broader sporting community—plays a crucial role in shaping the support structures and mental health outcomes for athletes and coaches. As a result, generalizing these findings to other countries and sporting cultures requires caution, as differences in exosystems may impact the relevance and applicability of the results (Purcell et al., 2019).

5.3.2 Limitations

Despite its strengths, this dissertation is not without limitations. One major limitation is the reliance on self-report measures across all studies. While self-report instruments such as the MHC-SF or the GAD-7 are widely used and validated, they are subject to biases such as social desirability, recall error, and individual interpretation. In the context of elite sport, stigma and notions of mental toughness may further influence athletes' willingness to provide accurate information about their mental health. Research indicates that athletes might underreport experiences of mental disorders due to fears of being perceived as weak or losing their place on a team if they seek help (Habeeb et al., 2022; López & Levy, 2013). This underreporting could contribute to inaccuracies in estimates of disorder prevalence, particularly among different demographic groups such as male and female athletes (Gulliver et al., 2015). The absence of objective measures or third-party evaluations further limits the extent to which these findings can be generalized to broader populations or applied in contexts where self-perception may not align with actual behavior or outcomes (Poucher et al., 2019).

Another limitation relates to the samples gathered in this dissertation. While participation in all three studies was voluntary, it may not fully represent coaches and athletes at higher risk for mental health issues. For example, in our longitudinal studies, coaches with lower emotional well-being were slightly more likely to drop out (Ackeret et al., 2022; Ackeret, Röthlin, Horvath, & Allemand, 2024). This raises the possibility that individuals experiencing more severe mental health challenges may have been underrepresented in the sample. Future studies should therefore try to look closer at coaches and athletes that feel less well, possibly by investigating those who have recently left elite sport or dropped out, as evidence suggests that those leaving elite sport may exhibit higher rates of mental health issues (e.g.; Gouttebarge et al., 2015; Lavallee & Robinson, 2007).

From a methodological standpoint, while the mixed-methods design of the third study enriches the research by combining quantitative and qualitative data, the use of an online survey for the qualitative component may have limited the depth and nuance of participants' responses. Face-to-face

interviews or more interactive qualitative methods could have provided a richer, more detailed exploration of participants' lived experiences, which is particularly important for a complex and sensitive topic like mental health during transitions. Additionally, qualitative methods might have allowed a deeper investigation into the surprising stability of social support, self-compassion, burnout, and PMH among coaches, even amid the external stressors introduced by Switzerland's strict COVID-19 lockdowns.

A final limitation of this dissertation is the reliance on general mental health measurement tools, such as the GAD-7, PHQ-9, and MHC-SF in the second and third studies, while the CBQ, a sport-specific tool, was used in the first study. Although these general tools are widely validated and useful for comparing mental health across different populations, their application in high-performance sport contexts presents challenges. The unique stressors and pressures faced by elite athletes may not be fully captured by these general tools, raising concerns about whether they accurately reflect mental health in this specialized settings (Larsen et al., 2023). For example, Kuettel et al. (2022) demonstrated significant differences in the prevalence of depressive symptoms when using traditional cut-off points for the Major Depressive Inventory (MDI; Bech et al., 2015) and the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) compared to alternative, more suitable thresholds for athletic populations. These findings suggest that general tools may either overestimate or underestimate mental health challenges in athletes, potentially leading to an inaccurate portrayal of their mental health (Henriksen et al., 2019). While sport-specific tools, such as the CBQ, offer more nuanced insights into athletes' mental health, they still require broader validation and acceptance in the field (Larsen et al., 2023).

6 Conclusion

In conclusion, this dissertation demonstrates that self-compassion and social support are valuable resources for promoting the mental health of both athletes and coaches in elite sport. By addressing different aspects of mental health—ranging from burnout prevention to PMH promotion and stress management during transitions—this dissertation provides a comprehensive understanding of how these factors interact within the high-performance sport environment. Future research should continue to explore the mechanisms by which self-compassion and social support influence mental health, particularly through longitudinal and intervention studies aimed at fostering these resources in both coaches and athletes, but also with more qualitative research aiming at understanding in-depth

and individual experiences on the role that self-compassion and social support play in preventing mental illness and promoting well-being.

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8 Appendix

A: Manuscript 1

Original publication:

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Six-month Stability of Individual Differences in Sports Coaches' Burnout, Self-compassion and Social Support

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Abstract

Using a three-wave prospective cross-lagged panel design, the study examined six-month stability of burnout, self-compassion and social support among sports coaches in terms of measurement invariance, mean-level change, rank-order stability, and structural stability. The participating coaches (N = 422; M_{age} = 44.48, SD = 11.03) completed an online questionnaire measuring self-compassion, social support, coach burnout and demographics at baseline and two follow-ups at three months and six months. The various forms of stability were assessed using structural equation modeling. There was no significant mean-level change in burnout, self-compassion, or social support, and all three constructs exhibited measurement invariance. Rank-order stability remained relatively high, ranging from .78 to .94 across the three time points. For all three constructs, covariances between latent factors were invariant over time, indicating high structural stability. While self-compassion and social support were positively related, both were negatively related to coach burnout. These results confirm the importance of preventing and addressing symptoms of burnout, low self-compassion and poor social support in sports settings.

Keywords: burnout, self-compassion, social support, coaches, longitudinal study, stability

Six-month Stability of Individual Differences in Sports Coaches' Burnout, Self-compassion and Social Support

It is widely accepted that sports coaching is a demanding occupation (Fletcher & Scott, 2010; Frey, 2007; Levy et al., 2009), involving stressors that include long and irregular working hours (Altfeld et al., 2018), insecure employment based on athletic performance (Bentzen et al., 2020), work-family conflicts (Pawsey et al., 2021; Potrac et al., 2017), and high emotional investment in the coaching profession (McNeill et al., 2017). Given the emotional strain of accumulated stress, some coaches are likely to experience negative mental health outcomes like burnout (Apostolidis, 2012; Kegelaers et al., 2021; Kelley, 1994; Malinauskas et al., 2010; Schaffran et al., 2016), which may lead them to quit their job (Olusoga & Kentta, 2017; Raedeke, 2004). However, not all coaches experience negative mental health effects (Raedeke et al., 2000), depending partly on risk and protective factors. Previous research has placed much greater emphasis on the former than the latter (Olusoga et al., 2019). Known protective factors include grit (Moen & Olsen, 2020), psychosocial resilience (Wagstaff et al., 2018), and coping skills (Olusoga et al., 2014), as well as self-compassion (Hägglund et al., 2021) and social support (Malinauskas et al., 2010). These last two factors have recently attracted increasing research interest because they are thought to enhance well-being and coping (Freeman, 2021; Knights & Ruddock-Hudson, 2016; Mosewich, 2020; Mosewich et al., 2019; Pacewicz et al., 2019; Thoits, 2011; Zessin et al., 2015).

Most of the research on self-compassion and social support in sports settings is cross-sectional and does not address the issue of coach burnout. For that reason, we adopted a longitudinal approach to examine the nature of burnout, self-compassion, and social support in coaching settings across six months. In particular, we sought to investigate the stability of these constructs and the relationships between them as a foundation for future basic research (e.g., differential change in the constructs) and applied research (e.g., interventions to reduce burnout by promoting self-compassion and social support). The present study also addresses the question of whether we can expect natural change, and if so, what kind of change (i.e., how will a particular construct evolve?). For example, if a known protective factor for mental health remains stable over time, it can reasonably be regarded as a relatively stable resource that a coach can depend on in the future. Conversely, where there is a deficit, an intervention to promote the resource may be indicated. It is important to note that high natural stability does not mean that a self-reported inner state cannot be influenced by an intervention – only that it is unlikely to change without intervention. Inter-individual differences in this regard imply

that it is possible to work with someone who, for example, reports a lack of social support. Another reason to investigate natural stability and change is that the relationships between constructs may also change; for example, does the potential protective relationship between social support and burnout persist or weaken over time?

Examining constructs such as burnout, self-compassion, and social support longitudinally, we can distinguish between different perspectives of change and stability (Nesselroade, 1991, 2001). The present study addresses three statistically and conceptually distinct types of stability: mean-level stability, rank-order stability, and structural stability (Allemand et al., 2007). *Mean-level change* implies that the average level of a construct changes over time; *rank-order stability* implies that individuals can keep their relative standing on a construct relative to others over time, commonly measured by test-retest correlations; and *structural stability* refers to stability of the pattern of correlations among constructs. High structural stability implies that these associations between constructs do not change over time. It is important to differentiate between these three types of stability because, for example, a group's mean-level trend may differ from its rank-order stability. If a group's members maintain the same relative positions over time, rank-order stability is high; at the same time, the population-level mean is independent of rank-order stability and may increase or decrease over time (Asendorpf, 2021). To interpret these types of stability in a meaningful way, it is first necessary to establish longitudinal measurement invariance. Stability and change can only be unambiguously interpreted as a reflection of a change process when items of a questionnaire do not change connotation or contribution to the construct over time (e.g., Meredith & Horn, 2004; Widaman et al., 2010).

Coach burnout, self-compassion and social support: Mean-level and rank-order stability

Coach burnout can be described in terms of three main dimensions (Raedeke & Smith, 2001): *emotional and physical exhaustion* as a result of prolonged exposure to work-life stress (the core dimension of burnout); *sports devaluation* or the extent to which a coach stops caring about their sport and their role as a coach; and *reduced sense of personal accomplishment*, referring to the self-evaluative component of perceived lack of achievement at work (Raedeke et al., 2000).

To date, only one study (Raedeke, 2004) has assessed the stability of coach burnout and observed a rank-order stability coefficient of r = .66 over a period of one year[1]. In a recent study of Swiss elite athletes, Gerber et al. (2018) reported rank-order stabilities of rs = .57 to .65 for burnout

[1] r values of < .3 are usually interpreted as low, 0.3-0.5 as moderate and > .5 as high (Cohen, 1988)

over a period of six months. Beyond sport settings, studies of early-career Finnish workers and Swedish teachers have reported rank-order stability coefficients of *r*s = .49 to .72 (Evolahti et al., 2013; Hultell et al., 2013; Jumat et al., 2020; Roskam et al., 2021; Tóth-Király et al., 2021) for periods ranging from three months to nine years.

The term *self-compassion* refers to one's compassion and benevolence toward oneself when confronted with failings or difficulties (Neff, 2015). Self-compassion can be conceptualized in terms of three bipolar dimensions: (1) *self-kindness versus self-criticism*: how warm-hearted, caring, and understanding or how self-critical one is when confronted with setbacks, failures, or other challenges; (2) *common humanity versus isolation*: the extent to which one accepts that failure, inadequacies, and mistakes are part of the human nature rather than an isolated "that only happens to me" approach; and (3) *mindfulness versus over-identification*: the extent to which one is aware of and accepts negative feelings and experiences for what they are rather than over-identifying with thoughts and feelings of suffering or becoming absorbed in one's reaction to this negative emotion (Neff, 2003a, 2003b).

In a study of female US athletes over a short time span of five days (pre- and post-competition), Killham et al. (2018) reported a rank-order stability of $r = .81$; to our knowledge, there are no other empirical data on the stability of self-compassion in coaches (or athletes). In other studies of adult depressive outpatients and US college students, self-compassion exhibited rank-order stabilities between $r = .51$ and $r = .80$ over periods ranging from 12 months to four years (Donald et al., 2018; Krieger et al., 2016; Stutts et al., 2018). In a sample of Chinese adolescents, self-compassion exhibited a lower rank-order stability of $r = .34$ over a three-year period (Yang et al., 2021).

Social support refers to the perceived availability of support and global satisfaction with the support provided by interpersonal relationships (Knoll et al., 2017), comprising structural components (e.g., network characteristics, number and type of relations) and functional components (e.g., emotional, esteem-related, informational, and tangible support; Barrera, 2000; Uchino, 2004; Wills & Shinar, 2000). Functional support is often further divided into received support and perceived availability of support (Sarason et al., 1990; Vangelisti, 2009); the latter is more consistently linked to beneficial health outcomes (Barrera, 2000; Uchino, 2004; Wills & Shinar, 2000).

To our knowledge, there are no empirical data on the stability of received or perceived social support among coaches or athletes, but researchers in personality and developmental psychology have reported rank-order stability scores in perceived social support between $r = .44$ and .73 over a

four-year timespan (Udayar et al., 2020; Weiss et al., 2021). In a meta-analysis, Wang et al. (2021) reported a comparable rank-order stability in perceived support of r = .55 over an average timespan of 0.72 years. In a study of perceived social support in a population of middle-aged adults, Allemand et al. (2015) reported a rank-order stability of r = .62 over a period of eight years. They found no difference in the mean-level change of perceived social support, suggesting that social support was relatively stable over time.

While burnout, self-compassion, and social support are typically conceptualized and measured as relatively stable individual differences constructs, they may fluctuate in different situations and over time. As the stability of these constructs among coaches remains unclear, the present study looked at changes over a six-month period to better capture any contextual changes during that time (e.g., beginning or end of season, different competitions) and because there is some empirical evidence that relevant changes may occur over this timespan (Gerber et al., 2018; Stutts et al., 2018; Wang et al., 2021). There are reasons for both stability and change with respect to burnout, self-compassion and social support among coaches. Factors that tend to have a stabilizing effect in the context of coaches would be certain aspects of personality (e.g., emotional stability) and a settled environment (e.g., same employer over a long period) while other aspects of personality (e.g., openness to experience, self-reflection) and environmental factors (e.g., relationship status, integration of new players) are likely to contribute to instability or change in coach burnout, self-compassion, and social support (e.g., Cook et al., 2021; Oglesby et al., 2020).

In summary, while previous findings suggest that burnout, self-compassion, and social support are mostly modestly stable, with interindividual differences in stability, there is also evidence of differences in stability ranging from modest to high. However, there are almost no data on these effects among sports coaches, especially in terms of both mean-level and rank-order stability. Indeed, to our knowledge, the mean-level stability of burnout, self-compassion, and social support has rarely been investigated in a sports setting, other than in a few cases in areas other than sport (e.g., Allemand et al., 2015; Hultell et al., 2013). As it may prove problematic to transfer findings from other domains to sports settings (Lundkvist et al., 2014), a dedicated study of sports coaches seems the better option.

Associations between coach burnout, self-compassion and social support

Burnout and self-compassion may be negatively related because, for instance, self-compassion enhances resilience to stress (Bluth & Neff, 2018) and may buffer burnout. In contrast,

people low in self-compassion may be more self-critical and this may result in increased burnout (Amemiya & Sakairi, 2020), or because burnout increases self-criticism (Chen & Kao, 2013) and therefore undermines self-compassion. Several cross-sectional studies have shown that self-compassion is negatively associated with burnout in helping professions and among physicians, students, clergy, and war veterans (e.g., Atkinson et al., 2017; Barnard & Curry, 2012; Gracia-Gracia & Oliván-Blázquez, 2017; Wörfel et al., 2014). To our knowledge, however, the relationship between burnout and self-compassion has not yet been investigated in sports coaching settings.

Coach burnout and social support may be negatively related because poor social support or social network strain tend to be associated with increased stress and potential burnout (Norris et al., 2017). The other way round, burnout may lead to social withdrawal, undermining social support (Price & Weiss, 2000). Empirical findings show that social support is associated with lower levels of stress appraisal and, in turn, with lower coach burnout (Apostolidis, 2012; Apostolidis & Karabatsos, 2012; Hendrix et al., 2000; Kelley, 1994; Kelley & Gill, 1993; Martin et al., 1999). In addition, support from friends, coaching colleagues, and family tend to be negatively associated with coach burnout (Hendrix et al., 2000). In short, the relationship between coach burnout and social support is empirically well established, but previous research was primarily cross-sectional.

Self-compassion and social support may be positively related because a supportive environment can help develop greater self-compassion (Neff, 2003a; Ingstrup et al., 2017) or because self-compassion makes it easier to build and maintain social relationships (Neff & Beretvas, 2013), so enhancing social support. To date, limited cross-sectional research has identified a positive relationship between social support and self-compassion in athletes (Jeon et al., 2016) and students (Dupasquier et al., 2020; Neely et al., 2009), but we are unaware of any studies exploring the relationship between social support and self-compassion in coaches.

Overall, existing theoretical considerations and empirical studies suggest that burnout, self-compassion, and social support are likely to be interrelated. Among coaches, however, only the association between burnout and social support is well established, and as far as we know, there are no existing data on the structural stability of these relationships. For that reason, there is a need for longitudinal data to assess the stability of any links between self-compassion, social support, and coach burnout over time in coaches.

The present study

The overarching aim of this longitudinal study was to examine stability and change in coach burnout, self-compassion, and social support in a large sample of coaches over a period of six months. To that end, the three constructs were measured three times, at intervals of three months. This timeframe was designed to capture the longitudinal interplay between the variables of interest rather than their daily or weekly fluctuations. The study had three specific objectives: First, we sought to establish longitudinal measurement invariance of the measures of burnout, self-compassion and social support measures over time to ensure that the constructs are comparable. Second, we sought to assess stability and change in burnout, self-compassion, and social support over time in terms of mean-level change and rank-order stability. Finally, we examined the structural stability of the associations between burnout, self-compassion, and social support.

Method

Participants

A sample of 422 sports coaches (20.7% female) was recruited in Switzerland through the national professional association of coaches, the national coach education and the national department for youth and adult sport. The participants' mean age was 44.48 years (*SD* = 11.03, *range* = 21-78); of these, 32% coached competitive sports at adult level; 54% coached competitive junior-level sports; and 14% coached recreational sports. Participants came from a wide range of individual and team sports (57 disciplines), including soccer (18%), ice hockey (9%), athletics (7%), alpine skiing (6%), tennis (6%), handball (6%), and swimming (5%).

Procedure

The study adhered to ethical standards and was approved by the university's Institutional Review Board (internal ethics committee). A link to the online survey was sent to potential participants through the institutions mentioned above. As well as being informed about the purpose of the study and confidentiality provisions, they were told that participation was voluntary and that they could withdraw without explanation at any time. After giving consent, participants completed online questionnaires at baseline (T1) and at three and six months (T2 and T3, respectively), answering the same set of questions at each time point. Demographic items (age, gender, sport, level) were recorded only at T1. Twelve weeks after each time point, participants received an email containing a link to the next assessment. Participants were asked to complete the survey within one week and received one e-mail reminder if they failed to do so. These self-report data were collected for 420 participants at T1; two coaches completed the survey at T2 and T3 only. At T2, 301 participants (71%

of the total sample) completed the questionnaire, and 259 participants (61% of the total sample) completed at T3. Participants who participated at all three measurement time points did not differ in burnout, self-compassion, and social support from those who participated at only one or two measurement time points (all *t*s < 1.83, all *p*s > .07, all *d*s < .18).

Measures

Coach burnout

To measure coach burnout, we used the 15-item Coach Burnout Questionnaire (CBQ; Harris et al., 2005), which is adapted from the Athlete Burnout Questionnaire (Raedeke & Smith, 2001) and addresses three dimensions of a coach's experiences: emotional and physical exhaustion, sport devaluation, and reduced sense of accomplishment in a sport-specific context (e.g., "It seems that no matter what I do, I don't coach as well as I should"). Items were rated on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). Higher scores reflect more coach burnout. On the basis of psychometric evaluations and theoretical considerations, Lundkvist et al. (2014) recommended the use of the CBQ to assess sport-specific coach burnout (for details of discriminant and convergent validity, see Lundkvist et al., 2014). As burnout is thought to be a syndrome, Raedeke and Smith (2004) combined the three dimensions as one latent factor by calculating the mean of the 15 items (Items 1 and 14 are reverse-coded). The internal consistency of the total scale score was good at T1 (α = .88), T2 (α = .87), and T3 (α = .88).

Self-compassion

To assess self-compassion, we used the Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011). Comprising 12 items (e.g., "I try to be understanding and patient towards those aspects of my personality I don't like"; "I try to see my failings as part of the human condition"), the SCS-SF is an adaptation of the original 26-item Self-Compassion Scale. It shows high internal consistency and correlates almost perfectly with the original 26-item Self-Compassion Scale (Neff, 2003b). Further, studies have shown good validity for the SCS (Huysmans & Clement, 2017; Raes et al., 2011). As Raes et al. (2011) recommended the use of an overall self-compassion index, negative subscale items were reversed, and the mean of all subscale scores was calculated to obtain an overall score for self-compassion. Items were rated on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). Higher scores reflect that a coach is more self-compassionate. Internal consistency of the total scale score was adequate at T1 (α = .73), T2 (α = .77), and T3 (α = .77).

Social support

To measure social support, we used the Brief Perceived Social Support Questionnaire (BPSSQ; Kliem et al., 2015), a 6-item instrument developed to assess perceived social support (e.g., "I receive a lot of understanding and security from others"). It has been shown that the BPSSQ is a valid measure of general social support (Kliem et al., 2015; Lin et al., 2019). Items were rated on a 5-point scale ranging from 1 (*not true at all*) to 5 (*very true*); higher scores reflect higher levels of perceived social support. The overall index was built by calculating the mean of all items. Internal consistency of the scale was good at T1 (α = .85), T2 (α = .85), and T3 (α = .85).

Statistical Analyses

Longitudinal measurement model

To address our research questions, we used longitudinal structural equation modeling (SEM; Grimm et al., 2016), beginning with a longitudinal measurement model of three correlated latent factors (self-compassion, burnout, and social support) at the three time points (T1 to T3). For each of these latent variables, we used the item-to-construct balance technique (Little et al., 2002) to create parcels (i.e., aggregate-level indicators based on the average of several items) as manifest indicators rather than using single items. The models were identified and scaled using the marker variable procedure, setting the loading of the manifest reference variable to 1, with the intercept of this reference variable fixed at 0. For the matching parcels, we allowed for correlated residual variances at T1 to T3 (Marsh & Hau, 1996).

Longitudinal measurement invariance

To determine whether the three measures behaved in equivalent fashion across the three time points, we assessed the longitudinal measurement invariance (MI) of the three-factor model (Widaman et al., 2010). Tests of longitudinal MI typically include fitting confirmatory factor models with increasingly severe restrictions: a configural model without additional parameter constraints (M1); a weak MI model (M2) with equal factor loadings over time; a strong MI model (M3) with equal factor loadings and item intercepts over time; and a strict MI model (M4) with equal factor loading, equal item intercepts, and equal item residual variances over time. While comparison of factor correlations requires only weak MI, comparison of factor means over time requires strong MI. The strictest form of invariance implies that all differences in means, correlations, and variances of the observed indicators across time points reflect differences in latent variables or factors.

Longitudinal structural invariance/stability

To examine whether associations between the three latent constructs (i.e., self-compassion, burnout, and social support) were stable or differ across the three time points, we tested for longitudinal structural invariance of the three-factor model by comparing a model with equal covariance of the latent constructs over time against a model in which associations were freely estimated over time (M5).

Longitudinal stability and change

To examine whether the constructs were stable or changeable across the three time points, we tested two competing models. We began with a second-order no-growth model (M6; Grimm et al., 2016) based on longitudinal measurement invariance, with three manifest indicators (parcels) per latent factor across all time points, implying no mean changes in the three constructs over time. For all lower-order factors (latent constructs at T1 to T3), we fixed the item intercepts at 0 across all time points; for the higher-order models, we specified an intercept (level) factor. We then tested a second-order latent growth model (M7; Grimm et al., 2016) based on longitudinal measurement invariance with three manifest indicators (parcels) per time point for all factors simultaneously. In addition to the intercept (level) factors, we specified linear slope (change) factors to determine whether the constructs were stable or changeable over time. For the linear growth model, we fixed the slope (change) factor loadings to 0, 1, and 2, corresponding to linear growth. Individual differences in construct levels would be indicated by significant variance in the intercept while individual differences in change (differences in the rates of change) would be indicated by significant variance in the slopes.

All analyses were performed in Mplus 8 (Muthén & Muthén, 1998–2017) using maximum likelihood (ML) estimation. To assess model goodness of fit, we used chi-square (χ^2), comparative fit index (CFI), and root mean square error of approximation (RMSEA) statistics, including 90% confidence intervals (CIs). In general, CFI values above .95 and RMSEA values below .06 indicate that a model is adequately parameterized and of good fit, although values above .90 and below .08, respectively, are acceptable (Browne & Cudeck, 1992; Hu & Bentler, 1998). Model comparisons were performed using nested chi-square ($\Delta\chi^2$) tests; comparison of RMSEA CIs is an effective alternative method of assessing the relative model fit of nested models. Moreover, changes in the CFI and RMSEA of less than .01 and .015, respectively, represent a trivial difference in model fit (Chen, 2007; Cheung & Rensvold, 1999).

Results

Descriptive Statistics

Table 1 presents descriptive statistics and sample sizes for the study variables. Overall, coaches were affected by burnout to a low to moderate degree. These findings are comparable to average levels of burnout among coaches found in other studies (Harris et al., 2005; Malinauskas et al., 2010). The results further showed that coaches reported moderate to high levels of self-compassion and social support, which is slightly higher than in comparable studies (e.g., Ferguson et al., 2015; Lizmore et al., 2017, Hartley & Coffee, 2019). Skewness values and kurtosis values were in the acceptable range according to cut-off values (Hair et al., 2010).

Longitudinal measurement invariance

Table 2 shows model fit indices based on tests of longitudinal measurement invariance (MI) for the three-factor model (M1 to M4). The most restrictive model of strict MI achieved good model fit. Although model comparison using the chi-square difference ($\Delta\chi^2$) test indicates a statistically significant difference from the less restrictive model, two indicators suggest that these reflect trivial differences in model fit. As CFI and RMSEA changes were less than .01 and .015, respectively, and there were substantial overlaps in RMSEA 90% CIs, we concluded that strict measurement invariance holds over time and adequately captures the data. Table 3 shows stability correlations among the latent factors and means of the latent factors based on strict measurement invariance models (M4). The results indicate relatively high levels of rank-order stability across time points, ranging from r = .78 to .94.

Longitudinal structural invariance/stability

Based on the model of strict measurement invariance (M4), we tested a model involving equal covariances of latent constructs across time points (M5; see Table 2). Compared to model M4, this model exhibited no decrement in model fit as assessed by the chi-square difference ($\Delta\chi^2$) test and fit indices, indicating that the covariances among latent factors are invariant over time. In terms of standardized effects, correlations (rs) between self-compassion and burnout ranged between -.44 and -.45 (p < .001); correlations between self-compassion and social support ranged between -.28 and -.29 (p < .001); and correlations between burnout and social support ranged between -.30 and -.31 (p < .001). Note that standardized values for parameters constrained to equality are not computed as a single common estimate.

Second-order latent growth models

Table 2 presents model fit indices for the second-order no-growth model (M6) and the second-order linear growth model (M7). The results for model M7 show a non-significant negative slope

variance for burnout and social support and a non-significant slope variance for self-compassion, indicating no individual differences in change. On that basis, we modified M7 by setting the three non-significant slope variances to zero (i.e., random-intercept, fixed-slope). Table 2 also includes model fit indices for the modified model ($M7^{+}$). Table 4 presents parameter estimates from this latent growth model. The results indicate significant individual differences in construct levels across the three time points as indicated by significant variances in the intercepts. For all three constructs, no significant changes were observed over time.

Discussion

The present study aimed to examine burnout, self-compassion, and social support in competitive sports coaches over a six-month period. To that end, we tested for measurement invariance of the three scales and investigated mean-level change, rank-order stability, and structural stability of the three constructs. The results showed longitudinal measurement invariance of the measures of coach burnout, self-compassion, and social support. This implies that the questionnaire items did not change connotation or contribution to the construct over time. In other words, the coaches interpreted the items consistently across the three time points, and this is a prerequisite for interpreting stability and change. In addition, the pattern of results points to the relatively high stability of coach burnout, self-compassion, and social support across the six-month period, as there were no significant mean-level changes and very high rank-order and structural stability. Our results are consistent with the assumption that self-compassion is related to a “stable feeling of self-worth” (p. 119) rather than to fluctuating self-evaluations (Mosewich et al., 2011; Neff & Vonk 2009). Further, the results seem consistent with the assumption that burnout appears to be a relatively enduring syndrome once experienced (Raedeke & Kenttä, 2013). The results also support the notion that perceived social support reflects a rather stable attitude of expectation (Brinkmann, 2021).

Since burnout symptoms do not seem to disappear naturally, coaches should actively do something about it. Altfeld et al. (2018) provided some individual approaches to help coaches deal with stress and thereby reduce burnout symptoms. Accordingly, coaches regularly should seek for sufficient physical and psychological recovery. Further, the adaption of soft skills like learning how to deal with own expectations or stress management could be fostered through sport psychologists or on an educational basis (Altfeld et al., 2018, Bentzen et al., 2017). In addition, self-regulatory interventions seem to improve burnout symptoms in coaches (McNeill et al., 2019).

Similarly, as coaches' levels of self-compassion seem to remain stable, those who wish to increase self-compassion should pursue an intervention. To our knowledge, to date there have been no self-compassion interventions with coaches. Researchers may be guided by existing interventions with athletes where moderate-to-strong effects of self-compassion interventions have been found (Mosewich et al., 2013; Röthlin & Leiggener, 2021). Further, qualitative studies indicate that self-compassion in athletes could be fostered through social interactions (Frentz et al., 2020, Ingstrup et al., 2017) or positive experiences with role models (Berry et al., 2010).

Finally, the results suggest that coaches with much social support can assume that this resource will be preserved while inadequate social support remains a risk factor. Social support can be enhanced through the mobilization of the social environment by improving individual social skills, by strengthen the tie to existing social networks members or by altering an individual's attitude towards social support (Cohen, 2004; Gottlieb, 2000). Further studies should seek to evaluate existing or adapting social support interventions in sports settings.

Overall, our results show higher rank-order stability of burnout, self-compassion, and social support during a similar duration than almost all previous studies. The expression of burnout in our sample is comparable to that found in other studies with coaches (e.g., Kilo & Hassmén, 2016; Malinauskas et al., 2010). No firm cutoffs have been established for what constitutes a high level of burnout based on the CBQ. Researchers should therefore be extremely cautious of classifying individuals as having high or low levels of burnout.

While any attempt to explain the observed high level of stability is necessarily speculative, our findings could suggest that coaches of the age of our sample have a clear understanding of their role—that is, they know exactly what is important to them, what their tasks are, and how they wish to behave. As this seems to ensure their relative success, there is little incentive to change anything. In addition, it may also be that our sample has had a very stable social environment during the study period. Both of these factors, clarity of a coaches' role and constant environments (i.e., environmental stability) may have contributed to the stability of self-reported burnout, self-compassion, and social support.

The high observed structural stability indicates that the correlations between the three constructs did not change over time. Put differently, regardless of time, coach burnout was negatively related to self-compassion and social support, which were themselves positively related. These findings are consistent with our assumptions and align with other recent research, indicating that self-

compassion and social support may reflect protective factors against burnout over time (Bluth & Neff, 2018; Neff & Beretvas, 2013; Norris et al., 2017). Note that the first assessment was conducted before COVID-19 has spread to Europe; the second and third assessments took place during strict lockdown policies in Switzerland. These policies came up with an unexpected practice stop for sportspeople of all performance levels as well as the postponement or canceling of various events as for example the Tokyo 2020 Olympic and Paralympic Games. For coaches, this time has meant the reframing of their athlete's goal-settings, re-organizing training structures and methods, creating new routines as well as recognizing the degrees of impact in every single athlete. Again, despite these sometimes-drastic circumstances, the current results provide strong evidence for the relative stability of the constructs and their associations.

Our results have some practical implications. The observed stability of burnout, self-compassion, and social support suggests that these do not change within the selected 6-month timeframe. However, living with burnout for an extended period may cause coaches to leave the profession (Raedeke, 2004) and negatively affect their athletes' wellbeing (Bissett et al., 2020). In addition, low self-compassion and social support are associated with poor mental health (MacBeth & Gumley, 2012), which suggests that intervention and prevention may be especially important for coaches who exhibit low self-compassion, low social support, and high burnout. This aligns with earlier evidence that intervention can promote changes in burnout (Langan et al., 2015), self-compassion (Ferrari et al., 2019), and social support (Hirani et al., 2018).

Limitations and Future Research

Our study has multiple strengths. The three-wave longitudinal design enabled us to analyze stability and change in coach burnout, self-compassion, and social support. Additionally, the recruitment of a large sample allowed us to test for measurement invariance, which is highly recommended for longitudinal panel designs (Newsom, 2015). The present study also has some limitations that should inform future research. First, when compiling our sample, we did not consider the issue of representativeness, and the sample is very heterogeneous (i.e., different levels of performance, different age groups of athletes coached, different sports), which has both advantages and disadvantages. On the one hand, the sample engages with a broad spectrum of activities at different levels and in various sports; on the other hand, certain sports may be over- or under-represented, so limiting the generalizability of our results. Another critique is that women were underrepresented in our study (20% women). Gender needs more attention in future research, as

initial evidence suggests gender differences in social support (e.g., Coventry et al., 2004; Matud et al., 2003). In addition, we did not collect any data on critical live events (e.g., job change, relationship break-up, COVID-related stress), and, therefore, we cannot say anything about their possible influence. Although coaches with higher burnout symptoms did not significantly show a higher attrition rate in this study, it may be that coaches with higher levels of burnout symptoms were less likely to participate. Future studies therefore should include more diverse samples with respect to levels of burnout symptoms and should also investigate reasons for coaches' withdrawal from sport. Another possible limitation concerns the measure of perceived social support. It has been shown that perceived social support is almost consistently linked to beneficial health outcomes, but not so received social support (Barrera, 2000; Brinkmann, 2021; Uchino, 2004; Wills & Shinar, 2000). Future researchers might therefore include measures of perceived and received social support in order to investigate potential differences in these concepts among coaches and the broader sports setting.

The focus of the current study was to examine the stability of coaches' burnout, self-compassion, and social support across six months, and their associations. In general, our results support the view that coach burnout, self-compassion, and social support are correlated. Future research is needed to examine the directions of effects between the three constructs. For example, it could be investigated whether a self-compassion intervention reduces coach burnout. This would be plausible since self-compassion interventions are known to help with other mental health problems like depression and anxiety (Ferrari et al., 2019). Similarly, it would be useful to explore whether promoting social support reduces burnout, as for example in the case of depression (Eagle et al., 2018). Future research should also examine changes in burnout, self-compassion, and social support during critical life events—for example, when a coach changes job or club, moves to a different location, or experiences a change in relationship or family status. To that end, an ambulatory assessment would be a useful way of monitoring day-to-day changes over a few weeks, "zooming in" more closely than our study design allowed. Equally, future studies could "zoom out" to look at possible changes in coach burnout, self-compassion and social support over several years.

Conclusion

The present study extends prior research on how coach burnout, self-compassion, and social support in coaches behave over time. Using longitudinal structural equation modeling, we explored three different types of stability over six-months. Our results show high mean-level and rank-order stability of burnout, self-compassion, and social support, as well as the structural stability of these

constructs over the study period. Coach burnout is invariably related negatively to self-compassion and social support, which were in turn positively related. From a practical perspective, these results could suggest that sports associations and health professionals should actively support coaches with high burnout scores, as it cannot be assumed that burnout will disappear naturally within a six-month timeframe.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that might influence the work reported in this paper.

Data accessibility statement

The analyses reported in this article were exploratory and not pre-registered. Data and analyses code will be made available on DRYAD after publication of the article.

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Table 1

Descriptive Statistics of the Variables on the Three Time points

	T1			T2			T3		
	n	*M*	*SD*	n	*M*	*SD*	n	*M*	*SD*
Self-compassion	420	3.54	0.50	301	3.48	0.52	259	3.55	0.52
Burnout	420	1.95	0.56	301	1.96	0.53	259	1.94	0.54
Social support	420	4.17	0.69	301	4.20	0.71	259	4.22	0.68

Note. The variables consist of mean scale scores with a range from 1 to 5. Two coaches completed the survey at T2 and T3 only.

Table 2

Goodness of Fit Indices for the Evaluation of Longitudinal Measurement Invariance (Models M1 to M4) and Second-Order Latent No-Growth and Growth Models (Models M5 and M6)

Model	χ^2	df	CFI	RMSEA (90% CI)	ΔModel	$\Delta\chi^2$	Δdf
M1: Configural invariance	363.18*	263	.985	.030 (.022; .037)	--	--	--
M2: Weak invariance	370.27*	275	.986	.029 (.021; .036)	2-1	7.09	12
M3: Strong invariance	387.19*	287	.985	.029 (.021; .036)	3-2	16.92	12
M4: Strict invariance	429.29*	305	.982	.031 (.024; .038)	4-3	42.10*	18
M5: Structural invariance	437.56*	311	.981	.031 (0.24; 038)	5-4	8.27	6
M6: No growth	519.46*	341	.973	.035 (.029; .041)	--	--	--
M7: Linear growth	482.81*	323	.976	.034 (.028; .040)	--	--	--
M7⁺: Linear growth modified	518.39*	338	.973	.036 (.029; .042)	--	--	--

Note. M1 to M4 = longitudinal measurement invariance models; M5 = longitudinal structural invariance; M6 = no growth model / random intercept only model; M7 = linear growth model; M7⁺: The model M7 was modified (i.e., the non-significant negative slope variance for burnout and social support and the non-significant slope variance for self-compassion were set to zero, indicating no individual differences in change). χ^2 = chi-square test statistic (ML estimator); df = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; 90% CI = 90% confidence intervals for RMSEA; ΔModels = comparison of models; $\Delta\chi^2$ = chi-square difference test; Δdf = difference in degrees of freedom. *p < .001.

Table 3

Stability Correlations and Estimates Means of the Latent Factors (Model M4)

	Self-compassion	Burnout	Social support
$r_{T1\text{-}T2}$	.88	.84	.78
$r_{T2\text{-}T3}$	.94	.86	.82
$r_{T1\text{-}T3}$	.87	.81	.89
M_{T1} (SE)	3.43 (0.03)	1.90 (0.03)	4.03 (0.04)
M_{T2} (SE)	3.37 (0.03)	1.93 (0.03)	4.05 (0.04)
M_{T3} (SE)	3.44 (0.03)	1.92 (0.03)	4.05 (0.04)

Note. SE = standard errors; all correlations are significant at $p < .001$.

Table 4

Parameter Estimates from the Second-Order Latent Growth Models (Model M7⁺)

	Intercept		Slope		Intercept correlations		
	M (SE)	Var (SE)	M (SE)	Var (SE)	1	2	3
1. Self-compassion	3.41 (0.03)	0.16* (0.02)	0.003 (0.01)	0[a]	--		
2. Burnout	1.91 (0.03)	0.22* (0.02)	0.01 (0.01)	0[a]	-.50*	--	
3. Social support	4.03 (0.04)	0.33* (0.03)	0.01 (0.01)	0[a]	.32*	-.35*	--

Note. SE = standard errors; [a] = the non-significant negative slope variance for burnout and social support and the non-significant slope variance for self-compassion from M7 were set to zero, indicating no individual difference in change. *$p < .001$

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Positive Mental Health Among Sports Coaches: A Six-Month Longitudinal Study

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Abstract

Positive mental health is important for sports coaches to keep functioning well over time, but little is known about its longitudinal stability. Consequently, this study examined stability and change of emotional, psychological, and social well-being in a sample of 422 sports coaches (M_{age} = 44.48, *SD* = 11.03) in terms of measurement invariance, rank-order stability, mean-level change, stability of interindividual differences, and structural stability. Participants completed measures of emotional, psychological, and social well-being at baseline and again at three and six months. Multiple perspectives of stability and change were examined using structural equation modeling. The results confirm that the measure of positive mental health functions equivalently over time. Stability of well-being remained high, with rank-order stability coefficients ranging from .67 to .79 at three and six months, and no mean-level change in well-being was observed. The results also indicate stable interindividual differences and structural stability of positive mental health over time. These results confirm the importance of addressing any symptoms of diminished positive mental health in the coaching population.

Keywords: well-being, sports coaches, longitudinal study, stability

Positive Mental Health Among Sports Coaches: A Six-Month Longitudinal Study

If we think about the characteristics a good sports coach should have, would these include “free from depression“ or “not burned out”? Or might we instead think about qualities like “is empathic,” “is happy to try new things,” or “is a motivator with a positive attitude”? While we may generally hope that positive things will happen, the absence of negativity alone is not enough to make this happen (Keyes & Annas, 2009; Keyes et al., 2002). Similarly, the shift from a predominantly clinical view of mental health to a more positive view includes the assessment of an individual’s well-being and functioning, generally referred to as *positive mental health* (PMH; WHO, 2004).

As PMH is a critical factor in the maintenance of well-being and optimal functioning over time (Keyes, 2002; Keyes & Annas, 2009), it is likely to be very important for sports coaches, who must deal with a wide range of demands and stressors in their professional life (Fletcher & Scott, 2010; Frey, 2007; Levy et al., 2009). This is especially the case in high-performance sporting contexts, where ever-changing, unpredictable, and highly competitive working conditions mean long working hours, short-term contracts, and low job security (Altfeld et al., 2018; Bentzen et al., 2020). These stressors can affect mental health and even lead to mental illness. Further, it can also enhance absenteeism and contributing to diminished job satisfaction, morale, and productivity (Harnois et al., 2000; Potts et al., 2021; Sparks et al., 2001) and, ultimately, withdrawal from the work environment. There is also evidence that poorer PMH may prompt coaches to engage in need-thwarting behaviors that impact the mental health of athletes they coach (Stebbings et al., 2012). Yet, despite the demonstrable relevance of PMH in this context, our understanding of PMH, its assessment, and its behavior over time remains limited (Hill et al., 2021; Pankow et al., 2023; Pilkington et al., 2022). The present study aims to address these gaps.

Conceptualization and Assessment of Positive Mental Health

The paradigm shift to a more salutogenetic view of mental health, emphasizing individual functioning and well-being, has significant implications for sports research. Well-being cannot be achieved or maintained simply by addressing an individual’s problems; in fact, there is accumulating evidence that mental illness and PMH are not opposites but constitute two distinct and only partly interrelated continua (Huppert & Whittington, 2003; Keyes, 2005; Lamers et al., 2011; Weich et al., 2011; Westerhof & Keyes, 2010). Further, evidence shows that promoting PMH seems to differ from preventing mental illness (MacDonald, 2006; Westerhof & Keyes, 2010; WHO, 2004) and suggests

that PMH protects against psychopathology (Grant et al., 2013; Keyes et al., 2010; Lamers et al., 2015; Wood & Joseph, 2010).

Despite the accumulating evidence of the importance of PHM, there is still conceptual ambiguity in the broader research literature about how to define and assess PHM (Baldock, 2020; Carr, 2012; Vaillant, 2012). This also presents a difficulty in the sports literature as the comparison of study results remains challenging due to different conceptual approaches and measurement instruments used (for further detail, see Pankow et al., 2022). Historically, two schools of thought have dominated discussions of PMH (Diener, 1984; Nelson-Coffey & Schmitt, 2022; Ryff, 1989). While the *hedonic* perspective focuses on positive affect (i.e., positive emotions and moods) and life satisfaction (Diener, 1984), the *eudaimonic* perspective emphasizes optimal individual functioning in everyday life (e.g., Nelson-Coffey & Schmitt, 2022; Ryff, 1989). Considering the conceptual and empirical overlap between the two perspectives (Keyes & Lopez, 2005; Keyes et al., 2002), researchers increasingly regard PMH as a construct that comprises both hedonic and eudaimonic elements (Keyes et al., 2002; Ryan & Deci, 2001). Further, by defining mental health as “a state of well-being in which individuals recognize their own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and are able to contribute to their communities” (WHO, 2004), the WHO also recognizes the importance of the social aspects of human functioning. In light of these developments, PMH is now widely acknowledged to encompass emotional, psychological, and social well-being (Keyes & Annas, 2009; Keyes et al., 2002; Westerhof & Keyes, 2010). Specifically, emotional well-being refers to happiness and life satisfaction, psychological well-being pertains to positive self-actualization, and social well-being relates to positive societal functioning or value.

One model that captures PMH holistically, that is, all three dimensions, is the Mental Health Continuum. The associated long-form instrument (MHC-LF; Keyes, 2002) contains 40 items, whereas the short form (MHC-SF; Keyes, 2009) comprises 14 items. The MHC-SF was developed to resolve the problem of the diagnostic threshold of the MHC-LF and for the use in multi-construct longitudinal and epidemiological panel studies (Keyes, 2009). The MHC-SF can be used as a continuous measure of well-being and its three dimensions (emotional, psychological, and social well-being), or to categorize mental health into three different states: flourishing, moderate mental health, and languishing. In the present study, we focus on the assessment of the level of well-being and its three dimensions, as this method takes into consideration more information for our study goals and also appears to better represent the WHO’s definition of mental health. Research has demonstrated that

the MHC-SF with its three subscales is a valid and reliable measure of PMH (Lamers et al., 2011). Its moderate test-retest reliability suggests that the MHC-SF is sensitive to both change and stability over time. Lamers et al. (2011) reported that subscale means and reliabilities were consistent across four measurement occasions over a period of nine months. The MHC-SF has been used in various samples and also already in sports, including samples of athletes (e.g., Knowles et al., 2021; Röthlin et al., 2023) and in a small sample of sports coaches (Pankow et al., 2022).

Previous Research on Positive Mental Health Among Sports Coaches

The multiple demands and potential stressors of a coaching career can have negative outcomes for a coach's mental health (Carson et al., 2019; Norris et al., 2017). Better mental health equips coaches to handle certain challenges better, such as managing expectations, dealing with setbacks, and working with diverse personalities (Carson et al., 2019; McNeill et al., 2018). Coaches who prioritize their mental health are also more likely to model positive behaviors and attitudes that promote a team culture of resilience and self-care (Pankow et al., 2022; Solstad et al., 2018; Thelwell et al., 2017). Specifically, Pankow et al. (2022) found that coaches high in PMH consciously acted in ways that would foster the growth and development of their student-athletes, and seeing their athletes succeed, in turn, predicted their own PMH (Pankow et al., 2022). Comparable results were found by Solstad et al. (2018), who reported that coaches with a higher level of empowering and a lower level of disempowering coaching-style in the beginning of the season reported higher psychological well-being at the end of the season. Prior research has also shown that PMH varies as a function of age and gender, so that older coaches reported higher levels of well-being than younger ones, and mixed results were found regarding gender (Carson et al., 2019; Gorczynski et al., 2020; Norman & Rankin-Wright, 2018).

Previous work on PMH in the context of sports coaching is limited in at least two important ways. First, previous studies have typically measured a single aspect of PMH without specifying a particular dimension (e.g., emotional or psychological well-being; Lundqvist, 2011; Pankow et al., 2023). There is a need for research on PMH in sports coaches who explicitly use the multidimensional model, as through its' use, more differentiated statements regarding the risk and protective factors of PMH can be made. Specifically, the inclusion of social well-being is becoming of interest in the sports literature, as several researchers and position statements state that mental health in sport cannot be considered without the social context (e.g., IOC, 2023; Purcell et el., 2021). Second, most existing studies are cross-sectional, making it difficult to clarify the manifestation and development of PMH.

There is a need for longitudinal studies of PMH in sports coaches, as stability and change are central issues for both basic research (e.g., differential change in PMH) and applied research (e.g., planning organizational or individual interventions to foster PMH).

The Present Study

To address these gaps, the present study examined emotional, psychological, and social well-being of sports coaches longitudinally over six months. Five research questions address five conceptually and statistically distinct perspectives of stability and change: *(1)* Does the measure of PMH function equivalently over time? Only if items of the MHC-SF (Keyes, 2009) do not change connotation or contribution to the latent construct of PMH across time, change and stability can be unambiguously interpreted as a reflection of a developmental process. Therefore, we tested the longitudinal measurement invariance of MHC-SF as a prerequisite for the second to fifth research questions (e.g., Meredith & Horn, 2004; Widaman et al., 2010). *(2)* How stable is PMH over time in terms of rank-order stability? Rank-order stability implies that individuals retain their relative standing on a construct over time; this is commonly measured by test-retest correlations. *(3)* Does the mean-level of PMH change over time? Mean-level change implies that the average level of a construct changes over time. *(4)* How stable are interindividual differences in PMH over time? This perspective refers to the fact that the amount of interindividual differences in PMH can decrease, increase, or stay stable across time; this is measured by comparing PMH factor variance longitudinally. *(5)* Does the structural stability of PMH persist over time? Structural stability refers to the patterns of intercorrelations between the dimensions (or items) of the PMH measure. Structural change implies that the associations between the dimensions of PMH change over time. Finally, as previous work has shown variation in PMH in function of age and gender (Carson et al., 2019; Gorczynski et al., 2020; Norman & Rankin-Wright, 2018), we explored the associations between emotional, psychological, and social well-being and age and gender.

Method

Transparency and Openness

The present study's design and its analysis was not preregistered. Reporting standards are followed throughout, including clear reports of the dataset, sample selection, any exclusions and measure used. Data and analyses code are available at DRYAD (Ackeret et al., 2023). The study was conducted in accordance with the principles of the Declaration of Helsinki. It adhered to the relevant ethical standards and was approved by the University's Institutional Review Board (internal ethics

committee). An a priori power analysis was conducted using the R *pwr* package version 1.3-0 (Champely, 2020) to determine the minimum sample size required to test the study goals. The results indicated that the required sample size to achieve 80% power for detecting a small to medium effect, at a significance criterion of α = .05, was *N* = 270. Data were analyzed using Mplus 8 (Muthén & Muthén, 1998-2017).

This is the second published study within a wider research project looking at psychological aspects of sports coaches in Switzerland over time. A preceding study has used data from this research project with a focus on self-compassion, social support, and burnout in coaches (Ackeret et al., 2022). The focus of the present study was to assess coaches' PMH over time using the MHC-SF.

Participants and Procedure

A sample of 422 sports coaches, of whom 20.7% were women, was recruited in Switzerland through Switzerland's national professional association of coaches, the Sports Coach Education Switzerland, and the national department of youth and adult sports. The participants were, on average, 44.48 years old (*SD* = 11.03, *range* = 21–78). The average weekly number of hours spent coaching were 28.67 hours (*SD* = 15.39) at t1, 23.33 hours (*SD* = 16.71) at t2, and 26.27 hours (*SD* = 17.19) at t3. At t1, the mean percentage of employment as a coach was 52% (*SD* = 39.25), and 48% (*SD* = 40.55) at t2 and t3. The mean percentage of employment other as a coach was 37% at t1 (*SD* = 40.28), 35% at t2 (*SD* = 40.65), and 36% at t3 (*SD* = 40.90). Within this sample, 32% coached adult-level competitive sports; 54% coached junior-level competitive sports; and 14% coached recreational sports. The participants represented 57 different individual and team disciplines, including soccer (18%), ice hockey (9%), athletics (7%), alpine skiing (6%), tennis (6%), handball (6%), and swimming (5%).

For recruitment purposes, the above institutions sent potential participants a link to an online survey. Initially, they were informed about the purpose of the study and confidentiality provisions; they were also told that participation was voluntary and that they could withdraw at any time without offering a reason. After giving their consent, the participants completed an online questionnaire at three measurement occasions: baseline (T1), three months (T2), and six months (T3). The questionnaires were identical on each occasion. Demographic variables (age, gender, sport, level) were assessed only at T1.

At twelve-week intervals, the participants received an email containing a link to the next assessment. They were asked to complete the survey within one week; if they failed to do so, they

received one email reminder. At T1, 420 participants returned the required self-reported data; two coaches completed the survey at T2 and T3 only. At T2, 301 participants (71% of the total sample) completed the questionnaire; at T3, 259 participants (61%) completed the questionnaire. There was a slightly higher dropout rate among participants who exhibited lower emotional well-being at T2, $t(299) = 1.776$, $p = .08$) and again at T3, $t(418) = 1.998$, $p = .05$). No differences were found with respect to social and psychological well-being (all ts < 0.882, all ps > 0.41, all ds < 0.33). No participants were excluded from the analysis.

Measures

The 14-item MHC-SF (Keyes, 2009)—an abbreviated version of the 40-item MHC-LF (Keyes, 2002)—measures three theoretical components of PMH: emotional well-being (3 items; e.g., “During the past month, how often did you feel satisfied with life?”); psychological well-being (6 items; e.g., “During the past month, how often did you feel that you had experiences that challenged you to grow and become a better person?”); and social well-being (5 items; e.g., “During the past month, how often did you feel that you had something important to contribute to society?”). Participants rated the frequency of every feeling they had experienced over the previous month on an ordered categorical 6-point scale (1 = never, 2 = once or twice a month, 3 = about once a week, 4 = two or three times a week, 5 = almost every day, 6 = every day). Internal consistencies across the three measurement occasions were αs = 0.79–0.87 for emotional well-being; αs = 0.83–0.87 for psychological well-being; and αs = 0.77–0.79 for social well-being.

Statistical Analyses

We used longitudinal structural equation modeling to examine PMH over time. To begin, we tested the measurement invariance of the MHC-SF’s three-factor model for ordered categorical items over time before performing direct statistical comparisons of factor means, variances, and covariances among the constructs. One common problem in such studies with ordered categorical indicators is limited data (Liu et al., 2017); if different numbers of response categories are observed at each time point, this may cause problems when specifying invariance constraints on the threshold parameters. In the present study, response category 1 (never) was not used in four cases. For that reason, with the exception of the descriptive analysis (see Table 1), we collapsed response categories 1 (never) and 2 (once or twice a month) for all MHC-SF indicators (see Liu et al., 2017, p. 495). We also rescaled responses 1 or 2 (collapsed), 3, 4, 5, and 6 as 0, 1, 2, 3, and 4, respectively, reducing each MHC-SF indicator to five observed categories at each of the three measurement occasions.

Longitudinal measurement invariance. Following the guidelines for testing longitudinal measurement invariance with ordered categorical indicators (Liu et al., 2017), we tested four longitudinal models. The baseline model (M1) tested the hypothesis that the same general pattern of factor loadings persists over time; this served as a baseline for the evaluation of three other models: loading (weak) invariance, threshold (strong) invariance, and unique factor (strict) invariance. The loading (weak) invariance model (M2) tested the hypothesis that factor loadings hold over time, implying that the variances and covariances of latent common factors can be longitudinally compared. The threshold (strong) invariance model (M3) tested the hypothesis that thresholds (as well as factor loadings) hold over time, enabling longitudinal comparison of latent factor means. Finally, the unique factor (strict) invariance model (M4) tested the hypothesis that, along with the other constraints, unique factor variances remain the same over time, implying that changes in the expected means, variances, and covariances over time can be attributed solely to changes in the latent common factors (for details, see Liu et al., 2017).

Our longitudinal measurement model comprised three correlated latent factors, with three observed indicators for emotional well-being, six indicators for psychological well-being, and five indicators for social well-being. measured at three measurement occasions. The corresponding latent common factors and the unique factors for each indicator were allowed to correlate across occasions. The model was specified using the marker variable procedure, setting the loading of a reference indicator to 1. This modeling strategy requires two of the thresholds for the marker variable to be invariant across occasions (for details, see Liu et al., 2017).

Longitudinal stability and change. Based on the unique factor invariance model (M4), we then examined the rank-order stability of the three-factor model of PMH by comparing latent factor correlations, and mean-level change of PMH over time, using latent factor mean differences from T1 as a reference (fixed to zero). To investigate whether rank-order stabilities in PMH differed for T1–T2 and T2–T3, we tested a model with equal latent stability covariances over time (M5) and compared it to a model with unconstrained stability covariances (M4). To determine whether mean PMH values differed across measurement occasions, we compared a model with equal latent common factor means over time (M6) to a model with unconstrained factor means (M4). To assess the stability of interindividual differences in PMH, we then compared a model with equal factor variances over time (M7) to a model with unconstrained factor variances (M4). Finally, we looked at the structural stability

of PMH by comparing a model with equal covariances between the three latent factors of PMH over time (M8) to a model with unconstrained factor covariances (M4).

We performed the analyses of ordered categorical data with Mplus 8 (Muthén & Muthén, 1998-2017), using theta parametrization and the weighted least squares mean and variance adjusted (WLSMV) estimator. Missing data were handled using Full Information Maximum Likelihood estimation. To evaluate overall model fit, we employed a combination of the comparative fit index (CFI) and root mean square error of approximation (RMSEA) statistics with 90% confidence intervals (CIs). For ordered categorical data, the following cutoff values are recommended as indicators of good model fit: CFI ≥ .96, RMSEA ≤ .05 (for a review, see Finney & DiStefano, 2013). Having established baseline model fit, we used nested model tests based on the adjusted chi-square difference test ($\Delta\chi^2$), using the Mplus option DIFFTEST to compare the less restricted model's fit to the next model in the hierarchy.

Some authors have suggested that changes in CFI and RMSEA might serve as useful indices when comparing nested models in the context of ordered categorical models (see Svetina et al., 2020, Table 1 for recommendations). Specifically, Rutkowski and Svetina (2017) suggested ΔRMSEA ≤ .05 in conjunction with significant $\Delta\chi^2$ for loading (weak) invariance and ΔRMSEA ≤ .01 and ΔCFI ≥ -.002 for threshold (strong) invariance (with three or fewer dimensions). As RMSEA is virtually independent of sample size, comparison of RMSEA confidence intervals (CIs) would be an effective method of assessing the relative fit of nested models.

Results

Table 1 shows the descriptive statistics and Spearman (rho) correlations for MHC-SF scores; category 1 and 2 responses were not collapsed for the purposes of this descriptive analysis. Overall, coaches exhibited rather high levels of PMH across time. There were no differences in means between T1 to T3 (i.e., overall PMH and its three dimensions) regarding coaches that were in- or off-season during the assessments. Further, in line with expectations, emotional, psychological, and social well-being were found to be moderately to strongly interrelated at all measurement occasions.

Table 2 presents the results of longitudinal measurement invariance testing for the three-factor MHC-SF model. All models (M1 to M4) exhibited good fit with the unique factor invariance model with best model fit in terms of CFI and RMSEA values. Using the Mplus option DIFFTEST, all of the nested model tests indicated that model fit did not worsen significantly compared with less restrictive models when more constraints were added. We concluded that the most restrictive model of unique factor

invariance (M4) holds across the three measurement occasions and adequately captures the data. Longitudinal unique factor invariance implies that changes in the mean values of the observed ordered categorical indicators can be attributed solely to changes in latent common factors.

Table 3 presents the results for rank-order stability and mean-level change in latent common factors based on the unique factor invariance model (M4). These results indicate relatively high levels of rank-order stability across measurement occasions, ranging from $r = .67$ to $r = .79$. Additionally, we tested a model (M5) that preserved the latent rank-order stability of common factors from T1 to T2 and from T2 to T3 (Table 3). These additional constraints did not reduce model fit when compared to M4, suggesting that latent factor covariances were equivalent over time. These results suggest that the participants exhibited relatively high levels of rank-order stability in terms of emotional, psychological, and social well-being. Those exhibiting high PMH tended to remain well throughout; similarly, low-well-being participants remained less well over time.

We observed only one significant latent mean-level change: an increase in emotional well-being ($p < .05$). However, constraining the latent factor means as equal across time (M6) by setting T2 and T3 to zero (with T1 as reference) did not significantly reduce model fit as compared to M4 (see Table 3). These results suggest that, on average, participants' emotional, psychological, and social well-being exhibited stability at the mean level. For the clinical classifications and stabilities, see supplementary.

Table 4 shows factor variances and covariances based on the unique factor invariance model (M4; see also Table 3). All factor variances were statistically significant ($p < .001$) at each time point, confirming interindividual differences for all components of PMH. In an additional analysis, we constrained common factor variances as equal over time (M7, Table 3) for each aspect of PMH. When compared to M4, model fit was not significantly worse, indicating that interindividual differences in PMH remain stable over time.

Regarding covariances among the three latent factors of PMH at each time point, the results indicate strong correlations ranging from .70 to .84 (Table 4). We also tested the structural stability of PMH by setting equal factor covariances over time (M8; see Table 3). On comparing this model to the less restrictive M4 (Table 3), the results again suggest that the patterns of covariance among the three latent factors are similar over time.

In a final analysis, we incorporated gender (1 = male, 2 = female) and age (as a continuous variable) in M4 to explore any correlations with latent PMH factors at each time point. The results

indicate that gender was not related to any of the mental health factors at any time point (*r*s < .07). Age was positively associated with emotional well-being (*r*s = .17–.20, *p*s < .01), psychological well-being (*r*s = .15–.20, *p*s < .01), and social well-being (*r*s = .18–.25, *p*s < .001), indicating that older coaches experienced higher levels of well-being than younger coaches.

In summary, based on unique factor invariance—the strictest form of measurement invariance—we systematically examined stability and change in the three-factor model of PMH from several perspectives. The results indicate stability rather than change in sports coaches' mental health over a six-month period.

Discussion

The present study examined PMH of sports coaches longitudinally over six months. More specifically, we examined emotional, psychological, and social well-being using five conceptually and statistically distinct perspectives of stability and change. First, we found that the measure of MHC-SF functioned equivalently over time. This implies that the coaches interpreted the items similarly over time, which is a prerequisite for examining other perspectives of stability and change. Second, we observed fairly high rank-order stability of PMH, indicating that PMH of coaches remained relatively stable over time. Third, we found that the mean-level of PMH did not change over time. Fourth, we also observed stability in interindividual differences in PMH over time, suggesting that the amount of interindividual differences in PMH has not changed. Finally, the structure of PMH remained stable over time.

The present findings have several implications. First, the finding of longitudinal measurement invariance of the MHC-SF in sports coaches indicates that the observed stabilities in PMH are likely due to actual stabilities rather than measurement errors or biases. Additionally, the high level of structural stability suggests that the multidimensional factor structure of PMH remains stable over time, further supporting the use of the measurement instrument in longitudinal studies. Accordingly, the MHC-SF is also likely to be of use for intervention studies as a reliable means of assessing the effectiveness of interventions over time.

Second, the findings of stability of PMH and specifically of individual differences in PMH suggest that coaches who exhibit high PMH can expect this to continue over shorter time periods, although low PMH remains a risk factor. This is an important finding because research has shown that higher PMH contributes to resilience by protecting against subsequent psychopathology and predicting a decrease in mental disorders (Grant et al., 2013; Keyes et al., 2010; Lamers et al., 2015; Wood &

Joseph, 2010), whereas lower PMH is associated with an increase in mental disorders (Keyes et al., 2010).

Taken together, these findings highlight the importance of actively addressing low PMH, as it will not improve naturally. According to Norris et al. (2017), coaches' PMH can be enhanced in three ways: by satisfying basic psychological needs, by reducing need-thwarting behaviors, and by increasing self-determined motivation. According to other recent studies, coaches with low job security and high workloads are more likely to experience poorer PMH (Bentzen et al., 2020; Solstad et al., 2018). In contrast, meaningful employment, a healthy organizational culture, transformational leadership, access to quality social support, and improved family-work-life balance can increase PMH (Carson et al., 2019; Hill et al., 2021; Pankow et al., 2022). Researchers have recently begun to explore factors that can protect or enhance PMH, but there is a lack of specific interventions to improve coaches' PMH. Beyond the field of sports research, one systematic review and meta-analysis of psychological interventions to improve PMH concluded that mindfulness-based multi-component positive psychological interventions exhibit the greatest efficacy (van Agteren et al., 2021).

Third, the present findings indicate that PMH was relatively stable over six months. However, this does not mean that there is no change and variability between the three-months' time intervals. To capture potentially more nuanced changes in PMH, shorter intervals (such as daily or weekly assessments) could be assessed. For example, evidence from organizational studies suggests that PMH may be lower on days when employees experience high levels of work-related stress (Harris & Daniels, 2007; Hoppmann & Klumb, 2012) and higher when they receive more support than usual from their coworkers (Simbula, 2010; Xanthopoulou et al., 2008). Shorter intervals between assessments may also help to identify specific events or stressors that affect coaches' PMH. For example, DeWolfe and Dithurbide (2022) reported dynamic changes in coaches' PMH during and after the Olympic Games. On the other hand, longer intervals could capture changes in PMH associated with exposure to a given task and social environment over a longer period (Sonnentag, 2015). In their longitudinal study, Baldock et al. (2022) reported lower levels of well-being at the beginning of the season due to negative appraisal of stressors and ineffective coping. On the other hand, Bentzen et al. (2016) observed a decline in well-being as the season progressed.

In that context, it would be interesting to track coaches' PMH over two or more competitive seasons. The hedonic treadmill theory of well-being suggests that while our responses to life events are short-term reactions, we adapt to the new situation over time (Diener et al., 2006). Longer studies

could also assess the impact of interventions designed to improve PMH, as any changes may not be immediately apparent. In general, the choice of a meaningful interval when assessing PMH in sporting contexts should be guided by the research question and practical considerations.

Fourth, the coaches in our sample exhibited relatively high levels of PMH over time. The mean levels are comparable with other studies of coaches and athletes based on the MHC-SF (e.g., Pankow et al., 2022; Röthlin et al., 2023). While any explanation of the high level of stability observed here is necessarily speculative, our findings suggest that the coaches in our sample may be well equipped to handle stress and pressure. For example, they may have developed adaptive coping mechanisms over time, or they may have a clearer understanding of their roles; indeed, our findings indicate that PMH seems to be higher in older coaches. Other possible reasons for this observed stability include a stable social environment or natural selection over time, as those who do not cope well with stress and pressure may ultimately leave. In Switzerland, the relatively high standard of coach education and the fact that most coaches work part-time may further contribute to the observed high levels of PMH, which may also be a limitation of our study (see below). Working part-time as a coach may reduce stress (e.g., by higher financial safety) or offers the possibility engage in (prosocial) behavior like (unpaid) coaching activities. Thus, on the one hand, working as a part-time coach can be a resource for PMH if it is their decision to work part-time. But on the other hand, it can also be a stress factor if they have to work part-time because their coaching job cannot cover their financial needs.

Finally, it is worth noting that while our first measurement occasion was conducted before the outbreak of COVID-19 in Europe, the second and third occasions occurred during Switzerland's strict lockdown. These measures brought training and competition to an unexpected halt for athletes at every level, and led to the postponement of all sporting events, including the Tokyo 2020 Olympic and Paralympic Games. For coaches, this meant adjusting athletes' goals, reorganizing training plans and methods, developing new routines, and recognizing the impact of these changes on each athlete. In spite of these significant changes, however, the PMH of the sports coaches remained relatively stable. Again, this may indicate adaptive coping mechanisms that the coaches used to maintain their positive well-being.

Practical Implications

Although our study was descriptive in nature, we would like to present some practical implications based on our findings. The observed stability of PMH implies that it does not change within the six-month study period. This is a good finding for coaches high in PMH, as high levels of

PMH are associated with good health, life expectancy, and satisfaction (Seow et al., 2016). On the other hand, coaches with lower levels of PMH must strive actively to improve, given the increased likelihood of mental illness and the potential associated impact on athletes' well-being (Keyes et al., 2010; Stebbings et al., 2012). Clearly, then, sporting bodies and systems should not underestimate the importance of PMH for their stakeholders.

Limitations and Future Research

The present study assessed PMH stability and change in a large sample of Swiss coaches. Our findings indicate that PMH is generally moderate to high in this population and is unlikely to change within a six-month time frame without intervention. However, we must also acknowledge some limitations. First, our sample was heterogeneous, representing many sports, sporting levels, and age groups of coaches and coached athletes. While this may have some advantages, it also raises concerns about the generalizability of our results, as the sample may not be representative of the population of Swiss coaches as a whole. Second, no statements can be made about individual sports and if the age effect of higher PMH whether the effect of higher PMH among older coaches is really age-dependent or, for example, is also influenced by the coaches' years of experience. Third, we found that coaches with lower emotional well-being dropped out of our study slightly more. Therefore, a further concern is that trainers who feel less well did not participate in our study. According to Gorczynski et al. (2020), coaches with a previous diagnosis of mental disorder typically exhibit significantly lower well-being than those who have no such diagnosis. Future studies should therefore look more closely at coaches who are feeling less well, and, to cover a holistic picture of mental health, also consider implementing measures of mental illness. Moreover, as Keyes stated that important domains of life contribute to our overall well-being (2002; 2009a), it may be of interest for future studies to also utilize the sport-specific version of the MHC-SF (Sport MHC-SF; Foster & Chow, 2019).

Conclusion

Recent studies have highlighted the need to work toward an agreed conceptualization of PMH in coaching contexts (e.g., Norris et al., 2017). The present investigation of the MHC-SF's measurement invariance and structural stability confirms its reliability and validity as a tool for assessing coaches' PMH over time. In addition, our findings show high mean-level and rank-order stability of participants' PMH over a six-month period. From a practical perspective, coaches with

lower PMH should be actively supported by sports associations and health professionals, as their mental health is unlikely to improve naturally.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that might influence the work reported in this paper.

Data accessibility statement

The analyses reported in this article were exploratory and not pre-registered. Data and analyses code will be made available on DRYAD after publication of the article.

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Table 1

Descriptive Statistics and Correlations of the Study Variables

	M (SD)	1	2	3	4	5	6	7	8	9
1. Emotional well-being (T1)	5.07 (0.72)	-								
2. Psychological well-being (T1)	4.82 (0.84)	0.58**								
3. Social well-being (T1)	4.13 (0.99)	0.52**	0.66**							
4. Emotional well-being (T2)	5.09 (0.78)	0.58**	0.51**	0.45**						
5. Psychological well-being (T2)	4.80 (0.81)	0.51**	0.70**	0.54**	0.61**					
6. Social well-being (T2)	4.07 (1.02)	0.40**	0.54**	0.63**	0.56**	0.63**				
7. Emotional well-being (T3)	5.11 (0.83)	0.61**	0.53**	0.45**	0.61**	0.53**	0.45**			
8. Psychological well-being (T3)	4.82 (0.86)	0.43**	0.66**	0.55**	0.52**	0.69**	0.50**	0.59**		
9. Social well-being (T3)	4.15 (0.98)	0.34**	0.53**	0.64**	0.36**	0.47**	0.66**	0.50**	0.64**	-

Note. $N = 422$; the correlations were calculated using Spearman (rho).

*$p < .05$; **$p < .01$

Table 2

Fit Indices for Longitudinal Models

Model	χ^2 (df)	CFI	RMSEA (90% CI)	$\Delta\chi^2$ (Δdf)	ΔModels
M1: Baseline model	1181.48* (741)	.968	.038 (.033; .041)	--	--
M2: Loading invariance model	1203.18* (763)	.968	.037 (.033; .041)	32.46 (22)	2-1
M3: Threshold invariance model	1281.49* (841)	.968	.035 (.031; .039)	93.86 (78)	3-2
M4: Unique factor invariance model	1248.53* (869)	.972	.032 (.028; .036)	31.97 (28)	4-3
M5: M4 and equal latent stability covariances	1244.79* (878)	.973	.031 (.027; .035)	10.61 (9)	5-4
M6: M4 and equal latent common factor means	1250.73* (875)	.973	.032 (.028; .036)	7.77 (6)	6-4
M7: M4 and equal latent common factor variances	1249.50* (875)	.972	.032 (.028; .036)	10.18 (6)	7-4
M8: M4 and equal latent common factor covariances	1238.19* (875)	.973	.031 (.027; .035)	9.73 (6)	8-4

Note. N = 422; weighted least squares mean and variance adjusted (WLSMV) estimator and theta parameterization; CFI = comparative fit index; RMSEA = root mean squared of approximation; 90% CI = 90% confidence interval for RMSEA; $\Delta\chi^2$ = nested chi-square difference using the DIFFTEST in Mplus; Δdf = difference in degrees of freedom; ΔModels = comparison of models.

*$p < .001$

Table 3

Rank-Order Stability and Mean-Level Change Based on the Unique Factor Invariance Model (M4)

Variable	Rank-order stability (*r*)			Mean-level change (ΔM)		
	T1-T2	T1-T3	T2-T3	T1	T2	T3
Emotional well-being	.74**	.74**	.73**	0+	0.07	0.21*
Psychological well-being	.67**	.72**	.79**	0+	-0.06	0.05
Social well-being	.69**	.75**	.74**	0+	-0.10	0.03

Note. N = 422; +ΔM: scaled as mean difference from T1 as reference fixed to zero.

*p < .05; **p < .001

Table 4

Factor Variances and Covariances and Correlations Based on the Unique Factor Invariance Model (M4)

Variable	Factor variances			Factor covariances (correlations *r*) T1		Factor covariances (correlations *r*) T2		Factor covariances (correlations *r*) T3	
	T1	T2	T3	1	2	1	2	1	2
1. Emotional well-being	1.83	2.04	2.60	--		--		--	
2. Psychological well-being	1.79	1.66	2.05	1.27 (.70)	--	1.47 (.80)	--	1.78 (.77)	--
3. Social well-being	1.98	1.93	1.70	1.37 (.72)	1.51 (.80)	1.54 (.78)	1.44 (.80)	1.59 (.76)	1.56 (.84)

Note. $N = 422$; all estimates are significant at $p < .001$.

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Factors Contributing to Elite Athletes' Mental Health in the Junior-to-Senior Transition: A Mixed Methods Study

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Abstract

The goals of this study were to examine factors that may affect the mental health of elite athletes during their junior-to-senior transition and to explore the types and frequency of facilitators and challenges athletes encounter during this transition. Using a cross-sectional, embedded QUAN(qual) mixed methods study design, we surveyed two samples for the study goals. All participants completed demographic data (e.g., gender, age, sports). Sample one (N = 394, M_{age} = 18.46 years, SD = 2.2) consisted of current transitioning athletes which completed questionnaires on stress, anxiety, depression, well-being, self-compassion, and social support. Mediation and moderation analyses revealed that stress leads to resource depletion, and that self-compassion can be an important resource for young athletes to draw upon to maintain their mental health. Regarding social support results were less conclusive. Sample two (N = 371, M_{age} = 27.70 years, SD = 8.3) consisted of athletes that have passed the transition. They responded to open questions about helpful strategies and challenges faced during their junior-to-senior transition, which were analyzed using thematic content analysis. Results showed that during the junior-to-senior transition, external resources were more frequently mentioned than internal resources when it came to facilitators. Furthermore, external challenges were perceived as hindering more frequently than internal challenges. These findings can guide practitioners by providing potential starting points for improving the mental health of transitioning elite athletes, as well as information on helpful strategies and barriers during the transition.

Keywords: anxiety, depression, well-being, social support, self-compassion, mixed methods

Factors Contributing to Elite Athletes' Mental Health in the Junior-to-Senior Transition: A Mixed Methods Study

Adolescent athletes experience major cognitive, social, physiological, and emotional developmental changes with the onset of puberty, a period of great developmental plasticity (Holder & Blaustein, 2014). Åkesdotter et al. (2020) found that the peak age of the onset of mental disorders in Swedish athletes is 19 years, indicating that adolescence and young adulthood are stressful and vulnerable times. On the route to being a senior elite athlete, young athletes have to master a further important and decisive developmental challenge: the junior-to-senior transition (JST). The JST is considered the most difficult transition in an athlete's career, as evidenced by the fact that only 20–30% of athletes pass the JST, and the majority drop out or switch to recreational sports (Franck et al., 2018; Stambulova et al., 2009; Vanden Auweele et al., 2004). With the everyday challenges of adolescence, this is compounded by additional, sport-specific mental and physical challenges. Among these are the social adaptation to new coaches and teams, increasing demands in training and competitions, selection pressure, and the compatibility of studies and sports (Franck et al., 2018; Stambulova et al., 2021; Wylleman, 2019; Wylleman et al., 2013). Therefore, it seems important to identify factors that promote mental health (i.e., the absence of mental disorders and the presence of well-being [WHO, 2014]) of athletes in the JST. The present study aims to contribute to this goal.

In most cases, the JST occurs between the ages of 18 and 24 years (Bennie & O'Connor, 2006) and lasts between 1 and 3 years (Stambulova et al., 2012). Because of sports, gender, and individual differences, it is difficult to make a universal prediction for the beginning of the JST. Stambulova (2009; 1994) defined the onset of the transition as when individual athletes begin to compete in senior competitions and team athletes begin to train with a senior team. On the one hand, this means that the JST does not have to start at the same time for different athletes of the same club. On the other hand, it also means that, depending on the age when the JST starts, athletes have to deal with different development challenges, both of which are additional potential sources of stress (Swainston et al., 2020; Wylleman et al., 2013).

Given the complexity of the changes that young athletes undergo, it is evident that a holistic perspective, which means considering all areas of an athlete's life, not just the athletic area, is essential to promote long-term mental and physical health (Wylleman et al., 2013). A positive change in one area of life can lead to positive changes in other areas, but equally, strains on one area; for example, a mental health disorder, can lead to strain and developmental delay in other areas.

Recently, Stambulova (2020) introduced the concept of career excellence, which refers to an athlete's ability to sustain a *healthy*, *successful,* and *long-lasting career* in sports and life. To that end, mental health should not only be considered a resource, but also an outcome of the athlete's career development (Stambulova, 2020). Drew et al. (2019) emphasized that a successful JST should not solely rely on athletic performance, but also consider the athlete's mental health. Consequently, it's essential to transition from mere career effectiveness (e.g., achieving JST success at any cost) to career excellence (e.g., attaining JST success while preserving mental well-being; Larsen et al., 2021; Stambulova et al., 2021). Deepening our insight into the mechanisms linking stress to mental health issues in JST athletes is a critical step in this direction.

The direct impact of stress on athletes' mental health is well-documented (e.g., De Francisco et al., 2016; McLoughlin et al., 2021; Poucher et al., 2021; Spielberger, 1990). The Stress Process Model (SPM; Pearlin et al., 1981), a framework for understanding the relationship between stress and mental health, outlines two further mechanisms through which stress affects mental health, using personal and social resources. Firstly, these resources can mediate the effects of stress, meaning they are altered by stressors, potentially exacerbating negative outcomes. Alternatively, they can moderate the stress effects, influencing the severity or direction of the stress-health relationship. The SPM not only offers a foundation for forming hypotheses about stress's impact on mental health but has also garnered empirical support (Aneshensel & Avison, 2015) across various contexts, from caregiving and family research to student populations and sports (e.g., Poucher et al., 2021; Reed et al., 2015; Wang, 2022; Yu et al., 2020).

For athletes in the JST, two valuable resources may be self-compassion and social support (Cormier et al., 2023; Sheridan et al., 2014). Self-compassion is a coping mechanism that refers to one's compassion and benevolence toward oneself when confronted with failings or difficulties (Neff, 2015). It has been found that stress is negatively related to self-compassion in young adults (Zhang et al., 2016; Model 1; path a). Furthermore, self-compassion goes along with higher well-being (Ferguson et al., 2014) and less psychological distress (Walton et al., 2020) in women athletes and is positively related to mental health in student athletes (Stamatis et al., 2020; Model 1; path b). In a sample of college students of comparable age, self-compassion has been found to buffer the relationship between stress, anxiety, and depression (Stutts et al., 2018). A stress buffering effect has also been identified in a sample of athletes (Röthlin et al., 2022). Moreover, self-compassion was reported as

amenable to change in athletes (Mosewich et al., 2013; Röthlin & Leiggener, 2021), which is an important indication for potential interventions.

Another known essential resource in athletes is social support. Social support has been defined as “social interactions aimed at inducing positive outcomes” (Bianco & Eklund, 2001, p. 85). Social support is a multifaceted construct encompassing structural elements, such as relationship types and count, and functional components (e.g., perceived and received support). In a sample of Canadian athletes, Poucher et al. (2021) found that increased stress was associated with less social support (Figure 1; Path a). Furthermore, athletes’ mental health is at risk when they are in new environments and lack social support (Dean & Reynolds, 2017; Gouttebarge et al., 2015; Rice et al., 2016; Model 1; path b). This is also reflected in qualitative studies that have reported that social support is a great resource, especially during transitions (Drew et al., 2019; Siekanska & Blecharz, 2020; Swainston et al., 2020). Social support was also found to be an important moderator of stress and its potential impact on mental health (John et al., 2019; Savage et al., 2017).

The impact of stress on mental health in competitive sports is well established (e.g., Arnold & Fletcher, 2021; Kuettel et al., 2019; Simpson et al., 2021). Expanding this knowledge on the specific group of athletes in the JST is deemed necessary. Unraveling how resources modulate the relationship between stress and mental health can shape future interventions and research directions for this specific group of athletes. Therefore, this study investigates the interplay between stress, resources, and mental health in transitioning athletes. In this regard, it is also vital to expand our current understanding of the factors that facilitate or challenge athletes’ adaptation to the demands of the JST. Much of our current knowledge on this topic stems from smaller qualitative samples (e.g., Andronikos, 2018; Franck & Stambulova, 2020) or given answer choices (e.g., Stambulova et al., 2012). Therefore, a qualitative investigation in a broader sample provides a more comprehensive view of perceived barriers and useful strategies and also allows to get a sense of the number of times these resources or barriers are mentioned. The insights derived from our two study aims can inform initiatives to either bolster mental health during this phase of adaptation or equip practitioners to support athletes during challenging periods.

Present study

Based on a mixed methods approach (Creswell & Plano Clark, 2011), the first objective of the current study was to better understand differences in the expression of mental health disorders and well-being by considering two potential resources—self-compassion and social support—in the stress

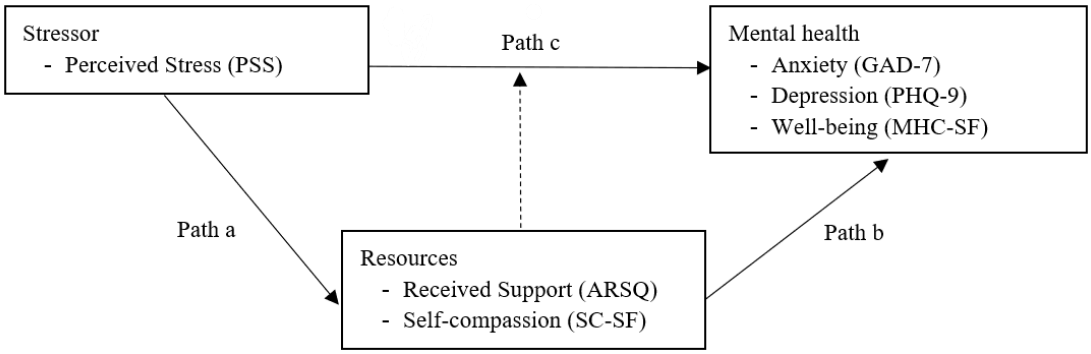
process. We used a general stress indicator that examines the degree to which athletes find their lives unpredictable, uncontrollable, and overloading as a predictor variable in the SPM. We used social support as an external social resource and self-compassion as an internal coping factor. It is not clear how resources work in the stress process in athletes undergoing the JST. Possibly, resources are mobilized during stressful situations and therefore diminish the occurrence of mental disorders (mobilization model; Barrera, 1988), or stress leads to a depletion of resources, which may enhance the occurrence of mental disorders (Aneshensel & Avison, 2015). Furthermore, considering the moderating effect, athletes with higher resources may have fewer mental health disorders than athletes with lower resources (stress-buffering hypothesis; Cohen et al., 2000). Knowing more about for whom and under what conditions self-compassion and social support act as resources is of great interest for planning future interventions. We focused on outcomes at the psychological level and investigated two common mental health disorders—anxiety and depression—and well-being in athletes (Figure 1).

We hypothesize that (A) stress is positively related to mental health disorders and negatively related to well-being. This relationship is mediated by (B) self-compassion and (C) social support, such that stress reduces social support and self-compassion and thus predicts more mental health problems and less well-being. In addition, we hypothesize that the relationship between stress and mental health is moderated by (D) self-compassion and (E) social support, implying that these two variables buffer the relationship between stress and the outcome variables anxiety, depression, and well-being.

The secondary goal was to gain insight into the challenges athletes encountered during the JST and what resources they called upon, as well as the frequency with which specific challenges and resources were mentioned. By utilizing qualitative methods to explore this issue, we can obtain a deeper and more nuanced understanding. This enriched knowledge would help tailor future interventions in the applied sports field and may be informative for researchers, as this issue has, to our knowledge, not been investigated in a representative sample.

Figure 1

Stress Process Model



Note. This diagram was adapted from the stress process model (Aneshensel & Avison, 2015). The mediator model is represented by the fixed lines, and the moderator model by the dashed line.

Methods

Research Philosophy and Design

To foster transparency and methodological integrity, we will begin by elucidating the study's philosophical underpinning (Ryba et al., 2020). The authors conducted this study from a post-positivistic position. Post-positivism permits a reflexive stance, accommodating an awareness of subjectivity in knowledge production (Teddlie & Tashakkori, 2003). This position recognizes that researchers have an influence on what the subject and object of a study is, but also seeks to reduce the degree of subjectivity in the research design process. Post-positivism puts emphasis on using both quantitative and qualitative approaches (Teddlie & Tashakkori, 2003). Consistent with this philosophical position, we adopted a mixed methods design in which both quantitative and qualitative data were collected concurrently within a single study. More specifically, we implemented an embedded mixed methods design, with a primary focus on quantitative data (referred to as a QUAN (qual) design; Creswell & Plano Clark, 2011). Embedded research designs are typically chosen when the secondary method addresses a slightly different aspect of the research question than the primary method but contributes to a comprehensive understanding of the phenomenon under study (Creswell, 2014).

Quantitatively, we assessed the roles of social support and self-compassion on stress, anxiety, depression, and well-being among transitioning athletes. Qualitative data provided in-depth insights into facilitators and challenges for passing the JST and the prevalence of the emerged facilitators and challenges in this specific population. This combined approach facilitated a

comprehensive, holistic exploration of factors that may affect athletes' mental health during the JST (Creswell & Plano Clark, 2011).

Participants and procedure

This study is part of a broader research project on elite athletes' mental health in Switzerland. Two studies emerged from this project. The first study aimed to assess the state of mental health of Swiss elite athletes (Röthlin et al., 2023), whereas the current study aimed to investigate ways to improve the mental health of athletes in the JST. To collect data for both studies, an online questionnaire was sent to all Swiss Olympic cardholder athletes (N = 4,873). Swiss Olympic cardholders are the best Swiss athletes in their respective sports. Athletes older than 16 received a letter and athletes older than 18 received an email with a brief description, a QR-code/link, and a personal code for the online survey. After scanning/clicking on the link, they were informed about their rights and the purpose of the study, and were asked to give their consent to participate. For the first study, athletes were surveyed for common mental health problems such as depression, anxiety, disordered eating, sleep problems, and levels of well-being. A total of 1,003 athletes (M_{age} = 21.69, SD_{age} = 7.09 range = 16-62 years, 54% women, 37% team sports) completed the questionnaire. In the current study, we identified two specific sub-samples: athletes undergoing the JST and those who have completed the JST, aligning with our study's primary and secondary objectives. Athletes in the JST, based on our inclusion criteria, received supplementary questionnaires addressing stress, self-compassion, and social support. Conversely, athletes who confirmed they had navigated past the JST were presented with two open-ended questions concerning both hindering and facilitating factors for passing the JST. This dual data collection approach not only enabled us to locate JST athletes across various sports but also minimized the risk of overwhelming respondents with excessive survey content.

Identification of the quantitative sample

The identification of the sample for the quantitative part was based on Stambulova et al. (2012) and was adapted to the Swiss sports system. After presenting a short definition of what was meant by the JST and by "the highest national age category", the participants were presented two identification questions: "Do you compete in the highest national age category in your sport?" for individual athletes and "Do you train with a team that competes in the highest age category?" for team athletes. If the participants answered in the affirmative, they were asked how long they had been training/competing in the oldest age category of their respective sports. Answers were collected on a

six-month basis for up to 3.5 years or longer. As noted, the JST is a phase rather than a single event. Therefore, we included athletes who had been training/competing in the highest age category of their sports for a maximum of three years (Stambulova et al., 2012). An a priori power analysis was conducted using G*Power version 3.1.9.6 (Faul et al., 2007) to determine the minimum sample size required to test the study hypotheses of the primary goal of the study. The results indicated that the required sample size to achieve 80% power for detecting a small effect, at a significance criterion of α = .05, was *N* = 395 for moderation (F-test, family, test for linear multiple regression with a fixed model and a R^2 increase) and mediation analyses (t tests family, test for linear multiple regressions with a fixed model and a single regression coefficient).

A total of 394 athletes completed the questionnaires (55.33% female, 0.25% other), which was adequate for testing the study hypotheses. The mean age was 18.56 years (*SD* = 2.22, *range* = 16–26). The athletes trained for 14.78 hours per week on average (*SD* = 6.20) and participated in 28.31 competitions per year (*SD* = 19.05). Fifty-eight different sports were represented, among which most of the athletes were from track and field (8.38%), ice hockey (7.10%), soccer (6.85%), cycling sports (6.10%), and alpine skiing (6.09%).

Identification of the qualitative sample

The sampling for the secondary aim of the study comprised all athletes that were no longer in the transition phase (the start of the transition more than three years ago). This led to 371 participants (52.56% female), with a mean age of 27.70 years (*SD* = 8.25, *range* = 17–62). On average, athletes trained for 16.12 hours per week (*SD* = 7.49) and participated in 25.42 competitions per year (*SD* = 19.32). Seventy-six different sports were represented, among which most of the athletes were from alpine skiing (6.74%), horse sports (5.94%), cycling sports (4.86%), track and field (4.85%), and ice hockey (4.31%). In line with our studies' goal, we did not meet a decision regarding a determined sample size or to halt data collection.

Measures

Quantitative data collection

Anxiety. Anxiety was assessed using the 7-item General Anxiety Disorder Questionnaire (GAD-7; Spitzer et al., 1999; Spitzer et al., 2006), which asks about seven core symptoms in the last two weeks (e.g., "I had not been able to stop or control worrying"). Participants answered the questions on a 4-point scale (0 = none, 3 = almost every day); the total score was formed by adding up the individual items. Higher scores reflect higher levels of anxiety. The diagnostic threshold of the

GAD-7 has previously been reported to be 10 (Löwe et al., 2008), and we implemented the same in this study. The GAD-7 has been shown to be a valid measure for general anxiety (Löwe et al., 2008), and the internal consistency of the GAD-7 in the present study was good (α = .85).

Depression. Depressive symptoms were assessed using the 9-item depression module of the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). Responses were given on the two weeks prior the assessment and ranged from *not at all* (0) to *nearly every day* (3) on a 4-point scale. Items (e.g., "I had little interest or pleasure in doing things") were summed up to a total score. Prior research has shown good validity of the scale (Kroenke et al., 2001) and has reported the diagnostic threshold of the PHQ-9 to be ≥ 10 (Kroenke et al., 2001), which we adopted for this study as well. Higher scores indicate that athletes have higher levels of depression. In the present sample, Cronbach's alpha was good (α = .84).

Well-being. The 14-item Adult Mental Health Continuum – Short Form (Lamers et al., 2011) has been shown to be a reliable and valid instrument to assess well-being (Lamers et al., 2011). The overall well-being score was built by building the mean score of all items (e.g., "During the past month, how often did you feel interested in life?") on a 6-point scale ranging from *never* (1) to *every day* (6). Higher scores correspond to higher levels of well-being. The internal consistency of the scale in the present sample was high (α = .90).

Self-compassion. To assess self-compassion, we used the Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011). Comprising 12 items (e.g., "I try to be understanding and patient toward those aspects of my personality I don't like"), the SCS-SF is an adaptation of the original 26-item SCS. It shows high internal consistency and correlates almost perfectly with the original 26-item SCS (Neff, 2003). Studies have shown good validity for the SCS-SF (Huysmans & Clement, 2017; Raes et al., 2011). As Raes et al. (2011) recommended the use of an overall self-compassion index, negative subscale items were reversed, and the mean of all subscale scores was calculated to obtain an overall score for self-compassion. Items were rated on a 5-point scale ranging from *almost never* (1) to *almost always* (5). Higher scores reflect that an athlete is more self-compassionate. The internal consistency of the total scale score was good (α = 0.80).

Social support. To measure social support, we used the overall score of the 22-item sport-specific Athletes' Received Support Questionnaire (ARSQ; Freeman et al., 2014). Items (e.g., "Over the course of the past week, how many times did someone boost your confidence") were rated on a 5-point scale ranging from *not at all* (0) to *seven or more times* (5), with higher scores indicating higher

levels of received support. The overall support score was derived from the average scores of the four subscales: informational, tangible, emotional, and esteem support. The overall score of the ARSQ is considered a valid measure to operationalize social support in athlete populations (Freeman et al., 2014). The internal consistency was excellent (α = .92).

Stress. Perceived stress was measured using the Perceived Stress-Scale-10 (PSS-10; Cohen et al., 1983). Comprising 10 items, the PSS was developed to measure the degree to which situations in one's life are considered stressful. Items (e.g., "In the last month, how often have you felt nervous and stressed?") were rated on a 5-point scale ranging from *never* (0) to *very often* (4). Higher scores indicate more perceived stress. Positively stated items were reversed to build the total mean score. The internal consistency of the scale was good (α = 0.85).

Qualitative data collection

Open-ended questions were used to explore facilitators and challenges encountered during the transition by athletes who have passed the transition successfully. The questions were: (a) "What/who has helped you the most during the JST?" and (b) "What have you found difficult during the JST?". Open-ended response boxes were provided. There was no specific instruction on how to provide the information (e.g., no complete sentences or a minimum of words required).

Statistical analyses

Quantitative data

Data were analyzed using JASP (version 0.14.1; JASP-Team, 2020) and the PROCESS macro for R (Hayes, 2012). Data were screened for systematic outliers, missing data, and normal distribution for study variables. We identified eight outliers based on z-scores greater or less than 3.29, with two for anxiety, depression, and well-being, and one each for self-compassion and stress. We chose not to eliminate these data since we couldn't attribute the variations to systematic issues; instead, they appeared to result from natural variation. Furthermore, no missing data was observed.

To address the research questions framed by the SPM, for each resource, we calculated three mediation and three moderation models. In all models, stress was used as a predictor variable, and anxiety, depression, and well-being were used as outcome variables. Self-compassion and social support were used as either mediators or moderators. Using multiple regression analyses, we tested for regression assumptions. No autocorrelation, multicollinearity or heteroscedasticity were observed, and the linearity of the partial scatterplots was given in every analysis. Given that the normal distribution of the residuals was slightly violated in all analyses, we used bootstrapping with 5,000

replicates for moderation and mediation analyses to obtain more robust confidence intervals (CIs). For the moderation analysis, we centered the independent and moderator variables and used unstandardized scores. We used JASP to run hierarchical regressions with the dependent variable and the moderator in the first step and the interaction term in the second step. Graphics were plotted with the PROCESS-macro for R. Effect sizes (f^2) were considered small (0.02), medium (0.15), and large (0.35; Cohen, 1988). We used the RPROCESS-macro to calculate the mediator models. Mediation was estimated according to the bootstrapped mediation method (Preacher & Hayes, 2004), in which a CI of the indirect effect is computed by using resamples of the data. If the CI does not include zero, then there is a significant mediation effect. Effect sizes (R^2) were considered small (0.02), medium (0.13), and large (0.26; Cohen, 1988).

Qualitative data

For the exploratory part of the study on helpful strategies and challenges encountered during the JST, we used thematic content analysis with an inductive approach (Braun & Clarke, 2006). According to Braun and Clarke (2006), this approach “is essentially independent of theory and epistemology, and can be applied across a range of theoretical and epistemological approaches” (p 78). Thus, it is considered more suitable to our study design as their newer reflexive thematic analysis approach which is situated in a qualitative paradigm. Patterns or themes were analyzed on a semantic level. Following this assumption, the research was not driven by the ideas or theoretical interest of the researcher in the field but was data driven (Braun & Clarke, 2006). The data analysis proceeded according to the following six steps recommended by Braun and Clarke (2006): (1) the data were reread multiple times to gain familiarity with the answers and to get some first analytic notes; (2) the data were manually coded by referring to the most basic segments or elements; (3) when all data have been systematically coded, codes were combined to themes; (4) themes were reanalyzed with regard to internal homogeneity and external heterogeneity (Patton, 1990); (5) themes were defined and refined for (6) writing the report. Steps 1–5 were carried out by two independent researchers, with iterative phases of individual work, discussions, and critical, thoughtful, reflections (Korstjens & Moser, 2018; Steinke, 2007). When the analysis was done, we involved a tallying of the number of responses for each code to give a sense of how common particular codes and themes were across the participants’ responses.

Methodological rigor

We ensured the methodological integrity of the qualitative data by aligning our philosophical foundation with our research objectives, data collection, analysis, and result presentation, as guided by Levitt et al. (2018). To highlight, the integration of qualitative data collection into the online questionnaire was a conscious choice to uphold the coherence of our philosophical stance by minimizing researcher-participant interactions, thereby striving for minimizing biases in knowledge production. This approach also improved the adequacy of the data, as the sample size suggests that diversity of responses could be captured. Furthermore, targeting participants who are undergoing or have passed the JST optimized the utility of our study, providing profound insights into the studied phenomenon (Levitt et al., 2017). Overall, we believe our study covers a relevant, timely and significant topic and makes a practically significant contribution by extending knowledge about factors influencing mental health in transitioning athletes (Tracy, 2010).

Results

Quantitative results

Descriptive statistics

The means and Pearson's correlations between the study variables can be found in Table 1. As expected, stress correlated positively with anxiety and depression and negatively with well-being, self-compassion, and social support. Self-compassion and social support were positively correlated with well-being and negatively correlated with anxiety and depression. As the GAD-7 and the PHQ-9 allow for clinical cut-offs, we calculated the prevalence symptoms of anxiety and depression. Approximately 14.97% of the athletes self-reported moderate to severe symptoms of anxiety, with women reporting more (21.56%) than men (6.86%). Depression symptoms were reported by 22.34% of athletes, with women reporting more (28.9%) than men (13.71%).

Mediation Analysis

The total effects in Table 2 show that stress is positively related to depression and anxiety (moderate effect) and negatively related to well-being (small effect) in both mediator models (Hypothesis A). Stress was negatively related to self-compassion in all analyses (small effect; Path a). Self-compassion had a significant negative effect on anxiety and depression and a significant positive effect on well-being (Path b). Self-compassion partially mediated the relationship between the predictor variable stress and the outcome variables depression, anxiety, and well-being (small effects; Hypothesis B), as in all models, the direct and indirect effects were significant. Stress was negatively related to social support in all three models (small effect; Path a), but social support only had a

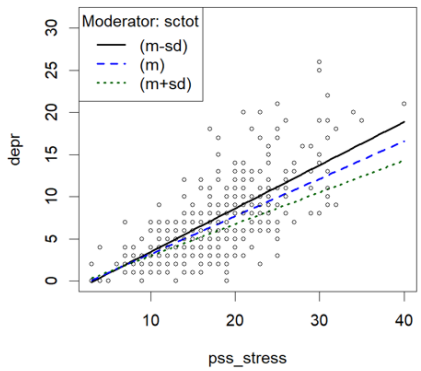
significant positive effect on well-being (small effect; Path b) and no significant effect on anxiety and depression. Social support significantly partially mediated stress and well-being (small effect), but not stress and anxiety or depression (Hypothesis C).

Moderation Analysis

A series of multiple regressions was conducted to test for Hypotheses D and E. The results in Table 3 show a significant moderate positive effect of stress on anxiety and depression and a significant small negative effect on well-being (Hypothesis A). Self-compassion had a significant negative effect on anxiety and depression and a significant positive effect on well-being. In addition, significant interaction effects were found; self-compassion acted as a moderator between stress, anxiety, and depression but not between stress and well-being (Hypothesis D). As expected, when self-compassion was high, the relationship between stress and depression or anxiety decreased. Figure 2 shows the moderation effect on depression. Social support did not significantly predict anxiety, depression, or well-being; the interaction effect of stress and social support did not account for more variance in all three outcome variables. Therefore, social support had no stress-buffering effect on the outcomes (Hypothesis E).

Figure 2

Moderating Effect of Self-compassion on the Relationship between Stress and Depression



Note. depr = Depression, pss_stress = Perceived stress, sctot = Self-compassion.

Qualitative results - Facilitators versus challenges during the JST

The open questions revealed several resources and challenges for the JST. Regarding resources that helped athletes with the transition, 29 raw data categories were identified, which subsequently resulted in four higher-order categories (physiological and sport-specific resources, psychological resources, sport-related support, and significant other's support). These four higher order categories were further classified into two general categories: internal and external resources

(Table 4). For challenges during the transition, the content analysis revealed 73 raw data themes, resulting in 10 higher-order categories (physiological and sport-specific skills, psychological challenges, lack of knowledge, higher performance demands, lack of support, lack of integration/challenges with new relationships, unethical behaviors from others, systematic and structural challenges, sport-life conflicts, and no challenges). These 10 higher-order categories were classified into three general categories: internal, external, and no challenges (Table 5).

The most frequently mentioned helping resources for athletes were of an external nature, namely, sport-related support (59.2%; e.g., coaches, team cohesion/integration), followed by support from significant others (22.5%; e.g., family, friends). These two higher-order categories accounted for 81.7% of the responses given regarding the facilitators of the JST. Internal resources were identified in only 18.2% of the responses and consisted of physiological and sport-specific resources (6.2%; e.g., hard work, technical knowledge) as well as psychological resources (12%; e.g., self-belief, determination). The most frequently mentioned challenges for the JST were also of an external nature, namely, higher performance demands (19.9%; e.g., physical requirements, pressure from others), lack of support (17.1%; e.g., from coaches, from team athletes), systematic and structural challenges (12.6%; e.g., lack of structure, transition too fast/too early), lack of integration/challenges with new relations (6.6%; e.g., difficulties with integration, age gap), unethical behaviors from others (5.5%; e.g., lack of respect, lack of consideration for age and needs), and sport–life conflicts (4.5%; e.g., dual-career, sport, and family). These external challenges emerged in 66.2% of the answers. Internal challenges were reported noticeably less (20.1%), with psychological challenges contributing slightly more (9.4%; e.g., lack of self-belief, too high expectations) than lack of knowledge (8.9%; e.g., unclear what it takes to manage the transition, nutrition) and physiological and sport-specific skills (1.8%; e.g., injuries). Approximately 13.6% reported that the transition was good and that they did not meet any challenges.

Discussion

This study is one of the two studies resulting from the research project on athletes' mental health in Switzerland. In fact, the purpose of the present study was twofold. First, two potential resources—self-compassion and social support—were investigated using the SPM as a theoretical framework to better understand stress mechanisms and, thus, how to support athletes' mental health during the JST by asking a sample of current JST athletes. For the second objective, qualitative data were used to learn more about facilitators and challenges athletes encountered during the JST by

asking a sample who had already passed the JST. In accordance with previous studies (e.g., McLoughlin et al., 2021), this study highlights that stress in JST athletes is associated with poorer mental health. Both self-compassion and social support yielded mixed findings for their roles in the stress process. Self-compassion was found to partially mediate between stress and anxiety, depression, and well-being and to moderate anxiety and depression. Social support mediated stress and well-being, and no other significant results were found. Below, we propose some preliminary interpretations, review the results in relation to the previous literature, discuss the results from the qualitative section, and offer some practical implications and limitations of the study.

Self-compassion seems to act as a valuable resource in the stress process of young athletes in two different ways. First, self-compassion is a possible explanation for the link between stress and mental health. Our results show that beyond the direct effect, athletes are also vulnerable to increased anxiety, depression, and decreased well-being, as stress translates into lower self-compassion, which in turn contributes to decreased mental health. Accordingly, athletes who are under high stress tend to neglect their self-kind and benevolent attitude toward themselves. This can lead them to be more dissatisfied with their performance, to be more self-critical, or to worry more about perceived mistakes and failures, which in turn leads to poorer mental health (Neff, 2015). These findings align with previous studies that also found a negative relationship between stress and self-compassion (Zhang et al., 2016). This is why athletes who manage to be self-compassionate despite stress could potentially benefit from better mental health. Moreover, to partially explain the relationship between stress and mental health, self-compassion acts in another way in the stress process, namely, as a stress buffer. Athletes with higher levels of self-compassion appear to respond more positively to stressful situations than athletes with lower levels of self-compassion. This is evidenced by the fact that the relationship between stress and mental health problems, such as anxiety or depression, is smaller for athletes with high self-compassion compared to those with lower self-compassion. This effect was not found for well-being. A potential reason may for this distinction may be the inherent nature of self-compassion which mainly functions to alleviate distress rather than amplify well-being. Although the buffer effect was small in this study, these results possibly indicate that self-compassion is more important when it comes to buffering the adverse effects of stress in mental illness symptoms than in well-being (Keyes, 2002). This finding is consistent with previous evidence demonstrating the potency of self-compassion as a mitigator of negative outcomes (Röthlin et al., 2022).

In addition to self-compassion, we examined social support as a possible explanation for the relationship between stress and mental health. Our results show that more stress is associated with less social support, which in turn is associated with lower well-being but surprisingly not with more symptoms of anxiety and depression. Unlike self-compassion, social support was not a buffer to the negative effects of stress on mental health, as was the case in other studies (Mitchell et al., 2014; Rees & Freeman, 2007). We assume that this is due to the operationalization of social support. Most studies finding the positive effects of social support on mental health outcomes have operationalized social support as perceived (e.g., Sullivan et al., 2020), in contrast to the present study, where social support has been operationalized as received. Studies have reported perceived social support to be a stable rather than a modifiable characteristic and as independent of the behavior of a particular network member (e.g., Newcomb, 1990; Sarason et al., 1987). In contrast, received social support is the retrospective report of actual support transactions from specific network members (Knoll & Kienle, 2007; Uchino, 2009) and therefore may be a more suitable indicator for supportive interactions (Knoll & Kienle, 2007). Studies have shown that the expectation of being supported (i.e., perceived social support) does not inevitably correspond with the concrete support received in a challenging situation (Uchino, 2009). In addition, Freeman et al. (2014) argued that the effectiveness of social support may be determined not only by quantity, but also by a variety of other factors, such as timing, the provider of support, or the matching of needs and type of support. Social support can even have negative effects by interfering with the recipient's experience of competence and autonomy, for example, if more support is given than is desired, or if the type of support does not meet needs (e.g., Hassell, 2010; Schwarzer & Leppin, 1991). Hence, on the one hand, received support may be less related to mental health than perceived support; on the other hand, athletes may benefit from social support only when it fits. This may be a reason for the rather low associations between social support, stress, and mental health in our study.

Interestingly, the results of the second part showed that external resources—that is, social support—were mentioned far more than internal resources when it comes to facilitators for the JST. Indeed, several qualitative studies have highlighted the value of social support, particularly in the context of the JST (Morris et al., 2017; Pehrson et al., 2017; Sanders & Winter, 2016). Armstrong and Oomen-Early (2009) stated that supportive coaches and team networks may be the most protective factors against mental health symptoms of college athletes, but conflicts with coaches have also been reported as independent predictors of mental health disorders among athletes (Shanmugam et al.,

2014). Given that the second sample consisted of athletes who successfully managed the JST, we assumed that the support fit was predominantly present, whereas this could be a determining factor for passing the JST in the first sample. Regarding challenges, our results indicate that external challenges are perceived as hindering more often than internal challenges. In particular, the higher performance requirements, lack of support, and systematic and structural challenges were noted as challenging. The athletes reported gaining early insights into elite sport as a valuable resource, and that lacking information about what it needs to become an elite athlete is challenging. Therefore, along with other researchers, we suggest that coaches and stakeholders support athletes in terms of preparation, namely, knowledge about the JST and gaining experience in senior teams (Drew et al., 2019; Morris et al., 2015; Swainston et al., 2020). Finally, this study highlighted the importance of individualized approaches when it comes to training plans, recovery periods, and more general support needed by athletes.

Practical implications

The prevalence of anxiety and depression symptoms in our study indicates that a substantial proportion of JST athletes are affected by mental health problems. Therefore, it seems appropriate to improve the mental health of JST athletes, and our study leads to some practical implications for how this could be done. First, to improve the mental health of athletes, it seems important to work on an athletes' stress management. For example, one could work on a better compatibility between sports and school (Debois et al., 2015). Second, athletes with high stress levels could benefit from self-compassion interventions to promote their mental health. In the sports context, self-compassion can be learned and is relatively stable (Ackeret et al., 2022; Mosewich et al., 2013; Röthlin & Leiggener, 2021). Third, our results showed that social support is of great importance when it comes to resources and challenges during the JST. Therefore, practitioners should address interpersonal relationships in terms of satisfaction and fit. Moreover, stakeholders in the sports system should be aware of the importance of fostering a culture of respectful interpersonal relationships between athletes and their entourage (Burns et al., 2022). Fourth, findings related to helping strategies and challenges during JST can guide practitioners when working with athletes who do not feel well or are experiencing difficulties in their road to elite sports.

Limitations and future studies

Studying a representative sample allowed us to draw some generalizable conclusions on how stress impacts resources and mental health in athletes in the JST. Through the mixed methods

design, we could gain some further insight into the resources and challenges met during the JST, which is interesting for tailoring adequate support. The present study also has some limitations that should inform future research. The JST is a phase that takes up to three years. With a cross-sectional design, we were only able to catch a snapshot. While the cross-sectional design offers a first impression of mediating effects, it also has been critically discussed because of the missing opportunity to establish a direction of causality (e.g., Maxwell, 2011; O'Laughlin et al., 2018). Future researchers should consider applying either a sequential mediation design as a lower cost-option or a multilevel longitudinal mediation design (Cain et al., 2018). Such models would allow to inform about direction of casual mechanisms, possibly confounding variables, and stability or age effects on athletes' mental health, as evidence suggests that states of mental health fluctuate (Belz et al., 2018; Keyes, 2002).

The present study has demonstrated that the SPM is a valid model for learning more about stress mechanisms in athletes. We motivate future researchers to include additional theoretically based variables to expand our knowledge of mental health enhancement resources for athletes in the JST. Moreover, in the present study, we exclusively surveyed athletes who were still in and those who had successfully completed the JST. A balance between resources and barriers often determines whether or not a transition is successful. Therefore, it is important to also look at stress–process mechanisms and their impact on mental health in unsuccessful environments to provide adequate support to athletes in or post crisis transitions. As it seems, social support is an important resource for JST athletes to rely on and is perceived as a barrier when missing. Nevertheless, the quantitative data from our study showed that social support, while positively correlated with well-being and negatively correlated with anxiety and depression, did not appear to be a stress buffer. Researchers should take up these discrepant findings and shed light on the precise mechanisms of action of received and perceived support on mental health in athletes, including satisfaction and need fit.

Conclusion

Mental health is a significant resource for athletes as they make career decisions and manage various sport and non-sport transitions, whereas a mental health deficit is a barrier to effective decision making and transition coping (Schinke et al., 2017). The JST does not cause mental health problems per se, but can nourish or malnourish athlete mental health. A holistic and long-term-oriented promotion of an athlete is imperative to nourishing athlete mental health. This study extends the existing literature by identifying opportunities for change in the relationship between stress and

mental health and also identifies helpful and hindering mechanisms during the JST in a large sample. Self-compassion seems to play an important role in the promotion of mental health in transitioning athletes. The effectiveness of social support should be carefully examined, as social support seems to act as a major resource but also a challenge when it is not adequately delivered. This study further offers an overview of facilitators and challenges met during the JST, which can help guide practitioners when working with athletes.

Declaration of competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT author statement

Nadja Ackeret: Conceptualization, Methodology, Formal analysis, Investigation, Writing – Original Draft, Visualization. **Philipp Röthlin**: Conceptualization, Methodology, Writing – Review, Project Administration, Funding acquisition. **Stephan Horvath:** Conceptualization, Methodology, Writing – Review, Project administration.

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Table 1

Means and Pearson's Correlations Between Study Variables

	M (SD)	Anxiety	Depression	Well-being	Stress	Self-compassion	Social Support
Anxiety	5.5 (3.9)	-					
Depression	6.9 (4.6)	**.76**	-				
Well-being	4.4 (0.8)	**-.51**	**-.58**	**-**			
Stress	17.6 (6.2)	**.72**	**.72**	**-.59**	**-**		
Self-compassion	3.1 (0.6)	**-.59**	**-.58**	**.52**	**-.68**		
Social support	1.7 (0.8)	-.21	-.26	.41	-.30	.27	-

Note. *N* = 394, all ps < .001. Large effect sizes (i.e., correlations > .5) are written in bold, all other correlations are moderate or small.

Table 2

Regression Table for the Mediation Analysis

Mediator Model	Outcome	Total effect (c)		Direct effect (c')		Effect of IV on mediator (a)		Unique effect of mediator (b)		Indirect effect (ab)		
		Effect (SE)	p	Effect (SE)	p	Effect (SE)	p	Effect (SE)	p	Effect (SE)	95% CI*	ES
Self-compassion	Depression	.54 (.03)	<.001	.46 (.04)	<.001	-.07 (.004)	<.001	-1.26 (.29)	<.001	.09 (.03)	.03 – .14	.16
	Anxiety	.46 (.02)	<.001	.38 (.03)	<.001	-.07 (.004)	<.001	-1.15 (.39)	<.001	.08 (.02)	.04 – .12	.20
	Well-being	-.08 (.01)	<.001	-.07 (.01)	<.001	-.07 (.004)	<.001	.28 (.08)	<.001	-.02 (.01)	-.03 – -.01	.25
Social support	Depression	.54 (.03)	<.001	.53 (.03)	<.001	-.04 (.01)	<.001	-.29 (.24)	.23	.01 (.01)	-.01 – .03	n.a.
	Anxiety	.46 (.02)	<.001	.46 (.03)	<.001	-.04 (.01)	<.001	.04 (.20)	.83	.002 (.01)	-.02 – .01	n.a.
	Well-being	-.08 (.01)	<.001	-.07 (.01)	<.001	-.04 (.01)	<.001	.26 (.04)	<.001	-.01 (.01)	-.02 – -.01	0.13

Note. IV = Perceived stress, SE = Standard Error, CI = Confidence interval, ES = effect size (ratio of the indirect effect to the total effect). All coefficients reported for paths a, b, c, c' and ab are unstandardized slopes with the corresponding standard error of the slope in parentheses.

*Estimated on 5000 bootstrap sample

Table 3

Regression Table for the Moderator Analysis

Moderator Model	Outcome		b[a]	SE_b[a]	95% bca[b] CI	*t*	R^2 Change
Self-compassion	**Anxiety**						
	Step 1	Stress	.38	.03	[.30 – .46]	12.55	.53
		Self-compassion	-1.14	.29	[-1.94 – -.45]	-3.79	
	Step 2	Stress x self-compassion	-.10	.03	[-.17 – -.01]	-3.43	.01
	Depression						
	Step 1	Stress	.46	.04	[.36 – .56]	12.93	.53
		Self-compassion	-1.25	.39	[-2.32 – -.30]	-3.53	
	Step 2	Stress x self-compassion	-.11	.04	[-.24 – -.02]	-3.38	.01
	Well-being						
	Step 1	Stress	-.06	.01	[-.07 – -.04]	-8.04	.38
		Self-compassion	.28	.07	[.13 – .43]	3.99	
	Step 2	Stress x self-compassion	<.01	.01	[-.01 – .02]	.78	<.01
Social support	**Anxiety**						
	Step 1	Stress	.46	.02	[.40 – .53]	19.46	.51
		Social support	.06	.20	[-.46 – .54]	0.23	
	Step 2	Stress x social support	- .03	.03	[-.11 – .05]	-1.03	<.01
	Depression						
	Step 1	Stress	.53	.04	[.46 – .61]	19.35	.52
		Social support	- .30	.25	[-.91 – .38]	-1.29	
	Step 2	Stress x social support	- .07	.05	[-.18 – 0.7]	-1.99	<.01
	Well-being						
	Step 1	Stress	-.07	.01	[-.08 – -.06]	-12.55	.40
		Social support	.24	.05	[.14 – .33]	6.10	
	Step 2	Stress x social support	<.01	.01	[-.01 – .02]	.94	<.01

Note. *N* = 394, SE = Standard Error.

[a] Confidence intervals and standard errors are replicated via Bootstrapping based on 5000 replicates.

[b] Bias corrected accelerated

Table 4

Facilitators for the Junior-to-Senior Transition

General category (% in total)	Higher-order theme	Examples of raw data themes	*%**
Internal resources (18.2 %)	Physiological and sport specific resources	Hard work, more training, technical knowledge	*6.2*
	Psychosocial resources	Determination, patience, acceptance of failures and losses, self-belief	*12.0*
External resources (81.7%)	Sport-related support	Coaches, (older) team members, financial support, team cohesion/integration	*59.2*
	Significant other's support	Family, friends, psychologists	*22.5*

Note. * % is calculated as the total of the answers in relation to the answers in the higher-order topics.

N = 349.

Table 5

Challenges Encountered During the Junior-to-Senior Transition

General category (% in total)	Higher-order theme	Examples of raw data themes	%*
Internal challenges (20.1%)	Physiological & sport specific skills	Injuries, physical changes (puberty)	1.8
	Psychological challenges	Too high expectations, lack of motivation, lack of self-belief	9.4
	Lack of knowledge	Unclear what it takes to manage the transition, nutrition, lack of plans	8.9
External challenges (66.2%)	Higher performance demands	Physical requirements, new competition rules, pressure from others	19.9
	Lack of support	From coaches, from older (team) athletes, from federations	17.1
	Lack of integration/ challenges with new relations	Difficulties with integration, age gap, competitive feelings	6.6
	Unethical behaviors from others	Lack of consideration for age and needs, lack of respect, discrimination, lack of appreciation	5.5
	Systematical and structural challenges	Intermediate category missing, transition was too fast/ too early, lack of experience, lack of structure	12.6
	Sport-life conflicts	Dual-career, sport and family, lack of time	4.5
No challenges (13.6%)	No challenges	Transition was good, no difficulties	13.6

Note. * % is calculated as the total of the answers in relation to the answers in the higher-order topics.

N = 333.

Erklärung

„Ich erkläre hiermit, dass ich diese Arbeit selbständig verfasst und keine anderen als die angegebenen Quellen benutzt habe. Alle Stellen, die wörtlich oder sinngemäss aus Quellen entnommen wurden, habe ich als solche gekennzeichnet. Mir ist bekannt, dass andernfalls der Senat gemäss Artikel 36 Absatz 1 Buchstabe r des Gesetzes über die Universität vom 5. September 1996 und Artikel 69 des Universitätsstatuts vom 7. Juni 2011 zum Entzug des Doktortitels berechtigt ist. Für die Zwecke der Begutachtung und der Überprüfung der Einhaltung der Selbständigkeitserklärung bzw. der Reglemente betreffend Plagiate erteile ich der Universität Bern das Recht, die dazu erforderlichen Personendaten zu bearbeiten und Nutzungshandlungen vorzunehmen, insbesondere die Dissertation zu vervielfältigen und dauerhaft in einer Datenbank zu speichern sowie diese zur Überprüfung von Arbeiten Dritter zu verwenden oder hierzu zur Verfügung zu stellen.

In meiner Dissertation habe ich ChatGPT-4o für Übersetzungen von Deutsch nach Englisch, zur Verbesserung der Kohärenz und Kohäsion von Texten, zur Überprüfung der Verständlichkeit sowie für grammatikalische Korrekturen verwendet.

Wabern, 17. Oktober 2024

Unterschrift