Contributions to Applied Sport Psychology

Value-Oriented Sports Injury Management in an Elite Youth Football (Soccer) Academy of the German Bundesliga

An Adaptable Model for Practitioners

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Abstract: We present a new concept in sports injury management (SIM) transformation. The central innovation of the concept is a way of thinking about SIM with the understanding that overarching values largely guide SIM processes (SIMPs). Accordingly, the concept aims to manifest SIMPs that are oriented by predefined values, so-called value-oriented SIMPs. New approaches are necessary because, despite substantial investments in physical measures, sports injuries still depict unimproved, omnipresent, and extensive risks to elite youth footballers. However, 85% of current injury-related time-loss could be avoided (Klein et al., 2020). SIM ineffectiveness may result from inconsistent concepts. Specifically, interventions are limited by SIMPs implicitly led by values of a "materializing ideology": focus on short-term success, expert-centeredness, and objectification. Consequently, we developed a consistent procedure to implement opposing values of sustainability, athlete-centeredness, and holism. These values guide the transformation of SIMPs at a German elite football academy. In evaluating this concept, athletes and staff members reported promising effects.

Keywords: athlete-centered care, integrated model of response to sport injury, dynamic systems theory, sustainable talent development, elite youth sports culture

Wertorientiertes Sportverletzungsmanagement in der Fußballakademie eines deutschen Bundesligisten. Ein anpassbares Rahmenmodell für die Praxis

Zusammenfassung: Wir präsentieren ein neues Konzept der Sportverletzungsmanagement (SVM)-Transformation. Die zentrale Innovation des Konzepts ist eine neue Denkart über SVM, die besagt, dass SVM-Prozesse (SVMPs) maßgeblich durch übergeordnete Werte geleitet werden. Dementsprechend beabsichtigt dieses Konzept, SVMPs zu etablieren, welche von vordefinierten Werten geleitet werden – sogenannte wertorientierte SVMPs. Neue Ansätze sind notwendig, da trotz substanzieller Investitionen in körperfokussierte Maßnahmen Sportverletzungen ein zuletzt in ihrer Häufigkeit unverändertes, omnipräsentes und weitreichendes Risiko für Nachwuchsleistungsfußballer darstellen. Dabei könnten derzeit schätzungsweise 85% der verletzungsbedingten Zeitverluste vermieden werden (Klein et al., 2020). Die Ineffektivität bisheriger SVM-Konzepte könnte aus inkonsistenten Vorgehensweisen resultieren. Denn SVM-Interventionen werden häufig durch SVMPs limitiert, die implizit von Werten einer „Ideologie der Materialisierung" geleitet werden: Fokus auf kurzfristigen Erfolg, Expertenzentrierung und Objektifizierung. Infolgedessen entwickelten wir ein konsistentes Verfahren zur Implementierung der entgegengesetzten Werte Nachhaltigkeit, Athletenzentrierung und Ganzheitlichkeit. Diese Werte leiten die Transformation von SVMPs in einer Fußballakademie eines deutschen Bundesligisten. In Prozessevaluationen berichteten Athleten und Staff-Mitglieder vielversprechende Effekte.

Schlüsselwörter: Athletenzentrierte Versorgung, integriertes Sportverletzungsmodell, Dynamische Systemtheorie, nachhaltige Talententwicklung, Nachwuchsleistungssportkultur

From 2021 to 2022, we implemented a novel concept for the transformation of sports injury management (SIM) and sports injury management processes (SIMPs)[1] in the German Bundesliga academy of Mainz 05. In our opinion, applying this concept to establish what we labelled as value-oriented SIMPs can have far-reaching consequences for the prevention and rehabilitation of sports injuries and, therefore, has several advantages for elite youth football. Here, we describe our concept and its first implementation in the respective academy. We give academy stakeholders a first impression of the possibilities of implementation, while pointing out likely difficulties in implementation. To aid other sport psychology practitioners, we will provide convincing arguments for initiating SIM transformations and a model to derive individual solutions of *how* to transform the SIMPs within your organization. We concluded that a typical article format does not lend itself to support the purpose of the current article. Therefore, this article does not fit the usual structure and standards of an empirical article. This article also does not deliver any copy-and-paste action protocols. Presenting a stiff action protocol would falsely suggest the existence of universal solutions for SIM and tempt practitioners to copy them directly, with the risk of failing due to the context-specific nature of sports injuries (Tee et al., 2020). Therefore, we will present our practical application only briefly, to make our concepts more comprehensible and instead focus on describing the underlying principles of our concept in detail.

The Acceptance Problem

At the beginning of our project, we had to overcome a challenge in the perception of sports injuries: Due to their omnipresence, high sports injury rates are widely accepted as a regular and immanent phenomenon of academy football by SIM stakeholders and athletes (see Table 1 for group definitions of different SIM stakeholders; Mayer & Thiel, 2011). The sports injury acceptance inhibits the motivation to reevaluate current SIMPs and invest in new evidence-based approaches to SIM. Therefore, we provide two arguments that helped us and may assist you as a practitioner to deal with the acceptance problem and may motivate academy executives to invest in new approaches to SIM. The arguments constitute (I) a summary of the current sports injury rates in German football academies as well as (II) a list of costs and possible benefits of more effective SIMPs.

Argument I: Current Sports Injury Rates

In total, academy athletes sustain on average 32 days of sports injury per season (Le Gall et al., 2006). Recent data from male U12–U19 athletes from a German first division football academy (Jaber et al., 2022) are consistent with international incidences (e.g., Hall et al., 2020; Le Gall et al., 2006; Price, 2004): 55.1% of athletes sustained at least one sports injury with an average time-loss of 23 days per sports injury with possibly several additional partial days lost during rehabilitation (Veith et al., 2022). Every fifth of those sports injuries (19%) was classified as severe. These data underpin the observation that, despite the investment of substantial resources in physical mea-

Table 1. Definition and systemic overview of groups within individual athletes' SIMPs

Group	Group members
Medical personnel	Physicians, physiotherapists, rehab trainers
Coaches	Head coach, assistant coach, goalkeeper coach
Staff members	Coaches, medical personnel, athletic trainers, analysts, sport psychologists, team support managers
Academy executives	Academy manager, sports director, department heads
Academy personnel	Staff members, academy executives
Teammates	Fellow athletes within the same football team
Private social system members	Family, friends, school, etc.
Social system members	Academy personnel, teammates, private social system
SIM stakeholders	Athlete, social system members

Note. See Electronic Supplementary Material 1 for a depiction of the systemic structure of SIM stakeholders.

[1] **Sports Injury Management (SIM)** = overarching structures and organization of sports injury prevention and rehabilitation.
Sports Injury Management Processes (SIMPs) = part of SIM, which entails the approaches, concrete actions, and interactions throughout sports injury prevention and rehabilitation.

sures (Droste et al., 2021), sports injuries depict an unimproved, omnipresent, and extensive risk to elite youth football athletes apparent in recent years (Pfirrmann et al., 2016). Elite youth footballers are at special risk when compared with their non-elite peers (Inklaar et al., 1996; Matos et al., 2011) due to age-related factors (Le Gall et al., 2007), football-specific characteristics of athletic performance (Steffen & Engebretsen, 2010), and the socioecological idiosyncrasies of the academy setting.

Argument II: Consequences of Sports Injury Management (In-)Effectiveness

In this section, we subdivide seven central reasons to invest in improving the effectiveness of SIM: We first list four costs of less effective SIM followed by three benefits of improved SIM. Firstly, the financial costs of sports injuries are immense (Ekstrand, 2013; Hickey et al., 2014). German professional football could avoid up to 85% of sports injury-related time-loss with financial savings of about 2.3 million euros per season (Klein et al., 2020). The second and third reasons are that sports injuries negatively affect athletes' performance in the short term (Drew et al., 2017; Hägglund et al., 2013) and talent development in the long term (Haugaasen & Jordet, 2012; Larruskain et al., 2022). Fourthly, the response to sports injuries portrays short- and long-term physical and mental health risks (Gabbe et al., 2010; Gledhill, 2021; Gouttebarge et al., 2016; Putukian, 2016), which may result in impairments in performance (Höner & Feichtinger, 2016; Lochbaum et al., 2021) or in drop-out and career-ending (Butcher et al., 2002; Drawer & Fuller, 2002; Quested et al., 2013; Vella et al., 2015). Beyond minimizing negative consequences, improving SIM produces additional benefits. The fifth reason to invest into effective SIM is that it fosters athletes' well-being (Mayer & Thiel, 2014; Schwab Reese et al., 2012), which in itself is ethically desirable but is also an important foundation for many other academy-relevant outcomes such as short-term performance (Jones et al., 2009; Lundqvist & Kenttä, 2010). The sixth reason constitutes benefits in an athlete's personal development such as increased resilience from effectively dealing with the adversity of sports injuries (Galli & Vealey, 2008; Sarkar et al., 2015). The seventh reason is that more effective SIM will directly improve long-term talent development (Ivarsson et al., 2017). Specifically, athletes then reside within an environment that fosters their development of athletic and personal competencies more effectively. For instance, such environments may preventively promote athletes' decision-making skills on and off the pitch.

The extensive range of the relative injury burden between clubs in German professional football, from only 3.1 to a numerous 52.1 days of time-loss per match played (Klein et al., 2020), shows that high incidences of sports injuries are not an unchangeable characteristic of elite sports. It suggests that there is a massive potential in *how* SIM is practiced. This discrepancy reveals the need for a closer examination of current SIM practices.

The Reason for Ineffective Interventions

Based on previous work (Aoyagi & Poczwardowski, 2012; Poczwardowski et al., 2004; Prochaska & Norcross, 2018), Hess and colleagues (2019) developed a classification system to categorize scholarly work and practice regarding sports injuries on three levels based upon the degree of philosophical abstraction from thinking to doing. In this context, abstracting in a philosophical manner means to reduce complex phenomena to their latent underlying major structures and principles. An overview of the classification system can be found in Electronic Supplementary Material 2. The highest (i.e., broadest) level of abstraction represents theoretical paradigms and overarching models like the biopsychosocial paradigm that guide the way of thinking, or conceptualizations, about sports injuries and SIM. The medium level of abstraction comprises approaches and frameworks that guide *how* SIM practice is executed (*modalities*). To expand the categorization, we include the transformation regarding how SIM is practiced and the aspired outcomes of transformation (goals) on the medium level. Within modalities, we differentiate modalities of transformation from modalities of implementation. Modalities of transformation describe how processes of SIM transformation within a system are initiated and sustained. Modalities of implementation describe how practitioners execute specific SIM interventions. The low (i.e., most specific) level of abstraction represents *what* concrete interventions (*actions*) are taken. According to Hess and colleagues (2019), the reason for ineffective sports injury outcomes is that scholarly concepts on the medium level that could inform sports injury practice are missing. Expanding on this, we argue that the limited SIM success of previous measures results from missing consistent concepts in scholarly work and practice on high, medium, and low levels of abstraction. As for every task within talent development in sports, each level should inform the following level for ideal (SIM) outcomes. To date, academies mostly implement only action-oriented interventions (low level, what) to improve their SIM with inconsistent concepts on a high and medium level, resulting in limited SIM success. The existing socioecological environment, system, and culture already incorporate more or less explicit concepts on a high and medium level such as ways of thinking about sports injuries and approaches of

how SIM is applied that may oppose the intervention. For instance, an intervention to enhance athletes' body awareness (low level) may be inhibited by SIM approaches with passive athletes (medium level) which are guided by conceptualizations that define sports injuries as exclusively biomedical phenomena (high level). Especially for sports injuries, inconsistent concepts limit interventions because in reality sports injuries are not segregated physical phenomena. When athletes experience sports injuries, they report the outcome of a process that is determined by the dynamic interaction between the internal perception of physical damage and the external socioecological context such as cultural narratives about the desirability to continue playing while being hurt (Bolling, Delfino Barboza, et al., 2019; Vella et al., 2022). In this case, as long as these cultural narratives that guide SIM practices on a medium level and, on a high level, the reasons why they exist (e.g., present organizational values) are not modified, they limit the effectiveness of SIM interventions on a low level. Consequently, we started our SIM transformation by analyzing the current socioecological environment of elite football academies and their SIM to gain an impression of initial conditions that could potentially influence our interventions and SIM effectiveness.

Analysis of Current Sports Injury Management Values

We descriptively analyzed the current SIM-relevant socioecological idiosyncrasies of German football academies from literature using the classification system as a model of analysis. While Hess and colleagues (2019) used their classification system mainly to analyze scholarly advancements, we applied it to inspect SIM practices. Hence, on a high level of abstraction, it was crucial to include the organizational values that guide the people who execute the SIM practices (Aoyagi & Poczwardowski, 2012). We define "values" not in the sense of an economic value but rather according to existential psychology, in which they serve as transsituationally stable overarching and fundamental guiding principles (Hitlin & Piliavin, 2004). Values guide all our actions and therefore shape the organizational culture and system. Despite their extensive impact, values can be implicit or explicit, and they can, but not necessarily, be chosen intentionally by an individual or organization. In contrast to goals, even intentionally chosen values as ideals cannot be fulfilled completely. They only show the direction. Being located on the highest level of abstraction, values hierarchically influence all subsequent levels of abstraction. Therefore, we were able to deduce three underlying values on a high level of abstraction as a central outcome of our analysis through examining the actions, modalities, and goals of the current academy system. The three values are *focus on short-term success*, *expert-centeredness*, and *objectification of athletes,* which in their interaction can be described as a *materializing ideology*. The values are typically incorporated by academies and, in our opinion, play a leading role for sports injury problems since they guide deficient SIMPs, produce high sports injury rates, and limit the effectiveness of SIM interventions (see below). We argue that these values are informal and somewhat implicitly guide SIM practices. Therefore, it was important to gain awareness about these values by identifying them in order to enable a transformation of these SIM dysfunctional values.

Focus on Short-Term Success

Focus on short-term success manifests in the pressure for the primacy of performance and success in the present (Nesti et al., 2012), which is a main source of the culture of risk in academies (Mayer & Thiel, 2011) and, therefore, high sports injury rates (Wiese-Bjornstal, 2010). While short-term success itself does not have to be detrimental to SIM, having a sole focus on it brings several disadvantages. Led by this value, elite youth football is characterized by a high pressure, competitive, and results-oriented climate experienced by all stakeholders (Güllich, 2014; Harttgen & Milles, 2004; Mills et al., 2014a; Olusoga et al., 2009). Also interaction with athletes is aimed primarily at promoting immediate success. Sports injuries are exclusively perceived as a substantial threat to academies' short-term goals. As a consequence of the focus on short-term success, athletes are confronted with conflicting expectations of how they shall treat their pain and sports injuries, the so-called risk–pain–injury paradox (Mayer & Thiel, 2011; Nixon, 1994). On the one hand, they are supposed to intensively take care of their body. On the other hand, they are expected to ignore signs of a heightened sports injury risk and perform while being hurt. Being part of the system and expected to accelerate return-to-play processes under social and time pressure (Courson et al., 2014; Johnson, 2004), medical personnel too are led to reproduce patterns of communication that foster the existing culture of risk (Mayer & Thiel, 2011).

Expert-Centeredness

Expert-centeredness is depicted by the phenomenon that throughout SIMPs, physical experts are substantially more active and possess more decisional authority than athletes. Athletes report that important decisions are often paternalistically made about them instead of with them and that their academies lack understanding for athletes (Mills et al., 2014a; Testoni et al., 2013). The opinions of

experts have a higher significance than the subjective reality of athletes. Within expert-centered SIM, the athlete is placed at the perimeter of action (Zanin, 2018). Being forced into a passive role in SIM (Harttgen et al., 2010; Mayer & Thiel, 2011), the manifestation of athlete-immanent potential is limited (Bartholomew et al., 2009). Athletes subsequently internalize this framework of role and task distribution (Bolling et al., 2020; S. Vella et al., 2022). Additionally, enforcement of cultural norms of conformity (Manley et al., 2016) combined with high levels of interdependency and ambivalence of academy relationships (A. Adams & Carr, 2019; Harttgen et al., 2010; Milles et al., 2011; Testoni et al., 2013) limit athletes' options to maneuver themselves toward the center of authority (Bartholomew et al., 2009; Nixon, 1992). SIM with low athlete autonomy is connected to worse sports injury outcomes (Goddard et al., 2021; Podlog & Eklund, 2007; Truong et al., 2020), for example, because with low autonomy, the gap between athletes' initial intention and the actual behavior widens for sports injury-relevant health behavior such as adherence to rehabilitation (Chatzisarantis et al., 2007, 2008).

Objectification

Objectification of athletes means that throughout SIMPs, athletes are treated like passive physical objects. Little attention is paid to athletes' holistic individuality and subjectivity, which incorporates, besides physical, also psychological, social, and contextual factors. SIMPs in elite football academies focus solely on the physical factor and struggle to match the multifaceted nature of sports injuries resulting in less effective prevention and rehabilitation of sports injuries (Hirmke & Kuhlmann, 2022; Truong et al., 2020, 2021). For instance, non-physical factors are oftentimes underrepresented in concussion protocols (Van Ierssel et al., 2022). Furthermore, SIMPs are typically executed exclusively by physiological experts such as physiotherapists and do not incorporate interdisciplinary cooperation where psychosocial factors are given weight in decisions (Arvinen-Barrow & Clement, 2015, 2017; Hess et al., 2019). These experts follow their assignments and work only within their designated scope of expertise (Dijkstra et al., 2014; Hess et al., 2019; Malcolm, 2006). Consequently, psychosocial factors are underrepresented in the interactions between athletes and medical personnel (Arvinen-Barrow et al., 2014). Instead, the sole ownership of all non-physical aspects of SIM is left to the individual athlete (Truong et al., 2021).

The "Materializing" Ideology

Together, these three values form the *materializing ideology* in academy football. In its extreme form, the materializing ideology dehumanizes athletes by reducing the individual athlete to physical material that is to be optimized for organizational short-term economic interests (Zanin, 2018). Medical support services are then only a means to bring back athletes to work as soon as possible to avoid economic damage (Mayer & Thiel, 2011). Factors that are presumed to have no direct impact on short-term performance, such as well-being and long-term health, are excluded from the scope of medical treatment and are instead the responsibility of the athletes themselves (Borg et al., 2021; Drawer & Fuller, 2002). These socioecological circumstances may make athletes more susceptible to adopting norms of a culture of risk (Mayer & Thiel, 2011; Nixon, 1993) and promote SIM-relevant maladaptive athlete behavior and coping strategies such as pain medication abuse (Read et al., 2023; Trinks et al., 2021), playing hurt (Kerr et al., 2014; Mayer & Thiel, 2018; Schnell et al., 2014), or low levels of rehabilitation adherence. Taken together, a materializing ideology constrains effective sports injury prevention and rehabilitation (Chan & Hagger, 2012; Forsdyke et al., 2016; Ivarsson et al., 2017; Truong et al., 2020).

Practical Application

A New Concept: Developing Value-Oriented Sports Injury Management Processes

It is important to emphasize two insights from the previous sections. First, there is a need for consistent SIM on different levels of abstraction. Previous attempts to enhance SIM via interventions failed due to missing concepts on a medium level and existing conflicting values of a materializing ideology on a high level of abstraction. Second, due to the hierarchical relation of different levels of abstraction in practice, SIM-deficient values of a materializing ideology influence subsequent levels resulting in ineffective SIM structures, processes, and actions. Both aspects suggest that the main obstacle in increasing the effectiveness of SIM seems to lie within academies' (implicit) values of a materializing ideology. From these findings, we developed a new comprehensive concept for the transformation of SIM practices toward more effective SIM that focuses on academies' values. The concept contains a new way of thinking about SIM, a purpose, a strategy, and systematic procedures of planning and implementation. Resulting from the above presented findings, the concept is based on a new way of thinking about SIM: Organizational values are crucial to successful SIM. Consequently, every attempt to improve SIM outcomes in practice must consider these values. This way of thinking expands previous conceptualizations that as-

sumed that the sole addition of physical interventions will solve the sports injury problem. At its core, our new concept contains a specific purpose of the transformation to establish *value-oriented SIMPs.* This means that academies intentionally define explicit, authentic, and SIM-beneficial values that guide all SIMPs. These values serve two main functions in SIMPs. First, throughout systematic planning processes, SIMPs are constructed according to the predefined values on all levels of abstraction. Second, values serve as overarching standards upon which practitioners can evaluate and adapt their SIMPs throughout their execution (Hitlin & Piliavin, 2004). The concept's strategy is oriented from the hierarchical structure of the three levels of abstraction. Therefore, the strategy suggests starting the conceptual part of the transformation by selecting and defining values at the high level. Then, the subsequent levels are carefully planned successively according to the respective higher levels to guarantee consistent transformational forces. Consequently, the concept's procedure of planning applies this strategy to the respective academy. A summary of the entire planning procedure is provided in Electronic Supplementary Material 3.

We developed and initiated a project at the German first division football academy of Mainz 05 where we applied this concept. Our planning procedure started with the value selection. We considered three aspects within the value selection process. First, we looked for alternatives in the respective area influenced by this specific materializing ideology value. For instance, for the value of expert-centeredness we searched for an alternative in the area of role distribution of different SIM stakeholders within SIM systems. Second, we looked for (SIM-beneficial) values that are supported by scientific evidence to improve SIM effectiveness. Third, we looked for values that would, in our opinion, fit our organization in a way that they can be embodied authentically. The chosen values were *sustainability*, *athlete-centeredness,* and *holism.* These new values start at the same level and therefore serve as SIM-beneficial alternatives to the values of a materializing ideology (see Figure 1). After explicitly defining values, our next steps of the planning procedure were to identify concrete goals, modalities of transformation, and modalities of implementation on the medium level. These steps are followed by the development of action-plans on the low level. As a part of our actions, an evaluation of our approach with athletes and staff members will initiate feedback loops to all previous stages. As a result, the whole concept will be evolving continuously. We provide details on the respective steps in the following sections and a summary in Electronic Supplementary Material 3. We continue with defining and describing the three chosen values in detail.

Sustainability to Oppose Focus on Short-Term Success

Naturally, besides short-term goals, academies and their athletes also possess long-term interests; they are simply underprioritized currently. With *sustainability* in SIM, we prioritize overarching long-term goals over short-term goals for three reasons: sports injuries, personal competencies, and talent development. Our first priority is sports injuries. A focus beyond junior short-term in-game performances toward the long-term health and well-being of athletes promotes that athletes are treated in a way that prevents sports injuries and re-injuries. For example, a long-term health focus will reduce the pressure of short-term outcome goals for athletes and make them feel safer to report sports injuries (Chrisman et al., 2013; Kroshus et al., 2014). More importantly, sustainability incorporates the notion that the rehabilitation process is continued until athletes return at least to their previous level of performance to reduce the risk of re-injury rather than merely being able to play again. An athlete may be approved physically to be able to play again, whereas mentally, he may not be ready to perform, for example, due to distrust in the previously injured body part which may highten the risk of re-injury. The second and third priorities of sustainability are the development of often neglected personal competencies and talent development (Barker et al., 2014). With a sustainable focus, every sports injury constitutes a challenging opportunity to develop personalities, skills, and personal competencies, such as resilience, and therefore also performance and talent development in the long run (Hammer et al., 2021; Nesti et al., 2012; Roy-Davis et al., 2017). SIM is then not only a concern of medical departments, but also a crucial part of general personal and talent development. Sustainability is thus important for two central motives. Since only a minority of athletes will reach professional level (Dugdale et al., 2021; Grossmann & Lames, 2015), these lifelong personal competencies will be of higher relevance in the long term for most athletes (Haslam et al., 2021). Furthermore, effective talent development aims to increase the probability for every single athlete to reach and consistently remain on the professional level in his adulthood. For this purpose, sustainable development and SIM, which lays the foundation of adult performance, is more important than juvenile short-term success (Barth et al., 2022; Güllich & Emrich, 2014; Miller & Kerr, 2002; Rees et al., 2016).

Athlete-Centeredness to Oppose Expert-Centeredness

Athlete-centeredness aims for athletes as central, active (taking initiative), autonomous, and responsible protagonists of SIM systems and processes. (Clement & Arvinen-

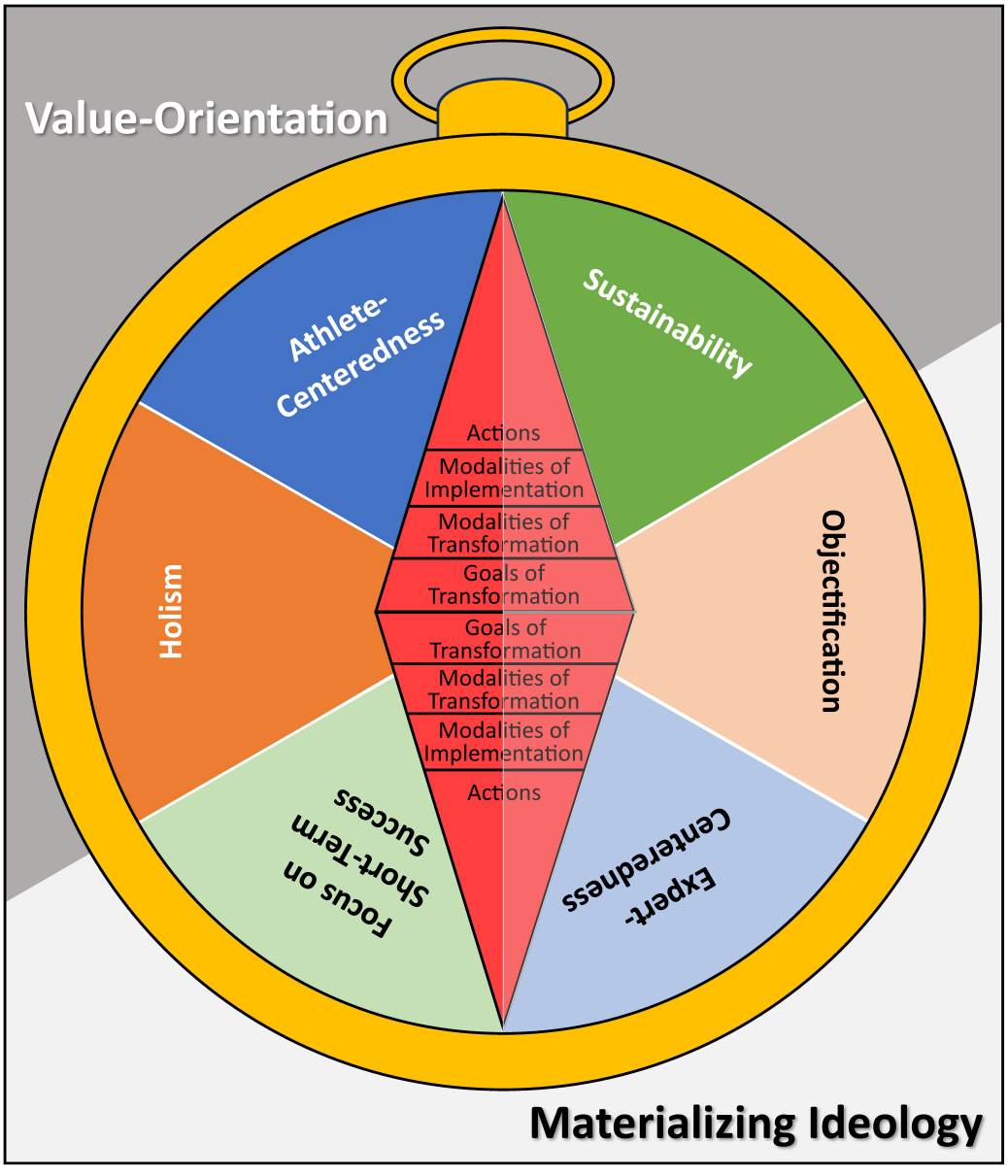

Figure 1. Compass toward value-oriented SIMPs. In the upper half of the figure are three targeted values of our value-oriented SIMPs. In the lower half of the figure are three current values of a materializing ideology. Pairs of opposing values are shown opposite each other with the same colors of different transparency. The compass needle depicts consecutive abstraction levels of transformation showing how SIM-practices develop toward football academies' values.

Barrow, 2013; Emrich et al., 2006; Hess et al., 2019; Kerr & Stirling, 2008; Miller & Kerr, 2002). Within athlete-centered SIMPs, athletes are actively involved and given responsibility to support their inherent striving for self-actualization and willingness to take responsibility (Rogers, 1995). Empowerment of athletes is a pivotal part of athlete-centeredness for several reasons. For instance, it is impossible for SIM stakeholders to control their athletes' sports injuries completely from an external standpoint. The reason is that sports injuries and factors influencing them vary intra- and inter-individually (Kellmann et al., 2018), are subjective (Vella et al., 2022), and comprise major psychosocial facets (Werner et al., 2023; Wiese-Bjornstal et al., 1998). Consequently, athletes need to be responsible for and active in sharing their perspective. They also need to be empowered to be able to precisely introspect and express their perceptions. SIM stakeholders who incorporate athlete-centeredness are confident that athletes possess the necessary resources to be responsible agents. For staff members, it is then a major task to develop their own psychosocial competencies to empower athletes. The incorporation of athlete-

Table 2. Three goals toward value-oriented SIMPs

Goal 1: Athlete appraisal goal
The athlete himself adapts the cognitive appraisal of his role within SIM. The athlete's new role is to be an active, responsible, holistically self-competent and autonomously thinking, feeling, and acting agent along his career path before, during and after a sports injury. As a part of his new role appraisal, the athlete pursues an appreciative cooperation with social system members in order to make the valuable resources unfold of which the athlete is provided by the surrounding social system.
Goal 2: Athlete empowerment goal
The athlete is sustainably empowered to fulfill the intended role by means of the promotion of his personal competencies. The athlete is then capable of taking the initiative to position himself at the center of his SIM system to take ownership as the protagonist of his SIMPs. Within an autonomy-supportive and athlete-centered environment, the athlete develops competencies and receives opportunities to sustainably support his inherent striving for self-actualization and willingness to take responsibility.
Goal 3: Social system members appraisal goal
Social system members adapt the cognitive appraisal of their roles within SIM. Their new role is to be supportive allies alongside the individual athlete's career path before, during, and after a sports injury. This new appraisal entails sustainably empowering athletes as active, self-competent, autonomous, and responsible holistic subjects to make informed decisions and to position themselves at the center of their SIMPs by means of social system members' disciplinary and psychosocial expertise.

centeredness involves staff member–athlete relationships being partnerships with shared responsibility and decision-making processes (Ardern et al., 2016; Makoul & Clayman, 2006; S. Vella et al., 2022) within an autonomy-supportive climate. In the context of relationships, transdisciplinary styles of cooperation, where physical, nonphysical, and private social system members share responsibility for multiple interrelated tasks throughout the SIMPs (Hess et al., 2019), are highly supportive of athlete-centered and holistic values.

Holism to Oppose Objectification

Holism involves that SIM stakeholders perceive athletes as multifaceted subjects whose realities are defined by unique and individual physical, psychological, social, and contextual factors (Bolling, Mellette et al., 2019; Henriksen et al., 2010; Hulme & Finch, 2015). The value of holism is in line with evidence-based holistic sports injury frameworks such as the integrated model of response to sport injury (Wiese-Bjornstal et al., 1998). These models consider the multifaceted nature of sports injuries as processes, not single incidents (Vella et al., 2022). Specifically, holistic models involve a broad system of factors that dynamically interact internally and externally of the athlete in the emergence of, response to, and recovery of sports injuries. When athletes and their sports injuries are perceived holistically, their well-being and holistic personal development gain relevance, since these are prerequisites for effective preventive and rehabilitative SIMPs (Bonell Monsonís et al., 2021; Chatzisarantis et al., 2008; Goddard et al., 2021; Sniehotta et al., 2005). Consequently, the acquisition of personal competencies such as introspection, self-knowledge, self-leadership, social competencies (Martindale et al., 2005; Miller & Kerr, 2002), and health locus of control (Lu & Hsu, 2013; te Wierike et al., 2013) is relevant for sports injuries. A holistic perspective on athletes and their sports injuries also incorporates considering social areas of life outside the academy including school, friends, and family. Parents in particular usually embody important social resources within SIM (Baker et al., 2003; Harttgen & Milles, 2004; Yang et al., 2010).

Three Systemic Goals

After selecting and defining values, the second step in the procedure of our concept was to deduce three main goals of transformation on a medium level of abstraction (see Table 2). It was important to define these goals, since the purpose of our concept was to establish SIMPs that are generally oriented by explicitly defined values. These goals serve as concrete, aspired outcomes of transformation that help us to measure and evaluate whether we made significant advances within SIMPs toward the chosen values that are specific to our project (Austin & Vancouver, 1996). Being at the beginning of this project, the goals do not claim a complete transformation of all SIMPs. They *sustainably* serve as the first important milestones on which further advancements can be built upon. Stemming from a systemic and *holistic* perspective, the three interrelated goals target the athlete, his surrounding social system members, and their relationship to each other. Being led by the value of *athlete-centeredness*, the goals mainly prioritize the athlete's advancements and his perspective.

A Bottom-Up Approach to Transformation

Subsequent to selecting and defining goals, we tried to find optimal pathways specifically for our organization

through which the intended transformation can occur. To us, a bottom-up approach as a modality of transformation was most suitable. Bottom-up means that transformations are initiated at the bottom of the hierarchy of the academy system from which those transformations spread toward the top by means of systemic principles. We chose this approach instead of a top-down approach for several reasons. First, it is individuals and not written concepts alone that need transformation in order for an organization to be transformed (Gilley et al., 2009). Within hierarchical structures, more individuals can be reached directly by focusing on the interaction with those people at the basis. Second, consistent with concepts of participatory processes in organizational management, the inclusion of organization members in decision-making is linked to successful organizational transformation (Schweiger et al., 2018). Third, a bottom-up approach also allowed us to be more agile while planning and implementing our project. This is important because we aimed at immediately initiating the athletes' and the academy's transformation and adapted it simultaneously to the ongoing actions with the help of a continual process evaluation. We wanted to avoid a long top-down conceptualization phase, which does not affect the athletes' current situation. Fourth, considering the hierarchical structure of football academies, top-down approaches of transformation may seem most effective (Daley et al., 2020). Transformation from top to bottom, however, often takes a lot of time, faces difficulties to include subcultural dynamics within organizations (Ogbonna & Harris, 2014), and may lose drive through the confrontation with unproductive resistance (Thomas & Hardy, 2011) from key gatekeepers or followers (Heyden et al., 2017; Thompson et al., 2021). Still, a bottom-up approach to transformation does not exclude top levels from this project. It was important to discuss and collectively agree with academy executives upon this modality and the resulting interventions.

Accordingly, we started our interventions at the basis with athletes and staff members. We include ourselves as academy psychologists at the bottom level of the hierarchy as well. First, we targeted the *athlete appraisal* and *empowerment goals* because within dynamic–systemic frameworks, modifications on an intraindividual level within the athlete's inner system will drive changes in the interrelated surrounding social system through feedback loops, and vice versa (Cohen & Sherman, 2014; Pol et al., 2020). Consequently, empowered athletes who are responsible and act competently serve as catalysts to propel the targeted system transformation bottom-up. Fueled by their inherent drive to take agency (Zanin, 2018), empowered athletes will pave their way into the center of their surrounding social system and SIMPs. Following both athlete goals, we targeted the *social system appraisal goal*. Social system interventions were also guided by the bottom-up approach focusing on social system members with whom athletes interact on a daily basis, for example, staff members, coaches, teammates, and parents. A supportive social system at the basis shall additionally empower athletes to take their first steps at the center of their SIMPs. Besides the hierarchical orientation regarding SIMPs, the bottom-up approach also included starting on the less formalized and therefore more accessible prevention of sports injuries (e.g., education of recovery habits). From there, we aimed for spillover effects into the more formalized processes of sports injury rehabilitation.

Interestingly, our concept's strategy led us to start our initial planning procedure at the hierarchically higher levels of abstraction. By contrast, we designed bottom-up transformational forces in a way such that they flow in the opposite direction. We expect that the initiation of transformational forces on the lower levels with interventions and modalities of implementation will successively promote the incorporation of the predefined values by the academy on a high level. In our opinion, this flow will be significantly supported by the consistent construction of different levels. Consequently, the sequence of implementation followed the logic of the flow of transformational forces. Actions (interventions) at the low (bottom) level are the starting point of implementation. This is necessary since one cannot implement values directly. Values must be "embodied" by the members of an organization, and therefore, members need to act and interact accordingly. Finally, when the transformation is finished and value-oriented SIMPs are established, we expect a flow of forces from top to bottom, starting from SIM-beneficial values to improved processes and outcomes of sports injury prevention and rehabilitation. In Electronic Supplementary Material 2, we provide an overview of all processes and their respective flow direction.

To achieve our three goals of transformation, we implemented recipient-specific interventions on multiple academy levels (see Vella, 2019), specifically targeting (A) athletes and (B) members of their social system. Since the modalities of implementation and actions are reciprocally connected, we will present them in the same sections with central modalities in italics. We provide a summary of all modalities and actions in Electronic Supplementary Material 3.

A) Athlete-Targeted Interventions

The first important modality was to work with an appropriate *target group*. We identified the U15 and U16 groups to be especially appropriate because of their level of

maturity (Mann et al., 1989; Weil et al., 2013), phase of ontogenetic psychological development with the increasing ability to act responsibly (Emery et al., 2006; Nemeth et al., 2013; Solmi et al., 2022; Steinberg, 2005), severe sports injury risk (Read et al., 2017; Ruf et al., 2022; Wik, 2022), preventive potential prior to sports injury and reinjury risk peaks (Ekstrand et al., 2011; Jaber et al., 2022; Klein et al., 2020), and reasons of academy-specific talent development.

Since both athlete-targeted goals involve the acquisition of complex and context-specific competencies with elements from cognitive, emotional, volitional, motivational, and social domains (Klieme & Hartig, 2008; Weinert, 2014), the learning-approach of *experiential learning* (Schenck & Cruickshank, 2015) seemed the most promising. As a consequence, we mainly focused on the modalities of implementation of our interventions, since the modalities are crucial in creating effective concrete learning experiences for athletes (Bonell Monsonís et al., 2021; Martindale et al., 2005). In order to empower athletes, it is essential to not only convey knowledge, for example about recovery, but also to teach concrete skills about how to apply this knowledge (Adams, 2015; Butler et al., 2008; Naderi et al., 2020). Therefore, within our interventions, athletes actively practiced competencies such as self-management, collectively reflected on their respective experiences, and later applied those competencies on a daily basis. For instance, athletes were encouraged to reflect on their current sleep hygiene, adapt it according to tips they learned within our interventions, and put it in relation to their sleep quality, which they tracked using a sleep protocol.

Consistency with constant learning experiences and encounters between the academy psychologist and athletes was key to sustainable learning. Therefore, we initiated a series of six preventive workshops for skills development in recovery management with U15 and U16 athletes over the course of one season. We addressed the topics of recovery basics in elite football, sleep, mental relaxation and activation, and habits. With regular short follow-ups, we increased the consistency of encounters. For example, we regularly used short periods of just five to 10 minutes before practice in the locker room to debrief about past or prepare for future workshops with athletes. To increase the consistency of learning experiences, each topic included additional self-directed learning material that athletes worked on autonomously and gathered in a special learning folder.

Communication was another important modality. The investment of these many resources (workshops, follow-ups, learning folders) to educate athletes modeled an athlete-centered value orientation and conveyed a statement to both athletes and all other SIM stakeholders about the necessity of empowering athletes for effective SIMPs. In this way we nurtured awareness of our SIM values in athletes.

To further promote effective learning, we utilized *developmentally appropriate education methods* (Martindale et al., 2005). For instance, we designed a superhero mascot wearing club colors who accompanied the workshop series and summarized the take-home messages. Moreover, we tried to choose the developmentally appropriate level of complexity and volume of the educational content and generally kept the proportion of oral lectures low. Instead, we created space for interaction and experimentation. For example, at the beginning of the workshop series, athletes discussed and gathered their favorite recovery habits in small groups. In another workshop, we practiced and reflected on different relaxation techniques. To promote the transfer into athletes' daily lives, we left the classroom as often as possible and conducted many workshops on the football pitch. Self-directed learning materials additionally stimulated the active practicing of workshop content at home.

Creating *autonomy-supportive* and *psychological safety-supportive environments* during workshops were further crucial interventional modalities. Therefore, we promoted an environment of inclusion, connection, and trustworthiness both within the athletes' teams as well as between athletes and psychologists representing the academy. The role of trust between athletes and staff members as well as academy executives will be further described in Section B and Final Reflections. To make athletes feel safe, we practiced appreciative and non-judgmental interactions. For instance, instead of judging the heterogeneity of individual starting points as deficient within athletes' learning-processes, we focused on strengthening individual resources and recognized individual developments. To promote the feeling of autonomy, we tried to show them that they are the central agents and experts of their SIMPs who are able to and must make individual decisions. As a specific example, athletes were encouraged to set and pursue their own individual recovery habit goals applying workshop content. There are numerous reasons for creating such environments for effective SIM. One motive to create a psychological safety-supportive environment was to enable the individual athlete to feel safe, allowing him to accept and present himself with all his strengths and weaknesses (Kahn, 1990), which is crucial to the reflective part of experiential learning. Feeling safe further encourages an athlete to leave his comfort zone in order to take responsibility for his own SIMPs and embark on new, uncertain, and possibly daunting pathways (Kwon et al., 2020). This is also crucial to the experimentation part of experiential learning because it helps athletes try

out new practices such as a new sleep routine (Edmondson & Lei, 2014).

Athletes' appraisal of psychological services in SIMPs and their sports injury plays a critical role in supporting the transformation toward the athlete appraisal goal (Forsdyke et al., 2016; Walker et al., 2007). While validating athletes' suffering from sports injuries, we framed sports injuries and psychological SIM services as a valuable resource for athletes' personal growth to enhance performance and mental health sustainably (Hammer et al., 2021; Roy-Davis et al., 2017). For example, with the help of role models like Cristiano Ronaldo and Tom Brady, athletes learned how advanced recovery habits together with the mindset of a professional athlete are crucial in determining success in their own football careers. We anticipated that this framing would help athletes and academy personnel to buy into the program, nurture approach-oriented motivation, and lead to better sports injury outcomes (Forsdyke et al., 2016).

At the end of the season, we *evaluated* the workshop series with a short online survey. The online survey contained qualitative and quantitative questions about the perceived modalities (e.g., "During workshops I felt secure and could speak freely"), content (e.g., "I use techniques to calm down in everyday life more often"), and sports injury outcomes (e.g., "I sustained fewer sports injuries during the last season"). Besides gaining feedback, the evaluation acted as an intervention. The evaluation was supposed to increase athletes' self-confidence through the gesture of being asked for feedback (Brooks et al., 2015). Furthermore, the academy proactively asking for their feedback showed appreciation and inevitable importance of their feedback for future academy improvements and therefore demonstrated athlete-centeredness.

Additionally, athletes received the *opportunity to work individually* with the academy psychologist. For instance, some injured athletes approached the sport psychologist to take advantage of their break from regular training to improve their mental skills. Injured athletes also had the chance of individualized computer-based training to improve executive functions. With this individual training we wanted to recognize their individual challenges and enhance feelings of competence and relatedness in a possibly isolating and identity-threatening situation (Ardern et al., 2013; Podlog et al., 2011).

B) Social System-Targeted Interventions

Ways of *communication* to spread and nurture awareness for the new value orientation are an important modality for the social system as well. First, we transparently communicated to all parties the intended interventions and the values, which informed those interventions. We also paid close attention to what our actions communicate nonverbally and to use this channel actively. For instance, by investing resources on psychosocially focused workshops with athletes, we communicated the values to social system members that psychosocial factors (holism) and athletes' actions (athlete-centeredness) significantly determine the sustainable effectiveness of SIMPs. Also, academy personnel invested valuable resources, such as football training time, to successfully incorporate these workshops. This investment of resources to empower athletes in SIMPs indirectly communicated the tangible commitment of academy personnel and the new value orientation of the academy system, which helped academy personnel embody the targeted value orientation.

Through the *interprofessional integration*, for example, of rehab trainers, in planning, conducting, and evaluating workshops, staff members experienced the benefits of transdisciplinary cooperation with shared ownership. Promoting a transdisciplinary cooperation also served as a means for fulfillment of staff members' needs (Ekstrand et al., 2018, 2019) and peer learning in a naturalistic context. In this sense, we hoped to generate bottom-up the first advocates of the new value orientation (Hess et al., 2019). Specifically, we invited staff members to every workshop with active responsibilities. For example, they spoke about their perspective on different recovery topics within workshops. After each session, we added non-confidential workshop material to accompanying learning folders that we handed to coaches, rehab trainers and physiotherapists. In the case of their absence, staff members received individual updates to guarantee that they were able to talk with athletes about the latest workshop content. By integrating staff members outside of their usual – often ambivalent (Harttgen et al., 2010) – roles, we facilitated new and trustful channels of interaction between athletes and staff members. Additionally, leading these workshops, we also had the chance to shape the environment within workshops. We hoped that the trustful environment that we actively promoted would positively influence interactions between athletes and staff members. Through staff members' integration, we also tried to increase their awareness about the inevitable importance of psychosocial factors for their function and indirectly tried to educate them. In this way, we aimed to help them feel more secure and competent implementing psychosocial know-how into their everyday work. As a result, the content conveyed to the athletes did not only exist within the borders of our workshops but was applied and naturally became part of the daily encounters of staff members and athletes, which also increased the consistency of workshop content (see Section A). For example, physiotherapists should feel empowered to ask athletes about their sleeping habits and refer to the workshop

content, since they were aware that this content was covered in the workshops. Additionally, there was always an updated learning folder in the physiotherapy treatment rooms to aid these conversations.

Also with staff members, *consistency* in the encounters was important. Besides existing interdisciplinary SIM meetings and regular formal and informal exchanges between the sport psychologist and staff members, individual psychological counseling was offered to every staff member. Additionally, we organized interprofessional education workshops, for example, on the psychology of pain conducted by an expert from the local university. Both the offer for individual psychological counseling as well as the education workshops served to increase their confidence in their psychosocial competencies and demonstrated the importance of their involvement and development for the project's success.

To promote an integrative approach to SIM, it was essential to *incorporate athletes' parents* as important resources of support outside the academy. Consequently, we proactively informed them about the workshop series with flyers. With the flyers, we first wanted to attract them as social system partners, who would sustainably encourage their children to take agency within SIMPs. Secondly, we wanted to express a commitment of our targeted value orientation to them. For example, we informed them about the role of psychology within sports injuries as well as the aims, steps, and content of the planned workshop series. Additionally, we gave them tips how to support their child's learning process during the workshop series.

After the workshop series, we administered individual interviews with head coaches, assistant coaches, physiotherapists, and rehab trainers from our U15 and U16 teams. The interviews consisted of two main parts to *evaluate* the impact on the individual staff member (e.g., "How did the workshops change your interaction with athletes?") and their perception of the impact on athletes (e.g., "How would you describe the atmosphere during workshops?"). First, we evaluated qualitatively and then quantitatively (e.g., "The sport psychologist addressed the athletes as individuals") with ratings from one to six. Individual interviews with staff members not only helped us gain valuable information, but also acted as an intervention. The interviews helped to increase staff members' feelings of competence in providing valuable feedback on psychosocial topics, even to the designated expert in this domain, which may enhance their confidence in applying psychosocial know-how (Brooks et al., 2015). Morever, the experience of feedback processes across professional domains also aimed to strengthen their acceptance towards transdisciplinary cooperation.

Final Reflections

Evaluation of Our Interventions

Evaluating our project more generally, it can be stated that many aspects are in line with expert football and non-football coaches' recommendations as well as athletes' perceptions (Gangsø et al., 2021; M. Klein & Herber, 2022) and scientific perceptions (Gledhill et al., 2017; Martindale et al., 2005) for optimal talent development environments (Mills et al., 2014b; Vallée & Bloom, 2005). Our specific evaluation was practically oriented to gain subjective impressions and concrete feedback. It does not suffice standards for scientific examinations. Therefore, we can only present single tendencies. In sum, the qualitative feedback suggests promising effects congruent with our intentions and progress toward our goals and values. Athletes reportedly implemented new recovery habits into their daily lives with good subjective effects: "The topic of recovery was helpful, because if you try to put it into practice in a sensible way, it has a positive effect, and you are fresher the next day." Furthermore, athletes recognized the intended nonverbal messages through our commitment: "The sport psychologist was very committed and motivated. It was noticeable that it is important to him." Additionally to the originally intended effects, they experienced cross-adaptive effects in school life and performance: "I learned how to relax and to focus better in football and school." Staff members reported multiple times that through their integration, they felt more psychosocially competent. One physiotherapist stated: "Through the workshops my repertoire expanded of how I can give athletes useful guidelines." Also, several staff member reports indicated that athletes seemed to gain awareness and competence within the topic of recovery: "We had a more serious injury in the U16 where I was impressed by how autonomously and responsibly the player approached the injury and his rehabilitation."

According to our subjective impression and qualitative feedback, the implementation of our interventions worked well. We perceived that the bottom-up approach limited the emergence of resistance to the transformation and facilitated the implementation of our interventions. However, we wish to further discuss three aspects of implementation in detail. First, the factor that was most limiting was time. The time frame to work with athletes was limited to actual practice time, such that practices had to be restructured for workshops, which was naturally an aspect of discussion with coaches. Also, staff members had only limited capacities to take part in workshops and in planning meetings. This was particularly true for staff members who were employed part-time at the academy.

Specifically, since transdisciplinary cooperation has not yet been institutionalized, this new approach came on top of previously practiced, parallel processes. Consequently, the transdisciplinary cooperation brought additional workload to staff members. Second, since we as sport psychologists identified the need for transformation and initiated the project, the initial responsibility to run the project was on us. Our goal is that finally the project would run independent of us via empowered athletes and academy members. So far, we are still in a transitional period where our support is needed to further drive the project. The last aspect concerns our chosen values. The design of this program does not allow us to evaluate whether our method to choose values was effective or whether we chose the right values. However, we see reason in the chosen values, since they matched our organizational idiosyncrasies, are supported by scientific evidence to be SIM-beneficial, and were derived as authentic alternatives to the current values of a materializing ideology. We argue that it is more important to intentionally choose explicit values that orientate SIM than the specific content of single values.

Limitations of Our Interventions

For most academies, value-oriented SIMPs pose a paradigm shift and require large-scale changes within the structure of the academy's system. Several challenges accompany the intended transformation, which may result in resistance. First, for staff members, the intended system transformation is associated with uncertainty, since previous strategies may not work with the new role distribution. Moreover, until a sufficient level of adaptation is accomplished, previous strategies may temporarily lead to interpersonal conflict or worse sports injury outcomes, for example, longer return-to-play, which is connected to fear of negative individual consequences such as job prospects (Testoni et al., 2013). Secondly, due to athletes' socialization, athlete-centered SIM is a new and uncommon approach for athletes. Athletes so far possess limited competencies to fulfil this new role, which may then lead to a situation where the demands of the new situation exceed the athletes' present capabilities. Thirdly, the prior system functioning brings advantages for athletes: Being located in a passive role of limited responsibility, decisional insecurity is "outsourced", and failure can be attributed externally. Thus, athletes may be tempted to stick with the strategy of denying responsibility (Aycan et al., 1999; Gosling et al., 2006; Montada, 2002).

Future Directions at the Mainz 05 Academy

After the described initiation of the project, our next steps are prioritized in accordance with the results of our evaluation. A general examination of our concept and its application with specific evaluation studies that follow scientific standards would help to further determine the effectiveness of single measures. After initiating transformations bottom-up, we subsequently intend to trigger complementary top-down transformation processes. This will then allow us to implement our value orientation into formal processes of SIM. Furthermore, it seems promising to increasingly integrate parents into SIMPs with the help of a "parent supportive culture" instead of solely educating parents (Harwood et al., 2019; Knight, 2019; Newport et al., 2021). Moreover, we plan to increasingly empower staff members directly to fulfill their new role, for example, via psychologically moderated peer consulting. Subsequently, we want to limit our own actions and leave the stage of value-oriented SIMPs to empowered athletes and staff members making the project less dependent on sport psychologists. Furthermore, in initiating the top-down phase, we plan to integrate academy executives not only on a conceptual level but also on a personal level. Facilitating additional trustful relationships between athletes and academy executives is crucial since executives make important decisions over athletes' careers.

Conclusion

Our initial analysis suggests that limited SIM outcomes, despite substantial physical investments, are the consequence of inconsistent concepts and dysfunctional values of a materializing ideology. To seize these potentials, we derived a new concept with the purpose of developing value-oriented SIMPs to increase SIM effectiveness. Since the derivation, approaches, and contents of our concept are based on scholarly work, the concept bridges the gap from theory to practice. Additionally, prioritizing modalities of implementation over actions, we target a remaining gap in the practical application of SIM evidence mainly regarding the aspect of how SIMPs are approached (Hess et al., 2019). Therefore, our concept provides practitioners with a useful structural framework, which has been absent from scientific literature to date, for the transformation of their individual SIM practices. Allowing room for adaptations to unique contexts and goals is a conscious feature of our concept. However, the description of modalities and actions of how we applied the value orientation can help others to understand how these abstract concepts can be transferred into practice and serve as first impulses. As recommended by Tee and

colleagues (2020), our approach delivers a starting point and guide to find individual solutions from which concrete SIM actions can be derived. Needless to say, the implementation of value-oriented SIMPs would require resources such as time, psychological competence, and financial commitment. However, with our concept we provide a way of thinking and strategy, which are essentially cost-efficient tools. Additionally, explicit SIM values are not only useful to the context of SIM but can facilitate coherent processes within the general talent development strategy. Our evaluation further supports the impression that we delivered a promising concept. Additional ideas to expand our concept exist, but first it has to withstand other practical applications and scientific evaluations.

Electronic Supplementary Material

The electronic supplementary material is available with the online version of the article at https://doi.org/10.1026/2941-7597/a000035

ESM 1. Graphical illustration. This file contains a graphical illustration of the sport injury management stakeholder system.

ESM 2. Graphical illustration. This file contains an overview of four consecutive processes in our project and their respective flow direction regarding different levels of abstraction.

ESM 3. Graphical illustration. This file contains a summary of our planning procedure to implement value-oriented sport injury management processes at the academy Mainz 05.

References

Adams, A., & Carr, S. (2019). Football friends: Adolescent boys' friendships inside an English professional football (soccer) academy. *Soccer & Society, 20*(3), 471 – 493. https://doi.org/10.1080/14660970.2017.1331164

Adams, N. E. (2015). Bloom's taxonomy of cognitive learning objectives. *Journal of the Medical Library Association : JMLA, 103*(3), 152 – 153. https://doi.org/10.3163/1536-5050.103.3.010

Aoyagi, M.W., & Poczwardowski, A. (2012). Models of sport psychology practice and delivery: A review. In S. Hanton & S. D. Mellalieu (Eds.), *Professional practice in sport psychology: A review* (pp. 5 – 30). Routledge.

Ardern, C. L., Bizzini, M., & Bahr, R. (2016). It is time for consensus on return to play after injury: Five key questions. *British Journal of Sports Medicine, 50*(9), 506 – 508. https://doi.org/10.1136/bjsports-2015-095475

Ardern, C. L., Taylor, N. F., Feller, J. A., & Webster, K. E. (2013). A systematic review of the psychological factors associated with returning to sport following injury. *British Journal of Sports Medicine, 47*(17), 1120 – 1126. https://doi.org/10.1136/bjsports-2012-091203

Arvinen-Barrow, M., & Clement, D. (2015). A preliminary investigation into athletic trainers' views and experiences of a multidisciplinary team approach to sports injury rehabilitation. *Athletic Training & Sports Health Care, 7*(3), 97 – 107. https://doi.org/10.3928/19425864-20150422-05

Arvinen-Barrow, M., & Clement, D. (2017). Preliminary investigation into sport and exercise psychology consultants' views and experiences of an interprofessional care team approach to sport injury rehabilitation. *Journal of Interprofessional Care, 31*(1), 66 – 74. https://doi.org/10.1080/13561820.2016.1235019

Arvinen-Barrow, M., Massey, W. V., & Hemmings, B. (2014). Role of sport medicine professionals in addressing psychosocial aspects of sport-injury rehabilitation: Professional athletes' views. *Journal of Athletic Training, 49*(6), 764 – 772. https://doi.org/10.4085/1062-6050-49.3.44

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin, 120*(3), 338 – 375. https://doi.org/10.1037/0033-2909.120.3.338

Aycan, Z., Kanungo, R. N., & Sinha, J. B. P. (1999). Organizational culture and human resource management practices: The model of culture fit. *Journal of Cross-Cultural Psychology, 30*(4), 501 – 526. https://doi.org/10.1177/0022022199030004006

Baker, J., Horton, S., Robertson-Wilson, J., & Wall, M. (2003). Nurturing sport expertise: Factors influencing the development of elite athlete. *Journal of Sports Science & Medicine, 2*(1), 1 – 9.

Barker, D., Barker-Ruchti, N., Wals, A., & Tinning, R. (2014). High performance sport and sustainability: A contradiction of terms? *Reflective Practice, 15*(1), 1 – 11. https://doi.org/10.1080/14623943.2013.868799

Barth, M., Güllich, A., Macnamara, B. N., & Hambrick, D. Z. (2022). Predictors of junior versus senior elite performance are opposite: A systematic review and meta-analysis of participation patterns. *Sports Medicine, 52*(6), 1399 – 1416. https://doi.org/10.1007/s40279-021-01625-4

Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: Implications for sports coaches. I*nternational Review of Sport and Exercise Psychology, 2*(2), 215 – 233. https://doi.org/10.1080/17509840903235330

Bolling, C., Delfino Barboza, S., van Mechelen, W., & Pasman, H. R. (2019). How elite athletes, coaches, and physiotherapists perceive a sports injury. *Translational Sports Medicine, 2*(1), 17 – 23. https://doi.org/10.1002/tsm2.53

Bolling, C., Delfino Barboza, S., van Mechelen, W., & Pasman, H. R. (2020). Letting the cat out of the bag: Athletes, coaches and physiotherapists share their perspectives on injury prevention in elite sports. *British Journal of Sports Medicine, 54*(14), 871 – 877. https://doi.org/10.1136/bjsports-2019-100773

Bolling, C., Mellette, J., Pasman, H. R., van Mechelen, W., & Verhagen, E. (2019). From the safety net to the injury prevention web: Applying systems thinking to unravel injury prevention challenges and opportunities in Cirque du Soleil. *BMJ Open Sport & Exercise Medicine, 5*(1), e000492. https://doi.org/10.1136/bmjsem-2018-000492

Bonell Monsonís, O., Verhagen, E., Kaux, J.-F., & Bolling, C. (2021). 'I always considered I needed injury prevention to become an elite athlete': The road to the Olympics from the athlete and staff perspective. *BMJ Open Sport & Exercise Medicine, 7*(4), e001217. https://doi.org/10.1136/bmjsem-2021-001217

Borg, A. F., Falzon, R., & Muscat, A. (2021). Psychological implications and rehabilitation programmes due to football-related injuries. *Counselling and Psychotherapy Research, 21*(4), 882 – 898. https://doi.org/10.1002/capr.12444

Brooks, A. W., Gino, F., & Schweitzer, M. E. (2015). Smart people ask for (my) advice: Seeking advice boosts perceptions of competence. *Management Science, 61*(6), 1421 – 1435. https://doi.org/10.1287/mnsc.2014.2054

Butcher, J., Lindner, K. J., & Johns, D. P. (2002). Withdrawal from competitive youth sport: A retrospective ten-year study. *Journal of Sport Behavior, 25*(2), 145 – 164.

Butler, L. D., Waelde, L. C., Hastings, T. A., Chen, X.-H., Symons, B., Marshall, J., Kaufman, A., Nagy, T. F., Blasey, C. M., Seibert, E. O., & Spiegel, D. (2008). Meditation with yoga, group therapy with hypnosis, and psychoeducation for long-term depressed mood: A randomized pilot trial. *Journal of Clinical Psychology, 64*(7), 806 – 820. https://doi.org/10.1002/jclp.20496

Chan, D. K.-C., & Hagger, M. S. (2012). Transcontextual development of motivation in sport injury prevention among elite athletes. *Journal of Sport and Exercise Psychology, 34*(5), 661 – 682. https://doi.org/10.1123/jsep.34.5.661

Chatzisarantis, N. L. D., Hagger, M. S., & Brickell, T. (2008). Using the construct of perceived autonomy support to understand social influence within the theory of planned behavior. *Psychology of Sport and Exercise, 9*(1), 27 – 44. https://doi.org/10.1016/j.psychsport.2006.12.003

Chatzisarantis, N. L. D., Hagger, M. S., & Smith, B. (2007). Influences of perceived autonomy support on physical activity within the theory of planned behavior. *European Journal of Social Psychology, 37*(5), 934 – 954. https://doi.org/10.1002/ejsp.407

Chrisman, S. P., Quitiquit, C., & Rivara, F. P. (2013). Qualitative study of barriers to concussive symptom reporting in high school athletics. *Journal of Adolescent Health, 52*(3), 330 – 335. e3. https://doi.org/10.1016/j.jadohealth.2012.10.271

Clement, D., & Arvinen-Barrow, M. (2013). Sport medicine team influences in psychological rehabilitation. In M. Arvinen-Barrow & N. Walker (Eds.), *The psychology of sport injury and rehabilitation* (pp. 156 – 170). Routledge.

Cohen, G. L., & Sherman, D. K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology, 65*(1), 333 – 371. https://doi.org/10.1146/annurev-psych-010213-115137

Courson, R., Goldenberg, M., Adams, K. G., Anderson, S. A., Colgate, B., Cooper, L., Dewald, L., Floyd, R. T., Gregory, D. B., Indelicato, P. A., Klossner, D., O'Leary, R., Ray, T., Selgo, T., Thompson, C., & Turbak, G. (2014). Inter-association consensus statement on best practices for sports medicine management for secondary schools and colleges. *Journal of Athletic Training, 49*(1), 128 – 137. https://doi.org/10.4085/1062-6050-49.1.06

Daley, C., Ong, C. W., & McGregor, P. (2020). Applied psychology in academy soccer settings: A systems-led approach. In J. G. Dixon, J. B. Barker, R. C. Thelwell, & I. Mitchell (Eds.), *The psychology of soccer* (pp. 172 – 188). Routledge. https://doi.org/10.4324/9781003005568-15

Dijkstra, H. P., Pollock, N., Chakraverty, R., & Alonso, J. M. (2014). Managing the health of the elite athlete: A new integrated performance health management and coaching model. *British Journal of Sports Medicine, 48*(7), 523 – 531. https://doi.org/10.1136/bjsports-2013-093222

Drawer, S., & Fuller, C. (2002). Perceptions of retired professional soccer players about the provision of support services before and after retirement. *British Journal of Sports Medicine, 36*(1), 33 – 38. https://doi.org/10.1136/bjsm.36.1.33

Drew, M. K., Raysmith, B. P., & Charlton, P. C. (2017). Injuries impair the chance of successful performance by sportspeople: A systematic review. *British Journal of Sports Medicine, 51*(16), 1209 – 1214. https://doi.org/10.1136/bjsports-2016-096731

Droste, J.-N., Fisser, S., Gebhardt, M., Edler, C., Lippie, E., McAleer, S., Del Vescovo, R., Bloch, H., & Riepenhof, H. (2021). Mitarbeiter im professionellen europäischen Fußball – Vergleich der Personalstruktur in der Sportmedizin, -wissenschaft und Physiotherapie zwischen der Bundesliga, La Liga, Serie A und der Premier League [Staff in professional European soccer – comparison of the staff structure in sports medicine, sports science and physiotherapy between the Bundesliga, La Liga, Serie A and the Premier League]. *Sportverletzung Sportschaden, 35*, 147 – 153. https://doi.org/10.1055/a-1386-6932

Dugdale, J. H., Sanders, D., Myers, T., Williams, A. M., & Hunter, A. M. (2021). Progression from youth to professional soccer: A longitudinal study of successful and unsuccessful academy graduates. *Scandinavian Journal of Medicine & Science in Sports, 31*(S1), 73 – 84. https://doi.org/10.1111/sms.13701

Edmondson, A. C., & Lei, Z. (2014). Psychological safety: The history, renaissance, and future of an interpersonal construct. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 23 – 43. https://doi.org/10.1146/annurev-orgpsych-031413-091305

Ekstrand, J. (2013). Keeping your top players on the pitch: The key to football medicine at a professional level. *British Journal of Sports Medicine, 47*(12), 723 – 724. https://doi.org/10.1136/bjsports-2013-092771

Ekstrand, J., Hagglund, M., & Walden, M. (2011). Injury incidence and injury patterns in professional football: The UEFA injury study. *British Journal of Sports Medicine, 45*(7), 553 – 558. https://doi.org/10.1136/bjsm.2009.060582

Ekstrand, J., Lundqvist, D., Davison, M., D'Hooghe, M., & Pensgaard, A. M. (2019). Communication quality between the medical team and the head coach/manager is associated with injury burden and player availability in elite football clubs. *British Journal of Sports Medicine, 53*(5), 304 – 308. https://doi.org/10.1136/bjsports-2018-099411

Ekstrand, J., Lundqvist, D., Lagerbäck, L., Vouillamoz, M., Papadimitiou, N., & Karlsson, J. (2018). Is there a correlation between coaches' leadership styles and injuries in elite football teams? A study of 36 elite teams in 17 countries. *British Journal of Sports Medicine, 52*(8), 527 – 531. https://doi.org/10.1136/bjsports-2017-098001

Emery, C. A., Hagel, B., & Morrongiello, B. A. (2006). Injury prevention in child and adolescent sport: Whose responsibility is it? *Clinical Journal of Sport Medicine, 16*(6), 514 – 521. https://doi.org/10.1097/01.jsm.0000251179.90840.58

Emrich, E., Prohl, R., & Brand, S. (2006). „Mündige Ästheten" in einer „lernenden Organisation" – Anregungen zur Qualitätsentwicklung im Nachwuchsleistungssport ["Mature aesthetes" in a "learning organization" – suggestions for quality development in youth competitive sport]. *Sportwissenschaft, 36*(4), 417 – 432. http://dx.doi.org/10.22028/D291-42033

Forsdyke, D., Smith, A., Jones, M., & Gledhill, A. (2016). Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes: A mixed studies systematic review. *British Journal of Sports Medicine, 50*(9), 537 – 544. https://doi.org/10.1136/bjsports-2015-094850

Gabbe, B. J., Bailey, M., Cook, J. L., Makdissi, M., Scase, E., Ames, N., Wood, T., McNeil, J. J., & Orchard, J. W. (2010). The association between hip and groin injuries in the elite junior football years and injuries sustained during elite senior competition. *British Journal of Sports Medicine, 44*(11), 799 – 802. https://doi.org/10.1136/bjsm.2009.062554

Galli, N., & Vealey, R. S. (2008). "Bouncing back" from adversity: Athletes' experiences of resilience. *The Sport Psychologist, 22*(3), 316 – 335. https://doi.org/10.1123/tsp.22.3.316

Gangsø, K., Aspvik, N. P., Mehus, I., Høigaard, R., & Sæther, S. A. (2021). Talent development environments in football: Comparing the top-five and bottom-Ffve-ranked football academies in Norway. *International Journal of Environmental Research and*

Public Health, 18(3), 1321. https://doi.org/10.3390/ijerph18031321

Gilley, A., McMillan, H. S., & Gilley, J. W. (2009). Organizational change and characteristics of leadership effectiveness. *Journal of Leadership & Organizational Studies, 16*(1), 38–47. https://doi.org/10.1177/1548051809334191

Gledhill, A. (2021). The downside of sports injury: Poor mental health in injured athletes. In A. Gledhill & D. Forsdyke (Eds.), *The psychology of sport injury: From risk to retirement* (pp. 63–75). Routledge. https://doi.org/10.4324/9780429019227-4

Gledhill, A., Harwood, C., & Forsdyke, D. (2017). Psychosocial factors associated with talent development in football: A systematic review. *Psychology of Sport and Exercise, 31*, 93–112. https://doi.org/10.1016/j.psychsport.2017.04.002

Goddard, K., Roberts, C.-M., Byron-Daniel, J., & Woodford, L. (2021). Psychological factors involved in adherence to sport injury rehabilitation: A systematic review. *International Review of Sport and Exercise Psychology, 14*(1), 51–73. https://doi.org/10.1080/1750984X.2020.1744179

Gosling, P., Denizeau, M., & Oberlé, D. (2006). Denial of responsibility: A new mode of dissonance reduction. *Journal of Personality and Social Psychology, 90*(5), 722–733. https://doi.org/10.1037/0022-3514.90.5.722

Gouttebarge, V., Aoki, H., Ekstrand, J., Verhagen, E. A. L. M., & Kerkhoffs, G. M. M. J. (2016). Are severe musculoskeletal injuries associated with symptoms of common mental disorders among male European professional footballers? *Knee Surgery, Sports Traumatology, Arthroscopy, 24*(12), 3934–3942. https://doi.org/10.1007/s00167-015-3729-y

Grossmann, B., & Lames, M. (2015). From talent to professional football – youthism in German football. *International Journal of Sports Science & Coaching, 10*(6), 1103–1113. https://doi.org/10.1260/1747-9541.10.6.1103

Güllich, A. (2014). Selection, de-selection and progression in German football talent promotion. *European Journal of Sport Science, 14*(6), 530–537. https://doi.org/10.1080/17461391.2013.858371

Güllich, A., & Emrich, E. (2014). Considering long-term sustainability in the development of world class success. *European Journal of Sport Science, 14*(Suppl. 1), S383–S397. https://doi.org/10.1080/17461391.2012.706320

Hägglund, M., Waldén, M., Magnusson, H., Kristenson, K., Bengtsson, H., & Ekstrand, J. (2013). Injuries affect team performance negatively in professional football: An 11-year follow-up of the UEFA Champions League injury study. *British Journal of Sports Medicine, 47*(12), 738–742. https://doi.org/10.1136/bjsports-2013-092215

Hall, E. C. R., Larruskain, J., Gil, S. M., Lekue, J. A., Baumert, P., Rienzi, E., Moreno, S., Tannure, M., Murtagh, C. F., Ade, J. D., Squires, P., Orme, P., Anderson, L., Whitworth-Turner, C. M., Morton, J. P., Drust, B., Williams, A. G., & Erskine, R. M. (2020). An injury audit in high-level male youth soccer players from English, Spanish, Uruguayan and Brazilian academies. *Physical Therapy in Sport, 44*, 53–60. https://doi.org/10.1016/j.ptsp.2020.04.033

Hammer, C., Podlog, L., & Gledhill, A. (2021). The upside of sports injury and disability: Personal growth following adversity. In A. Gledhill & D. Forsdyke (Eds.), *The psychology of sport injury: From risk to retirement* (pp. 76–89). Routledge. https://doi.org/10.4324/9780429019227-5

Harttgen, U., & Milles, D. (2004). Leistungsbereitschaft und Bewältigungsressourcen: Überlegungen zur Talentförderung im Fußball [Motivation and coping resources: Reflections on talent development in soccer]. *Leistungssport, 34*(4), 5–13.

Harttgen, U., Milles, D., & Struck, H. (2010). *"… Und dann werde ich doch Profi …": Empirische Grundlagen zur komplexen Talentförderung im Fußball* ["… And then I will become a professional …": Empirical foundations for complex talent development in soccer]. Wirtschaftsverlag NW.

Harwood, C. G., Knight, C. J., Thrower, S. N., & Berrow, S. R. (2019). Advancing the study of parental involvement to optimise the psychosocial development and experiences of young athletes. *Psychology of Sport and Exercise, 42*, 66–73. https://doi.org/10.1016/j.psychsport.2019.01.007

Haslam, C., Lam, B. C. P., Yang, J., Steffens, N. K., Haslam, S. A., Cruwys, T., Boen, F., Mertens, N., De Brandt, K., Wang, X., Mallett, C. J., & Fransen, K. (2021). When the final whistle blows: Social identity pathways support mental health and life satisfaction after retirement from competitive sport. *Psychology of Sport and Exercise, 57*, 102049. https://doi.org/10.1016/j.psychsport.2021.102049

Haugaasen, M., & Jordet, G. (2012). Developing football expertise: A football-specific research review. *International Review of Sport and Exercise Psychology, 5*(2), 177–201. https://doi.org/10.1080/1750984X.2012.677951

Henriksen, K., Stambulova, N., & Roessler, K. K. (2010). Holistic approach to athletic talent development environments: A successful sailing milieu. *Psychology of Sport and Exercise, 11*(3), 212–222. https://doi.org/10.1016/j.psychsport.2009.10.005

Hess, C. W., Gnacinski, S. L., & Meyer, B. B. (2019). A review of the sport-injury and -rehabilitation literature: From abstraction to application. *The Sport Psychologist, 33*(3), 232–243. https://doi.org/10.1123/tsp.2018-0043

Heyden, M. L. M., Fourné, S. P. L., Koene, B. A. S., Werkman, R., & Ansari, S. (Shaz). (2017). Rethinking 'top-down' and 'bottom-up' roles of top and middle managers in organizational change: Implications for employee support. *Journal of Management Studies, 54*(7), 961–985. https://doi.org/10.1111/joms.12258

Hickey, J., Shield, A. J., Williams, M. D., & Opar, D. A. (2014). The financial cost of hamstring strain injuries in the Australian Football League. *British Journal of Sports Medicine, 48*(8), 729–730. https://doi.org/10.1136/bjsports-2013-092884

Hirmke, M., & Kuhlmann, C. (2022). Vorstellung des prämierten Konzepts zur Integration von psychosozialem Verletzungsmanagement am Nachwuchsleistungszentrum des 1. FSV Mainz 05. In C. Voelcker-Rehage, N. H. Pixa, J. Rudisch et al. (Eds.), *Ein Gehirn, viel Bewegung – Variabilität und Plastizität über die Lebensspanne* [One brain, lots of movement – variability and plasticity across the lifespan] (pp. 12–13). Westfälische Wilhelms Universität Münster.

Hitlin, S., & Piliavin, J. A. (2004). Values: Reviving a dormant concept. *Annual Review of Sociology, 30*(1), 359–393. https://doi.org/10.1146/annurev.soc.30.012703.110640

Höner, O., & Feichtinger, P. (2016). Psychological talent predictors in early adolescence and their empirical relationship with current and future performance in soccer. *Psychology of Sport and Exercise, 25*, 17–26. https://doi.org/10.1016/j.psychsport.2016.03.004

Hulme, A., & Finch, C. F. (2015). From monocausality to systems thinking: A complementary and alternative conceptual approach for better understanding the development and prevention of sports injury. *Injury Epidemiology, 2*(1), 31. https://doi.org/10.1186/s40621-015-0064-1

Inklaar, H., Bol, E., Schmikli, S., & Mosterd, W. (1996). Injuries in male soccer players: Team risk analysis. *International Journal of Sports Medicine, 17*(03), 229–234. https://doi.org/10.1055/s-2007-972837

Ivarsson, A., Johnson, U., Andersen, M. B., Tranaeus, U., Stenling, A., & Lindwall, M. (2017). Psychosocial factors and sport injuries: Meta-analyses for prediction and prevention. *Sports Medicine, 47*(2), 353–365. https://doi.org/10.1007/s40279-016-0578-x

Jaber, A., Weishorn, J., Berrsche, G., Ott, H., & Bangert, Y. (2022). Injury profile among elite youth male football players in a German academy. *International Journal of Sports Medicine, 43*(02), 138 – 144. https://doi.org/10.1055/a-1516-4139

Johnson, R. (2004). The unique ethics of sports medicine. *Clinics in Sports Medicine, 23*(2), 175 – 182. https://doi.org/10.1016/j.csm.2004.01.003

Jones, M., Meijen, C., McCarthy, P. J., & Sheffield, D. (2009). A theory of challenge and threat states in athletes. *International Review of Sport and Exercise Psychology, 2*(2), 161 – 180. https://doi.org/10.1080/17509840902829331

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal, 33*(4), 692 – 724. https://doi.org/10.2307/256287

Kellmann, M., Bertollo, M., Bosquet, L., Brink, M., Coutts, A. J., Duffield, R., Erlacher, D., Halson, S. L., Hecksteden, A., Heidari, J., Kallus, K. W., Meeusen, R., Mujika, I., Robazza, C., Skorski, S., Venter, R., & Beckmann, J. (2018). Recovery and performance in sport: Consensus statement. *International Journal of Sports Physiology and Performance, 13*(2), 240 – 245. https://doi.org/10.1123/ijspp.2017-0759

Kerr, G. A., & Stirling, A. E. (2008). Child protection in sport: Implications of an athlete-centered philosophy. *Quest, 60*(2), 307 – 323. https://doi.org/10.1080/00336297.2008.10483583

Kerr, Z. Y., Register-Mihalik, J. K., Marshall, S. W., Evenson, K. R., Mihalik, J. P., & Guskiewicz, K. M. (2014). Disclosure and non-disclosure of concussion and concussion symptoms in athletes: Review and application of the socio-ecological framework. *Brain Injury, 28*(8), 1009 – 1021. https://doi.org/10.3109/02699052.2014.904049

Klein, C., Bloch, H., Burkhardt, K., Kühn, N., Pietzonka, M., & Schäfer, M. (2020). *VBG-Sportreport 2020 – Analyse des Unfallgeschehens in den zwei höchsten Ligen der Männer: Basketball, Eishockey, Fußball, Handball* [VBG Sports Report 2020 – analysis of accidents in the two top men's leagues: Basketball, ice hockey, soccer, handball]. VBG. https://www.vbg.de/DE/3_Praevention_und_Arbeitshilfen/1_Branchen/11_Sport/Sportreport_2020/Sportreport_2020_node.html

Klein, M., & Herber, J. (2022). *Damit alle gewinnen. 30 Anregungen für eine ganzheitliche Entfaltung der Athlet*innen* [So that everyone wins. 30 suggestions for the holistic development of athletes]. Athleten Deutschland e.V. https://athleten-deutschland.org/wp-content/uploads/AD_30-Anregungen-fuer-eine-ganzheitliche-Entfaltung-der-Athletinnen-und-Athleten_1412022.pdf

Klieme, E., & Hartig, J. (2008). Kompetenzkonzepte in den Sozialwissenschaften und im erziehungswissenschaftlichen Diskurs. In M. Prenzel, I. Gogolin, & H.-H. Krüger (Eds.), *Kompetenzdiagnostik* [Competence diagnostics] (pp. 11 – 29). VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-531-90865-6_2

Knight, C. J. (2019). Revealing findings in youth sport parenting research. *Kinesiology Review, 8*(3), 252 – 259. https://doi.org/10.1123/kr.2019-0023

Kroshus, E., Baugh, C. M., Daneshvar, D. H., & Viswanath, K. (2014). Understanding concussion reporting using a model based on the theory of planned behavior. *Journal of Adolescent Health, 54*(3), 269 – 274.e2. https://doi.org/10.1016/j.jadohealth.2013.11.011

Kwon, C., Han, S., & Nicolaides, A. (2020). The impact of psychological safety on transformative learning in the workplace: A quantitative study. *Journal of Workplace Learning, 32*(7), 533 – 547. https://doi.org/10.1108/JWL-04-2020-0057

Larruskain, J., Lekue, J. A., Martin-Garetxana, I., Barrio, I., McCall, A., & Gil, S. M. (2022). Injuries are negatively associated with player progression in an elite football academy. *Science and Medicine in Football, 6*(4), 405 – 414. https://doi.org/10.1080/24733938.2021.1943756

Le Gall, F., Carling, C., & Reilly, T. (2007). Biological maturity and injury in elite youth football. *Scandinavian Journal of Medicine and Science in Sports, 17*(5), 564 – 572. https://doi.org/10.1111/j.1600-0838.2006.00594.x

Le Gall, F., Carling, C., Reilly, T., Vandewalle, H., Church, J., & Rochcongar, P. (2006). Incidence of injuries in elite French youth soccer players: A 10-season study. *The American Journal of Sports Medicine, 34*(6), 928 – 938. https://doi.org/10.1177/0363546505283271

Lochbaum, M., Zanatta, T., Kirschling, D., & May, E. (2021). The profile of moods states and athletic performance: A meta-analysis of published studies. *European Journal of Investigation in Health, Psychology and Education, 11*(1), 50 – 70. https://doi.org/10.3390/ejihpe11010005

Lu, F. J. H., & Hsu, Y. (2013). Injured athletes' rehabilitation beliefs and subjective well-being: The contribution of hope and social support. *Journal of Athletic Training, 48*(1), 92 – 98. https://doi.org/10.4085/1062-6050-48.1.03

Lundqvist, C., & Kenttä, G. (2010). Positive emotions are not simply the absence of the negative ones: Development and validation of the Emotional Recovery Questionnaire (EmRecQ). *The Sport Psychologist, 24*(4), 468 – 488. https://doi.org/10.1123/tsp.24.4.468

Makoul, G., & Clayman, M. L. (2006). An integrative model of shared decision making in medical encounters. *Patient Education and Counseling, 60*(3), 301 – 312. https://doi.org/10.1016/j.pec.2005.06.010

Malcolm, D. (2006). Unprofessional practice? The status and power of sport physicians. *Sociology of Sport Journal, 23*(4), 376 – 395. https://doi.org/10.1123/ssj.23.4.376

Manley, A., Roderick, M., & Parker, A. (2016). Disciplinary mechanisms and the discourse of identity: The creation of 'silence' in an elite sports academy. *Culture and Organization, 22*(3), 221 – 244. https://doi.org/10.1080/14759551.2016.1160092

Mann, L., Harmoni, R., & Power, C. (1989). Adolescent decision-making: The development of competence. *Journal of Adolescence, 12*(3), 265 – 278. https://doi.org/10.1016/0140-1971(89)90077-8

Martindale, R. J., Collins, D., & Daubney, J. (2005). Talent development: A guide for practice and research within sport. *Quest, 57*(4), 353 – 375. https://doi.org/10.1080/00336297.2005.10491862

Matos, N. F., Winsley, R. J., & Williams, C. A. (2011). Prevalence of nonfunctional overreaching/overtraining in young English athletes. *Medicine & Science in Sports & Exercise, 43*(7), 1287 – 1294. https://doi.org/10.1249/MSS.0b013e318207f87b

Mayer, J., & Thiel, A. (2011). Verletzungen im Leistungssport aus soziologischer Perspektive: Ein Überblick [Injuries in competitive sport from a sociological perspective: An overview]. *Sportwissenschaft, 41*(2), 124 – 136. https://doi.org/10.1007/s12662-011-0193-9

Mayer, J., & Thiel, A. (2014). Health in elite sports from a salutogenetic perspective: Athletes' sense of coherence. *PLoS ONE, 9*(7), e102030. https://doi.org/10.1371/journal.pone.0102030

Mayer, J., & Thiel, A. (2018). Presenteeism in the elite sports workplace: The willingness to compete hurt among German elite handball and track and field athletes. *International Review for the Sociology of Sport, 53*(1), 49 – 68. https://doi.org/10.1177/1012690216640525

Miller, P. S., & Kerr, G. A. (2002). Conceptualizing excellence: Past, present, and future. *Journal of Applied Sport Psychology, 14*(3), 140 – 153. https://doi.org/10.1080/10413200290103464

Milles, D., Harttgen, U., & Struck, H. (2011). Bewältigungsressourcen und Leistungsentwicklung. Empirische Grundlagen zur

komplexen Talent- und Gesundheitsförderung im Fußball [Coping resources and performance development. Empirical foundations for complex talent and health promotion in soccer]. *Leistungssport, 41*(3), 41 – 47.

Mills, A., Butt, J., Maynard, I., & Harwood, C. (2014a). Examining the development environments of elite English football academies: The players' perspective. *International Journal of Sports Science & Coaching, 9*(6), 1457 – 1472. https://doi.org/10.1260/1747-9541.9.6.1457

Mills, A., Butt, J., Maynard, I., & Harwood, C. (2014b). Toward an understanding of optimal development environments within elite English soccer academies. *The Sport Psychologist, 28*(2), 137 – 150. https://doi.org/10.1123/tsp.2013-0018

Montada, L. (2002). Denial of responsibility. In A. E. Auhagen & H.-W. Bierhoff (Eds.), *Responsibility: The many faces of a social phenomenon* (pp. 79 – 92). Taylor and Francis.

Naderi, A., Shaabani, F., Gharayagh Zandi, H., Calmeiro, L., & Brewer, B. W. (2020). The effects of a mindfulness-based program on the incidence of injuries in young male soccer players. *Journal of Sport and Exercise Psychology, 42*(2), 161 – 171. https://doi.org/10.1123/jsep.2019-0003

Nemeth, D., Janacsek, K., & Fiser, J. (2013). Age-dependent and coordinated shift in performance between implicit and explicit skill learning. *Frontiers in Computational Neuroscience, 7*. https://doi.org/10.3389/fncom.2013.00147

Nesti, M., Littlewood, M., O'Halloran, L., Eubank, M., & Richardson, D. (2012). Critical moments in elite premiership football: Who do you think you are? Physical culture and sport. *Studies and Research, 56*(1), 23 – 32. https://doi.org/10.2478/v10141-012-0027-y

Newport, R. A., Knight, C. J., & Love, T. D. (2021). The youth football journey: Parents' experiences and recommendations for support. *Qualitative Research in Sport, Exercise and Health, 13*(6), 1006 – 1026. https://doi.org/10.1080/2159676X.2020.1833966

Nixon, H. L. (1992). A social network analysys of influences on athletes to play with pain and injuries. *Journal of Sport and Social Issues, 16*(2), 127 – 135. https://doi.org/10.1177/019372359201600208

Nixon, H. L. (1993). Accepting the risks of pain and injury in sport: Mediated cultural influences on playing hurt. *Sociology of Sport Journal, 10*(2), 183 – 196. https://doi.org/10.1123/ssj.10.2.183

Nixon, H. L. (1994). Coaches' views of risk, pain, and injury in sport, with special reference to gender differences. *Sociology of Sport Journal, 11*(1), 79 – 87. https://doi.org/10.1123/ssj.11.1.79

Ogbonna, E., & Harris, L. C. (2014). Organizational cultural perpetuation: A case study of an English Premier League football club. *British Journal of Management, 25*(4), 667 – 686. https://doi.org/10.1111/1467-8551.12037

Olusoga, P., Butt, J., Hays, K., & Maynard, I. (2009). Stress in elite sports coaching: Identifying stressors. *Journal of Applied Sport Psychology, 21*(4), 442 – 459. https://doi.org/10.1080/10413200903222921

Pfirrmann, D., Herbst, M., Ingelfinger, P., Simon, P., & Tug, S. (2016). Analysis of injury incidences in male professional adult and elite youth soccer players: A systematic review. *Journal of Athletic Training, 51*(5), 410 – 424. https://doi.org/10.4085/1062-6050-51.6.03

Poczwardowski, A., Sherman, C. P., & Ravizza, K. (2004). Professional philosophy in the sport psychology service delivery: Building on theory and practice. *The Sport Psychologist, 18*(4), 445 – 463. https://doi.org/10.1123/tsp.18.4.445

Podlog, L., Dimmock, J., & Miller, J. (2011). A review of return to sport concerns following injury rehabilitation: Practitioner strategies for enhancing recovery outcomes. *Physical Therapy in Sport, 12*(1), 36 – 42. https://doi.org/10.1016/j.ptsp.2010.07.005

Podlog, L., & Eklund, R. C. (2007). The psychosocial aspects of a return to sport following serious injury: A review of the literature from a self-determination perspective. *Psychology of Sport and Exercise, 8*(4), 535 – 566. https://doi.org/10.1016/j.psychsport.2006.07.008

Pol, R., Balagué, N., Ric, A., Torrents, C., Kiely, J., & Hristovski, R. (2020). Training or synergizing? Complex systems principles change the understanding of sport processes. *Sports Medicine – Open, 6*(1), 28. https://doi.org/10.1186/s40798-020-00256-9

Price, R. J. (2004). The Football Association medical research programme: An audit of injuries in academy youth football. *British Journal of Sports Medicine, 38*(4), 466 – 471. https://doi.org/10.1136/bjsm.2003.005165

Prochaska, J. O., & Norcross, J. C. (2018). *Systems of psychotherapy: A transtheoretical analysis* (9th ed.). Oxford University Press.

Putukian, M. (2016). The psychological response to injury in student athletes: A narrative review with a focus on mental health. *British Journal of Sports Medicine, 50*(3), 145 – 148. https://doi.org/10.1136/bjsports-2015-095586

Quested, E., Ntoumanis, N., Viladrich, C., Haug, E., Ommundsen, Y., Van Hoye, A., Mercé, J., Hall, H. K., Zourbanos, N., & Duda, J. L. (2013). Intentions to drop-out of youth soccer: A test of the basic needs theory among European youth from five countries. *International Journal of Sport and Exercise Psychology, 11*(4), 395 – 407. https://doi.org/10.1080/1612197X.2013.830431

Read, D., Smith, A. C. T., & Skinner, J. (2023). Theorising painkiller (mis)use in football using Bourdieu's practice theory and physical capital. *International Review for the Sociology of Sport, 58*(1), 66 – 86. https://doi.org/10.1177/10126902221082483

Read, P. J., Oliver, J. L., De Ste Croix, M. B. A., Myer, G. D., & Lloyd, R. S. (2017). An audit of injuries in six english professional soccer academies. *Journal of Sports Sciences, 36*(13), 1542 – 1548. https://doi.org/10.1080/02640414.2017.1402535

Rees, T., Hardy, L., Güllich, A., Abernethy, B., Côté, J., Woodman, T., Montgomery, H., Laing, S., & Warr, C. (2016). The Great British Medalists Project: A review of current knowledge on the development of the world's best sporting talent. *Sports Medicine, 46*(8), 1041 – 1058. https://doi.org/10.1007/s40279-016-0476-2

Rogers, C. R. (1995). *On becoming a person: A therapist's view of psychotherapy*. Houghton Mifflin.

Roy-Davis, K., Wadey, R., & Evans, L. (2017). A grounded theory of sport injury-related growth. *Sport, Exercise, and Performance Psychology, 6*(1), 35 – 52. https://doi.org/10.1037/spy0000080

Ruf, L., Altmann, S., Graf, F., Romeike, C., Wirths, C., Wohak, O., & Härtel, S. (2022). Injury incidence, severity, and burden in elite youth soccer players – A 3-year prospective study. *Journal of Science and Medicine in Sport, 25*(9), 737 – 742. https://doi.org/10.1016/j.jsams.2022.06.003

Sarkar, M., Fletcher, D., & Brown, D. J. (2015). What doesn't kill me…: Adversity-related experiences are vital in the development of superior Olympic performance. *Journal of Science and Medicine in Sport, 18*(4), 475 – 479. https://doi.org/10.1016/j.jsams.2014.06.010

Schenck, J., & Cruickshank, J. (2015). Evolving Kolb: Experiential education in the age of neuroscience. *Journal of Experiential Education, 38*(1), 73 – 95. https://doi.org/10.1177/1053825914547153

Schnell, A., Mayer, J., Diehl, K., Zipfel, S., & Thiel, A. (2014). Giving everything for athletic success! – sports-specific risk acceptance of elite adolescent athletes. *Psychology of Sport and Exercise, 15*(2), 165 – 172. https://doi.org/10.1016/j.psychsport.2013.10.012

Schwab Reese, L. M., Pittsinger, R., & Yang, J. (2012). Effectiveness of psychological intervention following sport injury. *Jour-*

nal of Sport and Health Science, 1(2), 71 – 79. https://doi.org/10.1016/j.jshs.2012.06.003

Schweiger, S., Stouten, H., & Bleijenbergh, I. L. (2018). A system dynamics model of resistance to organizational change: The role of participatory strategies. *Systems Research and Behavioral Science, 35*(6), 658 – 674. https://doi.org/10.1002/sres.2509

Sniehotta, F. F., Scholz, U., & Schwarzer, R. (2005). Bridging the intention–behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health, 20*(2), 143 – 160. https://doi.org/10.1080/08870440512331317670

Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Il Shin, J., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V., Correll, C. U., & Fusar-Poli, P. (2022). Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry, 27*(1), 281 – 295. https://doi.org/10.1038/s41380-021-01161-7

Steffen, K., & Engebretsen, L. (2010). More data needed on injury risk among young elite athletes. *British Journal of Sports Medicine, 44*(7), 485 – 489. https://doi.org/10.1136/bjsm.2010.073833

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences, 9*(2), 69 – 74. https://doi.org/10.1016/j.tics.2004.12.005

te Wierike, S. C. M., van der Sluis, A., van den Akker-Scheek, I., Elferink-Gemser, M. T., & Visscher, C. (2013). Psychosocial factors influencing the recovery of athletes with anterior cruciate ligament injury: A systematic review: Psychosocial influences on recovery of ACL injury. *Scandinavian Journal of Medicine & Science in Sports, 23*, 527 – 540. https://doi.org/10.1111/sms.12010

Tee, J. C., McLaren, S. J., & Jones, B. (2020). Sports injury prevention is complex: We need to invest in better processes, not singular solutions. *Sports Medicine, 50*(4), 689 – 702. https://doi.org/10.1007/s40279-019-01232-4

Testoni, D., Hornik, C. P., Smith, P. B., Benjamin, D. K., & McKinney, R. E. (2013). Sports medicine and ethics. *The American Journal of Bioethics, 13*(10), 4 – 12. https://doi.org/10.1080/15265161.2013.828114

Thomas, R., & Hardy, C. (2011). Reframing resistance to organizational change. *Scandinavian Journal of Management, 27*(3), 322 – 331. https://doi.org/10.1016/j.scaman.2011.05.004

Thompson, A., Bloyce, D., & Mackintosh, C. (2021). "It is always going to change" – examining the experiences of managing top-down changes by sport development officers working in national governing bodies of sport in England. *Managing Sport and Leisure, 26*(1 – 2), 60 – 79. https://doi.org/10.1080/23750472.2020.1800507

Trinks, S., Scheiff, A., Knipp, M., & Gotzmann, A. (2021). Declaration of analgesics on Doping Control Forms in german football leagues during five seasons. *Deutsche Zeitschrift Für Sportmedizin/German Journal of Sports Medicine, 72*(2), 67 – 74. https://doi.org/10.5960/dzsm.2020.474

Truong, L. K., Bekker, S., & Whittaker, J. L. (2021). Removing the training wheels: Embracing the social, contextual and psychological in sports medicine. *British Journal of Sports Medicine, 55*(9), 466 – 467. https://doi.org/10.1136/bjsports-2020-102679

Truong, L. K., Mosewich, A. D., Holt, C. J., Le, C. Y., Miciak, M., & Whittaker, J. L. (2020). Psychological, social and contextual factors across recovery stages following a sport-related knee injury: A scoping review. *British Journal of Sports Medicine, 54*(19), 1149 – 1156. https://doi.org/10.1136/bjsports-2019-101206

Vallée, C. N., & Bloom, G. A. (2005). Building a successful University program: Key and common elements of expert coaches. *Journal of Applied Sport Psychology, 17*(3), 179 – 196. https://doi.org/10.1080/10413200591010021

Van Ierssel, J., Pennock, K. F., Sampson, M., Zemek, R., & Caron, J. G. (2022). Which psychosocial factors are associated with return to sport following concussion? A systematic review. *Journal of Sport and Health Science, 11*(4), 438 – 449. https://doi.org/10.1016/j.jshs.2022.01.001

Veith, S., Whalan, M., Gibson, N., & Sampson, J. A. (2022). Exploring the true burden of a time-loss injury: Full vs partial time-loss in elite academy football (soccer). *Science and Medicine in Football*, 1 – 9. https://doi.org/10.1080/24733938.2022.2156587

Vella, S. A. (2019). Mental health and organized youth sport. *Kinesiology Review, 8*(3), 229 – 236. https://doi.org/10.1123/kr.2019-0025

Vella, S. A., Cliff, D. P., Magee, C. A., & Okely, A. D. (2015). Associations between sports participation and psychological difficulties during childhood: A two-year follow up. *Journal of Science and Medicine in Sport, 18*(3), 304 – 309. https://doi.org/10.1016/j.jsams.2014.05.006

Vella, S., Bolling, C., Verhagen, E., & Moore, I. S. (2022). Perceiving, reporting and managing an injury – perspectives from national team football players, coaches, and health professionals. *Science and Medicine in Football, 6*(4), 421 – 433. https://doi.org/10.1080/24733938.2021.1985164

Walker, N., Thatcher, J., & Lavallee, D. (2007). Review: Psychological responses to injury in competitive sport: A critical review. *Journal of the Royal Society for the Promotion of Health, 127*(4), 174 – 180. https://doi.org/10.1177/1466424007079494

Weil, L. G., Fleming, S. M., Dumontheil, I., Kilford, E. J., Weil, R. S., Rees, G., Dolan, R. J., & Blakemore, S.-J. (2013). The development of metacognitive ability in adolescence. *Consciousness and Cognition, 22*(1), 264 – 271. https://doi.org/10.1016/j.concog.2013.01.004

Weinert, F. E. (2014). Vergleichende Leistungsmessung in Schulen – Eine umstrittene Selbstverständlichkeit. In F. E. Weinert (Ed.), *Leistungsmessungen in Schulen* [Performance measurement in schools] (3rd ed., pp. 17 – 32). Beltz.

Werner, T., Michel-Kröhler, A., Berti, S., & Wessa, M. (2023). Not all injuries are the same: Different patterns in sports injuries and their psychosocial correlates. *Sports, 11*(12), 237. https://doi.org/10.3390/sports11120237

Wiese-Bjornstal, D. M. (2010). Psychology and socioculture affect injury risk, response, and recovery in high-intensity athletes: A consensus statement. *Scandinavian Journal of Medicine & Science in Sports, 20,* 103 – 111. https://doi.org/10.1111/j.1600-0838.2010.01195.x

Wiese-Bjornstal, D. M., Smith, A. M., Shaffer, S. M., & Morrey, M. A. (1998). An integrated model of response to sport injury: Psychological and sociological dynamics. *Journal of Applied Sport Psychology, 10*(1), 46 – 69. https://doi.org/10.1080/10413209808406377

Wik, E. H. (2022). Growth, maturation and injuries in high-level youth football (soccer): A mini review. *Frontiers in Sports and Active Living, 4*, 975900. https://doi.org/10.3389/fspor.2022.975900

Yang, J., Peek-Asa, C., Lowe, J. B., Heiden, E., & Foster, D. T. (2010). Social support patterns of collegiate athletes before and after injury. *Journal of Athletic Training, 45*(4), 372 – 379. https://doi.org/10.4085/1062-6050-45.4.372

Zanin, A. C. (2018). Structuring bodywork: Control and agency in athlete injury discourse. *Journal of Applied Communication Research, 46*(3), 267 – 290. https://doi.org/10.1080/00909882.2018.1465578

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