

FEAR AND ANXIETY IN ELITE SPORT

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Anxiety in Competitive Sport

To the audience, it is suspense, to the athlete, it is pressure; approaching the penalty kick in a World Cup final, running up to the last attempt in the Olympic long-jump. When we think of anxiety in sport, competitive anxiety is most salient. We can see athletes being afraid of missing the goal, of failing the attempt. Sometimes, when they fail, we attribute their failure to the experience of anxiety. But there is more to anxiety in elite sport than just competitive anxiety, and there is more to it than being afraid to fail. A key aspect of elite sport activities is their social nature – athletes compare their performance against others, and their performance is also compared or evaluated by others, such as family and friends, coaches, the audience. But that social evaluation goes beyond an evaluation of performance, it also concerns personal attributes of the athletes, especially their physical attributes such as strength, endurance, or appearance. The physical nature of sport also provides multiple physical threats, potentially leading to pain, at least, or to injury, whether from activities, material, or other athletes. Within the sport psychology literature, accordingly, competitive anxiety is distinguished from social physique anxiety and sport injury anxiety. To date, the major focus of research in sport psychology has been competitive anxiety.

In the past, sport psychological research on anxiety in sport mainly addressed the effects of anxiety on performance. Various models exist on the relationship between anxiety and performance. Moderators of this relationship have been identified and attentional mechanisms explaining the relationship have been proposed. But given that athletes usually experience anxiety as unpleasant, the question arises as to how it affects the well-being of athletes. Moreover, because anxiety appears to be a natural part of athletes' lives (and not only in competitions), the recurrent experience of anxiety must be considered to affect their mental health as more of a long-term outcome. It is then pertinent to understand antecedents and mechanisms of anxiety experience and its effects to develop mental health interventions to help athletes to cope with anxiety.

Defining of Terms

When defining anxiety, it is often distinguished from fear, which is somewhat elusive but useful in an applied context (e.g., Beckmann & Elbe, 2015, p. 190 f). Anxiety is seen as being the response to a more abstract threat in the future where an actual source of danger cannot be identified, whereas fear is considered as response to a more concrete and imminent threat (objective anxiety). Given that there is a

realistic chance of getting injured or harmed in sport, with the specific odds depending on the type of sport (Sallis et al., 2001), and given that the event of injury is definite, it makes sense to speak of fear of injury, not anxiety. However, still a great ambiguity remains – for example with respect to the type or extent of injury and harm (Kleinert, 2002).

Furthermore, following the distinction made by Spielberger (1966) the immediate, more transient response (state anxiety) can be distinguished from the more stable disposition to perceive ambiguous situations as threatening and respond with anxiety (trait anxiety). An athlete high in trait anxiety may more often react to ambiguous situations in competition or practice with a more pronounced and faster response of anxiety (Ehrlenspiel et al., 2011). While research on the relationship between competitive anxiety and performance has often focused on state anxiety (e.g., Woodman & Hardy, 2003), research on fear of failure and social physique anxiety is almost exclusively relying on the assessment of trait anxiety. In fact, trait anxiety in general and social physique anxiety in particular are among the most popular traits assessed in sport and exercise psychology research (Laborde et al., 2020). For the remainder of this chapter, we will also take a trait perspective on the relation between anxiety in sport and mental health in athletes.

Emergence of Anxiety

In the sport context, the emergence of anxiety is often explained using a cognitive approach, such as the transactional model of stress (Lazarus, 1999; for a review of stress see Chapter 16). A person acts within a given situation or condition and there is a “transaction” between the individual with personal characteristics and the environmental demands. These demands are evaluated, resulting in appraisals of threat or of challenge. Subsequent to a threat appraisal, anxiety is experienced as an unpleasant state consisting of feelings of apprehension and worries, physiological activation, and behavioural changes (Meijen et al., 2013). This anxiety, caused by a threat, is a central emotional component in the explanation why athletes fail to perform up to their potential in important competitions (known as “choking under pressure”; Beckmann et al., 2013; Mesagno & Beckmann, 2017; Mesagno & Hill, 2013). The relationship between anxiety and performance may (at least in part) be a vicious circle: because athletes remain anxious, they perform less well, and their poor performance in turn prolongs their anxiety.

Underlying the emergence of anxiety in a situation is uncertainty, which has been found to be the key source of anxiety and stress in (elite) sport (Robinson & Freeston, 2015). In competition, this uncertainty pertains first to an uncertainty about the outcome. It is a question of success or failure, about winning or losing, and to some, it is a question of hero or zero. But systematic analyses of sources of stress and anxiety in (elite) sport have identified aspects of uncertainty that go beyond the outcomes (Leary & Kowalski, 1997). Athletes experience uncertainty about how they and their performance will be evaluated by others and how they will evaluate themselves. They are also uncertain about whether they will experience physical harm or even injury and they are uncertain whether or to what extent they have control over the situation.

Forms of Anxiety in Sport

In the following sections, competitive anxiety, sport injury anxiety, and social physique anxiety will be introduced and differentiated. While these three sub-forms of anxiety vary in their characteristics, they are not entirely independent from one another and shape athlete anxiety in elite sport through their interplay (see Figure 15.1).

Fig 15.1

Competitive Anxiety

Competitions provide conditions and stimuli that are – at least in their sum – fairly unique and that can be considered as potential triggers of anxiety (Ehrlenspiel & Mesagno, 2022) or competitive stressors (such as



Figure 15.1 Anxiety in Elite Sport Revolves Mainly Around the Themes of Competition (“Competitive Anxiety”), Injury (“Injury Anxiety”), and of Presentation of Physical Attributes (“Social Physique Anxiety”). Figure Available Under a CC-BY4.0 License at osf.io/et3b2/

an audience being present, a direct comparison of performance, rewards, or punishment that are contingent on performance). Competitive anxiety can be defined as a specific negative emotional response to these competitive stressors (Mellalieu et al., 2009). Since the seminal work by Martens (Martens et al., 1990), the understanding of competitive anxiety is shaped by a two-dimensional model of anxiety. This assumes that the experiential (or “feelings”) component of the anxiety response encompasses a cognitive and a somatic or “emotionality” dimension (Liebert & Morris, 1967). Under competitive stress, athletes experience worries about success or failure or concerns about the (social) evaluation of their performance. In addition, they may experience changes in physiological symptoms, such as their heart pumping or their hands getting sweaty and cold. The latter experience is only loosely related to the actual physiological response (Mauss & Robinson, 2009). More recently, a third, regulatory dimension was suggested (Cheng et al., 2009) that considers the adaptive nature of anxiety and has been shown to relate more directly to performance. Athletes differ in the extent of their emotional response to a competition – intra-individually between different competitions but also within a competition inter-individually. And it is assumed that these differences can explain differences in performance.

Competitive anxiety is considered a core topic for research in sport psychology (Mellalieu et al., 2006) and in applied sport psychology, possibly because we can assume a direct relationship between anxiety and performance. Large-scale studies investigating the prevalence of competitive anxiety as a presenting issue in sport psychology consulting are missing. But performance anxiety is a prevailing issue, as it was a subject for up to 75% of psychology consultations offered at U.S. Olympic festivals (Kirschenbaum et al., 1993) and, for example, during the 2004 Olympics, pre-competitive anxiety was the third most frequently detected psychological problem among the Brazilian athletes (Samulski & Lopes, 2008).

sport Injury Anxiety

According to Kleinert (2002), sport injury anxiety can be defined as a widely indefinite concern or worry to sustain an injury in different sport situations. The content of these worries and concerns has been analysed mainly with respect to a competitive context. Qualitative interviews revealed that elite athletes worry about various themes, such as risk of injury, risk of being injured by an opponent, competing

despite injury, the risk of aggravating a previous injury, and the uncertainty of ability after injury (Hanton, Fletcher & Coughlan, 2005). There is also some indication that anticipation of pain after injury may be the content of concerns (Hsu et al., 2017). Injury anxiety often also comes in the form of re-injury anxiety in those athletes who had sustained an injury report worries of being re-injured. It is thought to occur predominantly during later stages of a rehabilitation process prior to return to sport (Walker et al., 2004).

There is some argument whether the term fear of (re-)injury and or (re-)injury anxiety should be used. Somewhat following the earlier made distinction between fear and anxiety, injury anxiety then is argued to be about worries and concerns about consequences of (re-)injury (potential surgery and its outcome, the rehabilitation process, time to return or even end of career). Fear of (re-)injury, on the other hand, would be about the fear of sustaining an injury itself (Hsu et al., 2017). Still, the two constructs have not been separated consistently and there is no differential evidence of either in relation to antecedents or consequences; therefore, we will stick with injury anxiety.

From a quantitative perspective, the relevance of injury anxiety in elite sport is difficult to assess, as there is no data on prevalence rates. Yet, injury anxiety is a recurrent theme in qualitative analyses of stressors in sport (Dunn, 1999; Hanton, Fletcher & Coughlan, 2005). A study among injured members of a ski team found that almost 60% reported fear of injury (Gould et al., 1997). Moreover, injury anxiety has been identified as an important factor in injury occurrence and rehabilitation, increasing the likelihood of injury occurrence (Short et al., 2004) and prolonging the rehabilitation process (Hsu et al., 2017).

Social Physique Anxiety

Given the social nature of elite sport, athletes present themselves to others – and this motivates strategies to present oneself favourably. Such strategies have been termed *self-presentation* and they aim at conveying desired impressions and concealing undesired impressions in a social situation (Leary, 1992). When athletes are concerned whether they are making the desired impressions, social anxiety or self-presentation concerns may follow. Such concerns can be related to any aspect of the athletes' self, from psychological (e.g., hardiness or competitiveness; Mesagno et al., 2011) to physical attributes. Social anxiety related to physical attributes, or the *physique*, has been coined *social physique anxiety* (Hart et al., 1989). Athletes may be afraid that others negatively evaluate their body composition or proportions, muscularity, or tone (Crawford & Eklund, 1994).

Social physique anxiety has been mainly studied in relation to exercise behaviour rather than in elite sport, assuming that social physique anxiety may for example affect adherence to an exercise class. Nevertheless, elite athletes can be expected to have higher social physique anxiety due to the social nature of elite sport; on the other hand, the fact that they are active and train their body might also lead to lower levels. Research is somewhat inconclusive with a slight trend towards elite athletes reporting higher levels of social physique anxiety compared to athletes active at lower levels of competition or to persons less physically active (Sabiston et al., 2014). Moreover, social physique anxiety not only appears to be an issue in sport psychology counselling (Samuel, 2013) but especially appears to play a role in the development of maladaptive attitudes to eating and disordered eating in female athletes (Sabiston et al., 2014).

Relation of Anxiety with Performance, Well-Being, and Mental Health

Performance

Research on the relationship between anxiety and sport performance has not led to an unequivocal understanding of anxiety. Different hypotheses exist on the relation between anxiety and performance, with the most prominent, the “Inverted-U-Hypothesis”, presumably dating back to a study by Yerkes and Dodson (1908) on the effects of electro shocks on discriminant learning in mice. It postulates that

performance is best at a medium intensity of anxiety. Stronger empirical support is available for claims that cognitive anxiety or worry is negatively related to performance in a linear fashion (e.g., Woodman & Hardy, 2003). Other models assume that cognitive anxiety may interact with the somatic component or even physiological response, potentially leading to a “catastrophe” (Hardy, 1990; Hardy & Parfitt, 1991). Researchers have also argued that it may be less the intensity of the anxiety response than the interpretation as more or less facilitative that affects performance (Hanin, 1978, 1995). This more individual perspective culminates in the idea of an individual zone of optimal functioning that expands from anxiety to other pleasant and unpleasant emotions (Hanin, 2000, 2004, 2007). Only if anxiety falls outside an optimal zone does it negatively affect performance. This idiographic approach may be the closest to an applied perspective but is difficult to test empirically.

It has also been of some question, how anxiety affects performance, with the current research focusing on attentional mechanisms. Anxiety is assumed to lead to increased self-monitoring of usually automatic motor skills or to the re-investment of declarative knowledge acquired during learning of a skill that is now proceduralized. This in turn leads to disruption of execution and subsequent performance failure (e.g., Beilock & Carr, 2001; Eysenck et al., 2007; Masters & Maxwell, 2008). Somewhat in contrast, anxiety may also lead to problems in executive functioning resulting in a loss of focus and higher distraction by task-irrelevant stimuli (e.g., Eysenck, 1979; Wine, 1971).

Injury anxiety and social physique anxiety have a more indirect relationship with performance in a competition but may have more direct relationships with performance over time and a career as an elite athlete. Within his psychophysiological model of fear of injury, Heil (1993) proposes that injury anxiety (“fear of injury” in his terms) negatively affects physiology (e.g., muscle tension) and psychology (e.g., concentration), which then negatively affects performance (e.g., disruption of skill execution and balance) leading to an increased risk of injury. Sense of poor performance is likely to initiate a vicious cycle in that it exacerbates physiological (tension, arousal) and psychological (concentration, self-confidence) responses. As a more chronic effect, injury anxiety will also be heightened. In a similar vein, social physique anxiety and self-presentation concerns appear to contribute to competitive trait anxiety – at least in female athletes (Martin & Mack, 1996).

Mental Health and Well-Being

Anxiety disorders are among the most common disorders (Bandelow et al., 2014; *see* Chapter 11). They are often associated with depression and addictions. Even if no clinically relevant anxiety disorder has developed, experiencing anxiety constitutes an unpleasant state negatively affecting subjective well-being, which basically reflects how individuals look at their lives and to what extent they feel happy or satisfied (Diener, 2009). Beyond a more “simple” effect on emotional well-being, anxiety can also be linked to a reduction in psychological functioning. Athletes who experience sport-related anxiety may also suffer from feelings of worthlessness, physical/emotional exhaustion, and a reduced sense of fulfilment (Lemyre et al., 2007). The stress and anxiety before competitions has been found to adversely affect sleep. Most athletes have experienced poor sleep before competitions (Erlacher et al., 2011). Further research showed that when athletes worried a lot, their sleep quality deteriorated over the nights before a competition (Ehrlenspiel et al., 2018). The repeated or even continuous experience of anxiety under high trait anxiety also has a more chronic effect and might even be associated with mental illness. Poor sleep as a consequence of anxiety might also be one underlying cause for a relation between anxiety, recovery, and rehabilitation after injury. Injury anxiety often turns into re-injury anxiety and during the rehabilitation process anxiety is also seen to be directed towards the rehabilitation process. Anxiety then hinders smooth rehabilitation and often interferes with a timely return to sport (Ford et al., 2017).

Considering long-term effects, anxiety in general and injury anxiety in particular have been found to be related to injury and injury rehabilitation (Heil, 1993; Brewer & Redmond, 2016). For example, a

review found that 2/3 of studies confirmed a relationship between (competitive) trait anxiety and the occurrence of musculoskeletal sport injuries (Cagle et al., 2017). Most importantly, however, experiencing anxiety in the sport context may have adverse effects on sport participation. Former gymnasts, for example, cited not liking the pressure of their sport as one key reason for dropping out (Klint & Weiss, 1986). Studies also show a clear relation between poor motivational climate (focus on ego-orientation, less autonomy support) and sport attrition (Barnett et al., 1992; Sarrazin et al., 2002).

In the general population, experiencing social physique anxiety is negatively linked to physical activity and exercise adherence (Sabiston et al., 2014). Social physique anxiety clearly thwarts enjoyment of physical activity. In elite athletes, a link between social physique anxiety and disordered eating has been established. In male and female college athletes, negative perfectionism was a predictor of disordered eating, but in females, social physique anxiety was an independent predictor of disturbed eating (Haase et al., 2002).

It is difficult to evaluate the relation between anxiety in sport and other mental health issues. Studies that investigate mental health of athletes usually use clinical measures such as the Generalised Anxiety Disorder (GAD-7, Spitzer et al., 2006) to assess anxiety. Such studies find a positive relation between anxiety and depression in athletes (Junge & Feddermann-Demont, 2016). But there is also indication that competitive trait anxiety more directly is related to symptoms of depression (Jensen et al., 2018). A potential route could be through extended worry and rumination, which is considered a clinical symptom of depressive and anxiety disorders (McEvoy et al., 2013). Interestingly, the relation between competitive anxiety and anxiety disorders is even less clear. Prevalence rates of anxiety disorders in the athlete population appear to vary somewhat around the general population with some studies showing clearly reduced rates (Walton et al., 2021). With respect to the relation between competitive anxiety and anxiety disorder, Walton et al. suggest that athletes with trait competitive anxiety may be more generally prone to show heightened fear and anxiety especially in social situations.

Following experiences of choking under pressure, elite athletes have also shown more general maladaptive emotional and behavioural responses. Through qualitative interviews with athletes that had experienced “choking”, Hill and colleagues (2019) were able to show that destructive behaviours such as drunk driving were used for coping with that experience. Moreover, they found that athletes went so far as to think about committing suicide after a choking experience (Hill et al., 2011).

But experiencing anxiety in sport situations might not be only detrimental to well-being or even mental health. Looking at the motivation for engaging in high-risk sport research has found that beyond the prototypical “sensation seeker”, some persons engage in such activities as mountain climbing for more adaptive reasons (Barlow et al., 2013). These activities offer the opportunity to experience a strong and concrete emotion such as anxiety. However, persons then experience how this emotion can be mastered and regulated and they experience successful emotion regulation.

Moreover, at least the worry component of anxiety has been linked to psychological functioning (Sweeny & Dooley, 2017). Worry prompts people to prepare for an action and take precautions. And worry also helps to attend to the eminent and most relevant stimuli when acting, very often the obstacles on the way to success. The idea, that (competitive) anxiety may have a positive side, is also considered in the idea that athletes themselves often view anxiety as facilitative and not debilitating to their performance (Jones & Swain, 1995).

Assessment of Anxiety in Sport

Although anxiety, as any emotion, may be assessed via physiological (e.g., heart rate, cortisol), behavioural (avoidance behaviour), or phenomenological markers (self-report), the assessment via self-report clearly dominates (Ehrlenspiel & Mesagno, 2022). The phenomenological experience of anxiety in sport has been assessed both qualitatively and quantitatively.

Qualitative research into competitive anxiety has mainly employed semi-structured interviews that have shed light on temporal dynamics of the anxiety response in face of a competition (Thomas et al., 2007), on the interpretation of anxiety as debilitating to performance (Hanton, Wadley & Connaughton, 2005), on choking experiences (Hill et al., 2017), or on the stressors as part of a competition (Mellalieu et al., 2009). But other methods such as the Event Sampling Method, open-ended questionnaire items, diaries, or protocols of verbalisations during a competition have also provided important insights into the competitive anxiety response (Neil et al., 2009). Similarly, mostly (semi-structured) interviews have been employed to explore experiences of social physique anxiety (e.g., McHugh et al., 2008) and the emotional response to sport injury (Johnston & Carroll, 1998). Oftentimes, qualitative analyses of qualitative research led to the development of questionnaires (Neil et al., 2009).

Within the realm of sport, often general, unspecific questionnaires have been employed but also area-specific questionnaires exist to assess anxiety and specifically trait anxiety. From a general approach, the Manifest Anxiety Scale (Taylor, 1956) or Cattell and Scheier's (1961) trait-anxiety factor have been early approaches to measure trait anxiety and relate it to performance in motor skills (Spielberger, 1989). More commonly used, however, is the trait version of the State-Trait Anxiety Inventory (Spielberger et al., 1983) that assesses trait anxiety uni-dimensionally and globally with 20 items. Originally developed in English, the questionnaire has been translated in many other languages.

The most common measure to assess competitive trait anxiety is the Sport Anxiety Scale (SAS; Smith & Smoll, 1990), more recently in its revised form (Smith et al., 2006). The SAS has seen translations and adaptations into French, German, Norwegian, Spanish, and other languages (Ehrlenspiel & Mesagno, 2022). It is based on a multi-dimensional model and assesses anxiety through scales on competition related worry, somatic anxiety, and concentration disruption. Experiences ("I feel jittery") are described and one has to indicate to what extent one usually feels that way.

Social physique anxiety is commonly assessed with the Social Physique Anxiety Scale (Hart et al., 1989). It originally included 12 items, but problems with its factorial validity have been identified leading to a 9-item (Martin et al., 1997) and a 7-item version (Motl & Conroy, 2001). The questionnaire asks to indicate to what extent statements are characteristic of oneself (e.g., "In the presence of others, I feel apprehensive about my physique/figure").

For the assessment of sport injury anxiety, the sport Injury Trait Anxiety Scale (SITAS; Kleinert, 2002) is often used. It describes 22 situations (e.g., "I already was injured in such a situation") that indicative of three different types of situations: low situational competency, high situational importance and situational loss of control. Respondents have to identify for each situation to what degree it raises concerns about injury.

Determinants and Risk Factors

Early approaches addressed anxiety mainly as a motive disposition that would make people more prone to anxiety reactions paying almost no attention to the function of the situation, (e.g., Taylor, 1953). Modern views conceive of anxiety as being determined by an interaction of personal (trait) and situational factors. The personality trait (trait anxiety) then determines how strong the anxiety reactions to a given situation will be. In the following, person-related and situation-related factors will be introduced separately, whereby the interaction between both factors will also be acknowledged in both sections.

Person Factors

In relation to personal factors impacting an individual's trait anxiety, individual motivational factors and goal setting appear to play a major role. Roberts (1986) argues that achievement motivated athletes are more likely to suffer from anxiety in competitions because they evaluate their performance based on social comparisons

and outcomes of competitions. These findings were supported by Vealey and Campbell (1988), who found that youth ice skaters were less susceptible to anxiety when they were motivated by learning and applying effort (task orientation) compared to those youth ice skaters comparing themselves to others (ego orientation). Hall and colleagues (1998) similarly show that athletes' win orientation predicts cognitive anxiety.

Taking these findings into account, it is not surprising that many further studies report the personality trait of perfectionism to be a consistent predictor of cognitive anxiety (e.g., Coen & Ogles, 1993; Hall et al., 1998; Saboonchi & Lundh, 1997) and social physique anxiety (e.g., Haase, 2002) in athletes. Perfectionism is associated with the setting of high personal standards and thus with a positive achievement striving in sport (Frost & Henderson, 1991), whereby especially the more extreme form of neurotic perfectionism is a risk factor for anxiety (Hall et al., 1998). Hall and colleagues (1998) furthermore argue that the concern over mistakes, doubts about actions, and personal standards that are associated with neurotic perfectionism, are what fosters cognitive as well as somatic anxiety in individuals. These findings go in line with research showing that anxiety may increase in individuals with a high baseline of negative emotionality, or, in other words, individuals scoring high on neuroticism (Krueger, 1999). Balyan et al. (2016) confirm that the personality trait of neuroticism is related to increased somatic anxiety and cognitive anxiety and to decreased self-confidence. Building up on this, it is logical that the personality factors of action and state orientation are also related to anxiety in both athletes (e.g., Landman et al., 2016) and non-athletes (e.g., Chatterjee et al., 2018; Kuhl, 1992). While action-oriented athletes have a good ability to downregulate negative affect, state-oriented athletes tend to struggle with coping after failure and the negative emotions associated with it (Kuhl, 1992).

In addition to personality traits, athletes' identification with their role as an athlete has shown to impact their experienced levels of anxiety (Cosh et al., 2013). Athletes with an exclusive identity as an athlete appear to suffer from higher levels of stress and anxiety (Grove et al., 1997) and show a higher susceptibility to depression and emotional difficulties following injury (Brewer et al., 2010; Green & Weinberg, 2001) and retirement (Horton & Mack, 2000). This is explained by athletes focusing so much on their athlete identity that they experience a crisis when their identity is threatened (Cosh et al., 2013). Looking at self-identity, a different picture emerges. Masten and colleagues (2006) report that higher levels of self-identity, which is more related to self-confidence, are associated with lower levels of trait anxiety in athletes. In other words, athletes who have a clear view of their identity and higher levels of self-confidence have lower levels of trait anxiety, because they are usually better able to cope with stress and have more effective coping strategies. According to Masten et al. (2006), this may also be an explanation for why female athletes are more susceptible to anxiety, since male athletes tend to have higher levels of self-identity.

Research has further shown that female athletes show higher levels of depression and eating disorders than male athletes (Kuettel & Larsen, 2020). This can partly be explained to a heightened social physique anxiety in female vs. male athletes (Haase 2002; Hart et al., 1989; Snow & Harris, 1986; Rice et al., 2019). Haase and colleagues (2009) in this context found social physique anxiety and eating disorders in female athletes to be related to the situational factor of whether they performed an individual or team sport. Individual female athletes were more likely to suffer from social physique anxiety than female team sport athletes, especially when they performed an aesthetic individual sport (Gay et al., 2011).

A further individual risk factor could be age, as younger athletes are reported to be at higher risk to suffer from anxiety (Rice et al., 2019). This may be due to younger athletes' lower level of experience with stressful situations and anxiety and due to youth athletes using less efficient coping strategies (Dias et al., 2010). According to Kamal et al. (1995) more experienced athletes also have a higher self-image than less experienced athletes, which may be another explanation for higher levels of anxiety in younger athletes.

Situation Factors

Besides individual risk factors increasing a person's susceptibility to anxiety, existing studies show that individual differences in anxiety are related to greater lifetime stress exposure (e.g., Slavich et al., 2019; Toussaint et al.,

2016). McLoughlin and colleagues (2021) find that the number of experiences of adulthood adversities significantly predicted anxiety independent of age and gender. Furthermore, athletes who had recently experienced adverse life events showed higher levels of anxiety (Rice et al., 2019).

Additionally, Rice et al. (2019) report that athletes, who had previously suffered from a concussion or musculoskeletal injury, reported higher global anxiety scores. Foskett and Longstaff (2018) assume that an injury increases anxiety because athletes may not have developed an identity apart from being an athlete. Therefore, as described earlier, an injury constitutes a threat to an athlete's identity and can cause anxiety as a result. This may also explain why athletes with a lower career satisfaction suffer from higher anxiety levels (Rice et al., 2019). If they are not successful in their career or at least not satisfied with their success, their status as an athlete and therefore the only identity that they have is threatened.

A further important factor for the experience of anxiety in athletes is coaching behaviour. Baker and colleagues (2000) report that negative personal rapport significantly predicts a variety of anxieties in sport, presumably because it increases the negative consequences of a bad performance of the athlete. Vealey et al. (1998) even find that coaching styles and behaviour are related to athlete burnout. This appears to be especially the case for controlling coaching behaviours, while autonomy-supportive coaching behaviours are not related to athlete anxiety (Cho et al., 2019). Similarly, Kenow and Williams (1992) suggest that coaches should be supportive and positive when coaching, especially if their athletes are anxious with low levels of self-confidence.

Parents' expectations and their behaviours have a similar impact on anxiety, especially in youth athletes. Athletes who perceive their parents to have high expectations tend to suffer from more anxiety, especially if parental pressure is combined with a low mastery climate (O'Rourke et al., 2011). Furthermore, Kaye and colleagues (2014) found that anxiety experienced as an outcome of parents' expectations is linked to parents' achievement motives and their performance-based goals, for example when parents wanted their children to outperform others. Not only coaches or parents, but also the audience increases pressure to perform well (Beilock & Gray, 2012) and competitive anxiety (Paivio & Lambert, 1959) in athletes. Especially aggressive audiences exert a negative impact and increase athletes' anxiety levels (Purnomo et al., 2019).

Besides the experience of stressful life events, injuries, or the behaviour of coaches, parents, and the public, it appears to matter whether athletes exercise a team or individual sport. Pluhar and colleagues (2019) found that team sport may function as a buffering factor against anxiety. According to the authors, this may be due to the individual sport athletes engaging in sport primarily for goal-oriented reasons, compared to team sport athletes exercising their sport for fun. Nixdorf et al. (2016) found higher scores in depression in athletes in individual sport than in athletes in team sport. A strong mediator of the depression scores were negative attributions after failure that was associated with individual sport rather than team sport. A tendency towards negative attributions after failure in terms of attributing failure to a lack of ability is typical for persons high in fear of failure.

Overall, to reduce anxiety problems and more generally preserve athletes; mental health and well-being a change in the sport system appears to be necessary. Adjusting the system to the needs of the athletes would involve creating an environment that reduces fears and promotes learning and performance. Psychological research has shown over and over again that energy directed toward fear- and constraint-removal is not only promoting athletes' mental health and well-being but also in the long-run proves to be more productive than energy directed toward increasing pressures (Gibb 1978, p. 51).

Practical Implications

The presented person and situation-related factors offer a variety of starting points for practical prevention and intervention strategies. Strategies that have been shown to be effective in preventing or down-regulating anxiety will be discussed following the process model of emotion regulation by Gross (1998).

According to Gross (1998, 2015), emotions result from different valuation systems and can be regulated at different stages in the process of emotion generation: By selecting a situation, by modifying a situation, through attentional deployment, through cognitive change, or through response modulation. While the first four strategies aim at changing antecedents and thus preventing anxiety to occur, the fifth strategy focuses on changing the anxiety reaction and therefore constitutes an intervention strategy.

Prevention Strategies

The first strategy proposed by Gross (1998), *situation selection*, suggests that situations that create anxiety are avoided. However, in the sport context, this cannot be applied to every situation and, furthermore, avoidance behaviour is usually considered to be maladaptive especially in the treatment of anxiety disorders. Avoidance helps to maintain anxiety through negative reinforcement but may still be useful in some cases (Hofmann & Hay, 2018). An athlete who competes cannot avoid the competition, but if, for example, anxiety increases when an athlete is watching other athletes perform, this situation can easily be avoided or shortened. In this sense, the treatment of anxiety may also involve the gradual selection of situations that the athlete can bear in order to learn and apply the further emotion-regulation strategies.

The second of Gross' (1998) strategies, which can be applied if the situation cannot be selected, is *modification of a situation*. There are many possible ways in which a situation can be modified. From a prevention perspective, athletes can work on their self-confidence and resilience to anxiety. Famous techniques to increase self-confidence include awareness on strengths and skills. To increase resilience towards anxiety, simulation trainings that simulate a situation, which is expected to increase anxiety, can be used. Furthermore, social support, for example through a team, has been shown to increase athletes' resilience (Beckmann & Zier, 2011). Sometimes, however, athletes are afraid of unforeseen things that might happen during a competition. Beckmann and Elbe (2015) recommend to make a list of these unforeseen events, along with practicing how to react to them. Additionally, it is useful to familiarise oneself with an unknown competition location before the start of the competition and to identify the potential threats in the competitive situation. The goal is to transform the more abstract threat that can be seen as characteristic of anxiety, to more concrete and imminent potential threats related to fear, so that the athlete can plan ahead on how to deal with the potential threats and thus change the upcoming situation for him or her.

The third strategy (Gross, 1998) is to prevent the development of anxiety through *attentional deployment*. Athletes can learn to control their attention and direct it away from potentially threatening stimuli (e.g., opponent or audience) towards stimuli that have a calming effect (e.g., own breath). This process of attentional deployment can further be supported by the use of pre-performance routines (e.g., Mesagno & Mullane-Grant, 2010) or strategic self-talk (Galanis et al., 2021).

Gross' (1998) fourth strategy of *cognitive change* aims at a cognitive re-evaluation of potential threats by the athlete. One of the most prominent approaches is cognitive reframing. Athletes learn to recognise negative thoughts and to restructure their content into positive thoughts. A further strategy includes rationalisation of the situation. With this strategy, the athlete attempts to put the situation into a broader perspective, reaching the perception that the situation may seem threatening but, compared to other, rationally more important situations in life, is not all that significant and thus less threatening.

The fifth of Gross' strategies constitutes a strategy that addresses the regulation of an emotion that has already emerged. Once anxiety occurs, there are several *response modulation* techniques that can be used as an intervention.

Intervention Strategies

Response modulation strategies include all strategies that change a person's response to anxiety (Gross, 1998). A simple but effective form consists of concentration on breathing (e.g., Koole, 2010). Particularly, a focus

on prolonged exhalation has proven to effectively eliminate disturbing, anxiety-inducing thoughts and the physiological arousal that accompanies them. In the breathing intervention, inhaling occurs automatically, while exhaling is actively prolonged.

Breathing techniques are furthermore incorporated in a variety of relaxation methods that can be used to downregulate anxiety, once they are trained on a regular basis. Relaxation trainings like progressive muscle relaxation or autogenic training have proven to be effective in helping athletes cope with anxiety, but an application immediately before participating in a competition is not recommended, as the techniques may interfere with the optimal level of functioning. Thus, progressive muscle relaxation and autogenic training need to be taught well in advance to educate athletes about the regulation of anxiety responses and about finding their optimal level of performance.

Another technique that may be used to intervene with an anxiety response is “embodiment”, the regulation of the mental state through bodily states (Gallagher, 2005). Bodily states, for example, include physical expression, posture, and body tension. The body posture influences information processing, motivation, and particularly how one feels. The body posture can be consciously controlled. Some embodiment techniques have proven to be useful in reducing acute anxiety or fear (e.g., Fuchs & Koch, 2014). An upright stance can support feelings of self-confidence and reduce anxiety-induced worries (e.g., Weineck et al., 2020). Another embodiment technique is the dynamic handgrip executed with the left hand. The left hand is clenched dynamically for about 10 to 15 seconds which interferes with worries and generates a relaxed mind. The dynamic handgrip has proven to be effective in reducing anxiety and choking under pressure in right-handed athletes in several studies and practical experiences (cf. Beckmann et al., 2013; Beckmann et al., 2021).

In addition to relaxation methods and embodiment, systematic desensitisation can be used in sport (e.g., Feltz & Landers, 1980; Kish, & Badami, 2019). For example, if a gymnast is afraid of practice on a gymnastic apparatus after injuring him or herself painfully on the high bar. Step by step, from just watching the high bar from a safe distance to seeing himself actually perform, the athlete will be brought back to the high bar. An important element is that each step is preceded by the induction of a relaxed and comfortable state.

Frequently, athletes are overwhelmed by anxiety instead of fully immersing themselves in the present moment. Mindfulness is an approach that is increasingly addressed in sport psychology (Moore, 2009). Mindfulness, or non-judgmental present-moment awareness, may help athletes improve their concentration, thus helping them improve their sport performances (Bernier et al., 2009). Furthermore, being mindful can also help athletes enjoy their sport and reduce anxiety which can reduce the potential for mental health issues and improve well-being (Bernier et al., 2009).

Personalising anxiety has also proven to be helpful, especially in younger athletes, if the preceding approaches do not work. The athlete can be asked to describe his or her anxiety in terms of something concrete, a fictitious person or animal, or a substance. Questions are asked on how big the anxiety is, what colour it is, and so forth in order to make the anxiety more tangible. The athlete should then name the anxiety. In the next step, it is possible to address and talk to the "red dragon Jeremy", so that one may learn to accept it and perhaps even find something positive about it. One could then find ways to close it off (cf. Boyes, 2015; Seemann, 2009).

Future Directions

The presented findings illustrate that high anxiety threatens mental health and well-being significantly. Thus, a main implication for applied sport psychology should be the development of interventions to prevent and intervene with high anxiety. Research, on the other hand, should further our understanding of the relation between anxiety and anxiety disorders in athletes. Repeated exposure to anxiety within the sport domain could be both a risk factor as well as an opportunity to develop coping skills to be used in other contexts.

To reach sustainable changes and prevent anxiety, research should investigate how children and adolescents in elite sport experience anxiety and what the main sources of their anxiety are. Complementary, long-term effects of sport enjoyment and sport participation on well-being need to be investigated. Looking at prevention possibilities from an applied perspective, child and youth development plays a major role. Personality development should be implemented in elite sport from an early age on. Youth athletes could for example be educated on the recognition of individual age specific stressors and need to be guided in developing effective coping techniques based on their individual personality characteristics. Therefore, the development of observational measures for the assessment of anxiety is needed. In addition to the development of sustainable youth development approaches, situational factors fostering anxiety in elite athletes should be altered, in order to create an environment with fewer stressors and sources of anxiety.

Furthermore, the gender aspect needs to be included. Particularly, anxiety in female athletes should be considered more detailed in both applied sport psychology and research. Although it has become clear that females tend to report and experience higher levels of anxiety, the specific mechanisms behind that phenomenon are mostly unclear. Research needs to take a more comprehensive approach considering cultural, social and environmental factors and take a quantitative and qualitative approach (Perry et al., 2021). Such research could provide ideas for creating sport psychological support that is more gender sensitive.

Another topic that should be subject of discussion in future research and practice is the topic of anxiety in para-elite athletes. While some research on the topic of anxiety in para-elite athletes exists (e.g., Bosma & Van Yperen, 2020; Silva et al., 2012; Rodrigues et al., 2015, 2017), research and interventions addressing the anxiety of para-elite athletes are still underrepresented (Rice et al., 2019).

Overall, a new perspective on anxiety needs to be established in the future, focusing on the benefits of experiencing and managing anxiety on personal development. For example, the development of coping skills and the feelings of mastery and success, associated with the overcoming of anxiety, constitute factors that connect the seemingly negative emotion of anxiety with functional aspects, like using anxiety to improve competitive preparation, and positive outcomes, such as reduced stress and increased well-being.

Summary

Elite sport can be accompanied by a variety of forms of anxiety such as competitive anxiety, sport injury anxiety, or social physique anxiety. Anxiety potentially decreases well-being and mental health in athletes. Risk factors to increase the likelihood of experiencing anxiety include individual factors, mainly characterised by different personality traits, or situational factors like life-time stress exposure or coaching style. Whenever possible, prevention strategies should be used and implemented particularly in the development of youth athletes. In addition to their regular training and practice they should acquire possible intervention strategies to cope with perceived threat situations. Thus, future prevention and intervention strategies should especially focus on youth development based on individual characteristics and on the creation of an elite sport environment with reduced pressures resulting in anxiety. A focus on the positive effects of anxiety management on personal development and life mastery would support a sustainable implementation.

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