Module 3. Psychological and Environment Key Performance Indicators

As a sport performance analyst or sports scientist, you may encounter difficulty in obtaining key performance indicators (KPIs) of the psychological domain.
How do we, as sports performance analysts and sports scientists, examine psychological data? And how much variance in sport performance is due to individual and environmental moderators of psychological factors? Finally, how do psychological KPIs affect performance?

Sport psychology is the scientific study of an athlete's thoughts and behaviour as they pertain to sport. Research has elucidated that several psychological factors are highly influential to sports performance, therefore, it is critical that we not only consider and attempt to quantify these factors, but to also include them in our sports performance predictive models. In this module, we cover the fundamental psychological factors and theoretical frameworks that have evidenced to be linked with sport performance. We will also discuss the measures available to quantify these intangible variables, as well as theories and psychological models of sport performance (Cox, 1998; Horn, 2008).

Let us elucidate some of the psychological variables that have been shown to influence sport performance (Raglin, 2001). Motivation, confidence, anxiety, depression, aggressiveness, self-esteem, self-efficacy, and concentration are some of the most studied and researched psychological variables in sport literature (Moritz et al., 2000; Jackson et al., 2001).

A well-established factor known to influence sport performance is motivation, regardless of whether it derives from the coach or the athlete (Vallerand, 2004). Research shows the importance of motivation to sport performance (Vallerand and Losier, 1999; Vallerand, 2004). Deterioration in performance is often attributed to a lack of motivation, just as surely as overcoming adversity or winning against a superior opponent is attributed to strong motivation. Although different forms of motivation exist (Iyengar and Lepper, 2000; Vallerand and Losier, 1999), most types fall within two major subcategories: intrinsic and extrinsic motivation (Staw, 1989; Ryan, 2000; Guay, Vallerand & Blanchard, 2000; Pelletier et al., 1995; Vallerand, 2007). Intrinsic motivation involves performing an activity or sport solely for enjoyment. Extrinsic motivation, on the other hand, relies on external rewards, also known as (aka) the bottom line (Vallerand, 1987; Vallerand, 2001, Elliot and Covington, 2001). The Sport Motivation Scale, developed in France (Pelletier et al., 1995), measures both intrinsic and extrinsic motivation. Because factorial validity of

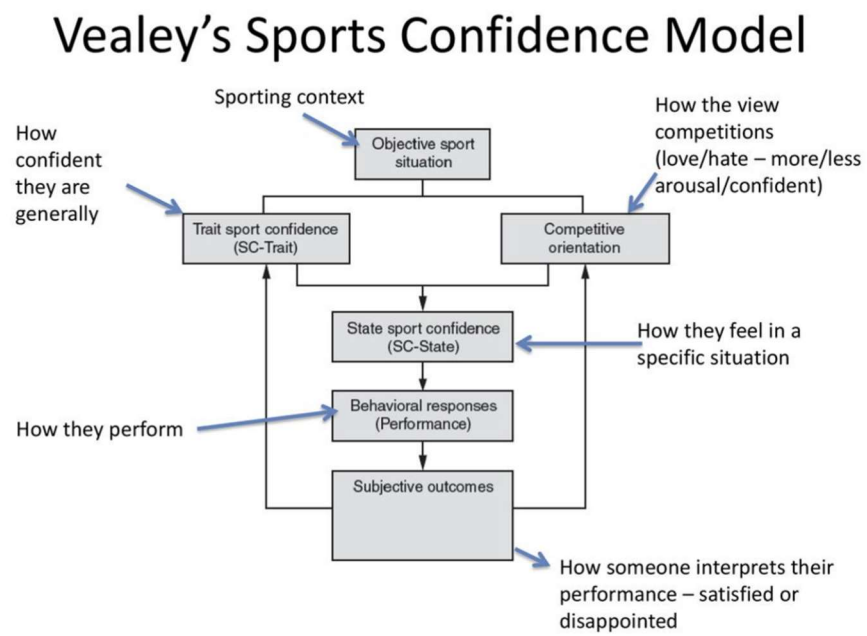
the original scale was questioned, a six-factor, twenty-four-item scale was later developed and named the SMS-6 (Mallett et al., 2007). An assessment of motivation commonly used to determine situation-specific motivation is the Situational Motivation Scale (SIMS) (Guay, Vallerand, and Blanchard, 2000).

Figure 1: Extrinsic and intrinsic motivation

Source: Prepared by the author

Confidence is a major psychological construct often discussed in sports (Vealey, 2008; Brewer and Vealey, 2009). What is confidence? A fine line exists between confidence and self-efficacy (Feltz and Lirgg, 1998). Sport confidence is defined as the belief an individual possesses about his or her ability to be successful in a sport (Feltz et al., 2008). Please see the figure below for a detailed diagram of the Sports Confidence Model Framework.

Figure 2: Vealey's Sports Confidence Model



Source: Ford, n.d., https://bit.ly/3qySOh1

Self-efficacy differs from confidence and refers to an athlete's belief in his or her capability to produce and achieve results in a particular situation (Bandura, 1999; Feltz, 2008). See the figure below.

Figure 3: Bandura's Self-Efficacy Model related to performance

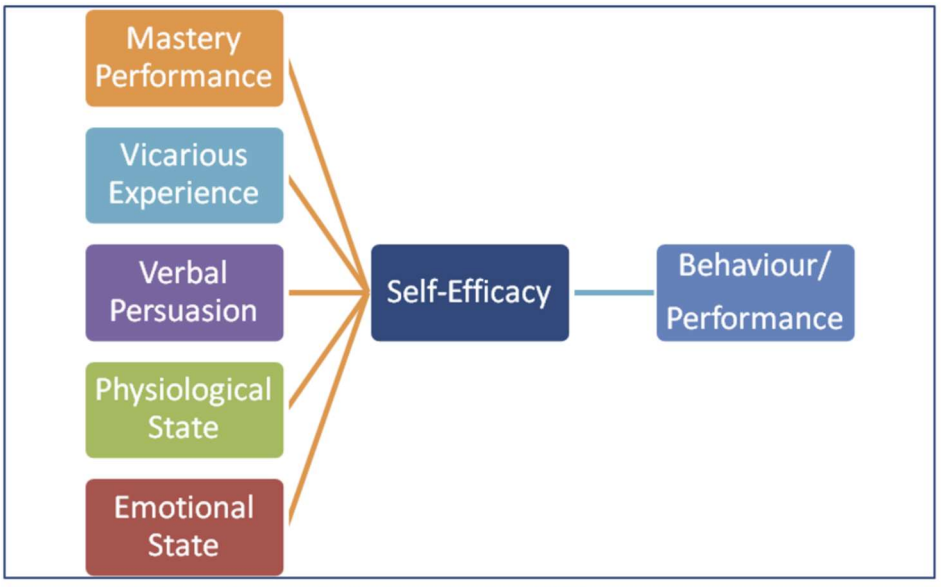


Figure 1: Self-Efficacy Theory (adapted from Bandura, 1997)

Source: Technology of Communication, 2015, https://bit.ly/3qzscfJ

For example, in the 2015 NBA final championships, as games progressed and injuries occurred, the odds of the Cleveland Cavaliers winning decreased significantly. LeBron James' individual performance self-efficacy did not wane, but since basketball is a team

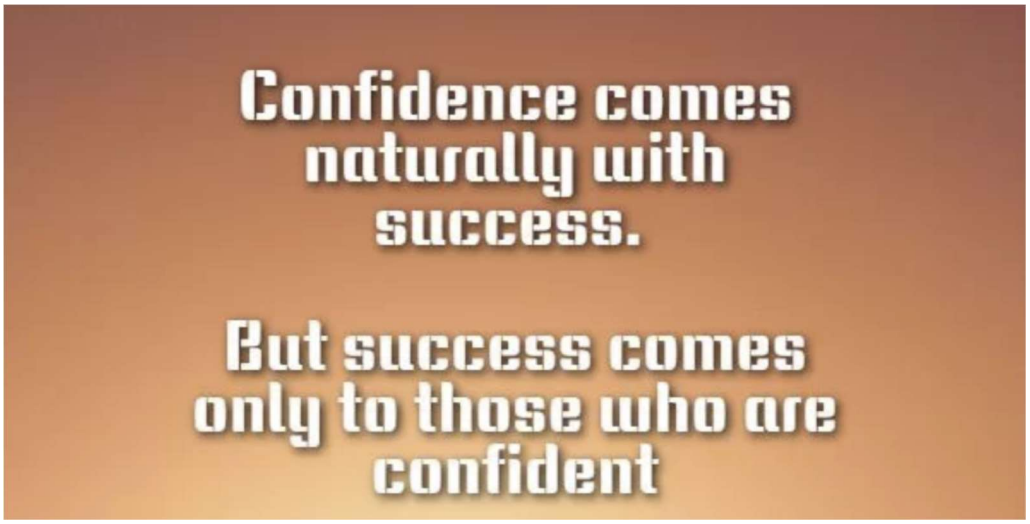
sport and not a one-man show, it was not enough to win a championship that year. It was evident during the last two games in the NBA finals that his self-efficacy of his team winning the championship waned due to a lack of production from his teammates. It must be noted that LeBron played outstandingly, amassed unbelievable statistics, and came close to having an average of triple-doubles during the finals' series, and yet they still lost to the team that did not have a player perform the way LeBron did, but as an overall team performance they played better and won.

Figure 4: LeBron James' 2015 impressive game statistics

Source: [Untitled image about LeBron James' 2015 impressive game statistics], n. d., https://bit.ly/3Gbxkir

The most commonly used general assessment of sports confidence is the Sport Orientation Questionnaire (SOQ) (Gill, 1988). Confidence can be classified as trait and state. The Trait Sport Confidence Inventory (TSCI) is used to assess trait sports confidence. Then we have the State Sport Confidence Inventory (SSCI), which measures an athlete's sports confidence just prior to an event and indicates his or her pre-competitive feeling of confidence for that event.

Figure 5: Confidence



Source: Golf Quotes, 2021, https://bit.ly/3QLvB5U

Narcissism is another interesting variable that is less often examined but may be particularly relevant to sport performance (Kohut, 1977; Russell, 1993). Although this construct carries a negative connotation, it seems that many superstar athletes have exhibited the characteristics and signs of narcissism, such as feelings of grandiosity, preoccupation with power, a strong need for admiration and attention, and exaggerated feelings of self-importance (Mace and Carroll, 1989; Elman, 2003; Tazegul, 2011).

Some famous athletes that have displayed narcissistic traits publicly include Muhammad Ali, Connor McGregor, Cristiano Ronaldo, Lionel Messi, Floyd Mayweather, and Tiger Woods, to name just a few.

Figure 6: Muhammad Ali's quotes

Source: USA Today Sports, 2016, https://bit.ly/3BypigH

The Narcissistic Personality Inventory (NPI) was used to assess narcissism (Raskin, 1979; Corry et al., 2008). Another method that can be used to assess narcissism is the projective Thematic Apperception Test (TAT), which asks athletes to complete sentences using their

own subjective experiences (Grayden and Murphy, 1958). There is also the Minnesota Multiphasic Personality Inventory (MMPI) with various scales designed to assess various personality traits, one of which is narcissism (Raskin, 1989). Currently, the NPI and the MMPI are the widely accepted measures of narcissism, as defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) (Raskin, 1989; Wright et al., 2013; Hopwood et al., 2012).

In 2011, intrigued by the notion that some of the world's greatest athletes seem to exhibit traits of narcissism, I conducted a pilot study on male professional tennis players to examine relationships between narcissism, match outcomes, and rankings. The findings revealed a strong positive correlation between narcissism, match outcomes, and player rankings in top Association of Tennis Professionals (ATP) on the tour (Martin and Thompson, 2011). Still, this was a small, single study, and further research is warranted. It will be interesting to see if these findings hold true across genders and for various sports.

It is also well known that when opposing athletes are equal in skill level and physical characteristics, a deciding factor between winning and losing is mental or psychological toughness (Jones et al., 2002). Many of us have seen players who may not be as talented as others, but who are mentally tough and come through in clutch moments, such as Rafael Nadal and Tom Brady. We also know of players who are very talented and yet crumble when the pressure is on, and as a result face difficulty in recovering from the psychological failure (Maxwell et al., 2006; Hill et al., 2009; Hill et al., 2010; Beilock et al., 2007). Such feelings can hinder an athlete from performing at the same level he or she once did prior to the psychological failure (Galli and Vealey, 2008).

Take, for instance, the Women's Tennis Association (WTA) professional tennis player Jana Novotna who, though up 4-1 in the third set of the 1993 Wimbledon finals, ended up losing to Steffi Graf. Novotna's tennis career fell into what seemed an interminable slump following that defeat. Remarkably, she was able to recover after a few years and redeem herself, first by reaching the 1997 Wimbledon finals, and finally by winning it in 1998.

A great deal of credit and blame for either rising to the occasion or crumbling under pressure has also been attributed to anxiety (Byrne et al., 2009; Krohne, 1988). This raises the following questions: What exactly is anxiety? And why is it so deleterious to the athlete's performance?

Before delving into the various anxiety-performance theories, let us discuss what anxiety really is and how it can be measured. Anxiety is a state of physiological arousal that is accompanied by worry and uncertainty (Raglin et al., 1991; Woodman and Hardy, 2003). There are two main types of anxiety; somatic and cognitive. Scientists characterize somatic anxiety as physiological changes that occur as a result of activation of the sympathetic nervous system when an athlete is apprehensive (Smith et al., 1990). Some

physiological changes that occur include an increased heart rate, sweaty palms, muscle tension, and shallow breathing (Edwards and Hardy, 1996). Cognitive anxiety, on the other hand, refers to the mental changes an athlete undergoes when preoccupied with the uncertainty of the desired outcome (Woodman and Hardy, 2003). See the figure below for a detailed description of the key differences between cognitive and somatic anxiety.

Figure 7: Differences between Cognitive and Somatic Anxiety

Cognitive Anxiety (Mind) Cognitive anxiety may stay at the same level or even increase when completion begins. This is most likely when facing strong oppposition	…….is characterized by thoughts and perceptions of worry/doubt and negative expectations (***mind***), about performance, self-evaluation and evaluation by others. EG: Young athletes might worry that they will perform poorly in front of their parents on school sports days, or the golf professional might start to think of how many thousands of pounds the next putt will cost if it is missed Negative Effects ○ Confusion/irrational thoughts/lack of concentration, nervousness or apprehension Positive Effects ○ Faster information processing/Increased attention
Somatic Anxiety (Body) Often decreases after competition has begun	….relates to our perceptions of our ***bodily state (physiological arousal)*** , for eg, such as awareness of a pounding heart (increased heart rate), increased blood pressure, clammy hands, trembling legs, butterflies in the stomach, shaking, pacing, sweating, restlessness and a dry mouth.

Source: IB Studies, n.d., https://bit.ly/3QH2BfH

Regarding quantifying these intangible factors, an assessment that distinguishes between cognitive and somatic anxiety is the State Trait Anxiety Index (STAI) which includes twenty items that refer to state anxiety and another twenty items that are allocated to trait anxiety (Spielberger, 1985; Tenenbaum and Furst, 1985; Klein, 1990). Please refer to the figure below for a detailed description of differences between trait and state anxiety.

Figure 8: Differences between trait and state anxiety

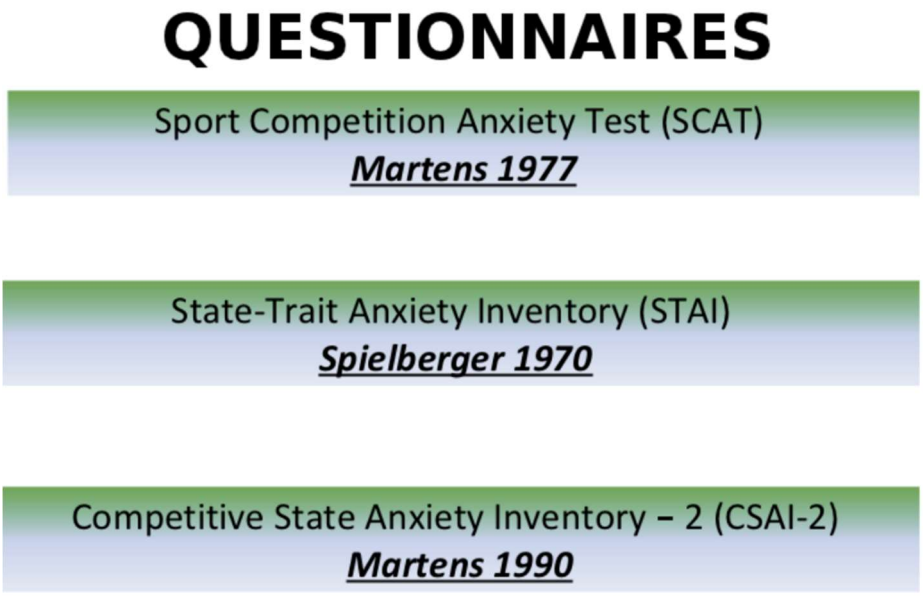
(1) - Trait Anxiety Innate- If you have the **trait** you are more likely to show the state ☹	… is a relative enduring disposition, ie it is an innate personality dimension that causes people at the high of this continuum to view a wide range of non-dangerous circumstances as threatening. It is a constant characteristic. Eg: A rugby player who worries about the condition of the pitch for the next month's game exhibits trait anxiety. Changing athlete's personalities is not really an option since there is much evidence from Psychology that tells us that it is very difficult to do.

(2) State Anxiety - Situation specific - Drops significantly one competition begins	…… is a **temporary** negative emotion of apprehensiveness and tension experienced in threatening situations and is situation specific For eg it can change during a game of football – it might be moderate just before kick off, lower as the game starts and then high at certain moments, such as when taking penalty. It is relatively easy to imagine ways in which we might be able to control state anxiety to improve performance

Source: IB Studies, n.d., https://bit.ly/3QH2BfH

There are several general anxiety assessments that do not distinguish between cognitive and somatic anxiety, but assess overall sports performance anxiety, such as the Competitive State Anxiety Inventory-2 Revised (CSAI-2R), the Sport Anxiety Scale-2 (SAS-2), the Sport Competition Anxiety Test (SCAT), and the Beck Anxiety Inventory (BAI) (Cox, 1998; Cox, 2003; Craft et al., 2003; Smith et al., 1990; Smith et al., 2006; Martens, 1977; Fydrich et al., 1992). In order to quantify some of the psychological KPIs, questionnaires such as those mentioned above and displayed in the figure below are recommended to capture data on athletes.

Figure 9: Questionnaires for obtaining Psychological KPIs in athletes

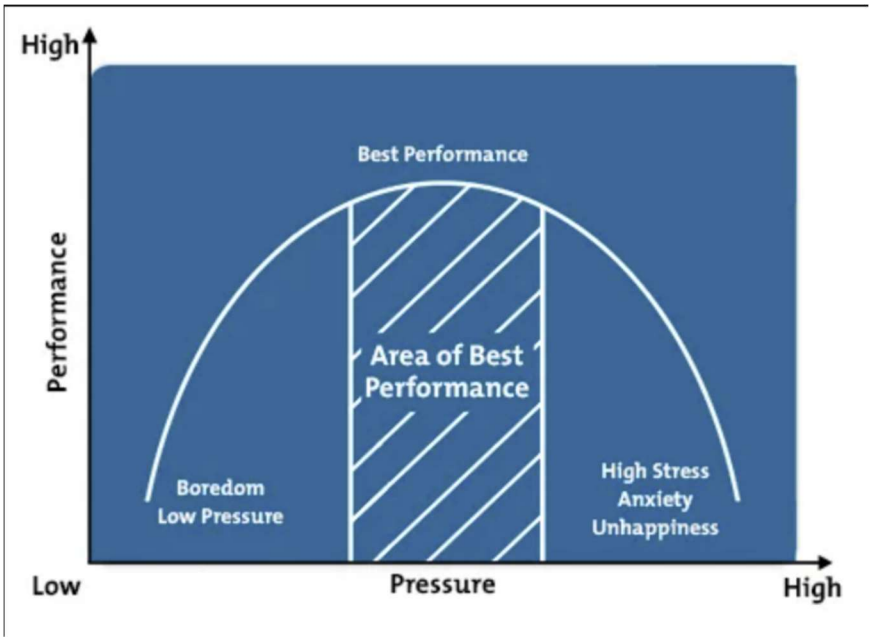


Source: IB Studies, n.d., https://bit.ly/3QH2BfH

Many anxiety-performance theories exist, including the inverted-U hypothesis, the drive theory, the catastrophe model, the multidimensional anxiety theory and the individual zones of optimal functioning theory (IZOF). These theories evolved from the observation of a strong relationship between anxiety and sport performance (Martens et al., 1970; Fazey and Hardy, 1988; Martens, 1971; Kerr, 1985; Hardy and Parfitt, 1991; Hanin, 1995; Hanin, 1997). Researchers have found that athletes who interpret their anxiety as preparatory and facilitative (in a "now I am ready to play'" manner) perform much better than athletes who interpret their anxiety as debilitating. The latter perform poorly (Jones et al., 1994).

Let us take a closer look at these theories. The inverted-U hypothesis holds that there exists an optimal level of anxiety, and that if the athlete has little or no anxiety, he or she will be easily bored and insufficiently challenged to perform at his or her best. The theory also states that if an athlete feels overwhelmed by very high levels of anxiety, he or she will also perform poorly (Martens and Landers, 1970; Hardy and Nelson, 1988; Fazey and Hardy, 1988; Hardy, 1996; Gould and Krane, 1992; Randle and Weinberg, 1997).

Figure 10: The Inverted-U Curve

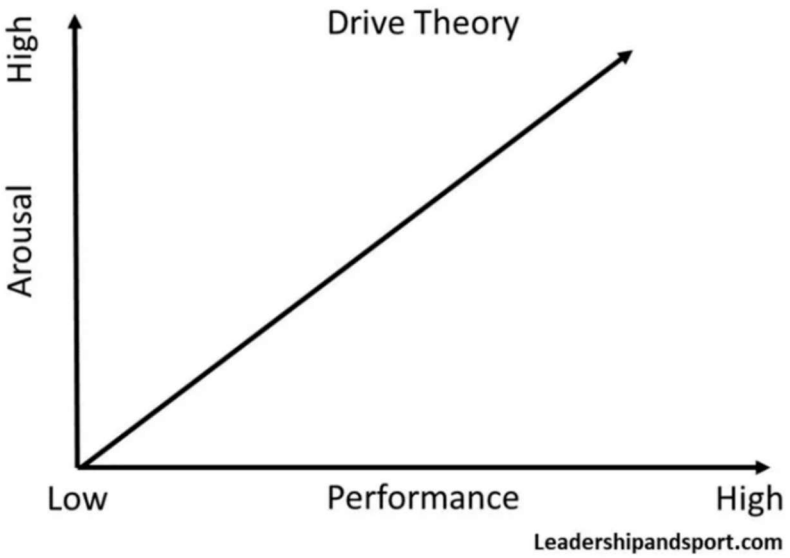


Source: Mindtools, n.d., https://bit.ly/3S4izkS

From The Relation of Strength of Stimulus to Rapidity of Habit-Formation, by Robert Yerkes and John Dodson. Published in the Journal of Comparative Neurology (1908). Work now in the public domain.

The drive theory basically states that the more anxiety an athlete feels, the better. This theory seems to have faded in importance, for obvious reasons (Martens, 1971; Kerr, 1985).

Figure 11: Drive theory

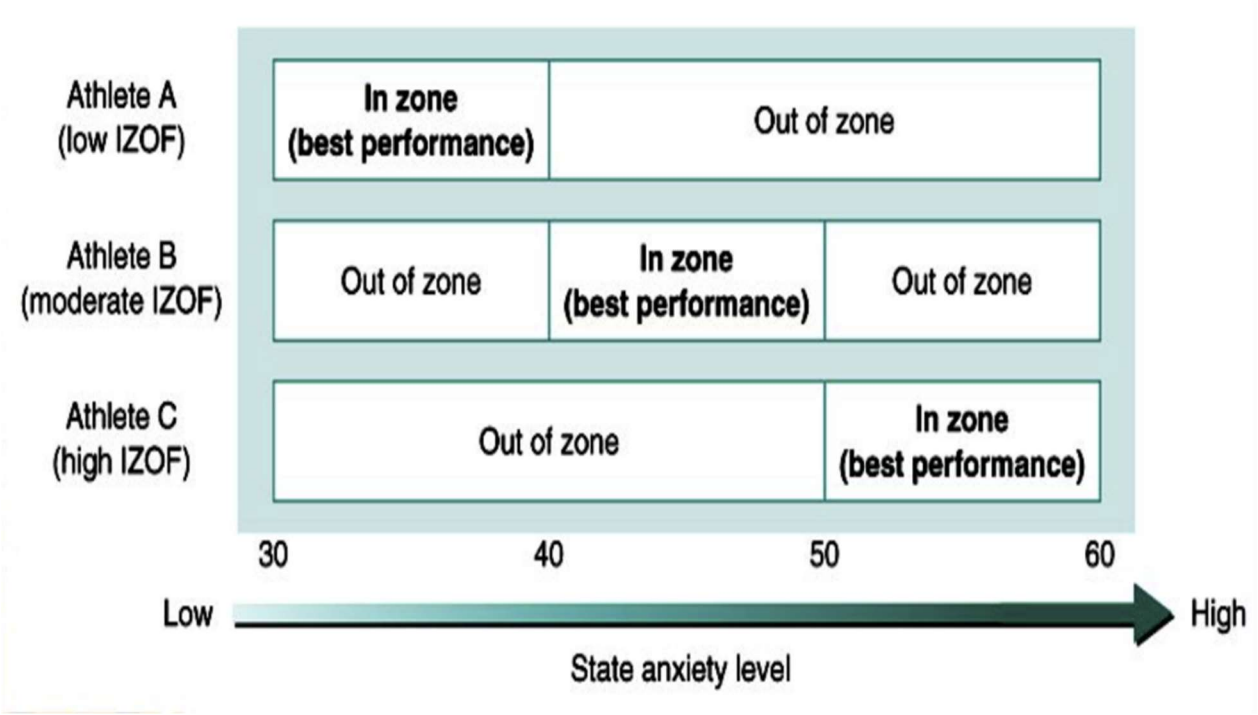


Source: Hardy and Parfitt, 1991

A controversial theory is the catastrophe model, which focuses on the interaction between physiological arousal and cognitive anxiety, as well as the athlete's interpretation of anxiety. It is based on the hypothesis that beyond a certain level of anxiety that is positively associated with physiological arousal and performance, additional anxiety leads to deterioration of performance (Hardy and Parfitt, 1991).

Many experts agree with the logic of this theory, although theories that developed later, such as the multidimensional anxiety theory and the framework of the individual zones of optimal functioning (IZOF) model, appear to be more accurate in terms of depicting the way anxiety affects sport performance (Hanin, 1995; Hanin, 2000; Hanin and Stambulova, 2004). Interestingly, the multidimensional anxiety theory hypothesizes a negative linear relationship between anxiety and performance, and a positive linear relationship between self-confidence and sport performance. It combines the constructs of confidence and anxiety (Martens et al., 1990; Woodman and Hardy, 2003). However, the IZOF model accounts for an additional factor not included in other theories , the concept that each individual athlete has a personal level of anxiety at which he or she performs optimally (Hanin, 1995; Hanin, 2000; Hanin and Stambulova, 2004).

Figure 12: The individual zones of optimal functioning

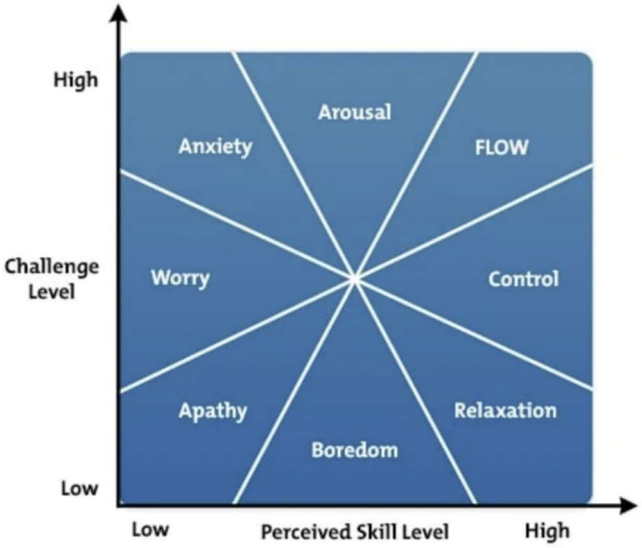


Source: Hanin and Stambulova, 2004

To add to the complexity of assessing intangible psychological factors, this particular variable consists of intricate components not yet too clearly defined or understood by researchers, athletes, or coaches. The concept of flow emerged from observing creative

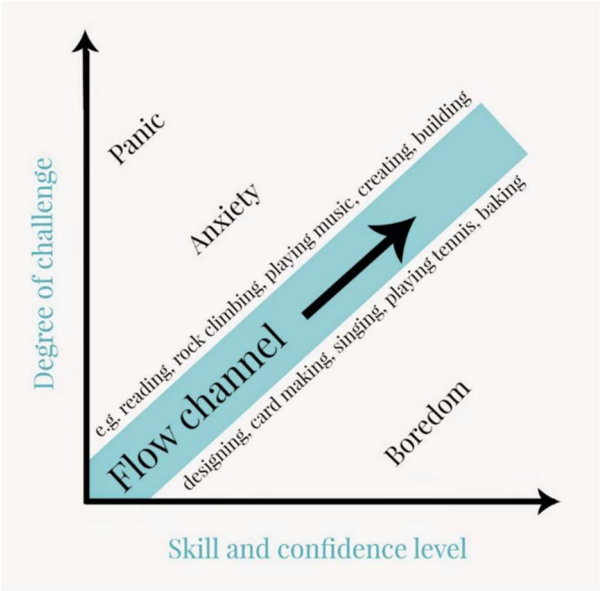
processes. Csikszentmihalyi and Wong (1991) noticed that when an artist was immersed in painting, all other bodily necessities, such as hunger, fatigue, and discomfort, seemed to be ignored. The artist was engulfed in the process and detached from the end product. The state of mind in which many athletes achieve optimal performance has been called the "zone" or "flow".

Figure 13: The challenge and perceived skill level to achieve flow



Source: Kukolic, 2020, https://bit.ly/3DnKyIb

Figure 14: Flow channel through the optimal range of degree of challenge and skill and confidence level of the athlete



Source: Csikszentmihaly, 1999

During flow, athletes experience intense focus and concentration, distortion of time, intrinsic satisfaction, and loss of reflective self-consciousness, yet all with a sense of control and mastery (Csikszentmihaly and Wong, 1991; Csikszentmihaly, 1999).

Instruments used to assess flow include the Flow Questionnaire and the Flow State Scale (Jackson et al., 2001). These instruments are designed to ascertain the level of challenge facing the athlete relative to his or her level of skill. Research suggests that for an athlete to be in a state of flow, his or her skill level and challenge level, or opposition, must be similarly matched. But if the athlete's skill level is very low compared with the opposition, he or she will experience too much anxiety, which is not conducive to being in a state of flow. Likewise, if the athlete's skill level is high and the opposition challenge level is low, the athlete will feel bored and may win, but not perform optimally (Nakamura, 2002; Nakamura and Csikszentmihalyi, 2009).

Over the years, experts in the field of sport psychology have attempted to characterise the psychological profiles of elite athletes declared that successful athletes possessed a particular psychological profile, called “the iceberg profile” termed by Morgan (Gould, 2002; Morgan and Smircich, 1980; Morgan, 1985; Rowley et al., 1995). His assessment included the following psychological factors: tension, depression, anger, fatigue, confusion, and vigour (Morgan and Smircich, 1980; Morgan, 1985; Rowley et al., 1995). Studies showed that, although levels of anger did not differ, successful athletes displayed lower levels of fatigue and confusion, and higher levels of tension, depression, and vigour when compared to their less successful counterparts. Within the Iceberg Profile, the finding of higher tension and depression may seem counterintuitive, there is a logical

explanation for this. The more successful an athlete, the more pressure he or she may feel to succeed, thereby leading to greater levels of tension. If and when such an individual fails, he or she may exhibit greater levels of depression compared to his or her counterparts. The difference seen in the perceived level of vigour is self-explanatory (Morgan and Smircich, 1980; Morgan, 1985; Morgan and Meier, 1988; Rowley et al., 1995). Please refer to the figure below for a graph of the "Iceberg Profile".

Figure 15: Iceberg Profile in successful athletes

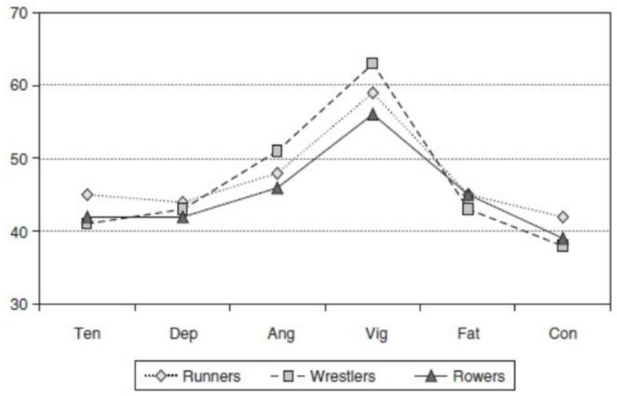


Figure 1 Profile of Mood States Iceberg Profiles in High-Level Runners, Wrestlers, and Rowers

Source: Adapted with permission from Morgan, W. P. (1985). Selected psychological factors limiting performance: A mental health model. In D. H. Clarke & H. M. Eckert (Eds.), *Limits of human performance* (pp. 70–80). Champaign, IL: Human Kinetics.

Note: Ten = tension. *Dep* = depression. *Ang* = anger. *Vig* = vigor. *Fat* = fatigue. *Con* = confusion.

Source: Psychology Research and Reference, n.d., https://bit.ly/3UaFz3z

This profile along with all the other frameworks discussed help us to decide which psychological KPIs to include in tracking athlete performance data. Please keep in mind that these frameworks do not always hold true, as there are outliers and exceptions, but for the most, part extensive research has been conducted on the KPIs aforementioned that at minimum they should warrant some consideration as to whether to be included depending on the question to be answered and how we can better help the athlete perform better.

Although there are many theories and measures of personality, a common instrument used to examine personality traits in athletes is Cattell's Sixteen Personality Factor Questionnaire (16PF). Using factor analysis, Cattell identified sixteen factors with primary traits including introversion and extraversion, tough-mindedness and receptivity, low anxiety and high anxiety, independence and accommodation, and self-control or the lack thereof (Cattell et al., 1970; Cattell, 1957; Cattell, 1973). Cattell's model is currently used to help athletes learn more about themselves and to understand their own personalities, with the objective of obtaining improved self-regulation (Orlick, 1989; Sagal et al., 2004). Many psychological constructs encompass subcategories. For instance, confidence is divided into the categories that were detailed earlier: state and trait confidence, as is

anxiety into state and trait anxiety (Martin and Gill, 1991; Krane, 1994; Cox et al., 2003; Covassin and Pero, 2004; Woodman and Hardy, 2003; Zeng et al., 2003). Aggression is a psychological construct that researchers have also subdivided into two types, instrumental and reactive aggression (McCarthy and Kelly, 1978; Donahue et al., 2009). Instrumental aggression is a type of healthy aggression through which athletes strategically devise a plan to hinder their opponent's performance (Maxwell, 2004). In contrast, reactive aggression consists of intentionally harming the opponent (Maxwell, 2004). This can lead to the perception that athletes are aggressive individuals, when in fact it may signify a higher level of passion for the sport (Donahue et al., 2009; Bredemeier, 1975).
Assessments used to measure aggression and anger are the twelve-item Competitive Aggressiveness and Anger Scale (CAAS) and the Anger Rumination Scale (ARS) (Maxwell, 2004; Sukhodolsky et al., 2001). Either scale can be used to assess anger and aggression. Note that anger is considered an emotional state, while aggression is a behaviour manifested during competition. Aggression also varies from sport to sport as well as by gender (Keeler, 2000; Maxwell, 2004). It is a KPI worth including not only regarding performance, but also during the debilitating process that occurs when an athlete is injured (Messner, 1988).

When it comes to injury and recovery, we know that physical and psychological factors can nurture or debilitate an athlete’s recovery. Psychological factors such as aggression, depression, and self-esteem, although often overlooked, have, in fact, been evidenced to affect the speed of recovery (Smith et al., 1990; Pargman, 1999; Leddy et al., 1994; Crossman, 1997). In professional sports, it is well known, particularly by the support staff, that some athletes display aggression or some form of anger when unable to play due to injury (Leddy et al., 1994). An injury is frustrating for an athlete, as it is an obstacle that is beyond the athlete's control that is getting in the way of his or her goal (Quackenbush and Crossman, 1994; Tracey, 2003).

Not surprisingly, studies have shown that injured athletes exhibit higher levels of anxiety and depression compared to injury-free athletes (Leddy et al., 1994). Depression symptoms include low self-esteem and loss of enjoyment in usually pleasurable activities (Smith et al., 1990; Smith et al., 1993). The Beck Depression Inventory (BDI) is a clinical assessment that is used to diagnose the severity of depression (Appaneal et al. 2009; Kandalaft et al., 2013). The factor of self-esteem or the feeling that one is valuable and has been evidenced in research to be a major contributing factor in both injury prevention and injury recovery (Smith et al., 1993; Leddy et al., 1994). To take it a step further, typically, an athlete's self-worth is tied to his or her athletic persona as the sport is what their life revolves around and as a result being injured can be a difficult time for athletes, with feeling a lack of self-worth (Sparkes, 1998; Green, 2001). If an athlete is showing signs and symptoms as the aforementioned, it would be a good idea to capture some relevant psychological KPIs to establish a baseline time point of the injury as well as throughout

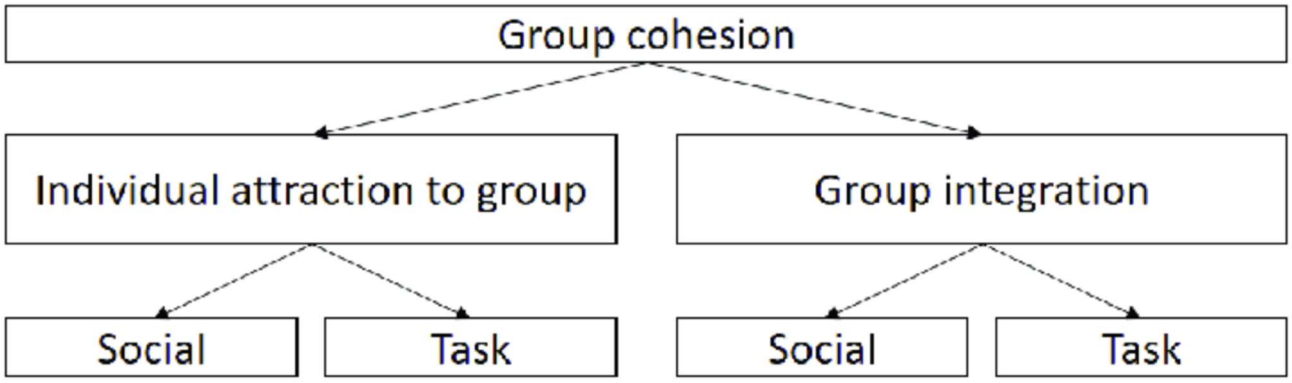
the player's recovery. A widely accepted measure of self-esteem, a possible KPI of interest, is the Rosenberg Self-Esteem Scale, a self-report in the form of a Likert scale (Rosenberg, 1965; Gray-Lee and Granzin, 1997; Gotwals et al., 2003).

Shifting the emphasis from individual athletes and KPIs for the individual player, team sports' KPIs are also important to gather. For team sports, additional psychological KPIs should be considered. Variables such as team cohesion, social facilitation, and social support have been shown to affect team performance (Gould et al., 2002).

Researchers in the field of sports psychology have long considered team cohesion to have a significant role in performance. A group of athletes who interact with one another for the purpose of reaching a shared objective is considered a team, while cohesion refers to the ability of individual players within a team to "stick together" (Ramzaninezhad, 2009; Marcos et al., 2010). A meta-analysis of forty-six studies found a moderate to strong correlation between cohesion and team performance. The instrument used in the study was the Group Environment Questionnaire (GEQ).

The GEQ consists of factors that evaluate attraction to a group and group integration based on task and social cohesion provide details about team cohesion variables falling under these main factors: sense of belonging, membership, interaction with the team, teamwork, closeness, and interdependency (Carron et al., 1985; Carron et al., 2002). Carron detailed variables falling under the umbrella of team cohesion: (1) sense of belonging, (2) membership and interaction within a team, (3) teamwork and closeness, and (4) and interdependency.

Figure 16: Carron's model of cohesion



Source: Maman et al., 2020, p. 124186

Other environmental variables known to affect sport performance are the social support of family and teammates, and the coach-player relationship (Smoll et al., 1978; Dawson, Dobson, and Gerrard, 2000; Jowett & Cockerill, 2003). However, the current measures of

psychological variables are assessed by self-report or observation (Baumeister et al., 2007). A major limitation of self-report assessments is that they are prone to social desirability bias (Fisher, 2008). In addition, in working with professional athletes, the athlete may not want to report a true weakness for fear of being released by a team, losing his or her position on that team, or having his or her salary reduced and possibly losing salaries and jobs as professional athletes (Fisher, 1998; Westerbeek and Smith, 2002). Therefore, results of self-reported assessments should not be relied upon to make drastic decisions, but as a tool to glimpse the mind of the athlete. Below is a table from research conducted on how to minimise social desirability bias when asking questions.

Table 1: Techniques, original and improved approaches on how to reduce social desirability bias when asking questions

Technique	Original Approach	Improved Approach
Indirect questioning	Posing questions directly Example: What harmful traditional practices are done in your community?	Posing indirect questions about the past, or the behaviors of others Example: What harmful practices do you know about that existed in the past? Do you think these practices might exist today in a hidden or open manner?
Providing assurances	Asking questions and waiting for participants to respond	Responding to hesitant participants by assuring them that their opinions are not wrong, and asking them to please speak freely
	Briefly explaining the confidentiality and anonymity procedures at the beginning of the in-depth interview or focus group discussion	Thoroughly explaining the confidentiality and anonymity procedures at the beginning of the in-depth interview or focus group discussion, and then offering reminders throughout the encounter, especially preceding sensitive questions
Probing for more information	Accepting generic or incomplete responses	Asking follow-up questions, or prompts Example: Can you explain more about why you feel this way?
Requesting stories or examples	Accepting generic or incomplete responses	Requesting that participants provide a story or example to illustrate their response Example: Can you tell me about a time that you experienced this?
Prefacing the question	Posing questions directly and with little context Example: Why do women attend (or not attend) antenatal care visits?	Providing context when asking questions, acknowledging that all communities have challenges and that people have diverse experiences Example: We know that some women attend antenatal care visits and others do not. What do you think are the reasons why women do (and do not) attend?

Source: Bergen & Labonté, 2020

There are alternatives to self-report questionnaires, such as computerised tasks that indirectly attempt to quantify difficult-to-measure constructs, such as, self-esteem, confidence, and anxiety (Karpinski, 2004; Egloff and Schmukle, 2002). Some of these assessments include the Dot-Probe Task and the Implicit Association Test (IAT). Throughout my work in research, I have been able to implement the implicit association task and evaluative conditioning task geared specifically toward sports performance and human performance for NASA astronauts and have had anecdotal success thus far, still further research is required to validate in the pro sports performance arena.

There remains a great need for improvement in the area of psychological assessment of sport performance. It is astonishing that measurement and assessment of psychological

variables have been neglected for so long in predictive models of sport performance. There is now at least enough literature to show that the mental or psychological aspect of sport is as important, if not more so, than physical measures (Jones et al., 2002). However, it cannot be argued that if an athlete is not near the level of contention of the opponent athlete or team, in spite of mental toughness, his psychological strength may not be sufficient to overcome the physical limitations. However, if we there are two athletes, or teams, with similar levels of physical prowess, talent, and skill, differences in the psychological variables will most likely account for whether the team wins or loses. From this module, you have now learned about some of the most important psychological KPIs to capture related to the psychological domain that contribute to internal load.

In the next module, we will discuss how all the physical, behavioural, physiological, psychological, and environmental KPIs can help us gauge an athlete's training load (TL). We will also examine how the physical and behavioural KPIs are encompassed within external load (EL) and how the physiological and psychological KPIs are quantified as internal load (IL). Furthermore, we will discuss how we can determine the optimal TL for an athlete and discuss the current trend of load management in professionals sports.

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