Psychological Flexibility in Athletes: Sport, Motivation, Goals, and the PPFI-Sport

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Abstract

To perform at the highest level, elite athletes today need to be both mentally and physically fit. A key skill of mentally fit athletes is the ability to adapt to the stress of competition in order to enhance their performance. Psychological flexibility (PF) is a measure of how well individuals cope with distress while pursuing personally meaningful goals; it is considered fundamental to an individual's health and well-being, and has been linked to improved sporting performance. The Personalized Psychological Flexibility Index (PPFI) is currently the gold standard for measuring PF as it utilises a three-factor model that includes avoidance, acceptance and harnessing. The measure was recently adapted for athletes in a sporting context to the PPFI-Sport; this study aimed to further confirm and validate the PPFI-Sport among a broad athletic population using confirmatory factor analysis (CFA). It investigated the relationships between PF and type of sport, motivation, goal orientation, and athlete demographics utilising the Sport Motivation Scale – 6 and the Task and Ego Orientations in Sport Questionnaire. The three-factor structure of the PPFI-Sport was reproduced by CFA, and the measure was found to be valid and reliable. Differences in levels of PF were found between individual and team sport athletes, between athletes with task- and ego-oriented goals, and between men and women. PF was related to intrinsic motivation, age, and level of competition. The strengths, limitations, and implications of the study are discussed, and future research opportunities are suggested. Utilising a longitudinal matched subjects design with able-bodied and para athletes is recommended.

Keywords: Psychological flexibility, PPFI, sport psychology, individual and team sport, goals in sport, motivation in sport, achievement motivation, athletic performance

Declaration

This thesis contains no material which has been accepted for the award of any other degree of diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

25 September 2022

Contribution Statement

In writing this thesis, my supervisor and I collaborated to generate the research aims, questions of interest, and methodological approach. I conducted the literature search and worked with my supervisor to complete the ethics application and preregister the project on the Open Science Framework. I was responsible for all participant recruitment, data collection, and data analyses in R. I wrote up all aspects of the thesis with my supervisor providing feedback.

Psychological flexibility in athletes: Sport, motivation, goals, and the PPFI-Sport

Adapting to the stress of competition is a sign of an elite athlete. Recent advances in understanding the role of emotion regulation in performance have shown how important this skill is (Doorley et al., 2022). Emotions can have a direct effect on our bodies physiologically; therefore, to cope with all types of experiences, athletes need to be able to handle their emotions in ways that enhance their performance, not distract from it (Gee & Luiselli, 2010). Having the mental skills to be able to face challenges and cope with unexpected stressors allows athletes to focus on their competitions and goals, one key mental skill in emotion regulation is psychological flexibility (PF). Athletes that are more psychologically flexible and able to cope effectively in stressful environments perform better and are more satisfied with their lives overall (Johles et al., 2020; Nicholls et al., 2016; Surujlal et al., 2013). An important question among sport and performance psychologists that has yet to be answered concerns PF in athletes. Is there a valid and reliable measure of PF, specifically for athletic populations? Another important question without an answer: Is an athlete's type of sport, motivation, and/or goal related to their level of PF?

Psychological Flexibility

PF is a concept that has started to gain traction in the performance psychology community in the past decade (Lundgren et al., 2020). It has come out of Acceptance and Commitment Therapy (ACT) where greater PF is the ultimate goal (Doorley et al., 2020; Kashdan & Rottenberg, 2010). In their 2020 article Kashdan et al., defined PF as "the pursuit of valued goals despite the presence of distress". While there is not a consensus on the exact definition of PF, other definitions are similar with most involving behaviours aimed at pursuing goals and working toward values (Doorley et al., 2020; Hayes et al., 2011; White et al., 2021). A

key aspect of PF is an individual's ability to stay present, engage with their emotions as well as their environment, and to respond to any challenges in a way that is aligned with their goals and values (White et al., 2021). Key dimensions of PF that are important include: an openness to experience our emotions, acceptance of these emotions, and the ability to harness our emotions to use them to further our goals. Additionally, the primary characteristic of psychological inflexibility is the avoidance of our emotions, at least of the ones that are most distressing and difficult to cope with. Researchers have found that while avoidance strategies sometimes help provide momentary relief from life's challenges, they often take us further from the life that we desire (Doorley et al., 2020). However, by being more open and accepting of their emotional experiences', individuals are more likely to take on challenges in order to achieve their goals, which has been shown to lead to a richer, more meaningful life (Kashdan & Rottenberg, 2010).

There are many positive outcomes that have been linked to higher levels of PF; however, it is also the absence of negative outcomes that has made PF so popular among ACT researchers and clinicians (Doorley et al., 2020). Higher levels of PF have been associated with self-compassion, job satisfaction, and overall well-being (Doorley et al., 2020). Kashdan and Rottenberg (2010) found that those with greater PF choose to focus on their values and goals in life, and by doing so they experience more job satisfaction and meaning in life. There is also research suggesting that being more psychologically flexible leads to an increase in the probability of healthy life choices, due to individuals becoming more self-determined (Kashdan et al., 2020; Kashdan & Rottenberg, 2010). Most of the current measurement tools in PF research measure psychological inflexibility, and as such there are more data on the different negative outcomes that are associated with psychological inflexibility. Psychological inflexibility has been linked with depression, anxiety, stress, burnout, and many other conditions that can

decrease an individual's psychological wellbeing (Doorley et al., 2020; Masuda & Tully, 2012). As a result of these findings, ACT researchers and clinicians emphasize improving PF in individuals by using different techniques such as mindfulness to improve mental health and wellbeing.

Psychological Flexibility in Athletes

Among athlete populations, research has shown that Mindfulness-Acceptance-Commitment interventions lead to increases in PF as well as improved sporting performance (Gross et al., 2018). Additionally, higher scores on psychological inflexibility have been associated with low performance scores as rated by athletes and their coaches (Johles et al., 2020). Current theories from performance psychologists suggest that the positive outcomes, adaptive coping strategies, and absence of negative outcomes that are associated with PF likely all play a role in improving sporting performance (Nicholls et al., 2016; Rice et al., 2016; Surujlal et al., 2013). Another theory behind this relationship is that athletes with greater PF can upregulate negative emotions in order to enhance their motivation and arousal levels for competition (Doorley et al., 2020; Gee & Luiselli, 2010; Robazza & Bortoli, 2007). However, too much anxiety or too high a level of arousal and performance is negatively affected (Gee & Luiselli, 2010).

Improved performance outcomes have been linked to greater PF in a range of settings (Bond & Bunce, 2003). However, limited research currently exists examining the effects of PF on athletic performance. Lundgren et al. (2020) conducted a study to evaluate the feasibility of an ACT intervention program with Ice Hockey players in order to improve their PF. Athletes in the intervention group significantly improved their PF, and reported improvements in their performances (Lundgren et al., 2020). Bond and Bunce (2003) found that acceptance was an

important longitudinal predictor of both improved performance and mental health among workplace employees. In athletic populations, strong relationships have been found between psychological inflexibility and negative mental health outcomes such as distress, depression, and anxiety which have been shown to negatively affect sporting performance and decision-making (Johles et al., 2020; Rice et al., 2016; Ruiz, 2010). Considering incidence rates of mental health symptoms in athletic populations range from 17 to 57%, with anxiety and depression the most prevalent conditions, improving PF, especially acceptance among athletes could help increase positive mental health outcomes and improve sporting performances (Armino et al., 2021; Rice et al., 2016).

One of the key building blocks of PF is default mental states or stereotyping (Kashdan & Rottenberg, 2010). While there are often negative connotations around stereotyping, for many athletes it is a positive attribute, as it allows them to make quick judgements about their environment and conserve mental energy (Kashdan & Rottenberg, 2010). The ability to quickly shift attention and decision-making skills are crucial for athletes in sports that require tactics and strategy (Raab, 2007). When athletes are unable to accept their negative emotional experiences, their attentional capacity and decision-making are negatively impacted which affects their performance (Kashdan & Rottenberg, 2010). Research has shown that when athletes face unexpected stressors, they use more avoidance based coping strategies instead of adaptive and active coping strategies that are more often employed when they are not distressed (Rice et al., 2016). Avoidance based coping in athletes often manifests as either a preoccupation with upsetting thoughts and feelings that they strongly believe they cannot cope with, or a preoccupation on the past or future which both lead to overwhelming levels of anxiety (White et al., 2021). Additionally, athletes with lower levels of PF are more likely to focus their attention

on the negative experiences and outcomes rather than what went wrong and how to improve, which can often lead to a negative loop of avoidance and poorer performances (Chang et al., 2018; Johles et al., 2020). Stressors for athletes come from all different areas, with the common sources being injuries, errors while competing, and the club/organizational climate (Rice et al., 2016). To minimise the impact that these stressors have on performance, athletes should be aiming to improve their PF in order to increase the likelihood of actively responding to cues in their environment and making better decisions that lead them toward goal achievement (Kashdan & Rottenberg, 2010).

The PPFI-Sport

Kashdan et al. (2020) developed the Personalized Psychological Flexibility Index (PPFI) in order to measure PF and how it relates to presently meaningful goals set out by the individual. While there were measurement scales used in PF research prior to 2020, the PPFI is the gold standard to measure distinct aspects of PF while maintaining the individual's focus on a presently meaningful goal (Kashdan et al., 2020). During the development of the PPFI, three constructs emerged as a way of coping with distress during goal pursuit: acceptance, harnessing, and avoidance (Kashdan et al., 2020). Initial studies have shown that the PPFI demonstrates a good fit to the model, has separability from emotionality, and distinguishes between avoidance and acceptance instead of treating them like end points on a continuum (Doorley et al., 2020). Previous measures of PF such as the Acceptance and Action Questionnaire and its revised version (AAQ-II) as well as the Multidimensional Psychological Flexibility Index, did not distinguish between negative emotionality and psychological inflexibility nor did they emphasize the importance of a personally relevant goal (Kashdan et al., 2020; Landi et al., 2021). Due to this, other measures of PF are missing crucial information, have higher correlations with

measures of distress, and are weaker predictors of positive outcomes associated with PF (Kashdan et al., 2020; Landi et al., 2021). Over other measures of PF, the PPFI predicts greater effort and progress toward goals, more joy, and a greater sense of control, autonomy, and competence (Kashdan et al., 2020).

To measure PF in athletes in a sport specific context there are two instruments that are readily available. The first is the PPFI-Sport, which was adapted from the PPFI, and validated in 2021 by honours student, Tom Rutherford. The second is a new scale called the Psychological Flexibility in Sport Scale (PFSS) which was published in 2020 by Johles et al. The PFSS has its merits as a PF scale; however, because it was adapted from the AAQ-II it unfortunately still has some of the same pitfalls as the AAQ-II, where it is a single factor scale that is highly correlated with negative emotionality and distress (Johles et al., 2020). The PFSS is a valuable addition as it broadens the scope of PF research with athletes. However, the three-factor structure and emphasis on individual goals that the PPFI-Sport combines, more closely aligns with the sporting context as well as the definition of and theory behind PF. Additionally, the PPFI-Sport includes harnessing within its factor structure. Harnessing is considered the most active approach to working with emotions, instead of against them or acting passively, which is critical in time poor situations such as athletic competitions when unwanted thoughts, feelings, or body sensations surface (Kashdan et al., 2020). During development of the PPFI, Kashdan et al. (2020) found that the harnessing factor, while used most infrequently, predicted the widest array of emotion regulation and adaptive coping strategies.

Individual vs Team Sport Athletes

While PF has been shown to enhance performance in athletes, not all athletes are the same (Johles et al., 2020). Athletes that compete in individual sports are vastly different to

athletes that compete in team sports. Individual and team-sport athletes differ in how they train, recover, interact with their competitors, perceive pressure, and ultimately manage their emotions and distress (Castro-Sánchez et al., 2018; Johnson, 1997). Despite there being some similarities, multiple studies have found that individual athletes have significantly higher levels of stress and different types of anxiety, which have been linked to avoidance based coping strategies (Castro-Sánchez et al., 2018; Norton et al., 2000). Competitive anxiety usually stems from fears of negative social evaluation of their performance by peers and others, and when athletes from individual sports compete, they are often the sole focus of an observer's attention which is likely why they experience this type of anxiety more than team sport athletes (Norton et al., 2000). On top of experiencing more anxiety, depression, and stress, individual sport athletes are also less likely to seek support from their peers or professionals than team sport athletes, which has been shown to facilitate higher levels of PF (Rice et al., 2016; Tindle et al., 2022). Currently, there is no published research comparing levels of PF between individual and team sport athletes. However, there is research showing that team sport athletes score higher on cognitive flexibility, which is defined as the ability to adapt and cope with changes in the environment (Aslan, 2018). While cognitive flexibility is different from PF, and the ability to adapt is more relevant to team sport athletes, this result is likely to be reflected in scores of PF as well, especially considering the higher levels of psychological distress that individual sport athletes experience (Aslan, 2018; Norton et al., 2000).

Athlete Motivation and Goals

Athletes from different sports differ in many ways. However, athletes within the same sport can also differ. Each athlete may have different reasons for participating in sport and what their goals may be within their sport. Motivation in athletes is what keeps them participating and

putting in effort to train and compete. While motivation can be separated into many different types, there are 3 main types of motivation that athletes demonstrate: intrinsic, extrinsic, and amotivation. Intrinsic motivation is characterized by individuals participating in an activity because they find the activity interesting and/or fun, additionally it usually provides the individual with a sense of satisfaction and competence (Deci & Ryan, 2000; Deci & Ryan, 2008). Extrinsically motivated behaviours are those that are motivated by the tangible rewards or outcomes of a specific activity, or in an attempt to avoid punishment (Deci & Ryan, 2000; Deci & Ryan, 2008; Roberts et al., 2018). Amotivation in contrast reflects a total lack of motivation to participate in a specific activity (Deci & Ryan, 2000). Better sporting performance has been linked to higher levels of both intrinsic and extrinsic motivation compared to amotivation (Clancy et al., 2016). However, when comparing intrinsic and extrinsic motivation, intrinsic motivation has been associated with better performance while extrinsic motivation has been associated with performance decrements (Cerasoli et al., 2014; Clancy et al., 2016; Deci & Ryan, 2000). In addition to performance correlates, athletes who are intrinsically motivated are more satisfied, experience enhanced well-being, and greater levels of self-efficacy (Blecharz et al., 2015; Deci & Ryan, 2000). On the other hand, extrinsic motivation has been associated with worry, negative affect, stress, and the formation of maladaptive behaviours (Clancy et al., 2016; Deci & Ryan, 2000; Deci & Ryan, 2008). Due to correlations with performance and other outcomes it is likely that PF will be positively related to intrinsic motivation and negatively correlated with extrinsic motivation. Athlete motivations are also linked to their goal orientation, with intrinsic motivation being highly related to the task orientation, and extrinsic motivation correlating with an ego orientation in sport (Roberts et al., 2018).

Valued goal pursuit is a key part of PF as it directs behaviour and can help individuals move from maladaptive coping strategies to adaptive ones (Kashdan et al., 2020). Goal directed behaviour is a proven technique that increases successful performance in athletes (Weinberg, 2013). Not all goals, however, have the same effect on performance. Two goal perspectives that athletes use to define their success and failures within the sporting context are: task and ego orientations (Duda, 1989). The task orientation is characterized by goals that emphasize personal mastery, and improvement, whereas the ego orientation includes goals aimed at mastery over others, showing off their skills, and winning (Belli, 2015; Duda, 1989; Harwood et al., 2000; Lochbaum, Çetinkalp et al., 2016). The task orientation has been correlated with greater enjoyment, greater skill development, greater satisfaction, better performance, less cheating, less worry, and the belief that hard work leads to success (Belli, 2015; Hom et al., 1993; Lochbaum, Çetinkalp et al., 2016; Newton & Duda, 1993; Roberts et al., 2018). While the ego orientation has been correlated with unsportsmanlike attitudes, aggressive behaviours, ill-being, anxiety, less enjoyment, higher stress, and poorer strategy formulation (Lochbaum, Çetinkalp et al., 2016; Newton & Duda, 1993; Rice et al., 2016; Roberts et al., 2018). Additionally, ego orientation has been found to correlate with the perception that an individual's ability has the biggest influence on performance, whereas task orientation correlated with the perception that effort has the biggest influence on performance (Newton & Duda, 1993). These relationships suggest that those with a task orientation will likely have higher levels of PF as they have lower stress and anxiety levels, they are better at strategy formulation, and are more likely to believe that poorer performance results from effort and not their skill or ability. Contrastingly, those with an ego orientation are more likely to have decreased PF as they believe that failure and challenges

reflect their skill level and as such, they often become reluctant to produce effort when they feel they will not succeed (Belli, 2015).

Study Aims and Hypotheses

The current study aims to:

1. Further confirm and validate the PPFI-Sport among a large adult Australian athletic population from different sports using Confirmatory Factor Analysis (CFA).
2. Investigate the relationships between PF, sport type, motivation, and goal orientation among athletes competing in sport at all levels within Australia.
3. Explore the relationships between athlete demographics and levels of PF.

The hypotheses relating to study aim 3 are:

1. Athletes in team sports will be more psychologically flexible than athletes in individual sports.
2. Athletes who are more intrinsically motivated will score higher in harnessing and acceptance on the PPFI-Sport scale.
3. Athletes who are more extrinsically motivated will score higher in avoidance on the PPFI-Sport scale.
4. Athletes who have goals that are task oriented will score higher in harnessing and acceptance on the PPFI-Sport scale.
5. Athletes who have ego-oriented goals will score higher on the avoidance scale.

Method

Ethics

Ethics approval was obtained from the University of Adelaide Human Research Ethics Committee, approval number 20/22. At the start of the online survey, participants were presented with an online preamble (Appendix A) that served as a Participant Information Sheet. They were informed of their right to exit the survey and end their participation at any point up until the survey was submitted, once the survey was closed participant information was anonymised and it was impossible to remove any individual participant data. After the online preamble participants were asked if they were 18 or over, this was a hurdle requirement whereby if 'yes' was not selected the survey would end. Those who were 18 or older at the time of completion then provided informed consent by completing a digital consent form which was another hurdle requirement. Participation in the study was voluntary, undergraduate participants from the University of Adelaide were provided with 0.5 credits toward their studies, and no compensation or rewards were given to external participants.

Preregistration on the Open Science Framework

We preregistered the hypotheses, procedures, materials, and data analysis plan on the Open Science Framework. Our preregistration can be viewed at: https://osf.io/***

Participants

Participants (n = 322) in the study were from local clubs and sporting organisations as well as undergraduate university students that participated in organised sport at the time. The undergraduate students that completed the survey were compensated with course credit, while all other participants received no compensation for their participation. Prior to data analysis, responses from participants that did not complete the survey in full or did not meet other survey

requirements (*n* = 133) were removed. Of those that completed the survey in full, 119 identified as women, 67 identified as men, 1 identified as other, and 2 participants preferred not to say. The average age of the survey was 27.27 (*SD* = 13.91). There were 31 different main sports that participants reported participating in, with 59 reporting an individual sport as their main sport, and 130 reporting a team sport as their main sport. Demographics from the sample are provided in Table 1.

Measures

Sport Type and Individual Goals

The first question that participants were asked was "What is your main sport?" before being asked to write a goal they have relating to that sport. The sport was coded as either an individual sport or a team sport for analysis later, if the sport could be considered as either individual or team (e.g., rowing), the athlete's goal was consulted to determine if they participate

Table 1

Sample Characteristics

Age	***n***	**Experience *(years)***	***n***	**Level of participation**	***n***	**Sport**	***n***
18-20	100	< 2	7	Social/ Local Competition	113	Hockey	32
21-25	30	2-5	44	State Competition	31	AFL	28
26-35	20	6 -10	51	National Competition	28	Netball	22
36-45	12	11 - 15	42	International Competition	16	Triathlon	16
46-55	15	16-25	23			Athletics	15
56-65	9	26-49	18			Soccer	14
66+	4	50+	4			Other	63

at an individual or team level. Participants were asked to take a few moments to consider what their goal was, and to be as specific as possible when recording it. Goals were then coded as either task-oriented or ego-oriented. The coding procedure was completed by two raters: the primary researcher and a graduate student at Pepperdine University in California. A goal orientation scoring framework (Appendix B) was developed to code each goal. Goals that focused on improving ability levels, trying hard, and having fun were coded as task oriented (Morales-Sánchez et al., 2022). Goals that were focused on winning, showing off, or being rewarded for athletic performance were coded as ego oriented (Morales-Sánchez et al., 2022). An example of a task-oriented coded goal was "to complete a half ironman"; an example of an ego-oriented coded goal was "winning the premiership for the 2022/2023 season". To assess agreement between raters the *irr* and *psych* packages in r were used (Gamer et al., 2019; Revelle, 2022). Cohen's (1960) kappa coefficient was 0.77 (SE = .05, 95% CI [0.68, 0.86]) indicating substantial agreement between raters.

Personalized Psychological Flexibility Index for Sport (PPFI-Sport)

To measure PF, participants completed the PPFI-Sport (Appendix C), a modified version of the 2020 Kashdan et al., PPFI. Participants responded to 4 initial items that the Rutherford (2021) study used to identify covariates related to the specific goal participants chose, followed by the 15 item measures of the PPFI-Sport on a 7-point Likert Scale (ranging from 1= *Strongly Disagree* to 7 = *Strongly Agree*). Rutherford (2021) found the Cronbach alpha reliability coefficient of the scale to be $\alpha = .84$, and this study found $\alpha = .70$ both indicting good internal reliability of the scale. The three dimensions of PF measured by the PPFI-Sport are Avoidance, Acceptance, and Harnessing. Each dimension is measured using 5-item sub scales, with the avoidance sub scale being reverse coded. The final score for PF is determined by

combining scores from each sub scale. To confirm this three-factor structure, a CFA was conducted using the *lavaan* package in r (Rosseel, 2012).

Sport Motivation Scale – 6 (SMS – 6)

The SMS-6 was used to measure participants' perceived motivations for participating in the main sport they nominated prior to the PPFI-Sport. The SMS-6 was chosen because it was found to have improved factorial validity over the original SMS; it includes integrated regulation as a form of extrinsic motivation, it has improved discriminant validity of intrinsic motivation factors, and it has been validated in a broad Australian athlete population (Mallett et al., 2007).

Participants were asked to respond to the statement "Using the scale below, please indicate to what extent each of the following items corresponds to one of the reasons for which you are presently training for/playing/competing in your MAIN sport." They then responded to 24-items using a 7-point Likert scale (ranging from 1 = Does not correspond at all to 7 = Corresponds exactly). The SMS-6 has 6 subscales: amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation. Cronbach's alpha for the scale was $\alpha = .84$. The subscales of external regulation, introjected regulation, identified regulation, and integrated regulation will be averaged together to get a score on extrinsic motivation while the score on intrinsic motivation will act alone (Clancy et al., 2017).

Task and Ego Orientation in Sports Questionnaire (TEOSQ)

The TEOSQ is a 13-item scale with each item scored on a 5-point Likert scale (ranging from 1 = Strongly disagree to 5 = Strongly agree). Participants were asked to respond to the 13-items with their main sport in mind. The TEOSQ has two subscales, the ego orientation subscale which is scored from averaging 6-items, and the task orientation subscale which is scored from

averaging the other 7-items (Clancy et al., 2017; Duda & Nicholls, 1992). Cronbach's alpha was $\alpha = .82$ for the scale.

Procedure

Participants were recruited by posting on social media groups, emailing local sporting clubs with information on the study as well as flyers in hopes they would pass the information onto their members. Further recruitment was also conducted through the university research participation system (SONA). Participants were then directed to the survey either via SONA (for undergraduate students at the University of Adelaide), or via the link/QR code on the survey participation flyer.

Qualtrics was used to conduct the survey. The online survey preamble was first, followed by the hurdle requirements checking for participants to be over 18 and to obtain their informed consent. The next section of the survey asked what the participants main sport was at the time, and a goal they have relating to that sport, followed directly by the PPFI-Sport. Participants were then required to complete the SMS-6 and the TEOSQ, followed by a set of demographic questions (age, gender, how long they have participated in their sport, what type of athlete they would classify themselves as, what level they compete at, how many hours a week they spend training, and whether they play other sports and if so which sports). Only participants that completed every scale item and demographic question were considered complete in terms of the data file ($n = 189$) and included in the final dataset.

Results

Data cleaning was conducted prior to final analyses. Out of the 322 surveys that were started, 189 complete surveys were included in the final data analyses. Surveys were excluded

for the following reasons: 118 were incomplete, 13 were not over 18 years old, one survey was removed due to the goal not being personal but relating to children, suggesting that the participant was a coach and not an athlete, and one survey was identified as a duplicate based on the goal, which was then confirmed using IP address and student ID information, the original survey the participant completed was included in the final analyses.

Confirmatory Factor Analysis

Assumptions for CFA were not met; the sample size was less than 200, and Shapiro-Wilk test for multivariate normality indicated the data was non-normally distributed (Kyriazos, 2018). Bootstrapping was utilised to address these assumptions, report the parameter estimates with greater accuracy, and reduce bias in standard error estimates (Byrne, 2010). Responses included in the final sample (n = 189) were used to perform CFA of the PPFI-Sport using maximum likelihood estimation with 10,000 bootstrapped samples. The model fit indices indicated a superior fit between the expected three factor model and the observed model: $\chi^2(87) = 150.57$, $p = .000$, $\chi^2/df = 1.73$, RMSEA = .06, SRMR = .07, TLI = .91, CFI = .93. (Alavi et al., 2020; Hu & Bentler, 1999). Consistent with the original PPFI, factor correlations between avoidance and acceptance (r = -.32), avoidance and harnessing (r = .21), and acceptance and harnessing (r = .19) all indicate separability between factors (Kashdan et al., 2020). The standardised factor loadings for the 15 scale items were all greater than |.45| and are reported in Table 2. These estimates are consistent with those from the original PPFI, as well as those found by Rutherford in 2021. Figure 1 depicts the factor structure and covariances of the CFA model.

Hypothesis Testing

Team vs. Individual Sport Scores on the PPFI-Sport

Of the 189 athletes whose surveys were included, 59 participants said that their main sport was an individual sport, while 130 said their main sport was a team sport. A *t*-test was conducted to determine if there was a significant difference in levels of PF between athletes in team sports and athletes in individual sports. A Levene's test was conducted initially to check for homogeneity of variance and the assumption was met. Additionally, a Shapiro-Wilk test for

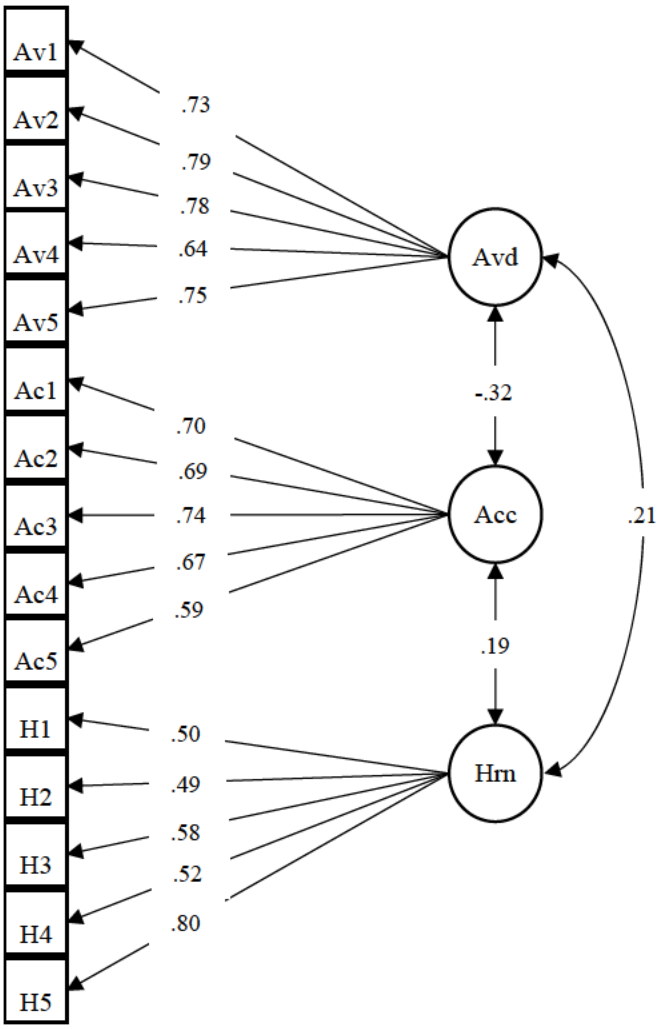
Table 2

Factor Loadings, Standard Errors, 95% Confidence Intervals, Z Scores, Significance Levels, and Standardised Estimates of the Confirmatory Factor Analysis of the PPFI-Sport.

Factor	Item	Estimate	*SE*	95% CI		*Z*	*p*	Stand. Estimate
				LL	*UL*			
Avoidance	Av1	1.20	0.11	0.97	1.40	10.81	0.000	0.73
	Av2	1.41	0.10	1.21	1.59	14.56	0.000	0.79
	Av3	1.21	0.10	1.01	1.41	11.85	0.000	0.78
	Av4	1.07	0.11	0.85	1.27	10.09	0.000	0.64
	Av5	1.25	0.11	1.04	1.45	11.90	0.000	0.75
Acceptance	Ac1	0.95	0.10	0.74	1.14	9.17	0.000	0.70
	Ac2	1.00	0.11	0.76	1.19	9.08	0.000	0.69
	Ac3	0.97	0.12	0.73	1.19	8.32	0.000	0.74
	Ac4	0.89	0.11	0.66	1.09	8.08	0.000	0.67
	Ac5	0.83	0.12	0.58	1.04	6.91	0.000	0.59
Harnessing	H1	0.70	0.14	0.42	0.97	5.05	0.000	0.50
	H2	0.75	0.15	0.44	1.02	5.17	0.000	0.50
	H3	0.95	0.13	0.68	1.20	7.16	0.000	0.59
	H4	0.89	0.14	0.60	1.16	6.32	0.000	0.52
	H5	1.32	0.12	1.07	1.55	10.87	0.000	0.80

Figure 1

Path Diagram of the CFA Model Representing the Factor Structure of PF as Measured by the PPFI-Sport



normality, along with a Q-Q plot and histogram showed that PF scores were normally distributed. A significant difference was then found between team and individual sport athlete's levels of PF, $t(187) = 2.79$, $p = .006$, demonstrating a small to medium effect ($d = .44$). Individual sport athletes scored higher ($M = 64.85$, $SD = 10.71$) compared to team sport athletes ($M = 60.25$, $SD = 10.41$) on the PPFI-Sport, indicating that individual sport athletes are more

psychologically flexible than team sport athletes. This result does not support the proposed hypothesis.

Motivation and PPFI-Sport Subscales

Scores on the SMS-6 subscales were used to determine if intrinsic motivation correlated with acceptance and harnessing, and if extrinsic motivation correlated with avoidance. Shapiro-Wilk tests for normality, along with Q-Q plots and histograms were used to examine the normality of each subscale. The intrinsic motivation, acceptance and avoidance subscales were all found to be non-normally distributed, therefore, Spearman rank correlations were used to examine the relationships between motivation and the subscales of the PPFI-Sport. Intrinsic motivation had a very small positive correlation with harnessing (ρ = .23, p = .001), while no significant relationship was found between acceptance and intrinsic motivation or avoidance and extrinsic motivation. This result suggests that athletes who are more intrinsically motivated are potentially also more equipped to harness their discomfort to motivate them during distressing situations in order to pursue valued goals, partially supporting hypothesis 2.

Additional post hoc analyses were conducted to examine the relationships between motivation and overall levels of PF. A very small correlation was found between intrinsic motivation and scores of total PF (ρ = .21, p = .003), no relationship was found between extrinsic motivation and total PF. This result supports the finding from the a-priori hypothesis testing.

Goals and the PPFI-Sport Subscales

In order to ascertain if there was a significant difference in scores on the PPFI-Sport subscale between athletes with task-oriented goals and athletes with ego-oriented goals, athlete goals first needed to be coded as either task- or ego-oriented based on the coding framework (see

Appendix B). After the raters reviewed the instances of disagreement, 80 goals were coded as ego-oriented and 110 as task-oriented. A Levene's test revealed homogeneity of variance between groups, and a significant difference was found between those with different goal orientations on the acceptance subscale, $t(187) = 1.98$, $p = .049$, indicating a small effect ($d = .29$). Athletes with ego-oriented goals scored higher ($M = 4.98$, $SD = 1.09$) compared to those with task-oriented goals ($M = 4.68$, $SD = 0.97$) on the acceptance subscale of the PPFI-Sport. After another Levene's test that confirmed homogeneity of variance, a *t*-test revealed that athletes with task-oriented goals scored higher ($M = 3.46$, $SD = 1.30$) compared to athletes with ego-oriented goals ($M = 2.83$, $SD = 1.28$) on the avoidance subscale, $t(187) = -3.33$, $p = .001$, indicating a medium effect ($d = .49$). These results indicate that athletes with ego-oriented goals are more likely to deploy adaptive coping mechanisms when faced with distressing situations during the pursuit of their athletic goals, compared to athletes with task-oriented goals. No significant difference was found between goal orientation when considering harnessing. These results do not support the proposed hypothesis.

Post hoc analyses were also conducted to examine the effect goal type had on overall scores of PF. A Levene's test revealed unequal variances on scores of total PF between athletes with task- and ego-oriented coded goals. Therefore, a Welch's independent samples *t*-test was conducted and showed a significant difference between different goal orientations on scores of overall PF, $t(145.58) = 3.72$, $p < .001$, representing a medium effect ($d = .56$). Athletes with ego-oriented goals scored higher on the PPFI-Sport ($M = 65.06$, $SD = 11.67$) compared to those with task-oriented goals ($M = 59.21$, $SD = 9.21$). This result supports the findings from the a-priori hypothesis testing, suggesting that athletes with ego-oriented goals use more adaptive coping

mechanisms when faced with distress, and are more psychologically flexible than athletes with task-oriented goals.

In addition to coding athlete's specific goals as either ego- or task-oriented, correlations between subscale scores on the PPFI-Sport and TEOSQ were used to investigate the relationship between the PPFI-Sport subscales and goal orientations. Using Spearman rank correlations due to non-normal data, no significant relationship was found between task-orientation and acceptance or harnessing, nor was one found between ego-orientation and avoidance. Post hoc analyses did, however, find a very small relationship between task orientation scores on the TEOSQ and total PF scores (ρ = .16, p = .031), while no relationship was found between ego-orientation scores and PF. This finding opposes the results found using the personal coded goals, however, due to how small this correlation is, not much can be extrapolated from this result.

Exploratory Post Hoc Analyses

As the PPFI-Sport is a new measure, and PF within athletes is still an emerging area of interest, exploratory post hoc analyses were conducted in addition to the hypothesis tests in an attempt to better understand PF in athletes. Further studies will need to be conducted to confirm these results with a-priori hypothesis testing.

Psychological Flexibility, Patterns of Participation in Sport, and Demographics

To examine any differences between genders regarding PF in athletes, a *t*-test was conducted. There were 120 individuals who identified as women, while 67 identified as men, individuals who reported their gender as "other" (n = 1) or "prefer not to say" (n =2) were not included in this analysis. A Levene's test confirmed the assumption of homogeneity of variance was met, and a significant difference was found between men and women $t(184) = 3.55$, $p < .001$. A medium effect was found (d = .54) with athletes who identified as men (M = 65.10, SD =

11.09) reporting significantly higher levels of PF compared to athletes who identified as women (M = 59.53, SD = 9.80).

Another interesting relationship was found between age and PF in athletes. A very small positive correlation (ρ = .25, p < .001) was found between an athlete's age and their level of PF, indicating that as athletes get older, they also become more psychologically flexible. This relationship should be interpreted carefully however, as the median age was 20 despite an age range of 17-77.

A few interesting relationships were found that indicate those who compete at a higher level and dedicate more time towards their sport are more psychologically flexible. In order to determine if there was a relationship between the level of competition that athletes regularly compete at, and their levels of PF on the PPFI, a Spearman rank correlation was used. A very small positive relationship (ρ = .24, p < .001) was found between the level of competition and PF, suggesting that those that compete at a higher level may have higher levels of PF. To add some support to this result (ρ = .24, p < .001), a small relationship was also found between how athletes classified themselves and their overall PF, indicating that athletes who are more elite within their sport may be more psychologically flexible than athletes who are only social/novice athletes. For this result regarding how athletes classified themselves, participants that chose 'other' (n = 7) were excluded from the analysis. Another small relationship was found between hours spent training each week and PF. A Spearman rank correlation was conducted (ρ = .27, p < .001) with athletes' levels of PF increasing with the hours they spend training each week. No significant relationship was found between how long athletes have been participating in their sport (years) and their levels of PF.

Discussion

The present study sought to further validate and confirm the factor structure of the PPFI-Sport, and to gain a better understanding of PF in a broad sample of Australian athletes. To achieve this, a CFA was run on the proposed model structure of the PPFI-Sport, then hypothesis testing was conducted to investigate how PF is related to an athlete's type of sport, motivation, and goal. Further post hoc analyses were then conducted to further explore PF among athletic populations. The results of the CFA confirmed the three-factor structure of the PFFI-Sport suggesting that it is a valid and reliable measure of PF among Australian athletes from a wide variety of sports, competing at all levels. Intercorrelations of the three factors further confirmed the three distinct dimensions of coping with distress during valued goal pursuit, advancing the theory that harnessing needs to be included in the measurement of PF, and that acceptance and avoidance are not just two ends on a continuum of PF (Kashdan et al., 2020). Additionally, by having participants respond to the scale items based on a personally meaningful goal related to their sport instead of responding to the items generally, the PPFI-Sport, like the PPFI, is able to more closely measure true levels of PF compared to other measures of PF (Kashdan et al., 2020).

As previous research into PF in athletes is extremely limited, the hypotheses of this study were all exploratory. Regarding the first hypothesis about type of sport, a significant difference in PF was found between individual and team sport athletes. In opposition to the proposed hypothesis, individual sport athletes in this sample were more psychologically flexible than team sport athletes. While this result is surprising, there were some differences between the two groups aside from the type of sport they played that may have skewed this result. Gender differences in athlete psychopathology levels have been well documented in the sport psychology literature; athletes that identify as women are more likely to experience symptoms of depression and anxiety compared to men (Correia & Rosado, 2019; Knowles et al., 2021; Norton

et al., 2000; Schaal et al., 2011). Due to the nature of this study and sport in general, athletes could not be assigned to either team or individual sports, and as such the gender distribution between the two groups was unequal. Of the athletes in the sample that played team sports, 68% were women, while only 53% of the athletes in individual sports were women. Psychological inflexibility has been previously associated with mental health outcomes such as depression and anxiety. Considering this study's exploratory post hoc analysis found women's scores of PF significantly lower than that of the men's scores, it is likely that the unequal gender distribution between groups skewed these results (Doorley et al., 2020; Masuda & Tully, 2012). The two groups also differed slightly in the average age of the athletes; individual sport athletes were on average 3.62 years older than the team sport athletes in this sample. Considering the small positive relationship between age and PF found during the exploratory post hoc analyses, it is possible that the age difference between the groups also contributed to this result.

Hypothesis two was partially supported by the study, with intrinsic motivation being significantly positively correlated with harnessing. The results suggest that intrinsically motivated athletes are more likely to seek out and use their stress and negative emotions in order to achieve their goals compared to extrinsically motivated athletes. This finding reflects the results from the Kashdan et al. (2020) study that found an association between harnessing and greater extraction of meaning in life from daily goals. Jenkins (2017) also found a relationship between PF and levels of autonomous extrinsic motivation. Taken together, these results indicate that PF is related to autonomous forms of motivation. A very small association was also found between intrinsic motivation and overall scores of PF; however, this relationship was found post hoc and needs to be validated in further research with a-priori hypothesis testing. Consequently, increasing intrinsic motivation and PF in athletes is likely to lead to better mental health and

performance outcomes (Johles et al., 2020; Kashdan & Rottenberg, 2010). No other significant relationships were found between motivation and scores on the PPFI-Sport or its subscales. Future research should strive to answer the following questions: Do autonomous forms of motivation lead to increased levels of PF in athletes? and if so, how does autonomous motivation increase an athlete's ability to cope with distress?

Contrary to hypotheses four and five, athletes with ego-oriented goals scored higher on the acceptance subscale, and lower on the avoidance subscale of the PPFI-Sport compared to those with task-oriented goals. Post hoc analyses also revealed that athletes with ego-oriented goals scored higher on overall PF than athletes with task-oriented goals. These findings suggest that athletes with ego-oriented goals are more likely to use healthy adaptive coping styles in the presence of distress when pursuing their goals than athletes with task-oriented goals. Interestingly however, a very small correlation between overall PF and task orientation scores on the TEOSQ was found during post hoc analysis. These contradictory results are likely due to a few different sources of error.

One potential source of error was the dichotomous labelling of goals. Treating goal orientations as dichotomous was likely not as informative as if they were interpreted as orthogonal (Lochbaum, Zazo et al., 2016). Forcing the raters to choose between task and ego for goals that did not fit the criteria for either goal type, as well as treating the subscale scores of the TEOSQ as dichotomous potentially caused some error in the results. An example of a goal that did not fit the criteria of a task- or ego-oriented goal was "To become recognised at a state level and improve in my overall performance throughout matches." The first part of the goal should be coded as ego-oriented but "improving performance during matches" indicates this is a task-oriented goal. Goals like this were common in the dataset and choosing between which part of

the goal was more prominent likely caused errors in the coding process. To avoid this forced choice, the Perception of Success Questionnaire (POSQ) instead classifies athlete task and ego goal orientations as high in both, low in both, or high in one orientation and low in the other (Roberts et al., 1998; Pensgaard & Roberts, 2003). A 2003 study with Winter Olympians using the POSQ, found that athletes with a high task and low ego orientation employed more social emotional support and used more active coping strategies (Pensgaard & Roberts, 2003). The study also found that high task/low ego and low task/high ego orientation athletes used more emotion focused coping strategies such as positive redefinition in order to manage their distress (Pensgaard & Roberts, 2003). These results strongly imply that athletes with either high task or high ego orientations could be more psychologically flexible depending on how they score on the other orientation subscale. As such, further analysis of the current data using an orthogonal approach may reveal a more complex relationship between goal orientation and PF. Gender may have also had an indirect effect on the relationship between goal orientation and PF. Of the athletes that were coded as having ego-oriented goals, 57% were female, whereas 67% of those with task-oriented goals were female, increasing the likelihood that the lower scores of PF among task-oriented athletes were due to gender differences and not goal orientation.

Strengths and Limitations

The present study had some notable strengths. First, the sample was large enough to draw meaningful conclusions. Second, this research has addressed the gap in the literature regarding athletes and PF. The sample further validated an important new measure of PF for athletic populations, provided a normative sample distribution of PF scores and produced statistically significant results that can guide future research in this area. Third, within the sample there was a wide range of athletes in terms of age, sport played, the level of participation, and experience in

their sport. Due to this large and varied sample, the results from this study are generalisable to most able-bodied athletes.

Several limitations of the study need to be addressed. First, a cross sectional design resulted in athletes completing the survey at different times in their season. The data collection window was between April and July, which in Australia is the end of the summer season sports and start of winter season sports. Additionally, the survey did not include questions asking what point in their season, or what type of environment athletes were in when they completed the survey. As such, we cannot deduce if a recent competition, challenge, performance, training session, or other situational factors affected responding. Longitudinal research with design considerations about situational timing of survey completion, as well as questions about recent emotional athletic, personal, and social situations would provide a more comprehensive understanding of how athletes cope with challenges and distress throughout the year. Second, due to the nature of the study, equal groups across different variables were not possible. Different proportions of men and women competing at different levels, in different sports introduces doubt into the significant results found in this study. Future research should aim to use a matched subjects design to ensure meaningful comparisons between groups.

Third, the demographic section of this study's questionnaire did not include any race or ethnicity questions. The study sample was drawn from a WEIRD (white, educated, industrialised, rich, and democratic) population. As such, no cultural implications can be drawn from the results. It is therefore important for future research into PF among athletes to be conducted in different countries and among diverse cultural populations within Australia. Additionally, the questionnaire did not include questions asking if athletes were able-bodied or para-athletes. One study with para-sport athletes reported a significant improvement in well-

being and mindfulness after an eight-session mindfulness-acceptance-commitment program, however, no significant improvement in levels of PF were reported (Macdougall et al., 2019). Future studies should seek to examine PF within the para-athlete space and compare the similarities and differences to able-bodied athletes, as well as between classifications of para-sport athletes.

Finally, the study only utilised self-report measures. Self-report measures have many advantages however, they are especially prone to social desirability bias (Adams et al., 2005; Paulhus & Vazire, 2007; Rosenman et al., 2011). It is therefore possible that some of the scale items asking about emotions and emotional responses were responded to in a socially desirable way. Additionally, responses may have aligned with previously stated attitudes and do not accurately reflect how the athletes currently experience and respond to their emotions (Ciuk et al., 2015). Self-report measures also require respondents to possess the insight required to know and understand their emotional responses in order to accurately respond to scale items asking about them (Ciuk et al., 2015). Future research with the PPFI-Sport should include a social desirability scale such as the Balanced Inventory of Desirable Responding, and other emotional response measures such as coach and peer report scales, as well as physiological measures (Perinelli & Gremigni, 2016).

Future Directions

In addition to the considerations for future research already outlined, further research into the psychometric properties of the PPFI-Sport is important to continue validating the measure. Longitudinal studies using the PPFI-Sport may increase understanding of whether PF is a state- or trait-based construct and establish whether the measure has temporal stability. By looking at PF longitudinally researchers will be able to examine how PF changes over an athlete's season

and career, and whether changes in goals over these periods significantly affect their levels of PF. Future studies should also look at the PPFI-Sport's predictive validity with objective, self- and peer- report measures of performance; discriminant validity of the measure should be investigated by comparing scores on the PPFI-Sport to scores of negative emotionality on measures such as the Big Five Inventory-2-Short Form.

Future research should also consider taking a broader approach to goals/goal orientations and motivation. As discussed earlier, the POSQ treats goal orientations as orthogonal instead of dichotomous, which provides a more complete picture of athlete goals (Lochbaum, Zazo et al., 2016). Lochbaum, Zazo et al. (2016) suggest that results from the TEOSQ be interpreted in the same orthogonal way as the POSQ, and that researchers should use both measures simultaneously for a more complete understanding of achievement goals. In addition to examining goal orientations, future studies should use an orthogonal approach to categorise the type of goal that athletes have. The nature of goals among athletes can be examined from many different perspectives; future researchers should investigate PF using different achievement goal frameworks while simultaneously exploring the difficulty and temporal nature of individual goals (Munroe-Chanler et al., 2004). Athlete motivation should also be investigated using broader definitions of motivation. The self-determination theory of motivation groups the six motivation regulations into three categories: amotivation, autonomous and controlled forms of motivation (Deci & Ryan, 1985; Ryan & Deci, 2000). By categorising motivation as autonomous or controlled, the more self-determined forms of extrinsic motivation, integrated regulation and identified regulation, are included with intrinsic motivation, and distinguished from the more controlled forms of extrinsic motivation, external regulation, and introjection (Deci & Ryan,

1985; Ryan & Deci, 2000). By taking a broader approach to athlete goals and motivations, researchers will gain a better understanding of how these constructs affect PF.

As research into PF within athletes starts to gain more momentum, further exploration into the cognitive and physiological constructs that contribute to what makes an athlete more psychologically flexible is needed. Current research suggests that emotions play a key role in concentration and performance during competition (Allen et al., 2013; McCarthy et al., 2013). Athletes report greater disruptions in their concentration when they are experiencing elevated levels of anxiety or happiness, but not excitement (Allen et al., 2013). Allen et al. (2013) suggest that excitement facilitates the harnessing of anxiety when individuals have a positive expectation of their ability to reach their goals and cope with challenges. Mental effort is another cognitive construct that is affected by anxiety (Allen et al., 2013; Eysenck et al., 2007; Smith et al., 2001). Athletes with higher levels of anxiety exert greater levels of mental effort during competitions and sometimes still see a decrease in performance, whereas those with less anxiety are able to improve performance with increased mental effort (Smith et al., 2001). Other findings also suggest that when athletes positively appraise their performance, greater mental effort can reduce the negative impact that elevated levels of anxiety usually produce (Allen et al., 2013). In team sports where teamwork, strategy, and adaptability are important, mental effort has been found to contribute to an athlete's ability to concentrate during competition, especially during situations where scores are close (Allen et al., 2013; Smith et al., 2001). Further investigation into how these constructs relate to avoidance, acceptance, and harnessing may help athletes understand and use their emotional states to improve their performance.

How and to what extent athletes experience stress plays a vital role in how they then cope with that stress (Anshel & Sutarso, 2007; Kristiansen & Roberts, 2010). Advances in research

methods now offer the use of physiological measures, such as salivary cortisol swabs, to measure stress levels (Ushiki et al., 2020). These measures give researchers a more accurate understanding of the extent to which stress is experienced by individual athletes. By using physiological measures of stress, researchers reduce the impacts of social desirability bias and measurement error, as athletes are not required to appraise their own stress levels in response to certain challenges. Future research using both self-report and physiological measures to investigate how PF is related to athlete levels of stress, how stress is experienced, and the coping strategies most often employed will significantly contribute to PF research. By incorporating cognitive and physical measures into future research, researchers will gain a more holistic understanding of athlete mental health and performance.

Post Hoc Findings

Findings from the additional exploratory post hoc analyses need to be further explored. Gender differences on PF were significant and may have moderated the relationships found in the other results of this study. Athletes who identified as men were significantly more psychologically flexible than women in this study, which likely reflects differences in anxiety symptoms between the genders. These differences need to be explored as they have important repercussions for performance targets; female athletes with pre-season anxiety are twice as likely to get injured during the season (Li et al., 2017). It is therefore important to investigate further how anxiety affects PF differences between genders, and if these differences have significant effects on athletic injuries and performance.

Age was also found to correlate with PF among athletes. The findings suggest that older athletes in this sample were more psychologically flexible than younger athletes, consistent with the findings from Plys et al.'s (2022) work which found older adults to be more psychologically

flexible than younger adults. Additionally, small relationships were found between hours training and PF as well as level of competition and PF, suggesting that athletes who compete a higher level and train more are more psychologically flexible. It is important to note however, that no relationship was found between years in sport and PF. These results imply that higher levels of PF may be related to more life experience, as well as more competitive athletic experiences. Future research should investigate the relationship between athletic experiences in sport such as representing their country and PF, while controlling for variables such as age.

Study Implications

These results indicate that the PPFI-Sport should be the measure of choice to further explore and understand PF in athletes. The three-factor structure is valid and reliable, and by asking for a personalised goal valued by the athletes, responses to scale items accurately reflect how they cope with distress during valued goal pursuit. The findings also reflect that an athlete's type of sport, motivation, and goal all play a role in their level of PF. Further research into each of these areas is still needed to confirm these findings, and to examine their effects on athletic performance.

The transition into, and out of elite sport can be stressful and challenging, especially for athletes with strong athletic identities (Barcza-Renner et al., 2020; Knowles et al., 2021). In the United States, less than 1% of athletes competing in the NCAA college system go on to compete in sport professionally, with the percentage even lower for women (Barcza-Renner et al., 2020). As such, fostering and maintaining athlete wellbeing is fundamental for athletes to cope with challenges inside and outside of competition, and prepare them for life outside of sport (Kashdan et al., 2010). Increased stress levels in athletes can lead to decreased hours of quality sleep, and poorer performance in daily activities as well as in sporting competitions (Storey et al., 2022).

Use of techniques to improve PF needs to be at the forefront of psychological training for athletes. Education on how harnessing distressing and uncomfortable emotions can help individuals achieve their goals should also be encouraged within the athletic community. As such the PPFI-Sport should be used to monitor individual athletes' wellbeing and ability to cope with distress, to identify those who are more at risk of decreased wellbeing.

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Appendix A

PROJECT TITLE: The Relationships between Motivations, Goals, and Psychological Flexibility among Individual and Team Sport Australian Athletes

HREC approval number: 20/22

Principal Investigator: ***

Student Researcher: ***

What is the project about, and who is undertaking the research?

Goals in sport are important as they guide the way we train, play, and compete. Sometimes when pursuing goals athletes can become stressed as they face different challenges. How individuals choose to deal with their uncomfortable feelings and face these challenges is referred to as their psychological flexibility. Psychological flexibility is measured by looking at how people accept, harness, and avoid their uncomfortable/distressing feelings in order to pursue their goals. This project aims to look at athletes specifically and how their psychological flexibility is related to their goals and motivations within the sporting context.

The PPFI-Sport is the first multiple choice questionnaire that you will fill out. This is a new scale in sports psychology domain and will hopefully soon be used to guide athletes in their mental preparation to improve athletic performance. It consists of writing a goal for your sport at the start then is followed by 19 questions about how you work towards that goal when you are faced with challenges. You will then complete the Sports Motivation Scale which is another multiple-choice questionnaire with 24 questions. This looks at your overall motivations with regard to your sport. The third questionnaire you will complete is the task and ego orientation is sports questionnaire which looks at how you approach and define success within your sporting/athletic achievements. You will then be asked to fill out some simple demographic questions about you and your sport.

This project is being conducted by ***. This research will form the basis for *** thesis in the degree of Honours Degree of Bachelor of Psychological Science at the University of Adelaide under the supervision of ***.

Why am I being invited to participate, and how long will it take?

You are being invited as you are over the age of 18, currently residing in Australia and currently competing in organized sport.

You are being invited to complete an online survey, that is expected to take a total of 15 – 20 minutes

You are being invited to complete:

- The Personalised Psychological Flexibility Index for Sport (PPFI-Sport), consisting of 19 questions on a 1-7 scale.
- The Sport Motivation Scale-6 (SMS-6), consisting of 24 questions on a 1-7 scale.
- The Task and Ego Orientation in Sport Questionnaire (TEOSQ) consisting of 13 questions on a 1-5 scale.
- Some basic demographic questions.

In total, there are 56 multiple choice questions and 8 demographic questions which are a variety of multiple choice and short answer questions. These questions can be completed in your own time, on a computer or mobile device.

If you are a University of Adelaide psychology student and complete the survey you will be awarded 0.5 SONA credits.

What are the potential benefits of the research project?

There has been really limited research into Psychological Flexibility among the athletic population. The PPFI-Sport scale is a brand-new scale that is still being tested to be correctly testing/measuring what we think it is measuring (Psychological Flexibility in the sporting context). This scale once validated could become a really useful tool for sporting clubs to use that is accessible and easy to understand for athletes and coaches without the need to have sports psychologists present. We are hoping that once coaches and athletes learn to interpret the results and how to improve them, their athletic performance, and well-being will also improve.

Are there any associated risks, and can I withdraw my participation?

There are no foreseeable risks associated with participating in this project. All data is kept anonymous.

Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any point up until you submit the survey, at which point your results are submitted and anonymised and cannot be removed as we cannot identify your data anymore.

What happens with my information?

Your privacy and confidentiality will be protected as each participant will be allocated a unique identification number which will be used to manage their data. After submitting your survey, your responses will be made anonymous and will be stored with the data set for future use and evaluation of the results from the research. Any reports, publications, or presentations of the research will present all results in terms of aggregated results.

Your information will only be used as described in this participant information sheet and it will only be disclosed according to the consent provided, except as required by law.

Who do I contact if I have questions about the project?

*** **Ph:** *** *** **Email:** *** ***

*** **Email:** *** ***

What if I have a complaint or concerns?

The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number 20/22). This research project will be conducted according to the NHMRC National Statement on Ethical Conduct in Human Research 2007 (Updated 2018). If you have questions or problems associated with the practical aspects of your participation in the project or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. If you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant, please contact the Human Research Ethics Committee's Secretariat on:

Phone: +61 8 8313 6028 Email: hrec@adelaide.edu.au **Post:** Level 3, Rundle Mall Plaza, 50 Rundle Mall, ADELAIDE SA 5000

Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?

The completion of submitted responses will be taken as an indication that you have read the above information and consent to participate.

Yours sincerely,

*** and ***

On behalf of the research team.

Appendix B

Inter-Rater Reliability Coding Form

Task oriented goals or Ego oriented goals

In the column labelled task or ego, please write "Task" or "Ego" based on your judgement resulting from this coding form.

Definition of Task Orientation

"The task-oriented goal dimension focuses on improving one's own ability, acquiring knowledge, and the belief that it is necessary to put forth effort, try to understand tasks, and collaborate with peers in order to succeed"

Code as Task Oriented if their goal includes words/statements such as…

- To have fun
- To improve my ability
- To learn more about playing/competing in the sport
- To understand the game/sport better
- To collaborate with teammates for success
- To challenge myself
- To complete a challenge to myself
- To improve my skills
- To improve my fitness/health
- To improve my strength/endurance/speed/agility
- To recover from injury and play without injury
- Be a better athlete/player than I was last year/season
- To gain confidence
- To learn from my mistakes/failures
- To make less mistakes as the season goes on
- To learn new skills
- To commit/try hard at training/games/competition
- To socialise
- To complete a skill in competition/game well by the end of the season
- To be consistent
- To contribute to the team in a meaningful way
- Progress to the highest level in the sport
- To play/compete as long as possible

DO NOT code as Task Oriented if their goal includes words/statements such as…

- To take time out for myself

Definition of Ego Orientation

"The ego-orientation dimension is characterized by the desire to outperform others and the belief that success requires greater ability relative to an external criterion"

Code as Ego Oriented if their goal includes words/statements such as…

- To be better than others
- To look fit/pretty/handsome
- To attract others to my physical physique
- To be the best
- Outperform others
- To be able to show off
- To have better skills than others
- To show off my skills
- To impress others
- To be successful
- To win
- To be better than someone else /team of others
- I want to be the best
- To win (race, game, grand final, premiership)
- To score the most points/goals/hits etc.
- To be awarded best player
- To be the best or one of the best players in team
- To make the final(s)
- To get medals/awards/trophies
- To make money
- To achieve a certain standard, or ranking (e.g. a certain time or distance for athletics)
- To make a certain team – e.g. A grade, state, national etc.
- To be competitive against other teams/individuals

DO NOT code as Ego Oriented if their goal includes words/statements such as…

- To perform at my best

Appendix C

Personalized Psychological Flexibility Index for Sport (PPFI-Sport) (adapted from Kashdan et al., 2020)

Personalized Psychological Flexibility Index for Sport (PPFI-Sport)

This survey measures how athletes pursue goals in the presence of unwanted thoughts and feelings. Athletes are first asked to identify a benchmark sporting competition they are currently preparing for in the coming year.

Instructions: *Take a few moments to consider a goal that you are pursuing in your **MAIN** sport. Be as specific as possible - provide a description AND a timeframe/specific date for your goal.*

My goal is: _____

For each statement below, select the rating that best describes YOUR thoughts and feelings about this goal. In response to the questions, there will be a temptation to portray yourself in an overly favourable manner. Please resist this temptation, and answer each question as honestly as possible. With your honesty, we can better understand the experiences of athletes striving towards meaningful goals. Remember, your responses are anonymous.

Response Scale: 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Somewhat Disagree*, 4 = *Neither Agree or Disagree*, 5 = *Somewhat Agree*, 6 = *Agree*, 7 = *Strongly Agree*

Items:

1. This goal is central to my life.
2. I find this goal challenging.
3. I feel stressed pursuing this goal.
4. I experience negative emotions while pursuing this goal (such as anxiety, frustration, guilt, anger, disappointment).
5. I avoid the most difficult goal-related tasks.[av] -

6. I put off pursuing this goal when I could be doing a more enjoyable task.[av] -
7. When I feel stressed pursuing this goal, I give up.[av] -
8. I get so caught up in thoughts and feelings that I am unable to pursue this goal.[av] -
9. When I feel discouraged, I let my commitment for this goal slide.[av] -
10. I accept the setbacks while pursuing this goal. [ac]
11. While pursuing this goal, I try to accept my negative thoughts and feelings rather than resist them. [ac]
12. I am willing to experience negative thoughts and emotions related to this goal. [ac]
13. I accept things I cannot change about this goal. [ac]
14. While pursuing this goal, I can observe unpleasant feelings without being drawn into them.[ac]
15. When faced with obstacles related to this goal, my frustration serves to energize me. [h]
16. I find worrying helpful to solving goal-related problems. [h]
17. When people distract me from this goal, I use any anger that arises to stay focused. [h]
18. I get motivated by guilt when I fail to meet my own expectations pursuing this goal. [h]
19. I find unpleasant emotions useful for reaching this goal.[h]

Scoring: [av] = from 5-item Avoidance subscale, [ac] = from 5-item Acceptance subscale, [h] = from 5-item Harnessing subscale. In the Avoidance subscale of the Personalized Psychological Flexibility Scale, items were reverse scored. When considering the Total PPFI-Sport Score Avoidance was also reverse scored, such that higher scores indicated less avoidance.