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Research Article

Psychological Flexibility Skills and Mental Wellbeing in Athletes: An Exploration of Associations and Gender Differences

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Abstract

Psychological flexibility skills (PFS) have shown to be an important aspect of wellbeing among the general population, however, there is a gap in research exploring flexibility skills among athletes. The present study examined the effects of PFS on young athletes' (n = 106, M = 19.9) psychological wellbeing, symptomatology, and gender differences. Data was investigated using correlations and linear regression analyses. Higher PFS was associated with subjective wellbeing, recovery experiences, self-esteem, and lower levels of perceived stress, and depression symptoms (r = 0.30-0.53). Among the PFS, value-based actions acted as the strongest predictor for mental wellbeing and symptoms. In addition, avoidance of distressing thoughts and emotions related to sport was a significant predictor for self-esteem, symptoms of stress and depression but not for subjective wellbeing and recovery experience. Also, our results highlighted gender disparities, with female athletes reporting higher stress and depressive symptoms, while males exhibited better mental wellbeing, psychological recovery, self-esteem, and higher psychological flexibility skills. Overall, engagement in value-based actions may enhance athletes' mental wellbeing. Further, it might be important to pay attention to individual differences related to gender both when assessing psychological flexibility skills and when applying interventions aimed at enhancing mental wellbeing among athletes.

Keywords

Psychological Flexibility, ACT, Athletes, Mental Wellbeing, Gender

1. Introduction

Mental health is an important resource empowering athletes to realize their potential and overcome challenges and distress in their careers. As defined by the World Health Organization, mental health embodies a dynamic state of wellbeing. It

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encompasses athletes comprehending their potential, finding meaning and purpose in sport and life, fostering relationships, navigating common stressors in life and within sports, and aligning actions with their values [1].

Mental health and related concerns in sport have been recognized in recent years. Athletes encounter a multitude of sport-specific stressors exacerbating psychological distress. These stressors include injury, concussion [2-4] overtraining [5], performance failure and pressure to perform and succeed [6, 7] and challenges in post-career adjustment [8]. Intense training itself elevates the risk of mental fatigue and excessive stress [9] impacting recovery and increasing the likelihood of sport-related injuries [10]. Acknowledging humans as bio-opsychosocial entities, a holistic coaching philosophy encompassing mental wellbeing is important. The consideration of mental wellbeing in sports also correlates with responsible sport practices [11]. Promoting and improving the mental wellbeing of athletes will enhance their quality of life and help them serve as societal role models [8].

Previous studies have emphasized the pivotal role of psychological flexibility in mental wellbeing [12-14]. Psychological flexibility denotes the ability to focus on the present moment, embracing thoughts and emotions non-judgmentally, and, depending on what the situation offers, maintain, or change behavior in line with personal goals and values. Engaging in psychologically flexible behavior involves observing internal experiences in an open, non-elaborative, non-controlling and non-judgmental manner, and engage in valued actions [15]. This mindful and flexible approach towards inner experiences reduces the need for emotional and cognitive control and allows people to focus or redirect their attention to what is most important and workable in the present moment. As a result, psychologically flexible people are less disturbed by private experiences and they have more attentional resources to perceive and respond effectively to purposeful opportunities that exist in the present situation [15]. Overall, psychological flexibility facilitates effective actions, enables one to be more creative and respond to situations as they arise, and to align action with one`s values, critical in the context of sports.

Psychological flexibility is a central concept in the Acceptance and Commitment Therapy/Training (ACT) model (Figure 1), [13, 15], fostering six interrelated skills 1) Acceptance of difficult experiences and thoughts while pursuing personally chosen values and goals. For example, athletes with well-trained acceptance skills, may fully focus on the task at hand while being open to unpleasant experiences such as excitement, anxiety, or physiological arousal. 2) Contact with the present moment, which can be defined as being here and now in the current situation and developing an awareness of thoughts and emotional reactions. For example, athletes` awareness of their inner experiences (thoughts and emotional reactions) and their impact on their behavior gives them a possibility to redirect attention flexibly on what is most important in the situation. 3) Defusion, refers to distancing oneself from one's thoughts, somatic experiences, images, or memories, thereby reducing the impact of inner experiences on action. For example, the athlete notices that her mind brings a thought" I am a failure, it is not even worth trying". Instead of believing in this and reacting accordingly, the athlete can view negative thoughts as mental processes rather than absolute truths. 4) Self-as-context, taking an observer`s perspective of emotions, sensations, and feelings. For example, self-critical thoughts while taking part in sport activities can be perceived from an observer perspective. 5) Clarification of values or ongoing actions in relation to what is important in life or sport. For example, the athlete is clear about what kind of athlete they want to be and what qualities are important for them both as an athlete and as a non-athlete. 6) Committed actions, i.e., doing whatever it takes to achieve a fulfilling and meaningful life and purposeful performance in line with one's values, regardless of the possible psychological barriers that might be encountered. For example, the athlete chooses to play on a moment-to-moment basis in a non-judgmental way according to one's values, despite the feeling of fear of failure [13].

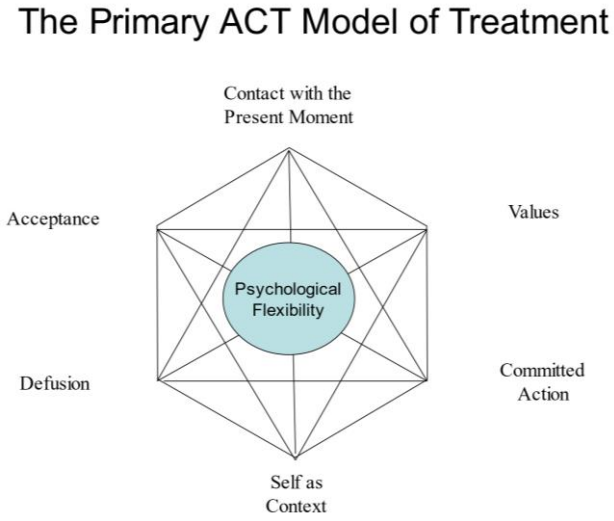

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Figure 1. *The hexaflex model of psychological flexibility.*

Rather than attempting to change or control of thoughts and emotions, the core in practicing psychological flexibility skills is the willingness to be open and aware of inner experiences, encouraging commitment to meaningful actions alongside with those experiences. Athletes are expected to cope with and regulate their cognitions, emotions, and bodily reactions, focusing on their performance even amidst stress or failure [16].

Psychological flexibility, akin to a personal resource, alongside psychosocial resources, plays a protective role against various health-related symptoms [17]. Studies have shown that higher levels of psychological flexibility are

associated with lower levels of health-related symptoms such as stress, depression, and anxiety [15, 18, 19], as well as better job-related wellbeing and lower levels of burnout [20]. Also, psychological flexibility has been shown to be a crucial determinant of mental health and behavioral effectiveness [21]. Consistent with this conceptualization of psychological flexibility, there are now dozens of studies showing that this characteristic or ability predicts outcomes such as mental health, physical health, and work performance [14, 15]. To our knowledge, research on the association between psychological flexibility and mental wellbeing in sports remains relatively limited. In sport settings, psychological inflexibility as measured by Acceptance and Action Questionnaire (AAQ-II) has been examined in studies exploring experiential avoidance (i.e., the unwillingness to experience difficult thoughts and emotions while pursuing one's values and goals) in athletes [22], rehabilitation among athletes [23, 24] and psychological problems in injured athletes [25]. Johles et al. (2020) [26] examined a new measure of psychological flexibility in athletes, the Psychological Flexibility Sport Scale (PFSS), and found that high levels of psychological inflexibility were significantly associated with low quality of life, depression, and anxiety. However, very few studies have explored different aspects of psychological flexibility (e.g., values vs. acceptance) and their role in athletes' mental wellbeing.

Counseling of athletes could benefit from evidence-based insights to variables associated with psychological wellbeing. Hence, this study aims to investigate the connection between psychological flexibility skills and mental wellbeing in athletes. Specifically, it examines how different dimensions of psychological flexibility (e.g., acceptance, mindfulness, values) relate to athletes' mental wellbeing, recovery experiences, self-esteem, and symptoms of stress and depression. Additionally, it aims to discern potential gender-based differences in psychological flexibility skills and whether these skills associations with mental wellbeing diverge between female and male athletes.

This objective stems from observations indicating that females often report more symptoms of depression and anxiety compared to males [27-30]. Additionally, experiential avoidance tends to be higher among female adolescents than male counterparts [31]. In addition, the association between avoidance of aversive thoughts and feelings and depressive symptoms appears stronger among females [27]. These insights suggest that gender-related differences should be observed in assessment and in counseling of athletes.

2. Materials and Methods

Participants

A total of 106 participants, 58 female (55%) and 48 male (45%) athletes, took part in the present study. Participants were recruited through the Jyväskylä Sports Academy and the National Olympic Training Centre Helsinki by a letter of invitation sent directly to the athletes with the help of their sport coaches. All participants were national level athletes who wanted to participate in a sport-specific ACT intervention (Mind & ACT intervention) in 2022. Participants were on an average 19.9 years old (*SD* = 3.8, range 16-35), and represented three different sports, including athletics (*n* = 55), basketball (*n* = 40) and ice hockey (*n* = 11). Among them, approximately 20% had a university level education. A total of 8% were full-time athletes. The participants trained professionally or semi-professionally at the sports academy or Olympic training centre. Their average training time per week was 15.11 hours (*SD* 4.64). The characteristics of the participants are shown in Table 1. The study received ethical approval from the Regional Ethical Review Board of the University of Jyväskylä, Finland, in autumn 2021 (1138/13.00.04.00/2021). The research was conducted in accordance with the Declaration of Helsinki (1964). All participants gave their written informed consent to participate in the study.

Table 1. *Participants Characteristics (n=106).*

Baseline characteristic	**n**	**%**
Age		
M (SD)	19.9	(*SD*=3.8)
15-17	29	27
18-22	54	51
23-34	23	22
Gender		
Female	58	55
Male	48	45
Sports		
Athletics	55	52
Basketball	40	38
Ice hockey	11	10
Educational level		
Primary school	13	12
High school	71	67
University of applied studies/ University	22	21
Full-time athletes	8	8
Total amount of training hour per week		
M (SD)		
6-11h	24	23
12-17h	53	50
18-23h	22	21

Baseline characteristic	n	%
24h <	7	6
Earlier experiences of mental coaching		
Yes	44	42
No	62	58
Earlier experiences on ACT tools		
Yes	29	27
No	77	73

Procedure

Data collection was conducted at four different time points, with the first data collection in spring 2022, the second in summer 2022, the third in autumn 2022, and the fourth at the end of 2022. All the participants were invited on a voluntary basis and informed that their anonymity would be preserved. The invitation letter contained information about the study, measurements, and purpose of the study. Participants registered for the study by email. The exclusion criteria were the following: The athlete a) was not training at the Sports Academy in Jyväskylä or the National Olympic Training Centre Helsinki, b) had a parallel psychological intervention, c) could not participate in the 6-week intervention due to travel, d) antidepressant dosage had been changed in the last six weeks, e) had suicidal intent, f) had an insufficient knowledge of the Finnish language.

Mental wellbeing and symptom measures

The Mental Health Continuum-Short Form [32] is a 14-item self-report measure of subjective emotional, psychological, and social wellbeing over the past month. Participants are asked to rate how often they experienced feelings of wellbeing in the past month on a 6-point scale ranging from 0 (never) to 6 (every day). Individual scores can range from 0 to 70, with higher scores indicating higher mental wellbeing. The questions are based on the following statements like "During the past month, how often do you feel satisfied with life" (emotional wellbeing); "During the past month, how often do you feel that you had experiences that challenged you to grow and become a better person" (psychological wellbeing); "During the past month, how often do you feel that you had something important to contribute to society" (social wellbeing). In previous studies, the internal consistency of the MHC-SF has ranged from 0.80 to 0.89 [33]. In the present study Cronbach's α was 0.91.

To assess the psychological recovery experience in free time, (outside the sporting hours), we used the Recovery Experience Questionnaire REQ [34], which has been validated in xx [35]. The items were rated on a 5-point Likert scale, ranging (1= I do not agree at all, 5= I fully agree) with four subscales (psychological detachment, mastery, control, relaxation). For each of the 16 items, the stem was "During time after sport…" Sample items included "…I forget about sport" (psychological detachment), "…I seek out intellectual challenges" (mastery), "…I decide my own schedule" (control), and "…I kick back and relax" (relaxation). The items were recoded so that a high score on each scale indicated a high level of the recovery experience. In this study, the original questionnaire was modified to apply to sports by using the word "sport" instead of the word "work". In the present study, Cronbach's α was 0.79.

The Dimensionality of Self-esteem RSES [36] measures general self-esteem with ten statements related to self-esteem and self-acceptance. The rating scale is a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The possible total score ranges from a minimum of 10 to a maximum of 40, with higher scores reflecting a more positive evaluations of the self. Sample items included, for example, "On the whole, I am satisfied with myself", and" At times I think I am no good at all". For the analyses, the five negative items were reversed. The internal consistency of RSES, analyzed using Cronbach coefficient, was 0.89.

Stress symptoms were measured using the Perceived Stress Scale -10 *PSS-10* [37]. The PSS-10 is a widely used 10-item scale on which respondents' rate how stressful (unpredictable, uncontrollable, and overloaded) they perceive their lives to have been within the past month (e.g. "How often during the past month have you been upset about something that happened unexpectedly?"). Each item was rated on a 5-point Likert scale (0 = never, 4 = very often). Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores between 0 and13 are considered low stress, scores between14 and 26 are considered moderate stress; and scores between 27 and 40 are considered high perceived stress. The internal consistency of the PSS has ranged from 0.74 to 0.91 in the previous studies (Lee, 2012). In the present study Cronbach's α was 0.71.

The Patient Health Questionnaire (PHQ-9) is a depression module that scores each of the nine DSM-IV depression criteria from 0 (not at all) to 3 (nearly every day) over past two weeks [38]. The PHQ-9 is not a screening instrument for depression but is used to monitor the severity of depression and response to treatment and has been validated for use in primary care. A total score of 0–4 represents no to minimal depressive symptomatology, 5–9 represents mild symptomatology, 10–14 represents moderate, 15–19 moderately severe, and 20 or more represents severe symptomatology. A PHQ-9 score ≥ 10 has a sensitivity and specificity of 88% for major depression. The internal consistency of PHQ-9 has been shown to be high, with previous studies featuring Cronbach's alpha values of 0.86 [38]. In the present study Cronbach's α was 0.76.

Psychological flexibility skills measures

Sport-related psychological flexibility was measured with the Psychological Flexibility Sport Scale PFSS [26], assessing psychological flexibility and the extent to which a person avoids distressing thoughts, emotions, behaviors, or memories in sport context. The PFSS questions are based on statements

such as "I worry about not being able to control my worries and feelings" and "My thoughts and feelings do not get in the way of how I want to live my life". The items are rated on a Likert scale ranging from 1 (never true) to 7 (always true). The scores can range from 7 to 49 with lower scores indicating higher levels of psychological flexibility (less avoidance). The PFSS has good reliability and validity. In previous studies with athletes, test scores have shown good internal consistency (0.87) [26]. In the present study Cronbach's alpha was 0.73.

The Values, Acceptance and Mindfulness Scale (VAMS), [39] is an instrument to measure sport -elated acceptance (e.g., "I worry about not being able to control my nervousness."), mindfulness (e.g., "Even though I feel stressed during games I carefully weigh my decisions."), and values (e.g., "I long to feel the thrill of the game.") with 11-item questions. All items are scored on a 5-point Likert scale ranging from 1 (never true) to 7 (always). A total score can be calculated for each subscale and the main scale. Individual scores can range from 11 to 77, with higher scores indicating higher sport-related psychological flexibility. For the analyses, the five negative items were reversed. The instrument is designed to capture three psychological processes hypothesized to be important in the context of sports in general: Mindfulness, acceptance, and values. In the current study, Cronbach's α was 0.70.

Athletes` mindfulness skills were measured using the 16-item Athlete Mindfulness Questionnaire (AMQ, [40]. The AMQ consists of three factors: (a) present moment attention (e.g., "I can easily sustain my attention on the competition"); (b) awareness (e.g., "I am aware that my emotions during training and competition can influence my thinking and behavior"); and (c) acceptance (e.g., "Even though some thoughts and feelings during training and competition may be unpleasant or miserable, I can get along with them peacefully"). Items were rated on a 5-point Likert scale, ranging from 1 (never true) to 5 (always true). The scores can range from 16 to 80, with higher scores indicating higher levels of mindfulness skills. The AMQ has demonstrated satisfactory reliability and validity [40]. In the present study, Cronbach's α was 0.76.

The Engaged Living Scale (ELS) is a measure of the process of engaged living, defined by ACT as the evaluation and performance of valued life activities [41]. This measure includes two subscales, Valued Living (*Learning to recognize values*, ELS-VL, 10-items) and Life Fulfilment (*Living according to the chosen values*, ELS-LF, 6-items). All items are scored on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). Total scores can be calculated for each subscale and the main scale. The scores can range from 16 to 80 with higher scores indicating higher engaged living skills. Results have shown that the ELS-16 (16 items) has adequate to good psychometric properties [42]. In the present study Cronbach`s α was 0.92 and for the subscales, α = 0.89 (ELS-VL) and α = 0.86 (ELS-LF).

Statistical analysis

Statistical analyses were conducted using IBM SPSS (26.0). The analyses were carried out in the following steps. First, we investigated using Pearson's correlations whether psychological flexibility skills (as measured by PFSS, VAMS, AMQ, ELS) were associated with athletes' mental wellbeing (MHC-SF), recovery experience (REQ), self-esteem (RSES) and symptoms of stress (PSS-10) and depression (PHQ-9) (research question 1). Correlations $r < 0.30$ were classified as small, $r \geq 0.30$ and $r < 0.50$ as moderate, and $r \geq 0.50$ as high [43]. Significant, and at least moderate correlations ($r \geq 0.30$) were studied more closely using a multiple regression analysis. Second, we used the stepwise method in purpose to identify those psychological flexibility dimensions that make a significant contribution to mental wellbeing, recovery experience, self-esteem, and symptoms of stress and depression, When the measure included both total and subscale scores, only subscale scores were included in the regression analysis. Third, we investigated the differences between female and male athletes in psychological flexibility skills. Means and standard deviations were determined to all athletes and separately for females and males, and the gender difference was investigated by t-test, and effect sizes (counted as mean difference divided by pooled standard deviation). Effect sizes $d < 0.20$ were interpreted as very small, $d \geq 0.20 < 0.50$ as small, $d \geq 0.50 < 0.80$ as moderate, and $d \geq 0.80$ as large [43]. We also studied the gender differences by investigating whether the correlations were significantly different between female and male athletes. Further, the stepwise method was repeated with same variables as above but including gender as an additional predictor variable. The correlations between predictor variables were lower that $r = 0.80$ and the VIF values were lower than 5 indicating that multicollinearity was not a problem.

3. Results

Associations between mental wellbeing, symptoms, and psychological flexibility skills

Engaged living skills total (ELS tot) had a significant and moderate ($r > 0.30$ and $r < 0.50$) positive correlation with mental wellbeing (MHC), recovery experience (REQ), self-esteem (RSES), and negative correlation with perceived stress (PSS) and depression (PHQ-9) (Table 2). Thus, a higher level of engaged living was related to better wellbeing and less symptoms. ELS subscales valued living correlated moderately with mental wellbeing (MHC-SF), whereas ELS life fulfilment correlated moderately or highly with all wellbeing and symptoms measures (MHC-SF, REQ, RSES, PSS-10, PHQ-9). In addition, athletes with higher level of avoidance of distressing thoughts, emotions, behaviors, or memories in sport context (PFSS) reported a higher amount of depression (PHQ-9, $r = 0.41$) and stress symptoms (PSS-10, $r = 0.44$), and lower self-esteem ($r = -0.38$). Mindfulness skills (VAMS-mf) correlated significantly and moderately ($r > 0.30$ and $r < 0.50$) with mental wellbeing (MHC-SF) and stress (PSS-10). Attention skills (AMQ-att) correlated moderately with mental wellbeing (MHC-SF).

Table 2. *Correlations between mental wellbeing and psychological flexibility skills measures including gender correlations.*

	ELS tot	ELS-VL	ELS-LF	PFSS	VAMS tot	VAMS-Va	VAMS-Acc	VAMS-Mf	AMQ-tot	AMQ-Att	AMQ-Awar	AMQ-Acc
MHC-SF	.45**	.30**	.48**	-.25**	-.23**	.17	.10	.31**	.20**	.32**	.21*	-.07
female	.32*	.29*	.26*	.002	.08	.29**	-.07	.09	.14	.11	.15	.05
male	.50**	.20	.62**	-.33*	.22	.07	.11	.37*	.32*	.48**	.30*	-.12
p-value			0.011	0.044						0.02		
REQ	.32*’	.15*	.40**	-.29**	.13	-.09	.18	.10	.13	.17	.15	-.03
female	.24	.12	.31*	-.18	-.05	-.17	.07	-.01	.06	.01	.09	.32
male	.32*	.10	.44**	-.32*	.20	.01	.20	.19	.22	.28	.22	-.04
p-value												0.033
RSES	.45**	.25*	.53*	-.38**	.16	-.09	.21*	.13	.17	.23*	.13	.20
female	.26	.12	.35**	-.21	.03	-.08	.14	-.13	.14	.00	.15	.11
male	.54**	.28	.60**	-.33*	.10	-.10	.10	.18	.29*	.41**	.10	.05
p-value	0.047		0.052							0.015		
PSS-10	-.39**	-.19	-.50**	.44**	-.30**	-.03	-.27*	-.32**	-.16	-.23*	-.11	-.01
female	-.35*	-.21	-.41**	.29*	-.19	-.18	-.11	-.11	-.18	-.05	-.26*	-.07
male	-.16	.08	-.37*	.31*	-.21	.09	-.21	-.27	-.22	-.30*	.07	-.16
p-value											0.048	
PHQ-9	-.36**	-.14	-.49**	.41**	-.21*	.07	-.25**	-.20*	-.14	-.27**	-.09	.03
female	-.28*	-.13	-.36**	.25	-.08	-.01	-.14	.03	-.11	-.28*	-.10	.06
male	-.22	.09	-.47**	.38**	-.17	.20	-.21	-.26	-.26	-.16	-.07	-.25
p-value							0.04					

* The correlation is significant at the 0.05 level.

** The correlation is significant at the 0.01 level.

MHC-SF (Mental Health Continuum-Short Form -14 items); REQ (Recovery Experience Questionnaire- 10 items); RSES (Rosenberg`s Self-Esteem Scale- 10 items); PSS-10 (Perceived Stress Scale- 10 items); PHQ-9 (Patient Health Questionnaire- 9 items); ELS tot (Engaged Living Scale- 16 items); ELS-VL (Valued Living- 10 items); ELS-LF (Life Fulfillment- 6 items); PFSS (Psychological Flexibility Sport Scale- 7 items); VAMS tot (Values, Acceptance, Mindfulness Scale- 11 items); VAMS-va (Values- 3 items); VAMS-acc (Acceptance- 5 items); VAMS-mf (Mindfulness- 3-items); AMQ tot (Athlete Mindfulness Questionnaire-16 items); AMQ-att (Attention skills- 6 items); AMQ-aw (Awareness- 5 items); AMQ-acc (Acceptance- 5 items).

Psychological flexibility skills as predictors for mental wellbeing and symptoms

As described earlier, only predictor variables having at least moderate correlations ($r \geq 0.30$) with the dependent variables were included in the stepwise regression analyses (see Table 2). In relation to emotional, psychological, and social wellbeing (MHC-SF), out of the four included variables (ELS-VL, ELS-LF, VAMS-Mf, AMQ-att), two significant models were found (Table 3). The Engaged living skills subscale life fulfilment (ELS-LF) explained 22% of the variance in MHC-SF (F = 29.600 (df = 1, 101), $p < 0.001$), and mindfulness skills (VAMS-mf) an additional 4% (F = 18.684 (df = 2, 101), $p < 0.001$).

For recovery experience (REQ), life fulfilment (ELS-LF) was the only predictor variables showing at least moderate correlation with REQ. Life fulfilment explained 16% of the variance in psychological experienced recovery (F = 19.079 (df = 1, 101), $p < 0.001$, Table 3).

In relation to self-esteem (RSES), we observed two significant models (Table 3). The Engaged living skills (ELS) subscale fulfilment (ELS-LF, Model 1) explained 27% of the variance in self-esteem (F = 38.796 (df = 1, 101), $p < 0.001$), and sport-related psychological flexibility (PFSS, Model 2) an additional 4% of the RSES (F = 24.135 (df = 2, 101), $p <$

0.001). These two models explained 31% of the total variability of self-esteem (RSES).

In terms of perceived stress (PSS-10), three predictor variables were included in the analysis (ELS-LF, PFSS, VAMS-Mf), and we found two significant models. Life fulfilment (ELS-LF, Model 1) made a significant contribution to the prediction and explained 24% of the variance in stress symptoms (F = 33.196 (df = 1, 101), $p < 0.001$), (Table 3). Sport-related psychological flexibility (PFSS, Model 2) outlined 8% (F = 24.666 (df = 2, 101), $p < 0.001$). Mindfulness skills (VAMS-Mf) did not contribute to the model and was excluded. Overall, life fulfilment (ELS-LF) and psychological flexibility (PFSS) explained 32% of the variance in stress (PSS-10).

For depression symptoms (PHQ-9), two significant models were found. The life fulfilment subscale (ELS-LF, Model 1) explained 23% of the variance in depression symptoms (F = 32.019 (df = 1, 101), $p < 0.001$), and the sport-related psychological flexibility (PFSS) an additional 6% of depression (F = 22.246 (df = 2, 102), $p < 0.001$). These two models accounted for 29% of the total variability of depression symptoms.

Table 3. *Regression analyses presenting significant predictors.*

Dependent var	Predictors Models#	Stβ	R^2	Adj R^2	Change R^2
MHC	1. ELS-LF	.430	.228	.221	.228***
	2. VAMS-mf	.219	.274	.259	.046*
REQ	1. ELS-LF	.400	.160	.152	.160***
RSES	1. ELS-LF	.452	.280	.272	.280***
	2. PFSS	-.233	.328	.314	.048**
PSS-10	1. ELS-LF	.398	.249	.242	.249***
	2. PFSS	.306	.333	.319	.083***
PHQ-9	1. ELS-LF	-.399	.241	.233	.241***
	2. PFSS	.275	.308	.294	.067**

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Excluded variables, MHC: AMQ-att, ELS-VL; PSS-10: VAMS-mf

MHC-SF (Mental Health Continuum-Short Form -14 items); REQ (Recovery Experience Questionnaire- 10 items); RSES (Rosenberg`s Self-Esteem Scale- 10 items); PSS-10 (Perceived Stress Scale- 10 items); PHQ-9 (Patient Health Questionnaire- 9 items); ELS tot (Engaged Living Scale- 16 items); ELS-VL (Valued Living- 10 items); ELS-LF (Life Fulfillment- 6 items); PFSS (Psychological Flexibility Sport Scale- 7 items); VAMS tot (Values, Acceptance, Mindfulness Scale- 11 items); VAMS-va (Values- 3 items); VAMS-acc (Acceptance- 5 items); VAMS-mf (Mindfulness- 3-items); AMQ tot (Athlete Mindfulness Questionnaire-16 items); AMQ-att (Attention skills- 6 items); AMQ-aw (Awareness- 5 items); AMQ-acc (Acceptance- 5 items).

Gender differences in symptoms and psychological flexibility skills

Differences between female and male athletes were found in all wellbeing measures and in 7 out of the 12 measures of psychological flexibility (Table 4). Female athletes reported lower level of mental wellbeing (MHC-SF, moderate difference, $d \geq 0.50 < 0.80$), lower recovery (REQ, small difference), self-esteem (RSES, large difference), a higher number of symptoms of stress (PSS-10, large difference) and depression (PHQ-9, large difference). Majority of both female and male athletes reported at least a moderate level of stress (females: 72% moderate, 28% severe; males: moderate 88%, 2% severe). A mild or moderate level of depression was found in 53% of females and of 25% of males (Table 4).

In the psychological flexibility skills measures, male athletes reported higher scores on engaged living (ELS-Total), valued living (VL) and life fulfillment (LF), and lower scores on the sport-related psychological flexibility (PFSS), reflecting less avoidance of distressing thoughts, emotions, behaviors. In terms of values, acceptance and mindfulness, male athletes reported higher values than female athletes (VAMS Total, VAMS-acc, VAMS-mf). In psychological flexibility (PFSS) the difference was large and in other significant differences, it was small or moderate. No gender differences were found in mindfulness (AMQ).

Table 4. *Wellbeing, symptoms, and psychological flexibility measures for all participants and separately for female (n = 58) and male athletes (n = 48). Mean values, standard deviations (SD), t-test and effect sizes (d) are presented.*

Wellbeing	**All M (SD)**	**Female M (SD)**	**Male M (SD)**	**t (df)**	**p-value**		**d**
MHC-SF	54.41 (9.54)	51.67 (8.57)	57.67 (9.70)	-3.365 (103)	p =.001	F < M	0.66
REQ	53.39 (6.66)	52.18 (6.20)	54.83 (6.97)	-2.068 (103)	p =.001	F < M	0.40
RSES	30.90 (4.84)	29.07 (4.57)	33.06 (4.26)	-4.599 (103)	p <.001	F < M	0.90
Symptoms							
PSS-10	21.80 (4.69)	24.12 (3.63)	19.04 (4.33)	6.540 (103)	p <.001	F > M	1.28
Mild	11.60 (2.07) 5 %	0 %	10 %				
Moderate	21.12 (3.50) 79 %	72 %	88 %				
Severe	28.12 (1.50) 16 %	28 %	2 %				
PHQ-9	4.46 (3.51)	5.76 (3.66)	2.90 (2.59)	4.559 (104)	p <.001	F > M	0.89
Minimal	1.97 (1.27) 59 %	45 %	75 %				
Mild	6.97 (1.32) 33 %	39 %	25 %				
Moderate	11.38 (14.1) 8 %	14 %	0 %				
Moderate severe	16.00 1 %	2%	0 %				
Severe	0 %	0 %	0 %				
Psychological flexibility skills							
ELS tot	63.09 (7.52)	60.90 (7.79)	65.91 (6.17)	-3.541 (101)	p <.001	F < M	0.71
ELS-LF	22.86 (4.22)	21.53 (4.19)	24.58 (3.65)	-3.867 (101)	p <.001	F < M	0.77
ELS-VL	40.21 (4.54)	39.36 (4.80)	41.31 (3.96)	-2.203 (101)	p <.030	F < M	0.44
PFSS	24.05 (7.88)	26.64 (7.64)	20.78 (6.99)	4.030 (102)	p <.001	F > M	0.80
VAMS tot	54.11 (8.12)	52.17 (7.08)	56.54 (8.76)	-2.815 (102)	p =.006	F < M	0.55
VAMS-acc	23.77 (5.38)	22.66 (4.76)	25.17 (5.83)	-2.427 (102)	p =.017	F < M	0.48
VAMS-va	17.24 (2.45)	17.28 (2.48)	17.20 (2.44)	.165 (102)	p =.869	F = M	0.03
VAMS-mf	13.15 (2.89)	12.34 (2.63)	14.17 (2.92)	-3.359 (102)	p =.001	F < M	0.66
AMQ tot	56.77 (6.50)	56.84 (6.93)	56.67 (5.99)	.133 (102)	p =.895	F = M	0.03
AMQ-att	24.46 (3.03)	24.10 (2.91)	24.91 (3.14)	-1.360 (102)	p =.177	F = M	0.27
AMQ-aw	19.53 (2.94)	19.47 (3.11)	19.61 (2.75)	-.245 (102)	p =.807	F = M	0.05
AMQ-acc	12.78 (3.89)	13.28 (4.26)	12.15 (3.31)	1.471 (102)	p =.144	F = M	0.29

MHC-SF (Mental Health Continuum-Short Form -14 items); REQ (Recovery Experience Questionnaire- 10 items); RSES (Rosenberg`s Self-Esteem Scale- 10 items); PSS-10 (Perceived Stress Scale- 10 items); PHQ-9 (Patient Health Questionnaire- 9 items); ELS tot (Engaged Living Scale- 16 items); ELS-VL (Valued Living- 10 items); ELS-LF (Life Fulfillment- 6 items); PFSS (Psychological Flexibility Sport Scale- 7 items); VAMS tot (Values, Acceptance, Mindfulness Scale- 11 items); VAMS-va (Values- 3 items); VAMS-acc (Acceptance- 5 items); VAMS-mf (Mindfulness- 3-items); AMQ tot (Athlete Mindfulness Questionnaire-16 items); AMQ-att (Attention skills- 6 items); AMQ-aw (Awareness- 5 items); AMQ-acc (Acceptance- 5 items).

Life fulfilment (ELS-LF) correlated significantly with wellbeing (MHC-SF) both among female and male athletes. However, in male athletes the association was significantly stronger ($r > 0.50$) compared to female athletes ($r < 0.30$). Also, sport-related psychological flexibility (PFSS, reflecting avoidance) and the mindfulness (AMQ) subscale present moment attention showed significantly higher correlation with wellbeing (MHC-SF) in male athletes compared to female athletes (Table 2).

In psychological recovery (REQ), both in female and male

athletes, life fulfilment (ELS-LF) correlated significantly and moderately with psychological recovery (REQ). A significant difference was observed in acceptance skills. In female athletes, the association with acceptance skill (AMQ-acc) and psychological recovery (REQ) was moderate (r > 0.30), although not significant, while in male athletes the association was very weak (r = -.04). Life fulfillment (ELS-LF) also correlated significantly with self-esteem (RSES) in female and male athletes. The association with ELS-LF and RSES was strong in male athletes (r >.50), while it was moderate in female (r >.30; p = 0.052). A significant difference was found in attention skills (AMQ-at) which correlated moderately and significantly with self-esteem in male athletes while there was a zero correlation in female athletes (Table 2).

In terms of stress, both in females and males, life fulfilment (ELS-LF) and sport-related psychological flexibility (PFSS) correlated significantly with stress (PSS-10, r = 0.29-0.41). For female athletes the association between PSS-10 and AMQ-Aw was significant and higher, although moderate (r = -.26), while in male athletes it was very low (r =. 07). In addition, life fulfillment (ELS-LF) correlated significantly and moderately with symptoms of depression (PHQ-9) both in female and male athletes (Table 2).

Based on the observation that there were several significant differences between female and male athletes in both symptoms and psychological flexibility skills, the stepwise method was repeated with the same variables as above but including gender as an additional predictor variable. When predicting mental wellbeing (MHC-SF) and recovery (REQ), gender did not appear as a significant variable and significant predictors were the same as presented earlier (MHC-SF: ELS-LF and VAMS-mf; REQ: ELS-LF). Gender was found to be a significant predictor when explaining self-esteem (RSES), stress (PSS-10) and depression (PHQ-9). When explaining variance in stress (PSS-10), gender acted as the strongest predictor explaining 29% of the variance.

4. Discussion

The present study aimed to explore the association between psychological flexibility skills and their potential to predict mental wellbeing and symptomatology among athletes. The findings highlighted the significance of certain psychological flexibility skills in various dimensions of wellbeing.

Among the psychological skills assessed, value-based actions (life fulfilment), and mindfulness emerged as the most robust predictors for subjective emotional, psychological, and social wellbeing. Higher levels of psychological flexibility skills were associated with improved subjective wellbeing, with these two variables collectively accounting for 26% of the variance.

Moreover, a higher level of value-based actions and reduced avoidance of distressing thoughts, emotions, behaviors, or memories within the sporting context were associated with lower levels of stress, explaining 32% of the variance in stress. Value-based actions notably stood out as the sole significant predictor for the psychological recovery outside sporting hours. Conversely, lower levels of value-based actions and increased avoidance of distressing thoughts, emotions, behaviors, or memories related to sports correlated with lower self-esteem and heightened depression symptoms, explaining 31% and 29% of the variance, respectively.

Our findings suggest that athletes with higher flexibility skills tend to experience enhanced subjective wellbeing, better recovery experiences, and self-esteem, coupled with reduced stress and depressive symptoms compared to those with lower levels of these skills. These findings resonate with prior research in diverse contexts [44, 45]. For instance, Lucas and Moore (2020) established a connection between psychological flexibility skills and life satisfaction. Similarly, Gloster et al. (2017) [46] noted that psychological flexibility positively moderated outcomes of physical health, mental health, and overall wellbeing within the general population. The results of the current study support this finding also among athletes and are in line with the study by Baranoff et al. (2015) [25] suggesting that lower acceptance skills predicted more severe depression symptoms after knee injury in athletes.

Stress remains an inevitable facet of competitive sports, demanding evidence-based interventions for athletes and coaches to manage sport-specific stressors effectively. Chronic stress significantly impacts athletes' personal growth, wellbeing, and performance, often leading to burnout and injuries [47, 48]. Perceived stress can also act as a predictor of depression [49]. In the current study, psychological flexibility skills exhibited positive associations with mental wellbeing, recovery experience, self-esteem, perceived stress, and depression. Particularly, identifying personal values, and in engaging in meaningful actions may enhance athletes` mental wellbeing, recovery experiences and self-esteem and reduce symptoms of stress and depression. Additionally, we observed that experiential avoidance, i.e., avoidance of distressing thoughts, emotions, behaviors, or memories related to sports correlated with stress, self-esteem, and symptoms of depression. This underscores the importance of not only embracing value-based actions but also cultivating the ability to be open and to accept stressful thoughts, and emotions pertinent to athletes' training.

Furthermore, our results highlighted gender disparities across all wellbeing measures among athletes. Female athletes reported more stress and depressive symptoms, while male athletes exhibited higher general mental wellbeing, psychological recovery, and self-esteem. These observations align with earlier findings suggesting that female young adults encounter mental health issues more frequently than males [27, 50]. Notably, differences in reported levels of psychological flexibility skills and their associations with wellbeing were observed between female and male athletes. For male athletes, value-based actions, sport-related avoidance, and present moment awareness displayed stronger associations

with wellbeing than in female athletes. Conversely, awareness of emotions during training and competition correlated more strongly with stress in female athletes. Female athletes also reported a higher correlation between acceptance and recovery experience than their male counterparts. These differences potentially contribute to variations in wellbeing among female and male athletes. Moreover, when gender was integrated in the regression analysis, it emerged as a significant predictor for stress, depression, and self-esteem but not for subjective wellbeing and recovery experience. This suggests the importance of considering gender-related individual differences, especially concerning stress, warranting further investigation in future studies. We tentatively conclude that it might be important to pay attention to individual differences related to gender both when assessing psychological flexibility skills and when applying interventions aimed at enhancing mental wellbeing among athletes.

Sports psychology professionals are encouraged to integrate psychological flexibility skills training into their work to bolster athletes' mental wellbeing and stress management. Instead of attempting to change or control of thoughts and emotions, emphasizing openness and awareness of inner experiences, while committing to meaningful actions is the core of practicing psychological flexibility skills. Clarifying values and focusing on value-based actions empower athletes to shape their unique sports careers and lives. Encouraging personal responsibility and internal motivation becomes more feasible when athletes base their actions and decisions on personal values. Overall, the integration of psychological flexibility skills is advocated in daily coaching practices, not solely by sports psychologists but also by coaches, provided they are trained and supervised by expert professionals.

5. Conclusions

Psychological flexibility skills have shown to be an important aspect of wellbeing among the general population. The aim of the current study was to investigate the role of flexibility skills in relation to mental health among athletes. Good psychological flexibility skills were related to better wellbeing, recovery experiences, self-esteem, and lower levels of stress and depression symptoms. Individually chosen value-based actions and open attitude towards unpleasant thoughts and emotions appeared to be particularly important skills. There were differences between female and male athletes in reported levels of psychological flexibility skills and their associations with wellbeing. More attention should be devoted to which psychological wellbeing skills are especially important when enhancing athletes' performance as well as general psychological wellbeing.

Abbreviations

PFS: Psychological flexibility skills
ACT: Acceptance and Commitment Therapy
AAQ-II: Acceptance and Action Questionnaire
PFSS: Psychological Flexibility Sport Scale
MHC-SF: Mental Health Continuum-Short Form
REQ: Recovery Experience Questionnaire
RSES: The Dimensionality of Self-esteem
PSS-10: Perceived Stress Scale -10
PHQ-9: Patient Health Questionnaire
VAMS: The Values Acceptance Mindfulness Scale
AMQ: Athlete Mindfulness Questionnaire
ELS: The Engaged Living Scale
SPSS: Statistical Package for the Social Sciences

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Data Availability Statement

The data is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

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Biography

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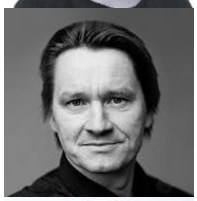

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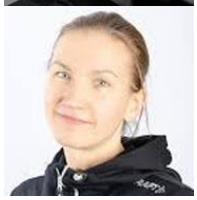

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Research Field

Hannaleena Ronkainen: Psychological flexibility, Acceptance and commitment therapy, Athletes` mental health
Tobias Lundgren: Acceptance and commitment therapy, Clinical psychology, Psychotherapy, Athletes` mental health
Göran Kenttä: Athletes` mental health, Mindfulness, Self-Compassion
Johanna Ihalainen: Exercise immunology, Athletes` health, Energy availability, Inflammation
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