Received: 10 July 2023 | Revised: 20 September 2023 | Accepted: 25 September 2023

DOI: 10.1002/mhs2.39

RESEARCH ARTICLE

WILEY

Psychological predictors of adolescent depression and anxiety symptoms across one season in grassroots netball

Lucy E. Davies[1] | Martin Turner[1] | Rachel Hopley[2] | Matthew Slater[3] | Elizabeth C. Braithwaite[1]

[1]Department of Psychology, Faculty of Health and Education, Manchester Metropolitan University, Manchester, UK

[2]Institute for Community Research and Development, University of Wolverhampton, Wolverhampton, UK

[3]School of Health, Science and Wellbeing, Staffordshire University, Stoke-On-Trent, UK

Correspondence
Elizabeth C. Braithwaite, Department of Psychology, Faculty of Health and Education, Manchester Metropolitan University, Manchester, UK.
Email: e.braithwaite@mmu.ac.uk

Abstract

Much of our knowledge about the relationship between psychological variables related to sport and adolescent mental health is based on research from elite athletes. However, the vast majority of adolescents who engage in sports do so at the grassroots level. We therefore sought to understand how self-reported psychological variables and sleep may be associated with symptoms of depression and anxiety across one season in grassroots adolescent netball. We collected self-report, paper-based questionnaire data from adolescent netball players at one large netball club based in the West Midlands of the United Kingdom at the start of the season (timepoint 1, September 2018, $N = 140$) and end of the season (timepoint 2, March 2019, $N = 132$). Ages ranged from 11 to 19 ($M = 13.54$), which were categorized as under 14s (U14, ages 11–14) and under 19s (U19, ages 15–19). Participants self-reported symptoms of depression and anxiety, basic psychological needs related to netball, demands and resources related to netball, and sleep quality at each time point. We used standardized residual change scores to test whether changes in the psychological variables related to their engagement in grassroots netball (basic psychological needs, demands and resources) and sleep quality were associated with changes in depression and anxiety symptoms over time. We report that increases in perceived sporting demands and reductions in sleep quality were associated with elevated symptoms of depression over the season. Reductions in perceptions of autonomy were associated with increases in symptoms of anxiety. We report novel evidence that self-reported, malleable psychological variables related to sports participation, and sleep quality, are associated with mental health in youth female athletes competing at the grassroots level. It would be worthwhile to explore whether mental health interventions and/or education delivered via grassroots sports clubs may be an effective method for promoting mental health resilience in adolescent athletes.

KEYWORDS

anxiety, basic psychological needs, demands and resources, depression, grassroots sport, sleep

1 | INTRODUCTION

Rates of mental health difficulties during childhood and adolescence are rising substantially across the United Kingdom (Newlove-Delgado et al., 2022; Peytrignet et al., 2023). From 2017 to 2021, mental ill health in 6–16-year-olds rose from 11.6% to 17.4%, and from 10.1% to 17.4% among 17–19-year-olds (Lifestyles team, NHS Digital, 2021). A recent acceleration of this trend could be partly attributed to the coronavirus disease 2019 (COVID-19) pandemic (Ford et al., 2021; Gracia et al., 2021; Magson et al., 2021). Consistently, female adolescents experience higher rates of depression and anxiety than their male counterparts (Campbell et al., 2021). We know that several psychological, environmental, physiological, and genetic variables are associated with poor mental health in adolescents (Patel et al., 2007; Rauh & Margolis, 2016), and a broad and holistic understanding of risk and resilience factors for poor mental health in this population is needed.

Organized, community-level sport is argued to be a protective factor against depression and anxiety in adolescence because it incorporates two factors that promote psychological resilience (Flores-Barriga, 2010): (1) physical activity (Biddle & Asare, 2011) and (2) community participation and social relationships (Eime et al., 2013). However, much of our knowledge about sports participation and mental health comes from populations of elite athletes, defined as high-performing national and international competitors, and professional and semiprofessional sportspersons (Rice et al., 2016). Among elite groups, there is some evidence to suggest that sports participation in adolescence is protective against symptoms of depression and anxiety (Eime et al., 2013; Rosenvinge et al., 2018), though there are higher rates of depression and anxiety reported among female athletes (Belz et al., 2018; Gerber et al., 2018; Junge & Feddermann-Demont, 2016; Turner et al., 2019) in line with the general population. Several aspects of sports participation in elite youth athletes are, however, associated with risk for psychological distress. For example, elite team deselection (Blakelock et al., 2016), poor sleep quality (Brand et al., 2010), burnout (Nixdorf et al., 2013), competing in individual sports compared with team sports (Nixdorf et al., 2016), overtraining (Kuettel & Larsen, 2020), injury (Wolanin et al., 2015), and pressure to perform (Noblet et al., 2003) are all associated with greater rates of self-reported psychological distress in this group. However, there are individual psychological factors related to sports that can influence the experience of emotional distress in sports settings. For example, sporting environments that satisfy young athletes' basic psychological needs (autonomy, relatedness, and competence) (Turgeon et al., 2022) promote well-being and buffer against psychological distress (Leversen et al., 2012). Additionally, perceptions of demands and resources determine whether athletes experience a "challenge" or "threat" psychological state in response to sporting task demands (Jones et al., 2009; Uphill & Jones, 2007). A challenge state, where sufficient resources to cope with demands are perceived, is associated with increased heart rate, reduced vascular resistance, and better performance outcomes (Blascovich & Mendes, 2000). A threat state, where there are insufficient perceived resources to cope with demands, is associated with increased vascular resistance and activation of the hypothalamic-pituitary-adrenal (HPA) axis, resulting in increased stress hormone cortisol, and poorer performance outcomes (Turner et al., 2012, 2013, 2014). Additionally, we know that physical activity has a positive impact on sleep quality (Brand et al., 2017), and that poor sleep quality increases the risk for psychological distress in adolescent girls (Kiss et al., 2022). Among elite youth athletes, academic, social, and sport-related demands, and competition anxiety, are barriers against good quality sleep (Watson & Haraldsdottir, 2023).

Thus, although there is some evidence that elite sports participation is protective against psychological distress, there are clear risk factors associated with poor mental health in this group. However, youth athletes who compete at the elite level make up less than 1% of total adolescents who are involved in youth sports (Malina, 2010). Indeed, a vast number of children and adolescents across the United Kingdom, and the world, participate in sports at a grassroots level, which is foundational, local level, community-driven, and primarily recreational at either the regional or local level. The main differences between grassroots sports and elite sports are a lower training burden, less intense training sessions, fewer expectations to perform well, and a lower requirement to travel. With regard to netball, in 2019, 685,000 girls were playing grassroots netball weekly in the United Kingdom (Ratcliffe, 2021). We have a limited understanding of mental health risks in this nonelite population of adolescent athletes, and potential psychological factors that could increase vulnerability to, or buffer against, psychological distress.

In the current study, we collected data from adolescent female netball players competing at grassroots level, aged 11–19 years, at the start and end of the 2018–2019 netball season. This is a particularly important population as young females are more prone to mental ill health (Abi-Jaoude et al., 2020), and drop out in sport (Weaver, 2022). We were interested in examining how psychological variables were related to depression and anxiety over time. We know from elite sports that increased pressure to perform is associated with psychological distress (Farrey, 2009; Walton et al., 2022). It is possible that this association also exists within grassroots sports, and we may therefore observe differing levels of self-reported psychological distress among those who compete at different levels of skill (e.g., local level versus regional level). It is unclear from the existing literature whether we might observe seasonal changes in symptoms of self-reported depression and anxiety in nonelite adolescent athletes. We know that deselection is associated with increased psychological distress (Blakelock et al., 2016); therefore, we might expect higher levels of depression and anxiety toward the start of the season, particularly in those players who were not selected for higher performing regional teams (in our sample regional team players were selected at the start of the season based on a netball trial, and local team players were made up of those players who (a) were not selected at trials and (b) who chose not to attend trials as they wanted to play at the local level). Alternatively, rates of depression and anxiety might be higher toward the end of the season in older

adolescents when many players will have important school exams (McDonald, 2001; Roome & Soan, 2019), and are transitioning to higher level education (Dvořáková et al., 2017). We would expect to observe developmental increases in self-reported symptoms of depression and anxiety (Hankin et al., 1998; Jane Costello et al., 2006; McLaughlin & King, 2015), and therefore higher self-reported symptoms in the older age group. To that end, our hypotheses were:

H1. There will be higher self-reported symptoms of depression and anxiety in older adolescents (under 19s) compared with younger adolescents (under 14s).

H2. Participants competing at higher (regional) levels will self-report more symptoms of depression and anxiety than participants competing at lower (local) levels.

H3. An increase in basic psychological needs satisfaction over the season (increasing levels of competence, autonomy, and relatedness) will be associated with reduced depression and anxiety symptoms.

H4. Reductions in perceived demands and increases in perceived resources will be associated with reduced depression and anxiety symptoms.

H5. An increase in self-reported sleep quality will be associated with reductions in depression and anxiety symptoms.

2 | MATERIALS AND METHODS

2.1 | Participants

Youth female athletes were recruited from one of the largest netball clubs in the West Midlands of the United Kingdom. Participants were recruited from the under 14s teams (U14; 11–14 years old) and the under 19s teams (U19; 15–19 years old) to partake in a longitudinal observational study over the 2018/2019 season. Participants who were aged 16 and above self-reported their ethnicity ($n = 25$) and they were a very homogeneous sample with $n = 24$ who self-reported as White British. We were unable to collect self-reported ethnicity data from participants aged 15 and younger due to ethical restrictions. At the netball club, there were eight U14 teams (five that competed at a local level and three that competed at a regional level), six U19 teams (three that competed at a local level and three that competed at a regional level).

2.2 | Procedure

We collected self-report measures from the players using paper-based questionnaires at three time points: early season (September 2018), mid-season (December 2018), and late season (March 2019). Because of missing data at the mid-season time point (20% attrition), and to maximize power for statistical analyses, in the current study we only used data from the early and late-season time points. $N = 140$ participants completed the questionnaire at the start of the season (timepoint 1, *T1*) and $N = 132$ participants completed the questionnaire at the end of the season (timepoint 2, *T2*). Questionnaires were completed at the start of the training session. At each timepoint, participants self-reported age, team played for within the club, number of years that they had played netball, and number of years played for that specific netball club. Participants also self-reported depression and anxiety symptoms, basic psychological needs, demands and resources, and perceived sleep quality. We extracted game data from club records, specifically how many quarters each player had played over the season. This study received ethical approval from the Staffordshire University Research Ethics Committee. Parents of players aged 15 and under provided consent for their participation via an opt-out system, and all players provided informed consent/assent at each time point. All study documents and questionnaires are available to view and download at https://osf.io/4f87m/?view_only=df367820436b4b13983ea6eaf6f489e9.

2.3 | Measures

2.3.1 | Basic psychological needs

Participants self-reported basic psychological needs using the Basic Needs Satisfaction in Sport Scale (BNSSS) (Ng et al., 2011). This is a 20-item scale that encompasses questions around perceived autonomy (10), relatedness (5), and competence (5). We adapted the scale so that the items were specific to their perceptions of grassroots netball. For example, "In netball I get the opportunity to make choices" (autonomy), "I have close relationships with people in netball" (relatedness), and "I can overcome challenges in netball" (competence). Participants were required to score, on a 7-point Likert scale, how true the statements were to their feelings about netball (1 = *Not true at all*, to 7 = *Very true*). The BNSSS has high reliability (Cronbach's α $T1 = 0.92$, $T2 = 0.91$) and is used to assess basic psychological needs in team sports (De Francisco et al., 2018).

2.3.2 | Demands and resources

The Challenge and Threat Scale (Mendes et al., 2007) was used to evaluate demands and resources, and has previously been used in a population of netball players (Turner et al., 2021). It is an 11-item scale that includes two subscales; five items regarding netball demands (e.g., *Netball is demanding*), and six items regarding netball resources (e.g., *I have the abilities to perform well*). For this study, we removed item 9 because it is a measure of motivational relevance and is a prerequisite to perceptions of resources ("performing well is important to me") (Meijen et al., 2020). Participants responded to

statements on a 7-point Likert scale from *strongly disagree* = 1 to *strongly agree* = 7. The Cronbach's α for demands was 0.77 (*T*1) and 0.73 (*T*2) and for resources was 0.82 (*T*1) and 0.81 (*T*2).

2.3.3 | Sleep

Participants self-reported their perceived sleep quality using a visual analog scale of 1–10, where 10 represents very high-quality sleep, and 1 represents very low-quality sleep.

2.3.4 | Anxiety

Participants self-reported symptoms of anxiety using the Generalized Anxiety Disorder Assessment (GAD-7) (Spitzer et al., 2006). This is a 7-item scale that requires participants to respond to statements about symptoms of anxiety that they may have felt over the past 2 weeks on a 4-point scale from "Not at all" to "Nearly every day," A total anxiety score is created by summing all items to create a score from 0 to 21. Scores of 5, 10, and 15 are used as the cut-off points for mild, moderate, and severe anxiety, respectively. The GAD-7 has been validated for use in adolescent samples (Mossman et al., 2017) and has also been used to assess anxiety in elite adolescent athletes (Junge & Feddermann-Demont, 2016).

2.3.5 | Depression

Participants self-reported symptoms of depression using the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). This is a 9-item scale that requires participants to respond to statements about how often they may have experienced symptoms of depression over the past 2 weeks on a 4-point scale from "Not at all" to "Nearly every day" (Kroenke et al., 2001). A depression score was created by summing item scores, to create a total score that ranges from 0 to 27. Cut-off scores of 5, 10, 15, and 20 are used to identify mild, moderate, moderately severe, and severe depression, respectively. The PHQ-9 has been validated for use in adolescent samples (Richardson et al., 2010) and has also been used to assess depression in elite adolescent athletes (Gerber et al., 2018). Due to the longitudinal nature of this study with young adolescents, and the requirement for participant retention, we removed the final item of the PHQ-9, which refers to suicidal feelings. Both the GAD7 and PHQ9 are designed to be used in concord and have been used with youth athlete populations (Michel-Kröhler & Turner, 2022).

2.4 | Statistical analysis

We examined demographic characteristics and self-reported levels of depression and anxiety, including the distribution of the data at each time point, and descriptive statistics by time point (*T*1/*T*2), age group (U14/U19), and performance level (regional/local), and correlations between variables. We then conducted assumption testing for analysis of variances (ANOVA) and regression analyses.

To address H1 and H2, we conducted two 2 × 2 × 2 repeated-measures ANOVAs, with anxiety and depression symptoms as the dependent variables. Timepoint was the independent repeated measures variable, and age group (U14/U19) and performance level (local/regional) were the independent variables. For follow-up, adjusted post hoc tests were used to further examine significant main or interaction effects.

To address H3–H5, unstandardized residual change scores were calculated for all variables of interest (autonomy, competence, relatedness, demands, resources, sleep, anxiety, and depression), from *T*1 to *T*2. We conducted hierarchical multiple regression analyses using the unstandardized residual change scores (Zumbo, 1999). This is preferable to using simple change scores as it eliminates autocorrelated errors and regression toward the mean effects (Gobbi et al., 2020). A positive residualized change score indicates an increase from *T*1 to *T*2, and a negative score indicates a decrease. The regression models used anxiety change and depression change as the dependent variables. In each model, performance level (regional/local) and age group (U14/U19) were entered into step one, basic psychological needs (autonomy change, competence change, and relatedness change) were entered into step two, demand change and resource change into step three, and sleep change into step four. We chose not to include years played, years played at the club, and quarters of netball played throughout the year as they were all correlated with participant age (years played $r = 0.45$, $p < 0.001$, years played at club $r = 0.19$, $p < 0.001$, quarters played $r = 0.33$, $p < 0.001$), and we wanted to avoid issues of multicollinearity in the regression models. All analyses were conducted using SPSS v28. Raw data is available to view and download at https://osf.io/4f87m/?view_only=df367820436b4b13983ea6eaf6f489e9.

3 | RESULTS

3.1 | Descriptive statistics

Participants self-reported that they had played netball, on average, for 5.36 years (SD = 2.78) and had played for this specific club for an average of 3.32 years (SD = 2.53). The mean number of quarters played over the season was 80.52 (SD = 11.46). Tables 1 and 2 display the descriptive data for the self-report symptoms of depression and anxiety, split by performance level and age group. Tables 3 and 4 display the descriptive characteristics of the variables of interest and correlations between the variables. Increases in self-reported depression and anxiety symptoms from *T*1 to *T*2 were associated with a poorer perception of sleep quality ($r = -0.50$, $p < 0.001$ and $r = -0.28$, $p = 0.003$), reduced competence ($r = -0.27$, $p = 0.006$ and $r = -0.25$, $p = 0.010$), reduced autonomy ($r = -0.30$, $p = 0.003$ and $r = -0.37$, $p < 0.001$), and an increase in perceived demands ($r = 0.30$, $p = 0.003$ and $r = 0.29$, $p = 0.002$) from *T*1 to *T*2.

TABLE 1 Descriptive statistics for self-reported depression symptoms at the start and end of the season, by performance level and age group.

Time	Performance level	Age group	*N*	Mean	SD
Start of the season (*T1*)	Local	U14	45	3.00	3.82
		U19	32	5.31	4.97
	Regional	U14	28	4.32	4.36
		U19	35	3.43	3.07
End of the season (*T2*)	Local	U14	49	3.86	5.91
		U19	23	5.70	6.20
	Regional	U14	27	6.22	6.19
		U19	33	5.03	4.48

Abbreviations: T1, timepoint 1; T2, timepoint 2; U14, under 14s; U19, under 19s.

TABLE 2 Descriptive statistics for self-reported anxiety symptoms at the start and end of the season, by performance level and age group.

Time	Performance level	Age group	*N*	Mean	SD
Start of the season (*T1*)	Local	U14	46	2.35	3.57
		U19	32	5.78	4.80
	Regional	U14	29	4.45	4.37
		U19	38	4.24	4.33
End of the season (*T2*)	Local	U14	49	3.41	4.40
		U19	23	6.96	6.09
	Regional	U14	28	5.75	5.74
		U19	33	6.88	5.78

Abbreviations: T1, timepoint 1; T2, timepoint 2; U14, under 14s; U19, under 19s.

Depression and anxiety symptoms were highly correlated with each other ($r = 0.59$, $p < 0.001$). Figures 1 and 2 display changes in depression and anxiety symptoms from *T1* to *T2* split by age and competition level.

3.2 | Repeated measures 2 × 2 × 2 ANOVAs

Data met all ANOVA assumptions before formal analysis. There was a main effect of time on depression symptoms ($F(1, 103) = 6.04$, $p = 0.016$, $np^2 = 0.06$), indicating that overall, symptoms increased from the start ($M = 3.9$, SD = 4.12) to the end ($M = 4.95$, SD = 5.71) of the season. There were no main effects of age group or performance level. There was also a main effect of time on anxiety symptoms ($F(1, 108) = 9.36$, $p = 0.03$, $np^2 = 0.08$), indicating that symptoms increased from the start ($M = 4.02$, SD = 4.37) to the end of the season ($M = 5.38$, SD = 5.53). There were no main effects of age group or performance level, and no significant interactions between age group, performance level, and time on symptoms of depression and anxiety.

TABLE 3 Descriptive characteristics for the variables of interest.

	N	Mean	SD	Skewness	Kurtosis
T1 depression	140	3.90	4.12	1.34	1.86
T2 depression	132	4.95	5.71	1.27	0.82
T1 anxiety	145	4.02	4.37	1.33	1.05
T2 anxiety	133	5.38	5.53	1.06	0.26
T1 BPN competence	141	27.14	4.88	−0.44	−0.30
T2 BPN competence	132	27.27	4.65	−0.56	0.09
T1 BPN autonomy	140	51.05	8.78	−0.60	−0.19
T2 BPN Autonomy	127	51.45	8.74	−0.52	0.32
T1 BPN relatedness	144	29.26	4.82	−1.39	2.98
T2 BPN relatedness	131	29.37	4.85	0.85	0.37
T1 resources	141	5.07	2.01	−0.55	−0.25
T2 resources	131	4.82	0.83	−1.36	3.69
T1 demands	139	2.87	0.85	0.29	0.28
T2 demands	133	2.87	0.87	0.32	−0.38
T1 sleep	144	7.10	2.17	−0.66	0.29
T2 sleep	131	6.66	2.83	−0.36	−0.92

Abbreviations: BPN, basic psychological needs; T1, timepoint 1; T2, timepoint 2.

3.3 | Hierarchical linear regression models

The data met all of the assumptions for regression analyses before formal analyses. The first regression model explained 35% of the variance in depression symptoms (adjusted $R^2 = 0.353$, $F(8, 79) = 6.40$, $p < 0.001$), results are shown in Table 5. An increase in demands from *T1* to *T2* ($\beta = 0.24$, $p = 0.022$), and reductions in sleep quality ($\beta = -0.50$, $p < 0.001$) were associated with an increase in depression. The results of the second regression model are displayed in Table 6 and explain 13% of the variance in self-reported anxiety symptoms (adjusted $R^2 = 0.131$, $F(8, 84) = 2.58$, $p = 0.015$). A reduction in perceived autonomy from *T1* to *T2* was associated with increases in anxiety symptoms ($\beta = -0.27$, $p = 0.026$).

4 | DISCUSSION

In this study, we examined change in self-reported symptoms of depression and anxiety across one season in adolescent, grassroots netball players, and tested associations with self-reported basic

TABLE 4 Correlations between variables of interest.

Variable	1	2	3	4	5	6	7	8	9	10
1. *T*1 age	-									
2. Team type	0.16*	-								
3. Sleep change	−0.10	−0.08	-							
4. Resource change	−0.17	0.09	0.09	-						
5. Demand change	0.11	0.27**	−0.03	−0.09	-					
6. Relatedness change	−0.27**	−0.01	0.21*	0.09	−0.03	-				
7. Competence change	−0.22*	−0.11	0.04	0.38***	−0.28**	0.12	-			
8. Autonomy change	−0.08	−11	0.13	0.17	−0.28**	0.24*	0.54**	-		
9. Depression change	−0.05	0.07	−0.50**	−0.08	0.30**	−0.09	−0.27**	−0.30**	-	
10. Anxiety change	0.05	0.14	−0.28**	0.03	0.29**	−0.13	−0.25**	−0.37**	0.59**	

Note: "Team type" refers to the level of competition and is coded as 1 = *local* and 2 = *regional*.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

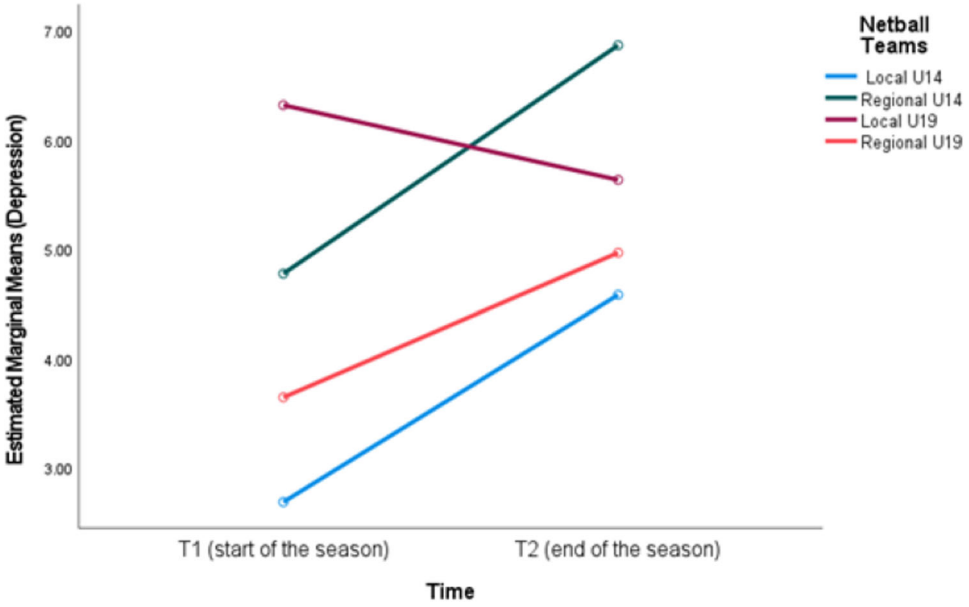

FIGURE 1 Change in estimated marginal means of depression symptoms across the season, split by age group and performance level. U14, under 14s; U19, under 19s.

psychological needs, demands and resources, and sleep quality. We hypothesized that older adolescents would self-report higher levels of depression and anxiety symptoms than younger adolescents (H1) and that those players competing at a higher level would self-report higher levels of depression and anxiety than those competing at a lower level (H2). However, we found no evidence in support of the first two hypotheses. Self-reported symptoms of depression and anxiety did, however, increase across the season, from *T*1 to *T*2, but this change did not differ by age or competition level. It is possible that the change in symptom rates over time could be attributed to exam stress (McDonald, 2001; Roome & Soan, 2019) or school transitions (Dvořáková et al., 2017) toward the end of the academic year, or the strain of the netball season.

We next hypothesized that an increase in self-reported basic psychological needs satisfaction components (autonomy, competence, and relatedness), and an increase in self-reported resources and reduced demands, would be associated with reductions in depressive and anxiety symptoms across the season (H3 and H4). We report that reductions in perceived autonomy were associated with elevated anxiety symptoms. This finding is synonymous with existing research detailing the relationship between basic psychological needs satisfaction and psychological distress (Leversen et al., 2012; Turgeon et al., 2022). However, self-reported change in competence and relatedness were not associated with depression or anxiety symptoms, as hypothesized. An increase in symptoms of depression, but not anxiety, was associated with an increase in perceived demands.

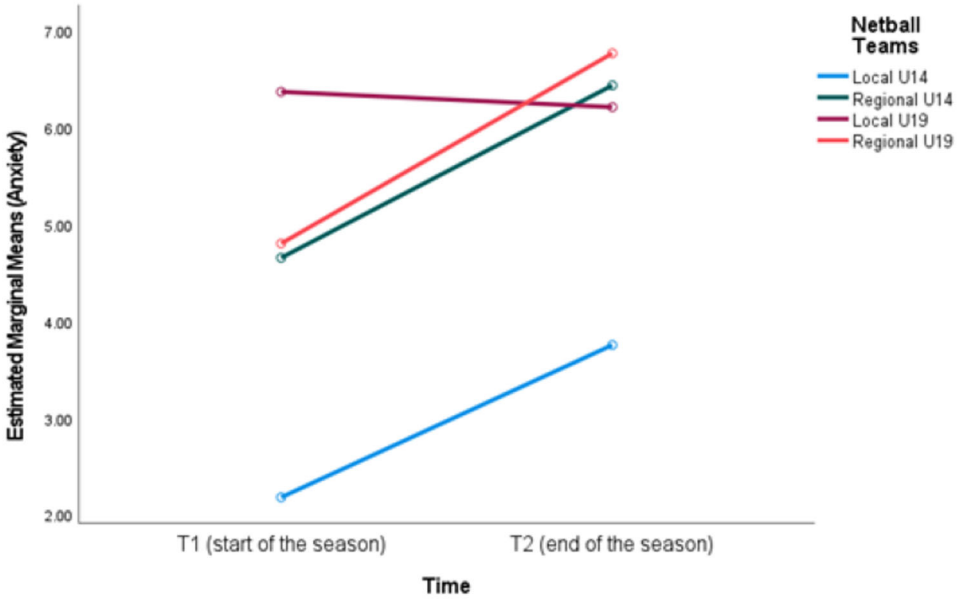

FIGURE 2 Change in estimated marginal means of anxiety symptoms across the season, split by age group and performance level. U14, under 14s; U19, under 19s.

TABLE 5 Hierarchal regression with depression change from *T1* to *T2* as the dependent variable.

Model	Variable	Unstandardized *B*	SE	Standardized *β*	*t*	*p*
Model 1	Age	−0.12	0.33	−0.04	−0.70	0.713
	Performance level	1.19	1.04	0.14	1.14	0.256
Model 2	Age	−0.34	0.34	−0.12	−0.98	0.328
	Performance level	1.12	1.01	0.13	1.12	0.267
	Competence change	−0.24	0.15	−0.20	−1.53	0.131
	Autonomy change	−0.13	0.08	−0.20	−1.57	0.120
	Relatedness change	0.01	0.11	0.01	0.05	0.959
Model 3	Age	−0.23	0.34	−0.08	−0.67	0.507
	Performance level	0.43	1.04	0.05	0.41	0.680
	Competence change	−0.16	0.17	−0.13	−0.95	0.346
	Autonomy change	−0.11	0.08	−0.18	−1.41	0.163
	Relatedness change	0.01	0.11	0.01	0.11	0.916
	Resource change	0.10	0.58	0.02	0.17	0.866
	Demand change	**1.65**	**0.77**	**0.26**	**2.15**	**0.035**
Model 4	Age	−0.45	0.29	−0.16	−1.52	0.133
	Performance level	0.56	0.89	0.06	0.63	0.533
	Competence change	−0.21	0.14	−0.18	−1.51	0.135
	Autonomy change	−0.09	0.07	−0.15	−1.41	0.163
	Relatedness change	0.08	0.10	0.09	0.87	0.387
	Resource change	0.46	0.50	−0.09	0.93	0.357
	Demand change	**1.53**	**0.66**	**0.24**	**2.34**	**0.022**
	Sleep change	**−0.79**	**0.15**	**−0.50**	**−5.33**	**<0.001**

TABLE 6 Hierarchal regression with anxiety change from *T1* to *T2* as the dependent variable.

Model	Variable	Unstandardized *B*	SE	Standardized *β*	*t*	*p*
Model 1	Age	0.16	0.31	0.06	0.54	0.594
	Performance level	0.99	0.98	0.12	1.01	0.318
Model 2	Age	−0.08	0.31	−0.03	−0.25	0.806
	Performance level	1.07	0.94	0.13	1.13	0.261
	Competence change	−0.11	0.14	−0.10	−0.78	0.438
	Autonomy change	−0.18	0.07	−0.30	−2.50	**0.014**
	Relatedness change	−0.08	0.11	−0.09	−0.77	0.443
Model 3	Age	−0.00	0.32	0.00	0.01	0.995
	Performance level	0.71	1.00	0.08	0.71	0.478
	Competence change	−0.11	0.15	−0.09	−0.71	0.481
	Autonomy change	−0.17	0.07	−0.29	−2.33	0.022
	Relatedness change	−0.08	0.11	−0.08	−0.73	0.469
	Resource change	0.40	0.55	0.08	0.71	0.480
	Demand change	0.72	0.74	0.11	0.97	0.337
Model 4	Age	−0.06	0.32	−0.02	−0.20	0.846
	Performance level	0.72	0.98	0.09	0.74	0.461
	Competence change	−0.13	0.15	−0.12	−0.89	0.379
	Autonomy change	**−0.17**	**0.07**	**−0.27**	**−2.28**	**0.026**
	Relatedness change	−0.05	0.11	−0.05	−0.47	0.642
	Resource change	0.53	0.55	0.11	0.97	0.334
	Demand change	0.0.65	0.72	0.10	0.89	0.374
	Sleep change	−0.32	0.16	−0.21	−1.97	0.053

Previous research has documented that self-reported demands are associated with poor mental health in elite athletes (Kaski et al., 2022), but as far as the authors are aware this is the first evidence that this relationship also exists in a nonelite population. Perceptions of greater demands than resources are consistently associated with a cardiovascular "threat"' response characterized by increased peripheral resistance, activation of the HPA axis, and worse sporting task performance (Turner et al., 2014). Repeated HPA activation in response to sporting demands in this population could potentially explain elevated vulnerability to symptoms of psychological distress (Klimes-Dougan et al., 2014). Notably, stress in middle childhood can result in blunted cortisol reactivity in adulthood (Young et al., 2021).

We also hypothesized that a decrease in self-reported sleep quality would be associated with an increase in depression and anxiety symptoms over the season (H5). We found that reductions in sleep quality were associated with increased depression symptoms. This is consistent with existing research, which has demonstrated that better quality sleep across a sporting season is associated with lower self-reported depression symptomology in adolescent elite athletes (Brand et al., 2010).

A key strength of this study is its longitudinal nature, whereas a large proportion of existing literature on mental health in youth athletes relies on cross-sectional designs (Breistøl et al., 2017; Foskett & Longstaff, 2018; Snyder et al., 2010). By using a longitudinal approach, we were able to assess the change in depression and anxiety symptoms over time and examine how change in psychological factors may buffer against or increase the risk for worsening symptoms. However, limitations should be considered. Our measures of depression and anxiety symptoms, as well as psychological variables and sleep quality, relied on self-report, and are therefore subject to reporter bias. The measure of sleep was based on just one item and may therefore not be as robust as using an established sleep scale. We chose to just use a one-item measure of sleep to reduce participant burden; however, we recognize that using an established multi-item scale would provide more robust data. An interesting area for future research would be to collect objective measures of sleep quality and duration using wearable devices. Further limitations include the moderate sample size, which was not powered to detect small effect sizes, and that data were only collected from one netball club based in the West Midlands of the United Kingdom, and therefore findings may not be generalizable across all grassroots netball settings. An interesting area of future research would be to examine whether these effects are consistent within grassroots netball across other regions and whether effects

are consistent in other grassroots sports. An additional limitation is that we did not collect any data on what was happening in the adolescent's lives outside of netball, for example, participation in other sports, exam stress, experience of bulling, and victimization. Due to the nature of data collection at the start of a training session, we chose to keep the measures brief and we were therefore unable to account for the effects of additional stress on adolescent mental health in this study. It is also worth noting that as this was not a clinical sample of participants, depression and anxiety mean scores were low, and therefore low variability in the data may mean reduced statistical power to detect small effects and long-term associations.

An important reflection is that sports participation is just one aspect of an adolescent's life, and a broad consideration of factors that may impact mental health is important. However, the current findings demonstrate that while organized sport has been previously labeled a protective factor against psychological distress (Flores-Barriga, 2010), there are some malleable factors associated with poor mental health in grassroots sports akin to those that have been identified in elite adolescent sports (Belz et al., 2018; Gerber et al., 2018; Junge & Feddermann-Demont, 2016). A novel approach to tackle rising rates of poor mental health in adolescent females may be to deliver interventions via grassroots sports clubs. Based on results presented here, mental health interventions could focus on reducing sport-related demands, increasing player autonomy and promoting the importance of quality sleep. Such interventions, guided through the mental health literacy framework, have already been implemented in both grassroots and elite-level sports (Hurley et al., 2020). These interventions have sought to increase parents' knowledge of youth mental health through clear, basic, and brief information. Parents have reported that sport club communities are an appropriate space to address mental health issues, as it provides a novel way to engage both parent and child in a community setting (Hurley et al., 2020).

In sum, we provide novel evidence from a longitudinal assessment of youth netball players over one season that self-reported perceptions of sports demands and autonomy, as well as sleep quality, are associated with symptoms of depression and anxiety. While considering the limitations and with the caveat that replication is needed, we suggest that mental health support and education delivered via grassroots sports settings may have the potential to reach many adolescents and positively impact mental health in this population.

ACKNOWLEDGMENTS

We are extremely grateful to all of the netball players who contributed their time to this study.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Raw data is available to view and download at https://osf.io/4f87m/?view_only=df367820436b4b13983ea6eaf6f489e9.

ETHICS STATEMENT

This study was reviewed and approved by the Staffordshire University Research Ethics Committee.

ORCID

Elizabeth C. Braithwaite http://orcid.org/0000-0003-4902-2262

PEER REVIEW

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1002/mhs2.39.

REFERENCES

Abi-Jaoude, E., Naylor, K. T., & Pignatiello, A. (2020). Smartphones, social media use and youth mental health. *Canadian Medical Association Journal*, *192*(6), E136–E141.

Belz, J., Kleinert, J., Ohlert, J., Rau, T., & Allroggen, M. (2018). Risk for depression and psychological well-being in German national and state team athletes—Associations with age, gender, and performance level. *Journal of Clinical Sport Psychology*, *12*(2), 160–178.

Biddle, S. J. H., & Asare, M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine*, *45*(11), 886–895.

Blakelock, D. J., Chen, M. A., & Prescott, T. (2016). Psychological distress in elite adolescent soccer players following deselection. *Journal of Clinical Sport Psychology*, *10*(1), 59–77. https://doi.org/10.1123/jcsp.2015-0010

Blascovich, J., & Mendes, W. (2000). Challenge and threat appraisals: The role of affective cues. In J. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 59–82). Cambridge University Press.

Brand, S., Gerber, M., Beck, J., Hatzinger, M., Pühse, U., & Holsboer-Trachsler, E. (2010). High exercise levels are related to favorable sleep patterns and psychological functioning in adolescents: A comparison of athletes and controls. *Journal of Adolescent Health*, *46*(2), 133–141.

Brand, S., Kalak, N., Gerber, M., Clough, P. J., Lemola, S., Sadeghi Bahmani, D., Pühse, U., & Holsboer-Trachsler, E. (2017). During early to mid adolescence, moderate to vigorous physical activity is associated with restoring sleep, psychological functioning, mental toughness and male gender. *Journal of Sports Sciences*, *35*(5), 426–434.

Breistøl, S., Clench-Aas, J., Van Roy, B., & Kjærsti Raanaas, R. (2017). Association between participating in noncompetitive or competitive sports and mental health among adolescents—A Norwegian population-based cross-sectional study. *Scandinavian Journal of Child and Adolescent Psychiatry and Psychology*, *5*(1), 28–38.

Campbell, O. L. K., Bann, D., & Patalay, P. (2021). The gender gap in adolescent mental health: A cross-national investigation of 566,829 adolescents across 73 countries. *SSM-population health*, *13*, 100742.

Dvořáková, K., Kishida, M., Li, J., Elavsky, S., Broderick, P. C., Agrusti, M. R., & Greenberg, M. T. (2017). Promoting healthy transition to college through mindfulness training with first-year college students: Pilot randomized controlled trial. *Journal of American College Health*, *65*(4), 259–267.

Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 98. https://doi.org/10.1186/1479-5868-10-98

Farrey, T. (2009, August 4). Game on: How the pressure to win at all costs endangers youth sports, and what parents can do about it. *ESPN*. https://www.harvard.com/book/game_on_how_the_pressure_to_win_at_all_costs_endangers_youth_sports_and_wha/

Flores-Barriga, H. (2010). *An examination of risk and resiliency: The role of organized sports as a protective factor*. California State University.

Ford, T., John, A., & Gunnell, D. (2021). Mental health of children and young people during pandemic. *BMJ*, *372*, n614. https://doi.org/10.1136/bmj.n614

Foskett, R. L., & Longstaff, F. (2018). The mental health of elite athletes in the United Kingdom. *Journal of Science and Medicine in Sport*, *21*(8), 765–770.

De Francisco, C., Parra, F. J., Arce, C., & Vílchez, M. D. P. (2018). Preliminary empirical validation of the "Basic Needs Satisfaction in Sport Scale" with a sample of Spanish athletes. *Frontiers in Psychology*, *9*, 1057.

Gerber, M., Best, S., Meerstetter, F., Walter, M., Ludyga, S., Brand, S., Bianchi, R., Madigan, D. J., Isoard-Gautheur, S., & Gustafsson, H. (2018). Effects of stress and mental toughness on burnout and depressive symptoms: A prospective study with young elite athletes. *Journal of Science and Medicine in Sport*, *21*(12), 1200–1205.

Gobbi, E., Maltagliati, S., Sarrazin, P., Di Fronso, S., Colangelo, A., Cheval, B., Escriva-Boulley, G., Tessier, D., Demirhan, G., Erturan, G., Yüksel, Y., Papaioannou, A., Bertollo, M., & Carraro, A. (2020). Promoting physical activity during school closures imposed by the first wave of the COVID-19 pandemic: Physical education teachers' behaviors in France, Italy and Turkey. *International Journal of Environmental Research and Public Health*, *17*(24), 9431.

Gracia, R., Pamias, M., Mortier, P., Alonso, J., Pérez, V., & Palao, D. (2021). Is the COVID-19 pandemic a risk factor for suicide attempts in adolescent girls? *Journal of Affective Disorders*, *292*, 139–141.

Hankin, B. L., Abramson, L. Y., Moffitt, T. E., Silva, P. A., McGee, R., & Angell, K. E. (1998). Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology*, *107*(1), 128–140.

Hurley, D., Swann, C., Allen, M. S., & Vella, S. A. (2020). A qualitative evaluation of a mental health literacy intervention for parents delivered through community sport clubs. *Psychology of Sport and Exercise*, *47*, 101635.

Jane Costello, E., Erkanli, A., & Angold, A. (2006). Is there an epidemic of child or adolescent depression? *Journal of Child Psychology and Psychiatry*, *47*(12), 1263–1271. https://doi.org/10.1111/j.1469-7610.2006.01682.x

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

Junge, A., & Feddermann-Demont, N. (2016). Prevalence of depression and anxiety in top-level male and female football players. *BMJ Open Sport & Exercise Medicine*, *2*(1), e000087.

Kaski, S., Arvinen-Barrow, M., Kinnunen, U., & Parkkari, J. (2022). Profiles of mental well-and ill-being among elite athletes: Associations with sport-related demands and resources. *Journal of Clinical Sport Psychology*, *1*, 1–19.

Kiss, O., Alzueta, E., Yuksel, D., Pohl, K. M., de Zambotti, M., Műller-Oehring, E. M., Prouty, D., Durley, I., Pelham, III W. E., McCabe, C. J., Gonzalez, M. R., Brown, S. A., Wade, N. E., Marshall, A. T., Sowell, E. R., Breslin, F. J., Lisdahl, K. M., Dick, A. S., Sheth, C. S., … Baker, F. C. (2022). The pandemic's toll on young adolescents: Prevention and intervention targets to preserve their mental health. *Journal of Adolescent Health*, *70*(3), 387–395.

Klimes-Dougan, B., Eberly, L. E., Westlund Schreiner, M., Kurkiewicz, P., Houri, A., Schlesinger, A., Thomas, K. M., Mueller, B. A., Lim, K. O., & Cullen, K. R. (2014). Multilevel assessment of the neurobiological threat system in depressed adolescents: Interplay between the limbic system and hypothalamic–pituitary–adrenal axis. *Development and Psychopathology*, *26*(4, Pt2), 1321–1335.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606–613.

Kuettel, A., & Larsen, C. H. (2020). Risk and protective factors for mental health in elite athletes: A scoping review. *International Review of Sport and Exercise Psychology*, *13*(1), 231–265.

Leversen, I., Danielsen, A. G., Birkeland, M. S., & Samdal, O. (2012). Basic psychological need satisfaction in leisure activities and adolescents' life satisfaction. *Journal of Youth and Adolescence*, *41*, 1588–1599.

Lifestyles team, NHS Digital. (2021). *Mental health of children and young people in Englad 2021 - wave 2 follow up to the 2017 survey*. Mental health of children and young people surveys. https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2021-follow-up-to-the-2017-survey

Magson, N. R., Freeman, J. Y. A., Rapee, R. M., Richardson, C. E., Oar, E. L., & Fardouly, J. (2021). Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. *Journal of Youth and Adolescence*, *50*(1), 44–57. https://doi.org/10.1007/s10964-020-01332-9

Malina, R. M. (2010). Early sport specialization: Roots, effectiveness, risks. *Current Sports Medicine Reports*, *9*(6), 364–371. https://doi.org/10.1249/JSR.0b013e3181fe3166

McDonald, A. S. (2001). The prevalence and effects of test anxiety in school children. *Educational Psychology*, *21*(1), 89–101. https://doi.org/10.1080/01443410020019867

McLaughlin, K. A., & King, K. (2015). Developmental trajectories of anxiety and depression in early adolescence. *Journal of Abnormal Child Psychology*, *43*(2), 311–323. https://doi.org/10.1007/s10802-014-9898-1

Meijen, C., Turner, M., Jones, M. V., Sheffield, D., & McCarthy, P. (2020). A theory of challenge and threat states in athletes: A revised conceptualization. *Frontiers in Psychology*, *11*, 126.

Mendes, W. B., Blascovich, J., Hunter, S. B., Lickel, B., & Jost, J. T. (2007). *Threatened by the unexpected: Physiological responses during social interactions with expectancy-violating partners*. American Psychological Association. https://doi.org/10.1037/0022-3514.92.4.698

Michel-Kröhler, A., & Turner, M. J. (2022). Link between irrational beliefs and important markers of mental health in a German sample of athletes: Differences between gender, sport-type, and performance level. *Frontiers in Psychology*, *13*, 3997.

Mossman, S. A., Luft, M. J., Schroeder, H. K., Varney, S. T., Fleck, D. E., Barzman, D. H., Gilman, R., DelBello, M. P., & Strawn, J. R. (2017). The Generalized Anxiety Disorder 7-item scale in adolescents with generalized anxiety disorder: Signal detection and validation. *Annals of Clinical Psychiatry: Official Journal of the American Academy of Clinical Psychiatrists*, *29*(4), 227–234.

Newlove-Delgado, T., Marcheselli, F., Williams, T., Mandalia, D., Davis, J., McManus, S., Savic, M., Treloar, W., & Ford, T. (2022, July 4). Mental health of children and young people in England 2022. *NHS Digital*. https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2022-follow-up-to-the-2017-survey

Ng, J. Y. Y., Lonsdale, C., & Hodge, K. (2011). The Basic Needs Satisfaction in Sport Scale (BNSSS): Instrument development and initial validity evidence. *Psychology of Sport and Exercise*, *12*(3), 257–264.

Nixdorf, I., Frank, R., & Beckmann, J. (2016). Comparison of athletes' proneness to depressive symptoms in individual and team sports: Research on psychological mediators in junior elite athletes. *Frontiers in Psychology*, *7*, 893. https://doi.org/10.3389/fpsyg.2016.00893

Nixdorf, I., Frank, R., Hautzinger, M., & Beckmann, J. (2013). Prevalence of depressive symptoms and correlating variables among German elite athletes. *Journal of Clinical Sport Psychology*, *7*(4), 313–326.

Noblet, A., Rodwell, J., & McWilliams, J. (2003). Predictors of the strain experienced by professional Australian footballers. *Journal of Applied Sport Psychology*, *15*(2), 184–193.

Patel, V., Flisher, A. J., Hetrick, S., & McGorry, P. (2007). Mental health of young people: A global public-health challenge. *The Lancet*, *369*(9569), 1302–1313.

Peytrignet, S., Marszalek, K., Grimm, F., Thorlby, R., & Wagstaff, T. (2023, July 4). *Children and young people's mental health*. The Health Foundation. https://www.health.org.uk/news-and-comment/charts-and-infographics/children-and-young-people-s-mental-health

Ratcliffe, K. (2021, July 4). #HereIfYouNeed: Pledge to support women and girls to get active as the grassroots game returns. *England Netball*. https://www.englandnetball.co.uk/pledge-to-support-women-and-girls-to-get-active/

Rauh, V. A., & Margolis, A. E. (2016). Research review: Environmental exposures, neurodevelopment, and child mental health—New paradigms for the study of brain and behavioral effects. *Journal of Child Psychology and Psychiatry*, *57*(7), 775–793.

Rice, S. M., Purcell, R., De Silva, S., Mawren, D., McGorry, P. D., & Parker, A. G. (2016). The mental health of elite athletes: A narrative systematic review. *Sports Medicine*, *46*, 1333–1353.

Richardson, L. P., McCauley, E., Grossman, D. C., McCarty, C. A., Richards, J., Russo, J. E., Rockhill, C., & Katon, W. (2010). Evaluation of the Patient Health Questionnaire-9 Item for detecting major depression among adolescents. *Pediatrics*, *126*(6), 1117–1123. https://doi.org/10.1542/peds.2010-0852

Roome, T., & Soan, C. A. (2019). GCSE exam stress: Student perceptions of the effects on wellbeing and performance. *Pastoral Care in Education*, *37*(4), 297–315. https://doi.org/10.1080/02643944.2019.1665091

Rosenvinge, J., Sundgot-Borgen, J., Pettersen, G., Martinsen, M., Stornæs, A. V., & Pensgaard, A. M. (2018). Are adolescent elite athletes less psychologically distressed than controls? A cross-sectional study of 966 Norwegian adolescents. *Open Access Journal of Sports Medicine*, *9*, 115–123.

Snyder, A. R., Martinez, J. C., Bay, R. C., Parsons, J. T., Sauers, E. L., & McLeod, T. C. V. (2010). Health-related quality of life differs between adolescent athletes and adolescent nonathletes. *Journal of Sport Rehabilitation*, *19*(3), 237–248.

Spitzer, R. L., Kroenke, K., Williants, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092–1097.

Turgeon, S., Martin, L., Rathwell, S., & Camiré, M. (2022). The influence of gender on the relationship between the basic psychological needs and mental health in high school student-athletes. *International Journal of Sport and Exercise Psychology*, 1–18. https://doi.org/10.1080/1612197X.2022.2161103

Turner, M. J., Carrington, S., & Miller, A. (2019). Psychological distress across sport participation groups: The mediating effects of secondary irrational beliefs on the relationship between primary irrational beliefs and symptoms of anxiety, anger, and depression. *Journal of Clinical Sport Psychology*, *13*(1), 17–40.

Turner, M. J., Jones, M. V., Sheffield, D., Barker, J. B., & Coffee, P. (2014). Manipulating cardiovascular indices of challenge and threat using resource appraisals. *International Journal of Psychophysiology*, *94*(1), 9–18.

Turner, M. J., Jones, M. V., Sheffield, D., & Cross, S. L. (2012). Cardiovascular indices of challenge and threat states predict competitive performance. *International Journal of Psychophysiology*, *86*(1), 48–57.

Turner, M. J., Jones, M. V., Sheffield, D., Slater, M. J., Barker, J. B., & Bell, J. J. (2013). Who thrives under pressure? Predicting the performance of elite academy cricketers using the cardiovascular indicators of challenge and threat states. *Journal of Sport and Exercise Psychology*, *35*(4), 387–397.

Turner, M. J., Massie, R., Slater, M. J., & Braithwaite, E. (2021). Do challenge and threat evaluations predict netball performance and selection at trials in youth netball players? *Sport, Exercise, and Performance Psychology*, *10*(1), 71–87.

Uphill, M. A., & Jones, M. V. (2007). Antecedents of emotions in elite athletes: A cognitive motivational relational theory perspective. *Research Quarterly for Exercise and Sport*, *78*(2), 79–89.

Walton, C. C., Rice, S. M., & Purcell, R. (2022). Mental health in youth elite athletes. In C. L. Reardon (Ed.), *Mental health care for elite athletes* (pp. 209–213). Springer.

Watson, A., & Haraldsdottir, K. (2023). Sleep. *The youth athlete* (pp. 585–594).

Weaver, M. (2022, March 7). More than 1 million girls in the UK lose interest in sport as teenagers. *The Guardian*. https://www.theguardian.com/education/2022/mar/07/uk-girls-lose-interest-in-sport-as-teenagers-women-in-sport-survey

Wolanin, A., Gross, M., & Hong, E. (2015). Depression in athletes: Prevalence and risk factors. *Current Sports Medicine Reports*, *14*(1), 56–60.

Young, E. S., Doom, J. R., Farrell, A. K., Carlson, E. A., Englund, M. M., Miller, G. E., Gunnar, M. R., Roisman, G. I., & Simpson, J. A. (2021). Life stress and cortisol reactivity: An exploratory analysis of the effects of stress exposure across life on HPA-axis functioning. *Development and Psychopathology*, *33*(1), 301–312.

Zumbo, B. D. (1999). *A handbook on the theory and methods of differential item functioning (DIF)* (Vol. 160). National Defense Headquarters.

How to cite this article: Davies, L. E., Turner, M., Hopley, R., Slater, M., & Braithwaite, E. C. (2023). Psychological predictors of adolescent depression and anxiety symptoms across one season in grassroots netball. *Mental Health Science*, 1–11. https://doi.org/10.1002/mhs2.39