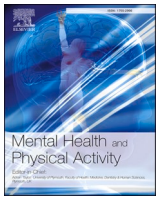
Mental Health and Physical Activity 25 (2023) 100555

Contents lists available at ScienceDirect

Mental Health and Physical Activity

journal homepage: www.elsevier.com/locate/menpa



A cross-sectional study of the psychosocial predictors of re-engaging in team sport during early motherhood

Caitlin Liddelow *, Bethany White, Emily Arnold, Stewart A Vella

Global Alliance for Mental Health and Sport (GAMeS), School of Psychology, University of Wollongong, Wollongong, NSW, 2522, Australia

ARTICLE INFO

Keywords:
Community sport
Identity
Motherhood
Participation

ABSTRACT

Background: Mothers with young children in Australia have significantly low rates of participation in physical activity and sport. This is potentially due to the postpartum transition to motherhood, and the expectation of the maternal role. This study aimed to apply an extended model of self-determination theory to compare mothers who have and have not re-engaged in team sports since their child was born and investigate the psychosocial factors that may have influenced their re-engagement in team sports.

Methods: A cross-sectional design was used to collect data from 191 mothers (M = 32.2) who were either currently playing or had previously played team sport. A hierarchical multiple regression was used to predict mother's motivation to re-engage using self-determination theory factors (autonomy, relatedness, competence), postpartum mental health (depression, anxiety, and stress) and maternal identity. A hierarchical binary logistic regression was then conducted to predict the likelihood of re-engagement based on motivation, postpartum mental health, and maternal identity.

Results: Findings showed that autonomy, competence, anxiety, and maternal identity play key roles in predicting the motivation of mothers to engage in team sport. Additionally, greater motivation increased the likelihood of a mother re-engaging in team sport.

Conclusion: This study has important theoretical and practical implications in that it expands the knowledge of the unique population of 'everyday' mothers within a sport and physical activity context, as well as provides preliminary directions for applied research in motivating mothers to re-engage in team sports.

Engaging in physical activity and sport is crucial for a healthy lifestyle (Eime et al., 2013), offering various physical health benefits alongside positive effects on mental well-being (Vancampfort et al., 2017). Regular participation in physical activity boosts self-esteem, identity, and reduces depression and anxiety risks (Schuch et al., 2018; Vancampfort et al., 2017). Group-based physical activity and sport offer additional benefits in fostering social connections, making them potentially more beneficial than individual physical activity (Peralta et al., 2022b; Vella et al., 2017). This fosters a sense of belonging and community, complementing exercise's positive effects, including increased life satisfaction and reduced stress (Eime et al., 2013; Pluhar et al., 2019). A recent groundbreaking study with 11,000 US children and adolescents revealed that team sports were more beneficial than individual sports, leading to lower levels of anxiety, depression, and negative social experiences (Hoffmann et al., 2022).

Despite the various benefits, many individuals struggle to engage in physical activity, with 45% of Australian adults aged 18–64 years not meeting the recommended activity levels (Australian Bureau of Statistics, 2018). The participation rate of women in physical activity is more concerning, with 30–40% of Australian women not taking part, with even lower rates during pregnancy (21.4%) and the postpartum period (Peralta et al., 2022b; Santos et al., 2022). Research on new mothers shows that almost half of those who were active before childbirth become inactive or irregularly participate after giving birth (Albright et al., 2006). This is concerning because women who do not resume physical activity after childbirth face additional risks, including postpartum weight gain, severe fatigue, social isolation, and postnatal depression (Dipietro, Evenson, & Bloodgood, 2019).

Several reasons contribute to a lack of re-engagement postpartum, including time constraints, motivation, and energy, as many mothers prioritise their family's needs (Albright et al., 2006; Lloyd et al., 2016). Becoming a new parent is a significant life transition (Tekavc et al., 2020), with women entering this phase often needing to restructure their lives (Saligheh et al., 2016). Additionally, mothers often feel a

* Corresponding author. Global Alliance for Mental Health and Sport, School of Psychology, University of Wollongong, Wollongong, NSW, 2522, Australia.
E-mail address: caitlinl@uow.edu.au (C. Liddelow).

https://doi.org/10.1016/j.mhpa.2023.100555
Received 28 May 2023; Received in revised form 4 September 2023; Accepted 14 September 2023
Available online 17 September 2023

strong societal expectation to focus on their family and caregiving roles (i.e., maternal identity) rather than personal pursuits (Forbes et al., 2020). Maternal identity is referred to as both a sense of harmony and confidence in the maternal role and the ability to meet their child's needs (Rogan et al., 1997), potentially making sport participation a lower priority compared to motherhood (Darroch & Hillsburg, 2017). Even if some mothers do return to sports after childbirth, they may experience guilt while juggling family, sports, and work responsibilities (McGannon et al., 2018), potentially acting as a barrier to re-engaging in team sports postpartum. Furthermore, poor physical activity postpartum may be linked to mental health issues, with approximately 12% of mothers experiencing postpartum depression in the first few years after childbirth (Shorey et al., 2018). Generally, lower levels of physical activity are associated with a higher incidence of mental health problems (Marques et al., 2020; Pearce et al., 2022), although this relationship remains to be extensively explored in the context of mothers.

Research has also explored the impact of various factors on mothers' sports engagement, including their sporting background, work commitments, and the number of children they have. Elite-level athletes, such as those representing their state or county, are more likely to return to sports postpartum (McGannon et al., 2018). Full-time employed mothers tend to report lower sport engagement (Limbers et al., 2020), and having more children can decrease sport re-engagement due to time constraints and increased caregiving responsibilities (Adachi-Mejia et al., 2010). However, much of the previous research has focused on elite athletes returning to sports after childbirth, where sports play a central role in their identity (Darroch & Hillsburg, 2017; Davenport et al., 2023; McGannon et al., 2018). Whilst insightful, these findings do not apply to the 'everyday' mother who participates in sport recreationally.

Recent research has investigated the effectiveness of group-based physical activity interventions in improving physical activity rates in postpartum mothers (Gilinsky et al., 2015; Peralta et al., 2021). These interventions moderately improved self-reported physical activity frequency and psychological well-being (Gilinsky et al., 2015; Peralta et al., 2021). However, whilst relatively effective, group-based physical activity lacks the same level of social interaction and connectedness as team sports (Ottesen et al., 2010). Team sports require participants to build relationships, work as a team, and foster group cohesion, enhancing both success and enjoyment (Eys et al., 2022). Therefore, further research is necessary to better understand team sport engagement in mothers with young children, ensuring they can benefit from the social aspects of team sports participation.

Psychosocial theories, which focus on malleable factors, may offer additional insights into the factors influencing sport re-engagement. Self-determination theory, the most applied theory in sport and physical activity research (Teixeira et al., 2012), proposes the importance of three psychological needs that assist or inhibit an individual's motivation to perform a certain behaviour; (i) autonomy, (ii) competence, and (iii) relatedness (Ryan & Deci, 2000, 2020). Motivation comprises six types, ranging from intrinsic to extrinsic, with varying degrees of self-determination (Ryan & Deci, 2000). While this theory has been successfully applied in diverse contexts (e.g., Calvo et al., 2010; Keshtidar & Behzadnia, 2017; Vella et al., 2021), its findings may not directly apply to mothers, whose motivations for engagement may differ. Experts have also suggested exploring additional variables related to well-being and mental health within the theory to enhance its applicability (Teixeira et al., 2012).

Therefore, using a cross-sectional research design, we aimed to apply an extended self-determination theory to gain a more nuanced understanding of motivation and re-engagement in team sport for "everyday" mothers. We also aimed to explore the relationship between postpartum mental health, maternal identity, and engagement in team sport. Based on the theory and previous research, we proposed: 1. The self-determination theory variables of autonomy, relatedness, and competence will predict a mother's motivation to engage in team sport; 2. Postpartum mental health and maternal identity will predict additional variance in motivation to engage in team sport, and; 3. Motivation, postpartum mental health, and maternal identity will each account for unique variance in the likelihood of re-engaging in team sport.

1. Methods

1.1. Study design

An online cross-sectional study was used to collect data at a single timepoint. Ethical approval was received for this research through the University Human Research Ethics Committee before commencing data collection (Ethics approval number: 2022/099). Data collection was conducted between May–August 2022 when COVID-19 restrictions were no longer enforced in Australia. The reporting of this study follows the 'Strengthening the Reporting of Observational Studies in Epidemiology' (STROBE) recommendations (Vandenbroucke et al., 2014).

1.2. Participants

Using the *a*-priori sample size calculator for hierarchical multiple regression by Daniel Soper, the extended self-determination theory with a medium effect size of $f^2 = 0.15$ (Ntoumanis et al., 2021), power = .80, $\alpha = 0.05$, and 6 predictors requires a minimum sample size of 97. To be eligible for the study, participants needed to be living in Australia, have a child (biological or non-biological) aged 0–3 years, have played a team sport before, and be proficient in English. Participants were recruited from social media sites such as Facebook, through the University participant pool, and in the community using posters.

1.3. Measures

Participants were first asked demographic questions concerning their age, annual income, ethnicity, living arrangements, work commitments, number of children, age of children, and their past engagement in team sport.

1.3.1. Autonomy

To assess participants' sense of self within their sport, a six-item scale developed by Hollembeak and Amorose (2005) was used. This scale contained questions such as "I have a say in what I do when participating in my sport", with responses ranked on a 5-point Likert scale from 1 (not true at all) to 5 (completely true). The average score was calculated with higher scores reflecting a stronger sense of autonomy in sport. This scale had a high internal consistency in this sample (Cronbach's $\alpha = 0.84$).

1.3.2. Competence

When determining participants' perceived ability towards their chosen sport, a three-item scale developed by (Amorose, 2003) was used. This scale contained questions such as "How good do you think you are at your sport?", with responses ranked on a 5-point Likert scale from 1 (not good at all) to 5 (very good). The three items were averaged with higher scores indicating a greater perceived competence. In this sample, the scale had a high internal consistency (Cronbach's $\alpha = 0.90$).

1.3.3. Relatedness

To evaluate participants' connection towards others in their team, the Group Environment Questionnaire (Carron, 1985) was used. This scale contained 18 questions that were split evenly into two subscales; task relatedness, with questions such as "We all take responsibility for any loss or poor performance by our team", and social relatedness, with questions such as "For me, this team is one of the most important social groups to which I belong", with responses ranked on a 9-point Likert scale from 1 (strongly disagree) to 9 (strongly agree). The items were then averaged to create one score for each subscale. Higher scores in each subscale indicated a greater sense of relatedness. Both task and

social relatedness had a high internal consistency (Cronbach's $\alpha = 0.82$ and 0.80, respectively) in this sample.

1.3.4. Relatedness

The Depression, Anxiety and Stress Scale 21 (DASS-21; Lovibond & Lovibond, 1995) was used to assess postpartum mental health in participants. The DASS-21 is widely used to assess the current emotions of an individual. It specifically assesses the unique emotional states of depression (e.g., "I couldn't seem to experience any positive feeling at all"), anxiety (e.g., "I was aware of dryness of my mouth"), and stress (e.g., "I tended to over-react to situations") across three subscales of 7 items. Participants were asked to indicate how much each statement applied to them over the past week, with each answered on a scale from 0 (Did not apply to me at all) to 3 (Almost always). Each item within each subscale is summed to create a total subscale score ranging from 0 to 21, with higher scores on a subscale indicating more severe negative emotions. Each subscale had an $\alpha = 0.91$ in this sample.

1.3.5. Maternal Identity

To assess participants' feelings towards their maternal responsibilities and connection to their children, the Maternal Identity Scale (Panthumas & Kittipichai, 2019) was used. This scale contained 24 questions with three subscales. The first subscale contained 6 items that measured a mother's attachment to their infant/s, with questions such as "I know what my child feels or needs"; the second subscale contained 8 items assessing role competence, with questions such as "I respond to my child's needs correctly"; and the last subscale contained 10 items asking about a mother's gratification in the role, with questions such as "I feel satisfied taking responsibility for my child". Responses were ranked on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The total score was found by finding the average of all items, with higher scores reflecting a stronger maternal identity and focus on maternal responsibilities. The maternal identity scale had a high internal consistency (Cronbach's $\alpha = 0.89$).

1.3.6. Motivation

To assess participants' motivation to engage in their chosen team sport, a revised edition of the Sport Motivation Scale (SMS-II; Pelletier et al., 2013) was used. This scale contained six sub-scales with three items measuring each type of motivation – intrinsic, integrated, identified, introjected, external and amotivation. All responses were ranked on a scale from 1 (does not correspond at all) to 7 (corresponds completely). The scores were then condensed and calculated using the Self-Determination Index (Rocchi et al., 2013), with the Intrinsic subscale given a weight of 3, Integrated subscale a weight of 2, Identified subscale a weight of 1, Introjected subscale a weight of −1, External subscale a weight of −2, and Amotivation subscale a weight of −3. A higher index score indicated greater levels of motivation. The SMS-II exhibited good internal consistency in our sample (Cronbach's $\alpha = 0.83$).

1.4. Procedure

Interested participants accessed an online questionnaire through a QR code on posters or social media posts, and a link on the participant pool. After reading the participation information sheet, participants were required to provide informed consent to continue the survey by checking a box. If they did not check this box, they were not able to continue. Participants then completed the demographic measures and measures of autonomy, competence, relatedness, maternal identity, athletic identity, and motivation. The questionnaire took approximately 15–20 min to complete. For participants from the community, they were not given anything as a reimbursement for their time. For those who participated through the participant pool, credit points were awarded for their participation.

1.5. Statistical analysis

A missing values analysis was conducted at the single item level, and data was found to be missing completely at random χ^2 (3943, $N = 191$) = 3976.70, $p = .350$. Participants with at least 70% missing data were removed. The remaining participants with missing data were automatically excluded listwise during each analysis. The extent of missingness for each variable of interest, included in the analyses, is as follows: re-engagement ($n = 0$), autonomy ($n = 13$), relatedness – task ($n = 20$), relatedness – social ($n = 20$), competence ($n = 25$), motivation ($n = 30$), maternal identity ($n = 11$), depression ($n = 6$), anxiety ($n = 4$), and stress ($n = 2$).

Descriptive statistics and Pearson's Bivariate Correlations (r) were conducted on the demographic and main psychological variables. Team sport re-engagement, mental health and level of team sport were examined using Point Bi-Serial correlations (r_{pb}) and the remaining continuous variables were reported using Pearson's (r). Upon inspection, 'years since previously played', 'age', and 'level of team sport' were significantly correlated with the outcome variable of motivation ($r = -0.18$, $p = .05$; $r = 0.21$, $p < .01$; $r = 0.25$, $p < .01$, respectively). Therefore, 'years since previously played', 'age', and 'level of team sport' were included as covariates where motivation was the outcome variable. Additionally, sport re-engagement was significantly correlated with 'years since previously played' ($r = 0.55$, $p < .01$). However, given they are very similar variables, such that those who are currently playing would have responded with '0' years since playing, it was decided that there was no benefit in controlling for this where sport re-engagement is the outcome variable.

Independent samples t-tests were also conducted to investigate any potential differences in the main psychosocial variables between mothers who have re-engaged and those that have not. Effect sizes, using Hedges' g due to the uneven sample sizes of each group, were then calculated. Significant differences between the two groups were identified for autonomy ($g = 0.37$, $p = .021$), competence ($g = 0.56$, $p < .011$), and motivation ($g = 0.48$, $p = .003$). Mothers who had re-engaged report higher mean scores on all three variables. See Table 1 for descriptive statistics, and bivariate correlations between the demographics, predictor, and outcome variables.

Using IBM SPSS (IBM Corp, 2021), the first hierarchical multiple regression was conducted to explore the predictive ability of the extended self-determination theory on motivation to engage in team sport. In step one, 'years since previously played', 'age', and 'level of team sport' were added as covariates. In step two, the self-determination theory variables of autonomy, task relatedness, social relatedness and competence were entered. In step three, mental health variables and in step four, maternal identity were added into the regression. The second hierarchical logistic regression was conducted to explore the prediction of team sport re-engagement. In step one, motivation was added. In step two, mental health variables and in step three, maternal identity were added into the model.

2. Results

2.1. Descriptive statistics

A total of 355 participants attempted the survey. Participants were excluded due to not having a child between 0 and 3 years ($n = 38$), not indicating whether they had previously or were currently engaging in team sport ($n = 12$) and had over 70% missing data ($n = 114$).

The remaining sample consisted of 191 participants, ranging from 18 to 46 years of age ($M = 32.2$, $SD = 5.0$). Most participants either worked full-time ($n = 77$; 40.3%) or part-time ($n = 79$; 41.4%), with the majority residing in New South Wales ($n = 103$; 53.9%) and Western Australia ($n = 40$; 20.9%). Participants' children were an average of 16.9 months old ($SD = 11.5$), and most participants reported they were in a relationship ($n = 179$; 93.7%) and living with their partner ($n = 112$; 58.6%) or living

Table 1
Descriptive statistics and correlations of demographic variables, autonomy, relatedness, competence, mental health, maternal identity, motivation and team sports Re-engagement.

	No re-engagement (*n* = 126) *M* (SD)	*Re-engagement* (*n* = 65) *M* (SD)	Effect size (*g*)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Team sport re-engagement[a]	–	–		−.10	−.01	.03	.11	**−.55****	.12	**.17***	**.26****	.12	.04	−.04	−.05	−.02	−.00	**.23****
2. Mental health diagnosis[a]	–	–		–	−.01	.07	−.00	−.10	−.00	.04	.08	.01	.04	.06	**−.27****	**−.29****	**−.27****	.00
3. Level of team sport[a]	–	–			–	**.18***	.06	−.02	.05	.12	**.28****	.14	.10	.12	−.05	−.03	−.00	**.25****
4. Age	32.09 (5.13)	32.37 (4.77)	0.06			–	.09	**.19***	**.26****	**.15***	**.15***	.10	.07	.03	−.07	**−.15***	−.07	**.21****
5. Household members	3.72 (1.24)	3.98 (0.88)	0.23				–	−.07	**.72****	−.02	.07	.10	.14	−.02	−.02	−.04	−.03	−.01
6. Years Since Played	–	–	–					–	−.02	**−.23****	**−.28****	−.15	−.07	.08	.07	.12	.09	**−.18***
7. Total Number of Children	1.60 (0.81)	1.80 (0.79)	0.26						–	−.03	.00	.05	.07	−.04	−.03	−.05	.04	.05
8. Autonomy	3.99 (0.72)	4.26 (0.78)	0.37*							–	**.36****	**.44****	**.29****	**.19***	**−.17***	−.12	−.12	**.45****
9. Competence	3.18 (0.80)	3.61 (0.74)	0.56**								–	**.25****	.12	**.21****	−.02	−.02	−.03	**.49****
10. Relatedness – Social	5.88 (1.42)	6.22 (1.36)	0.24									–	**.74****	.14	−.11	−.10	−.02	**.32****
11. Relatedness – Task	5.66 (1.43)	5.80 (1.45)	0.09										–	**.16***	−.08	−.08	−.02	**.29****
12. Maternal Identity	4.56 (0.35)	4.53 (0.39)	0.08											–	−.11	.05	−.05	**.31****
13. Depression	10.29 (3.18)	9.94 (3.19)	0.11												–	**.57****	**.65****	**−.16***
14. Anxiety	9.74 (2.55)	9.60 (3.40)	0.05													–	**.61****	−.00
15. Stress	13.54 (3.52)	13.51 (3.39)	0.01														–	−.07
16. Motivation	24.79 (29.10)	39.07 (30.45)	0.48**															–

Note. *M*=mean; *SD*=standard deviation; a=reported as point bi-serial (r_{pb}); g=Hedges' *g*. Team sport re-engagement: 0=No, 1=Yes; Mental health diagnosis: 0=No, 1=Yes; Level of team sport: 0=social/recreational, 1=More than social/recreational. $^{*}p < .05$ (two-tailed), $^{**}p < .01$ (two-tailed).

with their partner and family members ($n = 61$; 31.9%). Of the final sample, 38.2% of participants self-reported they had received a diagnosis for a mental health condition in their life ($n = 73$), with the most common being anxiety disorders ($n = 46$), post-partum depressive disorder ($n = 25$), and depressive disorders ($n = 27$).

Participants who were currently playing sport ($n = 65$; 34.0%), played at the recreational/social ($n = 114$; 59.7%), representative, such as for a district ($n = 35$; 18.3%), regional/state ($n = 32$; 16.8%), or national ($n = 10$; 5.2%) level, with 42.9% ($n = 82$) of participants engaging in netball. Additional reported sports included soccer, basketball, hockey, and oz tag. Participants who reported having previously played, but not re-engaged ($n = 126$; 66.0%), reported an average of 3.7 years since they last engaged.

2.2. Predicting motivation to re-engage in team sport

A hierarchical multiple regression ($n = 144$) was conducted to investigate whether autonomy, relatedness, competence, postpartum mental health, and maternal identity predicted a mother's motivation to re-engage in team sport.

In step one, years since previously played, age, and level of team sport were controlled for and accounted for a significant 13.5% of the variance in motivation, $R^2 = 0.14$, F (3, 140) = 7.31, $p < .001$. In step two, autonomy, competence, social relatedness, and task relatedness were added and accounted for an additional significant 24.7% of the variance in motivation, $\Delta R^2 = 0.25$, $\Delta F(7, 136) = 13.6$, $p < .001$. In step three, the postpartum mental health variables of depression, anxiety and stress were added and accounted for an additional non-significant 3.2% of the variance in motivation, $\Delta R^2 = 0.03$, $\Delta F(10, 133) = 2.40$, $p = .071$. In the final step, step four, maternal identity was included in the model and accounted for an additional significant 2.1% of the variance in motivation, $\Delta R^2 = 0.02$, $\Delta F(11, 132) = 4.9$, $p = .029$. In combination, the 11 predictors accounted for a statistically significant 43.5% of variance in motivation, $R^2 = 0.44$, adjusted $R^2 = 0.39$, F (11, 132) = 9.23, $p < .001$. Of the six predictors, autonomy ($\beta = 0.23$, $p = .005$), competence ($\beta = 0.28$, $p < .001$), anxiety ($\beta = 0.19$, $p = .049$), and maternal identity ($\beta = 0.16$, $p = .029$) were significant in the final model and positively increased motivation. According to Cohen's (1988) conventions, this can be considered a large effect size ($f^2 = 0.77$). Unstandardised (*B*) and standardised regression coefficients and squared semi-partial correlations (sr^2) for each predictor are reported in Table 2.

2.3. Predicting likelihood of Re-engagement in team sport

To assess whether motivation, postpartum mental health, and maternal identity will each account for unique variance in the likelihood of re-engaging in team sport, a hierarchical logistic regression ($n = 149$) analysis was conducted.

In step one, which included motivation, the omnibus model was statistically significant χ^2 ($df = 1$, $N = 191$) = 8.34, $p = .004$, Cox and Snell $R^2 = 0.05$, Nagelkerke $R^2 = 0.07$. The model was 63.1% accurate in its predictions of sport re-engagement. Hosmer and Lemeshow test results confirmed that the model was a good fit for the data, χ^2 ($df = 8$, $N = 191$) = 12.80, $p = .119$. Motivation significantly improved the predictive ability of the model, with the odds ratio indicating that if a mother's motivation increased by one unit, there was a 1.6% increase in the probability of re-engaging. In step two, which included motivation and the postpartum mental health variables, the omnibus model was not statistically significant χ^2 ($df = 3$, $N = 191$) = 1.60, $p = .659$, Cox and Snell $R^2 = 0.07$, Nagelkerke $R^2 = 0.09$. The model was 63.8% accurate in its predictions of sport re-engagement. Hosmer and Lemeshow test results confirmed that the model was a good fit for the data χ^2 ($df = 8$, $N = 191$) = 5.44, $p = .709$. Motivation was still the only predictor to significantly improve the predictive ability of the model, with the odds ratio showing that if a mother's motivation increased by one unit, there

Table 2
Unstandardised (B) and standardised (coefficients and squared semi-partial correlations (sr^2) for a regression predicting motivation to Re-engage in team sports (n = 144).

	Variable	*B* [95% *CI*]	*β*	sr^2	*p*-value	R^2	ΔR^2	*F*	ΔF [*df*1, *df*2]
Step 1					.363	.14	.14	7.31	7.31 [*3, 140*]
	Years Since Played	−1.35 [-2.40,-.30]*	−.21	−.04	.012				
	Age	1.30 [.38, 2.23]*	.23	.05	.006				
	Level of Team Sport	11.40 [1.68, 21.13]*	.19	.03	.022				
Step 2* **					**<.001**	**.38**	**.25**	**12.02**	**13.58 [*4, 136*]**
	Years Since Played	−.15 [-1.12, .83]	−.02	−.00	.763				
	Age	.67 [-.14, 1.49]	.12	.01	.106				
	Level of Team Sport	4.53 [-4.14, 13.20]	.08	.00	.304				
	Autonomy	11.04 [4.13, 17.95]*	.26	.05	.002				
	Competence	11.62 [6.04, 17.19]**	.321	.08	<.001				
	Relatedness – Social	−1.09 [-5.58, 3.40]	−.05	−.00	.632				
	Relatedness – Task	4.82 [.70, 8.94]*	.23	.02	.022				
Step 3* **					**<.001**	**.41**	**.03**	**9.39**	**2.39 [*3, 133*]**
	Years Since Played	−.27 [-1.25, .70]	−.04	−.00	.581				
	Age	.77 [-.04, 1.58]	.136	.02	.064				
	Level of Team Sport	4.51 [-4.06, 13.08]	.07	.00	.300				
	Autonomy	10.29 [3.42, 17.16]**	.24	.04	.004				
	Competence	11.42 [5.90, 16.95]**	.315	.07	<.001				
	Relatedness – Social	−.56 [-5.03, 3.89]	−.03	−.00	.801				
	Relatedness – Task	4.38 [.31, 8.46]*	.21	.02	.035				
	Depression	−1.85 [-3.74, .04]	−.19	−.02	.055				
	Anxiety	2.18 [.34, 4.01]*	.22	.02	.020				
	Stress	−.28 [-1.96, 1.39]	−.03	−.00	.739				
Step 4* **					**<.001**	**.44**	**.02**	**9.23**	**4.88 [*1, 132*]**
	Years Since Played	−.43 [-1.40, .54]	.07	−.00	.380				
	Age	.78 [-.02, 1.59]	.14	.02	.055				
	Level of Team Sport	3.84 [-4.63, 12.31]	.06	.00	.371				
	Autonomy	9.82 [3.04, 16.61]**	.23	.04	.005				
	Competence	10.28 [4.74, 15.83]**	.28	.06	<.001				
	Relatedness – Social	−.57 [-4.96, 3.83]	−.03	−.00	.799				
	Relatedness – Task	3.98 [-.05, 8.02]	.19	.02	.053				
	Depression	−1.61 [-3.49, .27]	−.16	−.01	.092				
	Anxiety	1.84 [.01, 3.68]*	.19	.02	.049				
	Stress	−.90 [-1.84, 1.46]	−.02	−.00	.821				
	Maternal Identity	12.48 [1.31, 23.66]*	.16	.02	.029				

Note: B = standardized coefficient; CI = confidence interval; *β* = beta; sr^2 = squared semi-partial correlation. *Df* = degrees of freedom. Significant steps are bolded.*$p < .05$ (two-tailed), **$p < .01$ (two-tailed).

was a 1.6% increase in the probability of re-engaging. Finally, in step three, which included motivation, mental health, and maternal identity, the omnibus model was not statistically significant χ^2 ($df = 1$, $N = 191$) = 3.62, $p = .057$, Cox and Snell $R^2 = 0.09$, Nagelkerke $R^2 = 0.12$. The model was 64.4% accurate in its predictions of sport re-engagement. Hosmer and Lemeshow test results confirmed that the model was a good fit for the data χ^2 ($df = 8$, $N = 191$) = 8.39, $p = .397$. Motivation was the only variable to significantly improve the predictive ability of the model ($\beta = 0.02$, $p = .002$). The odds ratio for motivation indicated that if a mother's motivation increased by one unit, there was a 2% increase in the probability of a mother re-engaging in team sport. Coefficients for each model's predictors are presented in Table 3.

Table 3
Predictor coefficients for the model predicting Re-engagement in team sport (n = 149).

	Variable	*b*	*SE*(*b*)	*p*	*Exp*(*B*) [95% *CI*]
Step 1					
	Motivation*	.02	.01	.005	1.02 [1.01, 1.03]
Step 2					
	Motivation*	.02	.01	.006	1.02 [1.01, 1.03]
	Depression	−.05	.08	.533	.95 [.80, 1.12]
	Anxiety	−.03	.08	.702	.97 [.83, 1.14]
	Stress	.09	.07	.210	1.10 [.95, 1.26]
Step 3					
	Motivation*	.02	.01	.002	1.02 [1.01, 1.03]
	Depression	−.06	.09	.472	.94 [.80, 1.11]
	Anxiety	−.04	.08	.865	.99 [.84, 1.16]
	Stress	.08	.07	.265	1.09 [.94, 1.26]
	Maternal Identity	−.97	.51	.059	.38 [.14, 1.04]

Note: CI = confidence interval. *$p < .05$ (two-tailed).

3. Discussion

This study explored the applicability of an extended self-determination theory, incorporating postpartum mental health and maternal identity, to mothers' re-engagement in team sport in Australia. We hypothesised that autonomy, relatedness, and competence would influence motivation to re-engage, but only autonomy and competence were significant predictors. Additionally, we proposed that postpartum mental health and maternal identity would predict motivation, however only anxiety and maternal identity emerged as significant predictors. Lastly, we hypothesised that motivation, postpartum mental health, and maternal identity would contribute to the likelihood of re-engagement, but only motivation significantly accounted for unique variance, indicating that higher motivation was linked to a greater likelihood of re-engaging in team sport.

Consistent with previous research applying self-determination theory to physical activity and exercise (e.g., Teixeira et al., 2012), autonomy and competence emerged as significant predictors of motivation for mothers to re-engage in team sports. This suggests that mothers with young children are more motivated to re-engage in team sports when they feel competent in their sports-related abilities and have a sense of autonomy in their participation choices. Team sports often prioritise body functionality over appearance (Peralta et al., 2022a), potentially boosting mothers' feelings of competence as they focus on their body's newfound capabilities (Raspovic et al., 2020). Additionally, recent

efforts to become more inclusive, such as revising their uniform policy to allow shorts instead of skirts (Hanlon et al., 2021) might contribute to heightened feelings of autonomy in sport. To support competence, sports organisations could provide educational opportunities for mothers who have not yet re-engaged, emphasising a safe and positive postpartum return, body positivity, and skill development in a low-pressure environment (Peralta et al., 2022a). To promote autonomy, sessions could involve building mothers' confidence, comfort, and offering appropriate modifications for the postpartum period (Peralta et al., 2022a). Additionally, considering the influence of social agents like friends and partners as autonomy-supportive or controlling may be valuable in women-focused interventions (Peralta et al., 2022b; Wilson & Rodgers, 2004). The remaining psychological need, relatedness, was not significant in this study, which is inconsistent with previous research (Calvo et al., 2010). It is unclear why this may be; however, one reason may be that this sample of mothers may be fulfilling their relatedness need in different social settings aside from team sport (e.g., mothers' groups; Strange et al., 2014).

Both anxiety and maternal identity significantly predicted additional variance in motivation to re-engage. The link between anxiety and motivation is not yet fully understood, as there is limited existing research supporting this finding. However, one potential explanation could be related to the well-documented evidence suggesting that team sport can act as a protective factor against anxiety symptoms and reduce anxiety levels (Eime et al., 2013). In this study, it is possible that mothers with higher levels of anxiety were more motivated to re-engage in team sport due to their awareness of the mental health benefits associated with such activities. They may view and use team sport to 'self--medicate', 'de-stress' and treat their anxiety (Peralta et al., 2022a). Nevertheless, more in-depth qualitative findings are needed to further investigate this notion.

Contrary to our hypothesis, the effect of maternal identity on motivation was unexpected. Prior studies indicated that mothers with a strong maternal identity tend to participate less in self-oriented activities (Darroch & Hillsburg, 2017; McGannon & Schinke, 2013). However, our finding revealed a different pattern where stronger maternal identity predicted greater motivation to re-engage. One potential explanation, as identified in a qualitative study by Peralta et al. (2022b), is that some mothers believe that exposing their children to physical activity will benefit their child's overall well-being, reinforcing their motivation to re-engage. Moreover, recent research suggests that 'modern-day' mothers are more inclined to prioritise their own needs compared to previous generations (Anderson, 2022), which provides support for this explanation. However, further investigation into generational shifts in maternal identity is warranted to better understand this phenomenon.

Furthermore, only motivation significantly predicted the likelihood of re-engaging in team sport. Whilst in contrast to our hypothesis, this finding is not surprising and it aligns with previous research showing motivation or intention is often the most significant predictor of engagement in healthy behaviours, particularly in sport and exercise engagement (Calvo et al., 2010; Keshtidar & Behzadnia, 2017). Increasing the motivation of mothers to engage in team sports provides an avenue for future interventions. The use of behaviour change techniques such as goal setting, self-monitoring of behaviour, and behavioural practice/rehearsal have all been shown to be associated with increases in motivation to engage in physical activity (Knittle et al., 2018). To attract and motivate mothers to engage, local sport associations and recreational and leisure centres should consider advertisements that include these behaviour change techniques.

Postpartum mental health failed to significantly account for unique variance in re-engagement. This suggests that mothers who had re-engaged in team sport did not have differential mental health symptoms compared to mothers that had not re-engaged. One reason for this may be due to the high priority of postpartum mental health awareness, prevention, and treatment in Australian health organisations (Teychenne et al., 2021; Werner et al., 2015). Additionally, several state and federal government initiatives targeted at educating and preventing postpartum mental health problems and associated barriers have shown to be effective (e.g., Fisher et al., 2010, 2016; Teychenne et al., 2021). Nonetheless, to the best of our knowledge, there are very few studies exploring these relationships in mothers with young children, additional research is required to grasp a greater understanding of these contradictory findings.

Surprisingly, maternal identity did not significantly predict re-engagement, despite being a predictor of motivation to re-engage. This might be due to a ceiling effect observed in the sample, where maternal identity scores averaged $M = 4.55$ out of 5.00. This ceiling effect might account for the non-significance in predicting re-engagement. Additionally, the unexpected relationship of stronger maternal identity predicting greater motivation could also be attributed to this ceiling effect. Although the Maternal Identity Scale was chosen for its validity and reliability, it was originally developed for first-time teenage mothers in Thailand (Panthumas & Kittipichai, 2019). Its use in Western countries may have limitations due to cultural differences in individualist and collectivist norms and varying perceptions of a 'good mother' (Liamputtong, 2006). Therefore, caution is advised when interpreting the study's findings regarding the influence of maternal identity.

3.1. Limitations and future directions

Whilst this study is the first to explore the determinants of team sport re-engagement among mothers with young children, it is not without its limitations. Firstly, the cross-sectional design restricts the interpretation of findings and does not offer insights into changes over time. Future research should employ longitudinal designs to gain a more comprehensive understanding. Secondly, the sample did not include non-biological mothers, potentially limiting the generalisability of findings to this group. Additionally, data on participants' locations (e.g., regional or metropolitan areas) was not collected, also impacting the applicability of results, as regional areas may differ in team sport accessibility. Lastly, while data collection did not coincide with COVID-19 lockdowns in Australia, past lockdowns and sport participation restrictions over the preceding years may have influenced a mother's ability to re-engage, potentially making the data not fully representative of actual engagement under different circumstances.

4. Conclusion

In this study, we aimed to understand the predictors of mothers' motivation and re-engagement in team sports using an extended self-determination theory. The findings partially supported the theory, revealing that autonomy and competence were significant predictors of mothers' motivation to re-engage. Interestingly, higher anxiety levels and a stronger maternal identity also significantly predicted increased motivation for re-engagement. However, when it came to re-engagement in team sport, only motivation was a significant predictor. To increase mothers' participation in team sports, sport organisations should develop materials and interventions that focus on enhancing motivation, incorporating specific behaviour change techniques. Prioritising motivational factors in interventions holds promise for increasing mothers' engagement in team sports.

Declaration of competing interest

There are no declarations of interest.

Data availability

Data will be made available on request.

References

Adachi-Mejia, A. M., Drake, K. M., MacKenzie, T. A., Titus-Ernstoff, L., Longacre, M. R., Hendricks, K. M., Beach, M. L., & Dalton, M. A. (2010). Perceived intrinsic barriers to physical activity among rural mothers. *Journal of Women's Health, 19*(12), 2197–2202. https://doi.org/10.1089/jwh.2009.1879

Albright, C. L., Maddock, J. E., & Nigg, C. R. (2006). Physical activity before pregnancy and following childbirth in a multiethnic sample of healthy women in Hawaii. *Women & Health, 42*(3), 95–110. https://doi.org/10.1300/J013v42n03_06

Amorose, A. J. (2003). Reflected appraisals and perceived importance of significant others' appraisals as predictors of college athletes' self-perceptions of competence. *Research Quarterly for Exercise & Sport, 74*(1), 60–70. https://doi.org/10.1080/02701367.2003.10609065

Anderson, K. D. (2022). *Maternal Identity of Modern-Day Mothers with High Identity Centrality*. Walden University.

Australian Bureau of Statistics. (2018). *National health survey: First results*.

Calvo, T. G., Cervelló, E., Jiménez, R., Iglesias, D., & Murcia, J. A. M. (2010). Using self-determination theory to explain sport persistence and dropout in adolescent athletes. *Spanish Journal of Psychology, 13*(2), 677–684. https://doi.org/10.1017/S1138741600002341

Carron, A. V. (1985). The development of an instrument to assess cohesion in sport teams: The Group Environment Questionnaire. *Journal of Sport Psychology*, 244–266.

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences* (2nd ed.). Lawrence Erlbaum Associates.

Darroch, F., & Hillsburg, H. (2017). Keeping pace: Mother versus athlete identity among elite long distance runners. *Women's Studies International Forum, 62*, 61–68. https://doi.org/10.1016/j.wsif.2017.03.005

Davenport, M. H., Ray, L., Nesdoly, A., Thornton, J., Khurana, R., & McHugh, T.-L. F. (2023). We're not superhuman, we're human: A qualitative description of elite athletes' experiences of return to sport after childbirth. *Sports Medicine, 53*(1), 269–279. https://doi.org/10.1007/s40279-022-01730-y

Dipietro, L, Evenson, KR, Bloodgood, B, et al. (2019). Benefits of physical activity during pregnancy and postpartum: An umbrella review. *Medicine & Science in Sports & Exercise, 51*(6), 1292–1302. https://doi.org/10.1249/MSS.0000000000001941

Eime, R., Young, J., Harvey, J., Charity, M., & Payne, W. (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*(98). https://doi.org/10.1186/1479-5868-10-98

Eys, M., Coleman, T., & Crickard, T. (2022). Group cohesion: The glue that helps teams stick together. *Frontiers for Young Minds, 10*. https://doi.org/10.3389/frym.2022.685318

Fisher, J., Rowe, H., Wynter, K., Tran, T., Lorgelly, P., Amir, L. H., Proimos, J., Ranasinha, S., Hiscock, H., Bayer, J., & Cann, W. (2016). Gender-informed, psychoeducational programme for couples to prevent postnatal common mental disorders among primiparous women: Cluster randomised controlled trial. *BMJ Open, 6*(3), Article e009396. https://doi.org/10.1136/bmjopen-2015-009396

Fisher, J. R., Wynter, K. H., & Rowe, H. J. (2010). Innovative psycho-educational program to prevent common postpartum mental disorders in primiparous women: A before and after controlled study. *BMC Public Health, 10*(1), 432. https://doi.org/10.1186/1471-2458-10-432

Forbes, L. K., Donovan, C., & Lamar, M. R. (2020). Differences in intensive parenting attitudes and gender norms among U.S. Mothers. *The Family Journal, 28*(1), 63–71. https://doi.org/10.1177/1066480719893964

Gilinsky, A. S., Dale, H., Robinson, C., Hughes, A. R., McInnes, R., & Lavallee, D. (2015). Efficacy of physical activity interventions in post-natal populations: Systematic review, meta-analysis and content coding of behaviour change techniques. *Health Psychology Review, 9*(2), 244–263. https://doi.org/10.1080/17437199.2014.899059

Hanlon, C., Yager, Z., Flowers, E., & Dadswell, K. (2021). *What girls want in sport uniforms to make them feel comfortable and confident to participate in sport: A national study*.

Hoffmann, M. D., Barnes, J. D., Tremblay, M. S., & Guerrero, M. D. (2022). Associations between organized sport participation and mental health difficulties: Data from over 11,000 US children and adolescents. *PLoS One, 17*(6), Article e0268583. https://doi.org/10.1371/journal.pone.0268583

Hollembeak, J., & Amorose, A. J. (2005). Perceived coaching behaviors and college athletes' intrinsic motivation: A test of self-determination theory. *Journal of Applied Sport Psychology, 17*(1), 20–36. https://doi.org/10.1080/10413200590907540

IBM Corp. (2021). *IBM SPSS statistics for windows*. IBM Corp. *Version 28.0*.

Keshtidar, M., & Behzadnia, B. (2017). Prediction of intention to continue sport in athlete students: A self-determination theory approach. *PLoS One, 12*(2), Article e0171673. https://doi.org/10.1371/journal.pone.0171673

Knittle, K., Nurmi, J., Crutzen, R., Hankonen, N., Beattie, M., & Dombrowski, S. U. (2018). How can interventions increase motivation for physical activity? A systematic review and meta-analysis. *Health Psychology Review, 12*(3), 211–230. https://doi.org/10.1080/17437199.2018.1435299

Liamputtong, P. (2006). Motherhood and "moral career": Discourses of good motherhood among southeast asian immigrant women in Australia. *Qualitative Sociology, 29*(1), 25–53. https://doi.org/10.1007/s11133-005-9006-5

Limbers, C. A., McCollum, C., Ylitalo, K. R., & Hebl, M. (2020). Physical activity in working mothers: Running low impacts quality of life. *Women's Health, 16*, Article 1745506520929165. https://doi.org/10.1177/1745506520929165

Lloyd, K., O'Brien, W., & Riot, C. (2016). Mothers with young children: Caring for the self through the physical activity space. *Leisure Sciences, 38*(2), 85–99. https://doi.org/10.1080/01490400.2015.1076362

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the beck depression and anxiety inventories. *Behaviour Research and Therapy, 33*(3), 335–343. https://doi.org/10.1016/0005-7967(94)00075-U

Marques, A., Bordado, J., Peralta, M., Gouveia, E. R., Tesler, R., Demetriou, Y., & Gomez Baya, D. (2020). Cross-sectional and prospective relationship between physical activity and depression symptoms. *Scientific Reports, 10*(1), Article 16114. https://doi.org/10.1038/s41598-020-72987-4

McGannon, K. R., McMahon, J., & Gonsalves, C. A. (2018). Juggling motherhood and sport: A qualitative study of the negotiation of competitive recreational athlete mother identities. *Psychology of Sport and Exercise, 36*, 41–49. https://doi.org/10.1016/j.psychsport.2018.01.008

McGannon, K. R., & Schinke, R. J. (2013). My first choice is to work out at work; then i don't feel bad about my kids": A discursive psychological analysis of motherhood and physical activity participation. *Psychology of Sport and Exercise, 14*(2), 179–188. https://doi.org/10.1016/j.psychsport.2012.10.001

Ntoumanis, N., Ng, J. Y. Y., Prestwich, A., Quested, E., Hancox, J. E., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Lonsdale, C., & Williams, G. C. (2021). A meta-analysis of self-determination theory-informed intervention studies in the health domain: Effects on motivation, health behavior, physical, and psychological health. *Health Psychology Review, 15*(2), 214–244. https://doi.org/10.1080/17437199.2020.1718529

Ottesen, L., Jeppesen, R. S., & Krustrup, B. R. (2010). The development of social capital through football and running: Studying an intervention program for inactive women. *Scandinavian Journal of Medicine & Science in Sports, 20*, 118–131. https://doi.org/10.1111/j.1600-0838.2010.01123.x

Panthumas, S., & Kittipichai, W. (2019). Validation of the maternal identity scale for primiparous Thai teenage mothers. *Asian Nursing Research, 13*(1), 69–75. https://doi.org/10.1016/j.anr.2019.01.007

Pearce, M., Garcia, L., Abbas, A., Strain, T., Schuch, F. B., Golubic, R., Kelly, P., Khan, S., Utukuri, M., Laird, Y., Mok, A., Smith, A., Tainio, M., Brage, S., & Woodcock, J. (2022). Association between physical activity and risk of depression. *JAMA Psychiatry, 79*(6), 550. https://doi.org/10.1001/jamapsychiatry.2022.0609

Pelletier, L. G., Rocchi, M. A., Vallerand, R. J., Deci, E. L., & Ryan, R. M. (2013). Validation of the revised sport motivation scale (SMS-II). *Psychology of Sport and Exercise, 14*(3), 329–341. https://doi.org/10.1016/j.psychsport.2012.12.002

Peralta, L. R., Cotton, W. G., Dudley, D. A., Hardy, L. L., Yager, Z., & Prichard, I. (2021). Group-based physical activity interventions for postpartum women with children aged 0–5 years old: A systematic review of randomized controlled trials. *BMC Women's Health, 21*(1), 435. https://doi.org/10.1186/s12905-021-01581-1

Peralta, L. R., Yager, Z., & Prichard, I. (2022a). Practice-based evidence: Perspectives of effective characteristics of Australian group-based physical activity programs for postpartum women. *Health Promotion Journal of Australia, 33*(3), 891–903. https://doi.org/10.1002/hpja.561

Peralta, L. R., Yager, Z., & Prichard, I. (2022b). 'There's just something really peaceful about it': A qualitative exploration of mothers with young children and engagement in group-based physical activity programs. *International Journal of Behavioral Medicine, 29*(6), 807–819. https://doi.org/10.1007/s12529-022-10062-0

Pluhar, E., McCracken, C., Griffith, K. L., Christino, M. A., Sugimoto, D., & Meehan, W. P. (2019). Team sport athletes may Be less likely to suffer anxiety or depression than individual sport athletes. *Journal of Sports Science and Medicine, 18*(3), 490–496.

Raspovic, A. M., Prichard, I., Yager, Z., & Hart, L. M. (2020). Mothers' experiences of the relationship between body image and exercise, 0–5 years postpartum: A qualitative study. *Body Image, 35*, 41–52. https://doi.org/10.1016/j.bodyim.2020.08.003

Rocchi, M. A., Pelletier, L. G., & Lauren Couture, A. (2013). Determinants of coach motivation and autonomy supportive coaching behaviours. *Psychology of Sport and Exercise, 14*(6), 852–859. https://doi.org/10.1016/j.psychsport.2013.07.002

Rogan, F., Shimed, V., Barclay, L., Everitt, L., & Wylli, A. (1997). 'Becoming a mother'—developing a new theory of early motherhood. *Journal of Advanced Nursing, 25*(5), 877–885. https://doi.org/10.1046/j.1365-2648.1997.1997025877.x

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology, 61*, Article 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Saligheh, M., McNamara, B., & Rooney, R. (2016). Perceived barriers and enablers of physical activity in postpartum women: A qualitative approach. *BMC Pregnancy and Childbirth, 16*(1), 1–8. https://doi.org/10.1186/s12884-016-0908-x

Santos, P. C., Leirós-Rodríguez, R., Abreu, S., Ferreira, M., Alves, O., & Mota, J. (2022). Physical activity during pregnancy and its effects on neonatal outcomes. *Placenta, 128*, 9–17. https://doi.org/10.1016/j.placenta.2022.08.009

Schuch, F. B., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P. B., Silva, E. S., Hallgren, M., Ponce De Leon, A., Dunn, A. L., Deslandes, A. C., Fleck, M. P., Carvalho, A. F., & Stubbs, B. (2018). Physical activity and incident depression: A meta-analysis of prospective cohort studies. *American Journal of Psychiatry, 175*(7), 631–648. https://doi.org/10.1176/appi.ajp.2018.17111194

Shorey, S., Chee, C. Y. I., Ng, E. D., Chan, Y. H., Tam, W. W. S., & Chong, Y. S. (2018). Prevalence and incidence of postpartum depression among healthy mothers: A systematic review and meta-analysis. *Journal of Psychiatric Research, 104*, 235–248. https://doi.org/10.1016/j.jpsychires.2018.08.001

Strange, C., Fisher, C., Howat, P., & Wood, L. (2014). Fostering supportive community connections through mothers' groups and playgroups. *Journal of Advanced Nursing, 70*(12), 2835–2846. https://doi.org/10.1111/jan.12435

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International*

Journal of Behavioral Nutrition and Physical Activity, 9(1), 78. https://doi.org/10.1186/1479-5868-9-78

Tekavc, J., Wylleman, P., & Cecić Erpič, S. (2020). Becoming a mother-athlete: Female athletes' transition to motherhood in Slovenia. *Sport in Society, 23*(4), 734–750. https://doi.org/10.1080/17430437.2020.1720200

Teychenne, M., Apostolopoulos, M., Ball, K., Olander, E. K., Opie, R. S., Rosenbaum, S., & Laws, R. (2021). Key stakeholder perspectives on the development and real-world implementation of a home-based physical activity program for mothers at risk of postnatal depression: A qualitative study. *BMC Public Health, 21*(1), 361. https://doi.org/10.1186/s12889-021-10394-8

Vancampfort, D., Firth, J., Schuch, F. B., Rosenbaum, S., Mugisha, J., Hallgren, M., Probst, M., Ward, P. B., Gaughran, F., De Hert, M., Carvalho, A. F., & Stubbs, B. (2017). Sedentary behavior and physical activity levels in people with schizophrenia, bipolar disorder and major depressive disorder: A global systematic review and meta-analysis. *World Psychiatry, 16*(3), 308–315. https://doi.org/10.1002/wps.20458

Vandenbroucke, J. P., von Elm, E., Altman, D. G., Gøtzsche, P. C., Mulrow, C. D., Pocock, S. J., Poole, C., Schlesselman, J. J., & Egger, M. (2014). Strengthening the reporting of observational studies in Epidemiology (STROBE): Explanation and elaboration. *International Journal of Surgery, 12*(12), 1500–1524. https://doi.org/10.1016/j.ijsu.2014.07.014

Vella, S. A., Benson, A., Sutcliffe, J., McLaren, C., Swann, C., Schweickle, M. J., Miller, A., & Bruner, M. (2021). Self-determined motivation, social identification and the mental health of adolescent male team sport participants. *Journal of Applied Sport Psychology, 33*(4), 452–466. https://doi.org/10.1080/10413200.2019.1705432

Vella, S. A., Swann, C., Allen, M. S., Schweickle, M. J., & Magee, C. A. (2017). Bidirectional associations between sport involvement and mental health in adolescence. *Medicine & Science in Sports & Exercise, 49*(4), 687–694. https://doi.org/10.1249/MSS.0000000000001142

Werner, E., Miller, M., Osborne, L. M., Kuzava, S., & Monk, C. (2015). Preventing postpartum depression: Review and recommendations. *Archives of Women's Mental Health, 18*(1), 41–60. https://doi.org/10.1007/s00737-014-0475-y

Wilson, P. M., & Rodgers, W. M. (2004). The relationship between perceived autonomy support, exercise regulations and behavioral intentions in women. *Psychology of Sport and Exercise, 5*(3), 229–242. https://doi.org/10.1016/S1469-0292(03)00003-7