Predictors of Psychological Functioning in Athletes: Physical Activity, Sense of Community, and Team Sport Participation

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Abstract

Aims: This study investigated whether sport type(team or individual), frequency of physical activity(PA), and perceived sense of community predict psychological functioning specifically loneliness, anxiety, and depression, among athletes. This research study aimed to whether social aspects of sport impact mental health(MH) outcomes beyond the health benefits of PA. **Method:** Participants (n=107) recruited via online advertisement, completed a cross-sectional online survey. Participants completed validated measures of loneliness(DJGLS), anxiety and depression(DASS-21), and sense of community(IGIM). Data was analysed using correlation, Mann-Whitney U tests, and hierarchical multiple regressions while controlling for age and gender. **Results:** Age emerged as the sole significant predictor across all models, with younger athletes reporting higher levels of anxiety, and depression. There was no significant correlation between psychological outcomes and sport type, PA frequency, or sense of community. However, participants in team sports reported significantly higher sense of community compared to participants in individual sports. **Conclusion:** Despite expectations, positive MH outcomes were not predicted by sport type or perceived sense of community. The findings suggest that simply engaging in PA may not protect against psychological distress unless it also fosters genuine emotional connection. Age-specific interventions and emotionally supportive sporting environments may be key to enhancing wellbeing.

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Introduction

Having meaningful social connections is essential for both mental and physical well-being (Heinrich & Gullone, 2006). While exercise has been recognized for its physical and mental health (MH) benefits, recent research highlights its potential role in mitigating loneliness (Pels & Kleinert, 2016). It has been established in the belongingness hypothesis that individuals have a basic need to belong, which drives human behaviour in every aspect of life and cultures, as a result, meeting this need is crucial to human's cognitive processes, emotional responses, and interpersonal interactions (Baumeister & Leary, 1995).

Current literature demonstrates that regular physical activity (PA) is vital for optimal brain function (Deslandes et al., 2009), it also implies that overall, PA can lead to a variety of physiological changes that enhances one's mood, boosts self-esteem, and reduces levels of stress and anxiety (Mikkelsen et al., 2017). Athletes of any ability face unique pressures and demands, that can impact psychological functioning both positively and negatively. While PA has been associated with improved MH outcomes, such as reduced anxiety and depression (Deslandes et al., 2009), the specific mechanisms by which athletic participation affects MH, particularly in relation to loneliness, are less understood. This research project seeks to address these gaps by exploring how key factors like PA, sense of community and belongingness, and team sport participation predict psychological functioning in athletes, particularly focusing on loneliness, anxiety, and depression by exploring the intricate association using theoretical frameworks and available empirical data to clarify the association.

Loneliness: Conceptualization and Impact

Loneliness is a pervasive societal issue with severe consequences severe health consequences (Holt-Lunstad, 2017). Loneliness is a complex emotional state characterized by

perceived social isolation and dissatisfaction with interpersonal relationships (De Jong Gierveld, 1998). Emotional loneliness reflects a lack of an attachment figure along with feelings of isolation, while social loneliness is defined as the lack of a social interconnections or a group of individuals that enables a person to establish a sense of companionship, belonging, and community (Yanguas et al., 2018).

Loneliness correlates with adverse health outcomes, including depression, anxiety, and suicidal ideation, (Beutel et al., 2017) alongside, cardiovascular disease (Valtorta et al., 2016), and increased morbidity, and mortality risk (Gerst-Emerson & Jayawardhana, 2015). Treating and preventing weaknesses in social connections should be a top priority for medical practitioners (Heinrich & Gullone, 2006).

Mansfield et al. (2021) findings identified three conceptions of loneliness: social, emotional, and existential, this review focuses on the social and emotional dimensions of loneliness, which capture the interpersonal and intimate deficits most strongly linked to psychological outcomes. Beutel et al., (2017) results indicated that 10.5% of their participants stated some level of loneliness. Their findings further illustrate that loneliness predicts higher risks of mental distress including, depression and generalised anxiety disorder reinforcing the perspective that loneliness is a serious health issue for a considerable portion of the population. Similarly, Park et al., (2019) analysed loneliness' extensive impact across mental and physical health outcomes, indicating that all health outcomes were effected by loneliness with MH and general well-being being the most effected, though research gaps remain regarding effective strategies in mitigating these effects.

Exercise and Mental Well-being

Regular PA has been strongly associated with improved MH outcomes, reducing symptoms of depression and anxiety (Deslandes et al., 2009; Eime et al., 2013). Exercise

promotes the release of endorphins and neurotransmitters like dopamine and serotonin (Bhattacharya et al., 2023), enhancing mood and buffering stress (Field et al., 2005). Moreover, engaging in PA provides opportunities for social interaction (Eyre et al., 2013) fostering a sense of belonging within community context, potentially counteracting feelings of loneliness.

Ströhle (2008) and Rebar et al. (2015) found that PA alleviates depression and anxiety through psychological mechanisms like self-efficacy and neurobiological pathways like enhancing serotonin metabolism. Findings from Ströhle (2008) indicated that moderate-intensity programs of 20–30 minutes, 3–4 times per week over 8–14 weeks appear most effective (Marcus et al., 1998; Otto et al., 2007, as cited in Ströhle., 2008), though mechanisms remain unclear and further controlled studies are necessary (Charney, 2004, as cited in Ströhle., 2008).

Philippot et al. (2022) further demonstrated that structured, supervised exercise significantly reduced depressive symptoms in hospitalized adolescents compared to social relaxation programs, although both improved anxiety. These findings suggest exercise serves as an important adjunct for treating depression, possibly through neurobiological and psychosocial benefits (Herting & Chu, 2017; Chaddock et al., 2010 as cited in Philippot et al., 2022).

Exercise, Social Connection, and Belonging

Social dynamics have proven vital in explaining why PA benefits psychological functioning and how if may act as a buffer in the face of loneliness (Haslam et al., 2018). McIntyre et al., (1990) investigated the effects of social interaction and PA on affect, findings highlighted that positive affect plays a limitless role in motivating individuals to engage in sociable, prosocial, and physically demanding activities. Such activities are linked to elevated

levels of positive affect. These findings underscore the need for further research into the positive motivations of exercise and its ability to build social interactions, and sense of belonging.

Surkalim et al., (2024) aimed to determine whether there is a link between current levels of exercise and loneliness with an interest in predicting how current levels of PA and loneliness may be associated with future states of themselves (i.e., future levels of PA and loneliness for the same individual) and each other (i.e., how PA influences loneliness and vice versa over time). Results suggested that although a decreased levels of exercise may be linked to future loneliness, a change in exercise levels has minimal effect on loneliness on an individual basis. This reinforces the assumption that social context within PA may play a larger role than the PA volume alone, highlighting that PA should foster meaningful connections and emotional support.

Conversely, loneliness may serve as a barrier to exercise participation for some individuals. Hawkley et al., (2009) found that loneliness was associated with higher odds of switching from PA to inactivity and lower odds of engaging in PA over the course of two years. Perceptions of social isolation and low self-esteem can diminish motivation and self-efficacy for engaging in PA. Moreover, the lack of social support and companionship may deter individuals from joining group fitness classes or recreational sports activities. In the context of athletes, understanding how the frequency of PA interacts with other psychosocial factors to influence psychological functioning could provide deeper insights into this association. However, PA alone does not fully account for MH outcomes, suggesting that other social or environmental factors may also play a significant role.

Aggerholm and Breivik (2020) explored this interplay applying a dialectic framework (Breivik, 1998), emphasizing reciprocal relationships between individuals and sports. They

identified belonging as a key value shaping social identity within football, which serves as a "social glue" through volunteer-driven clubs that foster inclusivity across cultural divides. While distinctions between being, having, and belonging remain conceptually blurred, this framework underscores the social and identity-based dimensions of sport participation.

Social Exercise Interventions and Team Dynamics

Social exercise interventions, combining PA with opportunities for social interaction, have emerged as a promising strategy for addressing loneliness, sedentary behaviour (Ahn et al., 2024) anxiety (Stonerock et al., 2015), and depression (Stanton & Reaburn, 2014). Group-based exercise programs, such as walking groups, team sports, and dance classes, offer participants social support, camaraderie, and a sense of belonging (Soria et al., 2022).

Despite loneliness being typically associated with older populations, research conducted by Ahn et al., (2024) indicated that younger generations may be more vulnerable to loneliness findings that align with Twenge et al. (2019) who found that psychological distress in younger populations has increased among younger adults in recent years. Indicating that younger adults have an even stronger correlation between loneliness and unfavourable health outcomes than middle aged and older adults (Hämmig, 2019, Matthews et al., 2016). Moreover, it was indicated in studies (Boen et al., 2008, Täuber & Sassenberg, 2012) that people find it easier to identify with sports teams or fitness centres, which in turn enhances their feeling of belonging.

Afaq et al., (2023) demonstrated that engaging in PA can significantly lower feelings of loneliness as people age. Bang et al., (2024) investigated how participation in team and individual school sports relates to adolescent depression, focusing on the mediating role of school belonging and moderating effects of gender. Findings illustrated that participation in both team and individual sport indirectly reduced depressive symptoms by enhancing senses

of belonging, with team sports offering stronger social benefits particularly for boys, while individual sports offered some benefits for girls but increased depression risk for boys. Results highlight the necessary consideration required for PA as an intervention for anxiety and depression.

Chen et al., (2025) concluded that exercise interventions have the potential to significantly reduce anxiety among students, with Tai Chi being especially effective. They found that three 50-minute sessions per week over the course of eight weeks produced favorable outcomes. Their findings support the thought that exercise type and dosage impact anxiety and supports the integration of structured PA into student MH strategies.

These interventions not only promote physical health but also foster meaningful social connections, reducing feelings of loneliness and increasing positive MH outcomes in the process (Stathopoulou et al., 2006). The concept of sense of community has emerged as a critical factor in promoting well-being. For athletes, engaging in PA provides opportunities for social interaction (Eyre et al., 2013) and fosters a sense of belonging within community settings, potentially counteracting feelings of loneliness and benefiting psychological functioning. Feeling connected to a group, whether through team membership or a larger athletic community, may provide social support that is crucial for maintaining psychological health (Ahn et al., 2024)

Team vs. Individual Sports

Another key consideration is whether sport type differentially affects athletes' MH. Moreover, it was indicated in studies (Boen et al., 2008, Täuber & Sassenberg, 2012) that people find it easier to identify with sports teams or fitness centres, which enhances their feeling of belonging. Pharr et al., (2019), reported that after adjusting for demographic characteristics team sport players had decreased risk for depression, and that playing as a

team has a greater effect reducing symptoms compared to individual sports. Pluhar et al., (2019) concluded that team sports better protect against anxiety and depression in comparison to individual sports, suggesting that this could be attributed to their social and enjoyable nature contrasting the isolating, goal-driven environment fostered by individual sports. Team sports inherently provide more opportunities for social interaction, cohesion, and camaraderie, which may reduce loneliness, improve MH and foster a stronger sense of community (Andersen et al., 2018). Conversely, athletes who participate in individual sports might lack these social benefits, potentially leading to increased feelings of isolation, despite engaging in regular PA (Sabiston et al., 2016). The lack of clarification on this sense of community, appeals for further group dynamic research that investigates individual sport environments (Evans et al., 2012) and recognizes the various forms of mutual reliance that exist in group structure and community in an individual sport (Kim et al., 2024)

The Current Study

While numerous studies have associated PA to improved MH (Eime et al., 2013), limited research examine how social dynamics within sports, such as the sense of belonging to a team or community, affect loneliness, anxiety, and depression among athletes. This study addresses this gap through examining the combined influence of frequency of PA, team vs individual sport participation, and perceived sense of community on psychological functioning, while controlling for age and gender. Understanding these relationships is essential for the understanding of social connectedness ability to enhance positive MH , as loneliness may reduce exercise participation for some individuals, whereas, engaging in regular PA holds potential benefits for alleviating loneliness and enhancing social well-being and MH.

The findings will have implications for MH interventions in sports settings, potentially highlighting the importance of community-building and social support in addition to the physical benefits of sport. Furthermore, this study contributes to clarifying mechanisms that associate PA with psychological functioning, particularly within in athletic contexts. By exploring these predictors this research aims to illustrate how team-based environments and high perceived sense of community can mitigate loneliness and promote positive MH outcomes.

The research questions that orientate this study are: R1. Does participation in either team or individual sports, frequency of PA and sport participation, and feeling of community within sport predict loneliness, while controlling for age and gender R2. Does participation in either team or individual sports, frequency of PA and sport participation, and feeling of community within sport predict anxiety, while controlling for age and gender R3. Does participation in either team or individual sports, frequency of PA and sport participation, and feeling of community within sport predict depression, while controlling for age and gender? R4. Is there a difference in sense of community and belonging among those individual sports compared to team sports

The hypotheses for this study are: H1. Higher PA frequency and stronger sense of community will be associated with lower loneliness, anxiety, and depression. H2. Athletes in team sports will report higher sense of community and lower loneliness, anxiety, and depression compared to individual sport athletes H3. Sense of community will mediate the relationship between sport type and psychological outcomes, with team sports predicting better MH through greater belonging.

Methodology

Participants

A total of 107 participants were recruited mainly via advertisement on social media and sport-related online groups (e.g. Instagram, and discord), providing brief information about the study (See Appendix J). Inclusion criteria required participants to be over the age of 18, identifying as an athlete that engages in physical activity (PA) at least once a week. Non - probability snowball sampling was the sampling method utilised, as participants were encouraged to share the study link with other individuals who met the inclusion criteria. The final sample of 107 participants consisted of 69.2% women (n=74) and 30.8% (n=33), with a mean age of 29.79 (SD= 12.93). Participants came from a variety of sporting backgrounds both team, (e.g. football, rugby) and individual (e.g. running, boxing) sports. Through the utilization of G*Power version 3.1.9.7, it was concluded that using a linear multiple regression with a medium effect size (f=.15), α error probability (.05), power (.8), numerator df (5), and number of groups = 5, results in a total sample size of 92 (See Appendix E).

Materials

Information Sheet

Once an interest was shown in the study the participants received a link to the questionnaire that takes an estimated maximum of 7 minutes to complete therefore, no breaks were required (See Appendix A). The information sheet detailed the aim of the study, the process, confidentiality, and their right to withdraw from the study (See Appendix B). My student email address was provided to ensure a point of contact for any questions or queries the participant may have had. The consent form ensured that the participants were aware of what their participation in the study entailed (See Appendix C).

Demographic Questionnaire

The demographic questionnaire collected data on age, gender, sport type (team or individual), and frequency of PA (duration and quantity of sessions per week) (See Appendix F). This data collection allowed for control of potential confounding variables in analysis.

Depression, Anxiety, and Stress Scale (DASS-21)

The DASS- 21 contains 7 items from each of the 3 subscales : Depression, Anxiety, and Stress (Lovibond &Lovibond, 1995) (See Appendix G). It uses a 4-point Likert scale ranging from 0 (Did not apply to me at all) to 3 (Applied to me very much, or most of the time), gauging the severity of the participants' experiences over the last week (Lovibond &Lovibond, 1995). All item scores were summed to create a total score, with higher scores reflecting greater severity of symptoms. The Cronbach's alpha for the anxiety subscale was 0.87, and for the depression subscale it was 0.94 (Antony et al., 1998), this highlights that the items are sufficiently consistent and demonstrates that the measure is reliable; results were above 0.7. Only the depression and anxiety subscales will be utilized for this study. In the current sample, Cronbach's Alpha was .90 for Depression and .84 for Anxiety indicating high reliability.

The In-Group Identification Measure (IGIM)

The In-Group Identification Measure (Leonard et al., 2015) contains 8 items rated on a 5-point Likert scale ranging from 1 (never) to 5 (very often) (See Appendix H). The In-Group Identification Measure wording was altered from community to sporting community. All item scores were summed to create a total score, with higher scores reflecting greater sense of community. The Cronbach's alpha for the scale was 0.87, this highlights that the items are sufficiently consistent and demonstrates that the measure is reliable. In the current sample, Cronbach's Alpha was .94 indicating high reliability.

De Jong Gierveld 11-Item Loneliness scale (DJGLS)

The De Jong Gierveld 11-Item Loneliness scale (De Jong Gierveld & Van Tilburg, 2006), measures two dimensions of loneliness (social and emotional) which generalize into a higher-order factor of a general sense of loneliness (bifactor structure) (See Appendix I). Positively and negatively worded items were reverse scored as necessary, then summed to compute subscale and total scores. Higher scores indicate greater loneliness. The average Cronbach's alpha for the emotional subscale was 0.86, and for the social subscale it was 0.89 (De Jong Gierveld & Van Tilburg, 2010), this highlights that the items are sufficiently consistent and demonstrates that the measure is reliable. In the current sample, Cronbach's Alpha was .87 overall indicating high reliability.

Debrief Sheet

The debrief sheet thanked the participants for contributing to the study and provided them with a final explanation of the study, highlighting that due the nature of the questionnaire once they submitted their responses it was not possible for their information to be removed (See Appendix D). It also illustrated that all responses were non-identifiable, and that participant identity would remain anonymous. They were finally reminded that should the study have caused any distress or affected them negatively in any manner that they should contact the 24-hour Samaritans helpline.

Design

This quantitative study employed a comparative cross-sectional research design, collecting data from athletes aged 18+ at a single point in time. Assessing their levels of psychological functioning specifically loneliness, anxiety, and depression among athletes in relation to their sport type (team vs. individual), frequency of PA, and sense of community within sport. This study also collected demographic information to provide a deeper insight

into the association between these variables, specifically controlling for age and gender. Independent Variables (IVs): Sport type (team vs. individual; categorical), Frequency of physical activity (continuous), Sense of community (continuous). Dependent Variables (DVs): Depression score, Anxiety score, Loneliness score. Control Variables (CVs): Age, Gender

Procedure

Following ethical approval from the National College of Ireland ethics committee participants were recruited via advertisement on social media and sport-related online groups (e.g. Instagram, and discord). Upon accessing the link, participants viewed an information sheet detailing the study's aim, confidentiality, voluntary participation, and right to withdraw up until data submission. They then provided informed consent electronically before proceeding to the questionnaire. The questionnaire consisted of demographic questions, followed by the DASS-21, IGIM, and Loneliness Scale, and concluded with a debrief page and mental health support resources. Completion time was approximately 7 minutes, and participation was entirely anonymous. Data was collected securely and stored in accordance with GDPR and institutional data protection policies

Once all data was collected, statistical analysis was performed. To perform these statistics IBM SPSS Statistics version 29.0.1.0(171) was utilised. Descriptive statistics were conducted for all variable to compute means, standard deviations, and frequencies, the distribution of variables will be examined to assess normality and identify outliers. Whilst also exploring correlations between the variables utilizing a Spearman's Rho correlation analysis to understand basic associations. A non-parametric independent-samples Mann-Whitney U test was performed to measure the association between sense of community and sport type, to assess which fosters a larger sense of belonging. Multiple linear regression was

performed to assess the combined and individual impact, of sport type, frequency of physical activity and sport participation, and their feeling of community within their sport on levels of psychological functioning specifically, loneliness, anxiety, and depression.

Results

This chapter presents findings of the study in relation to four research questions (R1-R4) and associated hypotheses (H1- H3). Descriptive Statistics were run to assess participant demographics and descriptive information on variables including age, gender, sport type, sense of community, loneliness, physical activity (PA), anxiety, and depression are reported. Bivariate correlations were run to examine relationships among psychological outcomes (loneliness, anxiety, depression), sense of community, and PA to provide an overview of associations between key variables (relevant to H1). Hierarchical Regression Analysis was conducted testing loneliness (R1), anxiety (R2), and depression (R3), investigating whether sport type, frequency of PA, and sense of community predict mental health (MH) outcomes while controlling for age and gender (related to H1 and H3). Finally, differences in sense of community between sport type are examined utilising non-parametric independent-samples Mann-Whitney U test (R4), addressing H2.

Descriptive Statistics

The Current data is taken from a sample of 107 participants (n=107). This consisted of 69.2% women (n=74) and 30.8% (n=33). A total 54.2% (n=58) of participants engaged in team sports as their PA, and the other 45.8% (n=49) participants engaged in individual sports as their primary PA.

Descriptive statistics are illustrated below in table 1 for gender, and sport type. Table 2 illustrates descriptive statistics for continuous variables

Table 1

Descriptive statistics for gender, and sport type

Variable	Frequency	Valid %
Gender		
Woman	74	69.2
Man	33	30.8
Sport Type		
Team	58	54.2
Individual	49	45.8

Table 2

Descriptive statistics for age in years, sense of community, total loneliness score, total loneliness score, total active minutes, total anxiety score, and total depression score.

Variable	*M* [95% CI]	*SD*	Range
Age in Years	*29.79* [27.31, 32.26]	*12.93*	18-79
Sense of Community	*20.07* [19.11, 21.04]	*5.06*	5-25
Total Loneliness Score	*24.94* [23.53, 26.36]	*7.39*	11-43
Total Active Minutes	*224.66* [196.15, 253.16]	*145.13*	40-910
Total Anxiety Score	*3.89* [3.12, 4.65]	*3.99*	0-18
Total Depression Score	*4.55* [3.73, 5.37]	*4.28*	0-20

Inferential Statistics

Before testing the predictive models, the relationships among loneliness, anxiety, depression, sense of community, and physical activity were explored using Spearman's rank-order correlations due to non-normal distributions. These analyses provide preliminary evidence relevant to H1, which states that higher PA frequency and a stronger sense of community would be associated with lower psychological functioning. See Table 3 for full details.

The relationship between loneliness and other psychological and behavioural variables was examined there was a moderate, positive correlation between loneliness and anxiety ($\rho = .39$, $n = 107$, $p < .001$) and a strong, positive correlation between loneliness and depression ($\rho = .51$, $n = 107$, $p < .001$). These findings indicate that higher levels of loneliness are associated with higher levels of anxiety and depression. No significant relationships were observed between loneliness and sense of community ($\rho = –.12$, $p = .212$) or between loneliness and physical activity ($\rho = –.02$, $p = .880$).

The relationship between sense of community and other variables was examined there was a small, positive correlation between sense of community and physical activity ($\rho = .27$, $n = 102$, $p = .005$), suggesting that individuals who report greater sense of community also tend to engage in more active minutes per week. No significant correlations were found between sense of community and loneliness ($\rho = –.12$, $p = .212$), anxiety ($\rho = –.02$, $p = .877$), or depression ($\rho = –.06$, $p = .563$).

The relationship between physical activity and mental health variables was explored, a weak, positive correlation was found between physical activity and anxiety ($\rho = .21$, $n = 102$, $p = .037$), indicating that individuals engaging in more active minutes per week reported

slightly higher anxiety. No significant associations were observed between physical activity and loneliness (ρ = –.02, p = .880) or depression (ρ = .12, p = .246).

Anxiety demonstrated significant associations with several variables. There was a strong, positive correlation between anxiety and depression (ρ = .68, n = 107, p < .001) and a moderate, positive correlation between anxiety and loneliness (ρ = .39, p < .001). A weak but significant positive relationship was also found between anxiety and physical activity (ρ = .21, p = .037). No significant association was observed between anxiety and sense of community (ρ = –.02, p = .877).

Depression demonstrated a strong, positive correlation with both anxiety (ρ = .68, n = 107, p < .001) and loneliness (ρ = .51, p < .001), indicating that individuals experiencing higher levels of depression also report higher anxiety and loneliness. No significant correlations were observed between depression and physical activity (ρ = .12, p = .246) or between depression and sense of community (ρ = –.06, p = .563).

Table 3

Correlation table (Spearman's Rho) – sense of community, total loneliness score, total loneliness score, total active minutes, total anxiety score, and total depression score.

Variable	1.	2.	3.	4.	5.
1. Sense of Community	-				
2. Total Loneliness Score	-.12	-			
3. Total Active Minutes	.27**	-.02	-		
4. Total Anxiety Score	-.02	.39**	.21*	-	
5. Total Depression Score	-.06	.51**	.12	.68**	-

Note: *ρ < .05, **ρ < .01

The following hierarchical multiple regression analyses address research questions 1–3 by testing sport type, PA frequency, and sense of community predict loneliness, anxiety, and depression, after controlling for age and gender. These models directly test parts of H1: associations between PA, sense of community, and mental health outcomes and H3: the potential mediating role of sense of community in the relationship between sport type and psychological outcomes.

Hierarchical multiple regression analysis was performed for R1 to investigate whether frequency of physical activity, sport type, and perceived sense of community predict levels of loneliness, after controlling for the influence of age and gender. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The correlations between the predictor variables (age, gender, frequency of physical activity, sport type, and perceived sense of community) were assessed and r values

ranged from -.44- .39. Tests for multicollinearity also indicated that all Tolerance and VIF values were in an acceptable range. These results indicate that there was no violation of the assumption of multicollinearity, and that data were suitable for examination through multiple regression analysis. In the first step of the hierarchical multiple regression, two predictor variables were entered: age and gender. This model was not statistically significant ($F(2, 99) = 2.016$, $p = .139$) with an R^2 of .039 explaining 3.9% of the variance in loneliness (see Table 2 for full details). After the entry of frequency of physical activity, sport type, and perceived sense of community at Step 2, with an R^2 of .054 the total variance explained by the model was 5.4% ($F(5, 96) = 1.088.$, $p = .372$). The introduction of frequency of physical activity, sport type, and perceived sense of community explained an additional 1.5% of variance in loneliness, after controlling for age and gender; this change was not statistically significant (R^2 Change = .015; $F(3, 96) = .49$, $p = .957$). In the final model, none of the five predictor variables were found to uniquely predict loneliness to a statistically significant degree. Frequency of physical activity, sport type, and perceived sense of community were negative predictors of loneliness, gender was a positive predictor of loneliness, and age was the strongest predictor in the model ($\beta = -.22$; $p=.066$). See Table 4 for full details.

Table 4

Hierarchical regression model predicting loneliness

Variable	R^2	R^2 Change	*B*	*SE*	*β*	*t*	*p*
Step 1	.04						
Age			-.12	.06	-.21	-2.01	.047
Gender			.91	1.65	.06	.55	.582
Step 2	.05	.02					
Age			-.13	.07	-.22	-1.86	.066
Gender			.86	1.72	.05	.50	.618
Team or Individual Sport			-.36	1.80	-.02	-.20	.842
Total Active Minutes			-.003	.01	-.06	-.52	.608
Sense of Community			-.17s	.164	-.11	-1.02	.311

Hierarchical multiple regression analysis was performed for R2 to investigate whether frequency of physical activity, sport type, and perceived sense of community predict levels of anxiety, after controlling for the influence of age and gender. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The correlations between the predictor variables (age, gender, frequency of physical activity, sport type, and perceived sense of community) were assessed and r values ranged from -.48- .39. Tests for multicollinearity also indicated that all Tolerance and VIF values were in an acceptable range. These results indicate that there was no violation of the assumption of multicollinearity, and that data were suitable for examination through multiple

regression analysis. In the first step of the hierarchical multiple regression, two predictor variables were entered: age and gender. This model was statistically significant ($F(2, 99) = 15.72$, $p<.001$) with an R^2 of .226 explaining 22.6% of the variance in anxiety (see Table 2 for full details). After the entry of frequency of physical activity, sport type, and perceived sense of community at Step 2, with an R^2 of .243 the total variance explained by the model was 24.3% ($F(5, 96) = 6.18.$, $p<.001$). The introduction of frequency of physical activity, sport type, and perceived sense of community explained an additional .2% of variance in anxiety, after controlling for age and gender ; this change was not statistically significant (R^2 Change = .002; $F(3, 96) = .49$, $p= .690$). In the final model, one of the five predictor variables (age) was found to uniquely predict anxiety to a statistically significant degree. Gender, sport type, and perceived sense of community were negative predictors of anxiety, frequency of physical activity was a positive predictor of anxiety, and age was the strongest predictor in the model ($\beta = -.41$; $p<.001$). See Table 5 for full details.

Table 5

Hierarchical regression model predicting anxiety

Variable	R^2	R^2 Change	*B*	*SE*	*β*	*t*	*p*
Step 1	.23***						
Age			-.14	.03	-.44	-4.75	<.001
Gender			-1.11	.79	-.13	-.1.40	.164
Step 2	.23***	.002					
Age			-.13	.03	-.41	-3.85	<.001
Gender			-1.20	.83	-.14	-1.45	.151
Team or Individual Sport			-.24	.87	-.03	-.27	.785
Total Active Minutes			.001	.003	.038	.40	.693
Sense of Community			-.03	.08	-.04	-.43	.666

*Note: ***p < .001*

Hierarchical multiple regression analysis was performed for R3 to investigate whether frequency of physical activity, sport type, and perceived sense of community predict levels of depression, after controlling for the influence of age and gender. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The correlations between the predictor variables (age, gender, frequency of physical activity, sport type, and perceived sense of community) were assessed and r values ranged from -.44- .39. Tests for multicollinearity also indicated that all Tolerance and VIF values were in an acceptable range. These results indicate that there was no violation of the assumption of multicollinearity, and that data were suitable for examination through multiple regression analysis. In the first step of the hierarchical multiple regression, two predictor

variables were entered: age and gender. This model was statistically significant ($F(2, 99) = 11.68$, $p<.001$) with an R^2 of .191 explaining 19.1% of the variance in depression (see Table 2 for full details). After the entry of frequency of physical activity, sport type, and perceived sense of community at Step 2, with an R^2 of .199 the total variance explained by the model was 19.9% ($F(5, 96) = 4.78.$, $p<.001$). The introduction of frequency of physical activity, sport type, and perceived sense of community explained an additional .8% of variance in depression, after controlling for age and gender; this change was not statistically significant (R^2 Change = .008; $F(3, 96) = .33$, $p= .801$). In the final model, one of the five predictor variables (age) was found to uniquely predict depression to a statistically significant degree. Gender, frequency of physical activity, and perceived sense of community were negative predictors of anxiety, sport type was a positive predictor of depression, and age was the strongest predictor in the model ($\beta = -.44$; $p<.001$). See Table 6 for full details

Table 6

Hierarchical regression model predicting depression

Variable	R^2	R^2 Change	*B*	*SE*	*β*	*t*	*p*
Step 1	.19***						
Age			-.14	.03	-.42	-4.40	<.001
Gender			-.51	.88	-.06	-.58	.565
Step 2	.20***	.008					
Age			-.15	.04	-.45	-4.11	<.001
Gender			-.62	.92	-.07	-.67	.503
Team or Individual Sport			.723	.96	.09	.76	.451
Total Active Minutes			<.001	.003	-.02	-.17	.867
Sense of Community			-.02	.087	-.03	-.26	.799

*Note: ***p < .001*

Finally, sense of community and sport type were compared to address research question 4 and hypothesis 2. A non-parametric independent-samples Mann-Whitney U test was conducted for R4 to compare the sense of community scores for either team or individual sports players due to non-normal distributions. There was a significant difference in median scores for team (MD= 23.5) and individual (MD= 18), Z= -3.83, p<.001. Based on a Pearson's correlation analysis the magnitude of the effect size (r = -.44) is moderate. Results concluded a statistically significant difference that indicates participation in team sports is associated with a moderately higher sense of community compared to participation in individual sports

Discussion

The present study investigated how sport type (team or individual), frequency of physical activity (PA), and sense of community correlate with phycological outcomes specifically, loneliness, anxiety, and depression, whilst controlling for age, and gender. The study was guided by four research questions and three hypotheses, examining whether sense of community differs between sport type and mental health (MH). The research aimed to associate with the belongingness hypothesis (Baumeister & Leary, 1995), which highlighted the fundamental need for belonging among individuals, and how it acts as a fundamental psychological drive that shapes behaviour and well-being. This study aimed to address gaps in literature that has often prioritised physical benefits of PA without sufficiently exploring the social and psychosocial mechanisms that influence MH outcomes (Deslandes et al., 2009; Mikkelsen et al., 2017). Sense of community was a stronger predictor of MH outcomes than either PA frequency or sport type. Team sport athletes reported higher levels of perceived SOC than athletes who participated in individual sports, this suggests that the social environment of team activities may foster greater senses of belonging, and emotional support. However, neither sport type nor PA frequency significantly predicted psychological functioning, after controlling for age and gender.

Although loneliness was strongly correlated with anxiety and depression reiterating previous findings on its central role in psychological distress (Beutel et al., 2017; Heinrich & Gullone, 2006), results from the regression model for Research Question 1 (R1), were not statistically significant, they indicated that neither sport type, PA frequency, nor SOC significantly predicted loneliness, when controlling for age and gender. This contrasts previous research that suggest loneliness can be prevented by group-based PA (Haslam et al., 2018). These findings do not support Hypothesis 1(H1), which proposed that lower levels of loneliness would be linked to higher PA and a stronger SOC. Furthermore, Hypothesis 3(H3),

which proposed a mediating role of sense of community, was not supported in the context of loneliness.

The regression model for Research Question 2(R2) related to anxiety had an overall significance, however, age was the only significant predictor; older individuals reported lower levels of anxiety. Neither PA, sport type, nor sense of community significantly contributed to the model. Although not statistically significant PA had a weak positive correlation with anxiety, which suggests that more active individuals may report slightly higher anxiety, contradicting expectations as it has been frequently demonstrated that PA reduces anxiety symptoms (Deslandes et al., 2009; Rebar et al ., 2015). The lack of significance in this study raises the possibility that contextual or individual variables, such as coping style, sport climate, or motivation, may moderate this effect. H1 was again not supported, in relation to anxiety as lower levels of anxiety was not associated with higher PA and a stronger SOC, and H3 was not supported, as sense of community did not mediate effects of anxiety.

While the overall regression model for Research Question 3(R3) was significant, age was the only variable that predicted depression with younger athletes reporting higher levels. Sport type, PA, and sense of community did not contribute to the variance in depressive symptoms. These findings contradict the widespread belief that sport participation inherently protects against depression (Ströhle, 2008; Eime et al., 2013). Although previous research connected PA to improved mood and reduced depressive symptoms (Deslandes et al., 2009; Field et al., 2005), these relationships may rely more on factors not assessed in this study, like social context (Surkalim et al., 2024), motivation, and self-efficacy. As with anxiety, these findings do not support H1 or H3, indicating no protective effects of PA or sense of community on depression in this sample.

Research Question 4(R4) investigated whether SOC differed between participant sport type. participants who engaged in team sports reported a moderately higher sense of community than individual sport athletes, which is partially consistent with Hypothesis 2(H2). This reinforces the proposed idea that team environments foster stronger social connections supporting the findings derived from Pluhar et al. (2019) and Pharr et al. (2019). However, the rest of H2 that proposed that team sport athletes would also report lower levels of loneliness, anxiety, and depression, was not supported as there no significant differences in psychological outcomes were observed. The moderate correlation indicates that team sports may not necessarily result in genuine community experiences, even if they theoretically offer more frequent social interaction, as Boen et al. (2008) argue, team membership does not always equate to team identification or support. Furthermore, the divide in sport type is blurred, since even individual athletes frequently train in group environments, compete as a team, or participate in online communities (Kim et al., 2024). Conclusively these findings do not support H2.

Contributions and Major Implications

This study's findings challenge the assumption that sport from a theoretical perspective, is a universal protective factor. While models like the belongingness hypothesis (Baumeister & Leary, 1995) and related models such as the social cure hypothesis (Haslam et al., 2018), provide strong frameworks, current results suggest that belongingness must be authentic, and emotionally supportive to have protective effects. Therefore, simply being part of a sport team or engaging in frequent PA may not be sufficient unless these experiences foster genuine emotional connections. This perspective aligns with previous findings (Surkalim et al., 2024) reinforcing the assumption that social context within PA plays a larger role than the PA volume alone, highlighting that PA should foster meaningful connections and emotional support.

Across all three predictor models (R1-R3), age was the most consistent and only significant predictor, with younger athletes reporting higher levels of loneliness, and significantly higher levels of anxiety and depression. This correlates with findings from Twenge et al. (2019) and reinforces current concerns about the MH vulnerability of younger athletes. Highlighting the importance of age-specific interventions and suggests that sport-based MH intervention should be accessible to younger participants. These findings suggest that from a policy perspective promoting sport engagement alone might not be enough to improve youth MH, interventions should instead aim to enhance psychological safety, emotional support, and positive team sport culture within sporting environments.

Strengths and Limitations

This research has a number of limitations. First, the cross-sectional design precludes causal inference, as a result of the data being collected at a singular point in time it is unclear whether mental health outcomes are caused by or merely associated with sport experiences.

Second, the sampling method, an opportunity-based snowball sampling technique was utilised as participants were encouraged to share the study link with other individuals who met the inclusion criteria. Those who had higher levels of interest in the study could have been more motivated to encourage others to complete the questionnaire, limiting the study due to ungeneralisable results considering the potential skewed sample. The sample may also lack diversity in terms of geographic location, and competitive level, as a results of the sampling method further limiting generalizability

Third, the self-report measures utilised are susceptible to potential biases like desirability and recall, particularly given the stigma around MH in sport environment. Therefore, participants may have responded the questionnaire in a so called ‘socially acceptable’ way and not in relation to how they actually felt.

Fourth, the sample size (n= 107) while adequate according to power analysis (n= 92+), was relatively small and drawn primarily from social media platforms, potentially limiting generalizability, a sample size of such quantity, may have limited statistical power, particularly for detecting mediation effects.

Fifth, the sport type classification; team or individual, has the potential to oversimplify complex participation structures, as most sports have the potential to contain both independent and collective components.

Lastly, the measure of sense of community relied on the adaptation of the In-Group Identification Measure (Leonard et al., 2015) from community to sporting community, and while reliability was acceptable, further validation in sport contexts would strengthen confidence in its applicability.

Although this study contained many limitations, a key strength of this study is the fact that it was an online questionnaire leading to relatively quick, practical, easier, and convenient completion, whilst also providing a sense of privacy for the participants when responding to potentially sensitive questions. It also contributes to a growing body of literature questioning the assumed universality of sport's MH benefits, by testing multiple psychological outcomes while controlling for key demographics.

Future Research Directions

Future research should consider a longitudinal design to monitor and assess changes in MH over time and to determine the potential causal pathways associating sport participation and well-being. Mixed-method approaches, combining qualitative and quantitative approaches may provide a deeper understanding of how athletes interpret emotional support, community, and belonging. Given the unexpected positive correlation found between PA and anxiety, future research should investigate whether individuals with

higher levels of anxiety utilise PA as a comping mechanism rather than a preventative measure. Utilising qualitative or mixed-methods studies would assist in the exploration of participants' motivations for partaking in PA and whether engagement alleviates or worsens their anxiety symptoms.

Although participants who engaged in team sports reported a greater sense of belonging, this did not transfer into improved MH outcomes. Instead of focusing on generalised feelings of community, future research could take a deeper look into the quality of social interactions and perceived emotional support. Age consistently predicted lower levels of loneliness, anxiety, and depression. Future studies could investigate the reasoning for psychological superiority of older individuals, examining life stability, social maturity, resilience or coping mechanisms that may protect physically active populations from MH challenges.

Conclusion

This study explored four key research questions investigating the role of sport type, PA and sense of community in predicting loneliness, anxiety, and depression among athletes. None of the sport-related variables significantly predicted MH outcomes after controlling for age and gender. Although after utilising age as a control variable it emerged as the only consistent and statistically significant predictor across all models, particularly highlighting the unique MH vulnerability of younger athletes. These findings suggest that sport participation alone does not protect against psychological distress, highlighting the particular MH vulnerability of younger athletes.

Although participants who engaged in team sports reported a higher sense of community, this structural difference did not translate into better psychological outcomes, challenging assumptions that team environments and formats are inherently more protective.

Instead, the findings suggest that interventions that foster social connectedness, regardless of sport type may be key to promoting wellbeing and positive MH outcomes among athletes, challenging the simplistic view that team environments naturally foster emotional support and improved wellbeing. Practitioners should emphasise and focus on cultivating inclusive environments that support MH by addressing the quality of social engagement within sport, advancing beyond the simplistic divisions of team versus individual formats.

Practically, these findings suggest that the development and design of sport-based MH therapies need to evolve. To better understand how and why athletes connect within their sporting environment, future interventions and research must gain a different perspective deeper than surface-level participation prioritizing emotional connection, social inclusion, and age-sensitive support strategies in athletic environments.

This study's findings emphasise the importance of reconsidering assumptions regarding the positive effects of sport on psychological functioning and MH. Future studies should investigate how athletes develop emotional connection and support within their sporting environments utilising mixed methods and longitudinal approaches. The emphasis must now be place how sport is experienced, particularly for younger athletes navigating challenging emotional and developmental environments, as findings illustrate that participation alone is no longer sufficient.

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Appendices

Appendix A

Link to Questionnaire

https://forms.gle/1Ra2WfbWhfPSjXE56

Appendix B

Information sheet

Invitation to complete this study:

You are being invited to take part in a research study. Before deciding whether to take part, please take the time to read this document, which explains why the research is being done and what it would involve for you. If you have any questions about the information provided, please do not hesitate to contact me using the details at the end of this sheet. The National College of Ireland filter committee has reviewed this project, but it is principle investigators responsibility to ensure required ethical principles are adhered to during the completion of the study.

Purpose of the study:

I am Jessica Kelleher, an undergraduate student, in the School of Business, in the Department of Psychology, the National College of Ireland. I am undertaking this research study, Predictors of Psychological Functioning in Athletes: Physical Activity, Sense of Community, and Team Sport Participation, as part of my final year undergraduate research project. This research is focused on establishing an association between psychological functioning specifically, loneliness, anxiety, and depression, in relation to an individual's participation in either team or individual sports, whilst also examining their frequency of physical activity and sport participation, alongside their feeling of community within that sport.

What will the study involve?

The study will involve the completion of a survey. This may take up to 10 minutes.

Who can take part in this study?

You can take part in this study if you are an athlete of any ability aged 18 and above, who partakes in a team or individual sport on a regular basis this being engagement at least once a week. You may not take part in this study if do not engage in physical activity at least once a week and or under the age of 18.

Do you have to take part in this study?

No, you are under no obligation to take part in this research. However, we hope that you will agree to take part and give us some of your time to complete the survey in order to contribute to the world of psychological research. It is entirely up to you to decide whether you would like to take part. If you decide to do so, you will be asked to agree to a digital

consent form and upon request you will be forwarded a copy of the information sheet for your own records. If you decide to take part, you are free to withdraw at any time prior to questionnaire submission without providing a reason.

What information will be collected?

Initially we gather some demographic information from you such as age, gender and place of residence. All information gathered after this will be based on your opinions and experience of your relationship with psychological functioning specifically, loneliness, anxiety, and depression, in relation to your participation in either team or individual sports, whilst also examining your frequency of participation in physical activity, alongside your feeling of appendix within that sport.

Will your participation in and response to this study be kept confidential and anonymous?

Yes, all information that is collected about you during the course of the research will be kept confidential. All electronic information will be encrypted and held securely, and will be accessed only by researchers on the project: Jessica Kelleher, and Dr Robert Fox

No information will be distributed to any other unauthorised individual or third party, only the research team. Your individual data cannot be made available to you due to the anonymous nature of this study. Should you wish to follow up on the results of this research please contact Jessica Kelleher: x22315893@ncirl.ie.

Which will happen to the information which you give?

On completion of this research project, the data will be retained on the National College of Ireland server. After 5 years, all data will be destroyed (by the PI). As all the data collected will be electronic data will be reformatted or overwritten by the PI in the National College of Ireland. Due to the anonymous nature of the questionnaire once it is submitted it is not possible to withdraw the submitted data, but it will remain anonymous and confidential. There is a possibility that the research and its findings will be published beyond the submission of this research project for example in research publications, and conferences. NCI will have responsibility for the data generated by the research. Anonymised data will be stored on NCI servers in line with NCI's data retention policy. Local copies of data saved on personal password protected devices/laptops will be deleted by the student's graduation or 3 months after the student exits the psychology programme at NCI. It is envisaged that anonymised data will also be uploaded to a secondary data repository to facilitate validation and replication, in line with Open Science best practice and conventions.

Can I withdraw from the study?

If you decide to take part, you are free to withdraw at any time prior to questionnaire submission without providing a reason. To withdraw from this study, you can simply close the browser on which you have thus questionnaire open, prior to submission. Once you have submitted your responses to this questionnaire your individual data cannot be withdrawn due to the anonymous nature of this study.

What will happen to the results of this study?

The research will be written up and presented as a report which will be presented at National and International conferences and may be published in scientific journals. A copy of the research findings will be made available to you upon request.

What are the possible advantages and disadvantages of taking part in this study?

There are no direct benefits for partaking in this research. However, the information gathered will contribute to research that helps us to understand the association between psychological functioning specifically, loneliness, anxiety, and depression, in relation to an individual's participation in either team or individual sports, whilst also examining their frequency of physical activity and sport participation, alongside their feeling of community within that sport. It is not envisaged that any negative consequences will emerge for you in taking part in this research. However, there is the potential risk that due to the nature of some of the questions participants could experience some feelings of emotional distress as a result of the sensitive topics disscussed, if you subsequently feel distressed when answering questions in the survey, please find the relevant supports here: Mental Health Helplines: International Directory

What if there is an issue or a problem?

If you experience any issues or problems while completing this study, you may contact me (x22315893@student.ncirl.ie). Similar to above if you find yourself distressed or needing support following completion of this survey please find the relevant supports here: Mental Health Helplines: International Directory

Any further queries?

If you need any further information, you can contact me:

Principal Investigator

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School of Business

National College of Ireland

Additional Investigators

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Dept. of Psychology

School of Business

National College of Ireland

If you agree to take part in the study, please click Yes in the Online Form.

Thank you for taking the time to read this

Appendix C

Consent form

In agreeing to participate in this research I understand the following:

I voluntarily agree to participate in this research study.

I understand that even if I agree to participate now, I can withdraw at any time prior to questionnaire submission or refuse to answer any question without any consequences of any kind.

I understand that once the questionnaire has been submitted due to anonymity of the data collected withdrawal of my submission is not possible.

I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.

I understand that participation involves completing the following questionnaire.

I understand that I will not benefit directly from participating in this research.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that the information sheet has made me aware of how my data will be managed.

I understand and I am aware that I cannot access my individual results due to anonymity.

I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Please tick this box if you have read and agree with all of the above information.

Please tick this box to indicate that you are providing informed consent to participate in this study.

Please tick this box to indicate you are over the age of 18, and participate in physical activity at least once a week

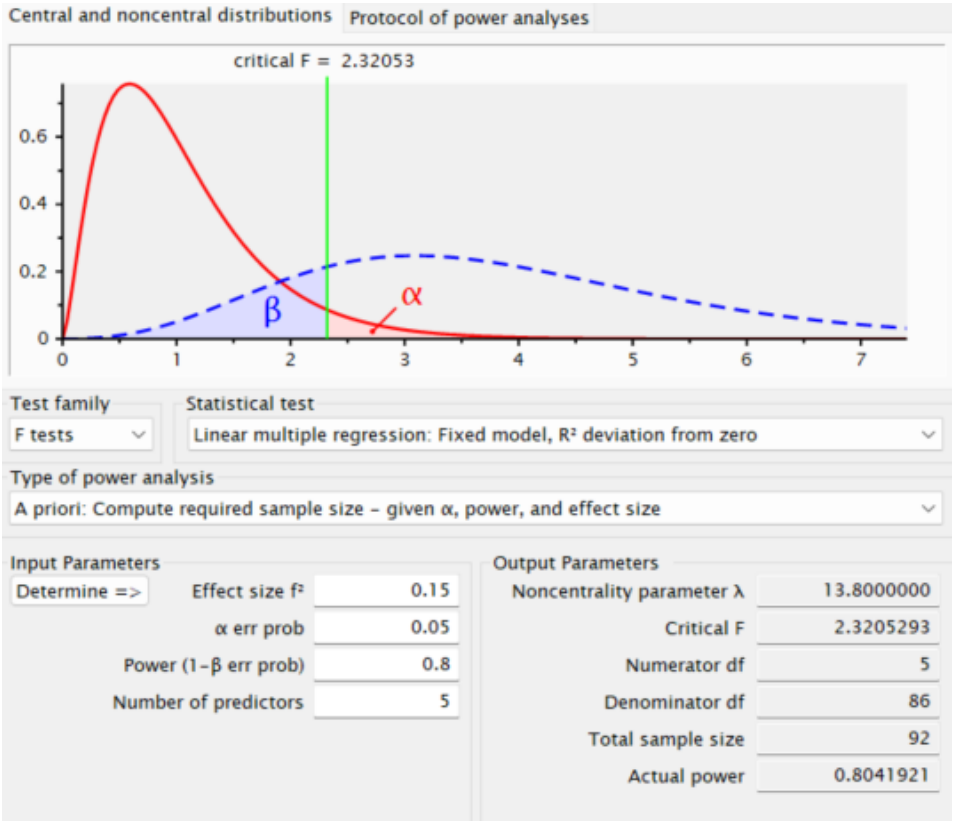
Appendix D

Debrief Sheet

Thank you for participating in this study which aims to further investigate the Predictors of Psychological Functioning in Athletes: Physical Activity, Sense of Community, and Team Sport Participation. You are reminded at this point that due to the anonymity of this data once you submit your response it is not possible for it to be withdrawn. To reassure any doubts you may have, your information and response is non-identifiable, therefore it would not be possible for someone to identify you via the responses given meaning your information will remain confidential, and your identity will remain anonymous. Please feel free to contact Jessica Kelleher she will be glad to answer your questions about this study at any time, you may contact her via email at: x22315893@student.ncirl.ie if you have any question or queries. If you feel this study affected you negatively, please seek help, please find the relevant supports here: Mental Health Helplines: International Directory alternatively, Samaritans services are available 24 hours a day, for confidential, non-judgmental support and you can freephone them at 116123, or email them at jo@samaritans.ie

Appendix E

*G*power for sample size*



Appendix F

Demographic Questions

What age are you?

Text box:

What is your gender?

Woman

Man

Non-Binary

Self-describe:

What country do you live in?

Text box:

Do you play a sport? If your answer is yes, please click other and specify which sport/sports.

No

Other; text box:

Is your primary sport a team, or individual sport?

Team sport

Individual sport

How many days a week do you engage in physical activity?

Text box:

On average how many minutes is each session?

Text box:

Appendix G

DASS-21 (with stress subscale removed)

Please indicate for each of the statements, the extent to which they apply to your situation, the way you feel now. Please select the appropriate answer. Answer Categories: 0= Did not apply to me at all, 1= Applied to me to some degree, or some of the time, 2= Applied to me to a considerable degree, or a good part of the time, 3= Applied to me very much, or most of the time.

1. I felt that life was meaningless
2. I felt that I had nothing to look forward to
3. I couldn't seem to experience any positive feeling at all

4. I was unable to become enthusiastic about anything
5. I felt that I wasn't worth much as a person
6. I felt down-hearted and blue
7. I found it difficult to work up the initiative to do things
8. I was aware of the action of my heart in the absence of physical exertion
9. I experienced breathing difficulty
10. I experienced trembling
11. I felt I was close to panic
12. I felt scared without any good reason
13. I was worried about situations in which I might panic and make a fool of myself
14. I was aware of dryness of my mouth

Appendix H

In-Group identification measure

Please indicate for each of the statements, the extent to which they apply to your situation, the way you feel now. Please consider their sporting community where they see the term ‘community’. Please select the appropriate answer.

1. Would you say you are a person who considers your sporting community important?
2. Would you say you are a person who identifies with your sporting community?
3. Would you say you are a person who feels strong ties with your sporting community?
4. Would you say you are a person who is glad to belong to your sporting community?
5. Would you say you are a person who sees yourself as belonging to your sporting community?

Appendix I

De Jong Gierveld 11-Item Loneliness Scale

Please indicate for each of the statements, the extent to which they apply to your situation, the way you feel now. Please select the appropriate answer.” Answer categories (“yes!” “yes,” “more or less,” “no,” and “no!”)

Social subscale

1. There is always someone I can talk to about my day-to-day problems
2. There are plenty of people I can rely on when I have problems

3. There are many people I can trust completely
4. There are enough people I feel close to
5. I can call on my friends whenever I need them

Emotional subscale

6. I miss having a really close friend
7. I experience a general sense of emptiness
8. I miss the pleasure of the company of others
9. I find my circle of friends and acquaintances too limited
10. I miss having people around I often feel rejected

Appendix J

Social Media and Notice Board Posters

Notice board:

Social media: