

Research article

Team Sport Athletes May Be Less Likely To Suffer Anxiety or Depression than Individual Sport Athletes

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Abstract

The objective of the study was to determine whether 1) the proportion of athletes with mental health diagnoses and 2) athlete motivations for playing differ between team sports and individual sports. We conducted a cross-sectional study of child and adolescent athletes assessed at a sports injury prevention center. We compared self-reported anxiety, depression, and reasons for participating in sports between athletes in individual sports (e.g. gymnastics, running, diving) and team sports (e.g. soccer, football, hockey). In addition, we categorized motivation for participating in sports as 1) for fun, with associated benefits of participation including motives such as making friends and being part of a team or 2) for goal-oriented reasons with associated benefits of participation including motives such as obtaining scholarship or controlling weight. At the time of this analysis, 756 athletes between the ages of 6 and 18 years had undergone a sports injury prevention evaluation. Most athletes were White (85%) and there was a slight female predominance (56%). Of the total population, 8% reported suffering from anxiety or depression. A higher proportion of individual sport athletes reported anxiety or depression than team sport athletes (13% vs. 7%, $p < 0.01$). Individual sport athletes were more likely than athletes in team sports to play their sports for goal-oriented reasons, as opposed to for fun (30% vs. 21%, $p < 0.05$). Individual sport athletes are more likely to report anxiety and depression than team sport athletes. The mental health benefits of participation in organized sports may vary between individual sport athletes and those playing team sports.

Key words: Mental health, athlete, organized sport, competition, depression, anxiety, adolescents.

Introduction

As the prevalence of mental health issues continues to increase globally, more studies have focused on physical activity as a potential protective mediator for mental health disorders including anxiety and depression (Boone and Leadbeater, 2006; Schaal et al., 2011). Having extensively examined how exercise improves physical health, researchers are now focusing on the psychological impacts of physical activity (Eime et al., 2013; Nixdorf et al., 2016). Between 2-9% of children are diagnosed with major depressive disorder, while 5-10% of children and up to 25% of teenagers suffer from anxiety (Glover and Fritsch, 2018; Sabiston et al., 2016). Presenting adolescents with an opportunity to socialize, relieve stress, and build confi-

dence, physical activity has been associated with decreased risk of these illnesses (Adachi and Willoughby, 2014; Boone and Leadbeater, 2006; Findlay and Bowker, 2009; Lubans et al., 2016; McMahon et al., 2017; Toseeb et al., 2014). Several studies suggest that physical activity is beneficial to the mental health of young people, 30-40% of whom will show moderate or severe depressive symptoms between ages 12 and 19 (Boone and Leadbeater, 2006; Sabiston et al., 2016). Strong et al. (2005) recommend school-age youth should engage in 60 minutes of exercise per day to increase muscle strength, reduce body fat, maintain healthy body weight, promote bone density, improve mood, and decrease symptoms of depression and anxiety. Therefore, individual and team sports seem to help mediate the presentation of psychological disorders and serve as effective treatment measures.

Furthermore, organized sports participation is associated with a decreased risk of anxiety, depression, feelings of hopelessness, suicidal ideation and suicide attempts, illicit drug use, and the smoking of tobacco products, above exercise alone (Miller et al., 2002; Miller and Hoffman, 2009; Pedersen et al., 2017). Organized sports correlate more positively with adolescent mental health than other forms of physical activity (Eime et al., 2013). Organized sports have been associated with decreased depressive symptoms, increased self-esteem, and improved social abilities (Sabiston et al., 2016; Vella et al., 2017). The social benefits of participating in sports have been linked to reduced stress and better self-reported overall mental health in young adults (Sabiston et al., 2016; Vella et al., 2017). A study from 2015 revealed that those who do not participate in or drop out of organized sports have greater social and emotional difficulties than those who continue to play (Vella et al., 2015). Non-athletes are also 10-20% more likely to suffer from mental health issues (Vella et al., 2017). The benefits of sport and physical activity on metrics of mental health have been well-established.

Not all sports, however, impact mental health in the same way. Kajbafnezhad et al. (2011) discovered "significant difference between [team sports and individual sports] in terms of psychological skills and motivation of athletic success" (p. 1904). Playing on a team both encourages fitness and allows young people to develop important mental and social skills (Boone and Leadbeater, 2006; Vella et al., 2017). Team sports provide an opportunity for children to learn to work well with others and effectively contribute to

a group (Sabiston et al., 2016). The resulting sense of support and acceptance likely plays an integral role in reducing depressive symptoms and leads to healthy relationships with adults and peers (Eime et al., 2013; Boone and Leadbeater, 2006). Boone and Leadbeater (2006) found that positive experiences on teams with coaching, skill development, and peer support contribute to feelings of social acceptance and decreased body dissatisfaction and ultimately fewer depressive symptoms among adolescents.

Individual sports help cultivate other important psychological skills. When athletes practice alone, they can improve their ability to concentrate and improve mental strength. While individual sports often provide less social opportunity, they encourage responsibility and self-reliance. Individual sport athletes may engage in a “higher level of preparation” because their success depends completely on their own skills and training (Kajbafnezhad et al., 2011). Yet, this increased sense of accountability can lead to intense feelings of shame or guilt after losing (Nixdorf et al., 2016). Team sports are sometimes stressful as a result of competition, team dynamics or coaching issues, but individual sports may cause greater internal attribution such as shame after failure, which is linked to depressive symptoms (Boone and Leadbeater, 2006; Hanrahan and Cerin, 2009; Nixdorf et al., 2016). Nixdorf et al. (2016) reports that elite junior athletes who play individual sports suffer more from depression than those who play team sports. Sabiston et al. (2016) reveals that youth who engaged in team sports throughout high school reported fewer depressive symptoms later in life, but the same did not apply to individual sports. Both team and individual sports have been shown to support mental and physical health, but, as noted by Vella et al. (2017), “the weight of evidence suggests that participation in team sports may be more strongly linked to positive social and psychological outcomes when compared to individual sports” (p.688)

Individual sport athletes can exhibit increased anxiety not only because of the way they internalize failure, but also their tendency to set intense personal goals for themselves (Nixdorf et al., 2013). Individual sports for which judges determine success, including gymnastics, figure skating, and dance, correlate with the highest rates of anxiety in elite athletes; these athletes feel immense pressure to differentiate themselves from the competition in the pursuit of perfection and a judge’s approval (Schaal et al., 2011). Team sport athletes also engage in perfectionist behaviors, but perhaps not to the extent of individual sport athletes (Nixdorf et al., 2013). The current study tests the hypothesis that team and individual sports have distinct associations with the diagnoses of anxiety and depression. In addition, we hypothesized that young team sport athletes are motivated to play for different reasons than individual sport athletes.

Methods

Study design

We conducted a cross-sectional study of athletes who underwent an injury prevention evaluation (IPE) at a sports injury prevention center affiliated with an academic pedi-

atric medical center between April 2013 and February 2018. The focus of the center is to reduce the risk of sport-related injuries and conduct research on injury prevention in sport. Specifically, each athlete completes an extensive questionnaire detailing sports participation, previous injury history, training regimen, dietary intake, and sleeping habits followed by anatomic measurements, performance measures, biomechanical evaluations, functional movement assessments, and physical fitness screening. At the end of the evaluation a list of injuries for which the athletes are at highest risk is generated and a prescription for decreasing the risk of those injuries is given to the athlete. Athletes are either self-referred, referred by other athletes who have gone through an IPE, referred in by coaches, or are referred in by physicians who have treated them for past injuries. All stages of athletes from early amateur through professional are evaluated. Only participants aged 18 years and younger were included in these analyses. The institutional review board of Boston Children’s Hospital approved this study.

Participants were provided with a list of the most common sports and asked to select the three organized sports they prioritize participating in yearly; participants were allowed to write in sports not listed. Individual sport was defined as a sport not requiring another person to compete with you (not including the opponent or events such as relays). Individual sports included swimming, cross country, gymnastics, tennis, fencing, track and field, boxing, equestrian, dance, figure skating, long distance running, martial arts, diving, wrestling, and sailing. For the purposes of this analysis, participants were analyzed as individual sport athletes only when they participated exclusively in individual sports year-round; any athlete who participated in a team sport during any season was categorized as a team sport athlete. Single sport athletes were defined as those who only listed participation in one sport during the year and measured as a binary yes/no variable.

Reason for playing was coded into thematic categories. Fun reasons for playing included: to have fun, to make friends, to be part of a team, or enjoyment/love of the sport. Goal-oriented reasons for playing included: to obtain a school scholarship, to control weight, to be strong, to be popular, to make parents happy, or to win a championship. Strenuous and moderate exercise was measured using the Marx Activity Rating Scale and analyzed categorically by how often a participant engaged in either level of exercise outside of their usual practice regimens over the course of a week (0 x/week, 1-2x/week, $\geq 3x/week$).

BMI was adjusted by age and gender using ranges recommended by the Center for Disease Control (CDC, 2017). Anxiety and or depression was defined as clinician diagnosed, but was self-reported by the participant. Alcohol consumption was defined as a binary measure where “no” was defined as an athlete who reported never drinking alcohol and “yes” was defined as an athlete that selected a response option ranging from less than 1x per month to daily.

Statistical analyses

All analyses were performed using Stata® software version 14 (©StataCorp, 2015). We screened for potential covariables by first conducting univariable analyses. A Pearson's Chi-square or Fisher's exact test was used to compare categorical variables. Any variable that differed between individual sport and team sport athletes on univariable comparisons with a statistical significance of $p < 0.2$ was entered into a logistic regression model in order to determine the independent effect of each variable on our main outcomes. A p -value of < 0.05 or a 95% confidence interval that did not cross 1 were used to define statistical significance.

Results

There were 756 athletes that underwent an injury prevention evaluation during the study period. The mean age of participants was 13.5 ± 2.5 years. The mean age was similar between male and female athletes (13.5 ± 2.6 years, and 13.6 ± 2.6 , $p = 0.11$). Just over half of the study cohort was comprised of female athletes (Table 1). Nearly three quarters of participants had a normal BMI and most participants identified as White (Table 1).

There were no significant differences in type of sport (individual vs. team) between age groups but a higher proportion of female athletes only participated in individual sports (Table 2). Self-reported diagnoses of depression and or anxiety were also higher among individual sport athletes (13% vs. 7%, $p < 0.01$) and among female athletes (10.3% vs. 4.9%, $p < 0.01$). While overall participants were largely within a normal BMI range for their age and gender, the proportion of overweight/obese participants was lower among individual sport athletes (Table 2). Few ($n = 8$) athletes were underweight. Individual sport athletes had a higher proportion of athletes playing for goal-oriented reasons compared to team sport

athletes (Table 2). Individual sport athletes also had a higher proportion of athletes that played only one sport all year (Table 2). There was no significant difference overall between athletes who played mostly for fun compared to those who played for goal-oriented reasons in the proportion with anxiety and depression (8.1% vs. 7.8%, $p = 0.87$).

Table 1. Athletes that underwent an injury prevention evaluation ($n = 756$).

	n/N ^a (%)	
Age (yrs.)	6 - 12	233/756 (31)
	13 -18	523/756 (69)
Gender	Female	426/756 (56)
	Male	330/756 (44)
Race	White	644/756 (85)
	Black	16/756 (2)
	Asian	26/756(3)
	Other	70/756 (10)
Sport Type	Team	608/749 (81)
	Individual	141/749 (19)
Depression/Anxiety	Yes	60/756 (8)
	No	696/756 (92)
BMI (kg/m ²)	Normal	526/672 (78)
	Over/Obese	146/672 (22)
Drink Alcohol	Yes	45/515 (9)
	No	470/515 (91)
Reasons For Playing	Fun	577/750 (77)
	Goal Oriented	173/750 (23)

*Not all respondents answered every question

Because single sport athletes included dancers, figure skaters, and gymnasts—sports for which athletes typically train year round—we thought they might have a disproportionate effect on whether athletes who trained year round were also those who only participated in one sport. Thus, in order to ensure that the effect of these athletes was not solely responsible for our findings, we repeated the analyses after removing these athletes.

Table 2. Univariable comparisons between individual and team sport athletes †

	Individual Sport n/N (%)	Team Sport n/N (%)	P-value †
Age (yrs.)	6 - 12	42/141 (30)	p=0.76
	13 -18	99/141(70)	
Gender	Female	104/141 (74)	p<0.01
	Male	37/141 (26)	
Depression/Anxiety	Yes	19/141 (13)	p<0.01
	No	122/141 (87)	
BMI (kg/m ²)	Normal	109/124 (88)	p<0.01
	Over/Obese	15/124 (12)	
Drink Alcohol	Yes	7/97 (7)	p=0.69
	No	90/97 (93)	
Reasons For Playing	Fun	98/140 (70)	p<0.05
	Goal Oriented	42/140 (30)	
Single Sport Athlete	Yes	78/141 (55)	p<0.01
	No	63/141 (45)	
Train Year Round	Yes	125/141 (89)	p<0.01
	No	16/141 (11)	
Strenuous Exercise (Times a week)	0	53/138 (38)	p<0.01
	1 -2	37/138 (27)	
	3 or more	48/138 (35)	
Moderate Exercise (Times a week)	0	38/141 (27)	p<0.05
	1 -2	44/141 (31)	
	3 or more	59/141 (42)	

† Pearson's χ^2 or Fisher's Exact. Underweight not included ($n = 8$).

Table 3. Independent associations after adjusting for gender, age, and BMI ‡

		OR - Individual Sport	95% Confidence Interval
Reasons For Playing	Fun	0.51	(0.3-0.8)
Single Sport Athlete	Yes	8.76	(5.6 – 13.8)
Train Year Round	Yes	2.39	(1.3 – 4.3)
Depression/Anxiety	Yes	1.72	(0.9-3.2)

‡ Models adjusted for gender and age and gender adjusted BMI.

After removing dancers, figure skaters, and gymnasts, individual sport athletes were still more likely to play one sport exclusively (31% vs. 13%, $p < 0.01$); however, individual sport athletes were no longer significantly more likely to train year round compared to team sport athletes (82% vs. 73%, $p = 0.15$). Team sport athletes were more likely to engage in moderate to strenuous exercise outside of practice.

After adjusting for potential covariates, individual sport athletes were significantly less likely to play for fun, more likely to train year round, and more likely to only participate in a single sport. In addition, individual sport athletes were more likely to carry a diagnosis of anxiety or depression, but the significance of this finding decreased as we adjusted for the other variable (Table 3).

Discussion

We hypothesized that type of sport, team vs. individual, would be associated with athletes' motivations for playing and/or mental health diagnoses. Concerning the relationship between sports and mental health, current research suggests that youth who engage in sports have lower levels of self-reported diagnoses of anxiety and depression than those reported by the general population (Jewett et al., 2014). In our study, 8% of athletes reported suffering from physician-diagnosed anxiety or depression, a statistic below the national average. Data from the National Surveys on Drug Use and Health found prevalence rates of major depressive episodes in adolescents and young adults to be 11.3% in 2014, up from 8.7% in 2005 (Mojtabai et al., 2016). Therefore, while depression and anxiety rates seem to be increasing over time in the general adolescent population, individual and team sports seem to help mediate the presentation of psychological disorders in adolescents and serve as effective treatment measures (Vella et al., 2017). The physical benefits of exercise as well as the sense of accomplishment and self-esteem youth gain by playing sports may contribute to fewer mental health issues (Eime et al., 2013; Toseeb et al., 2014; Vella et al., 2017). In our study, a significantly higher proportion of individual sport athletes suffered from anxiety or depression. While both team and individual sports may be protective factors for these disorders, a greater proportion of individual sport athletes (13%) reported anxiety or depression compared to team sport athletes (7%). After adjusting for other covariates, sport type (individual vs. team) remained associated with a diagnosis of anxiety or depression, but the findings were no longer statistically significant (OR 1.72; 95%CI 0.9-3.2).

In regression analysis however, playing an individual sport alone was not a risk factor for anxiety and dep-

ression. As most of our study individual athletes were female, it raises the question of whether this points to a specific patient population who may be at increased risk for mental health issues. For example, research has shown that sex differences in brain structure and function, such as those that promote reproductive success, are also likely to put women at greater risk of mood and anxiety disorders (Altemus et al., 2014). Therefore, it is important to consider how the coupling of gender and sport type may affect risk for mental health issues.

Sports can provide relief for symptoms of mental health issues, allowing adolescents to alleviate and manage their problems (Toseeb et al., 2014). This mechanism of amelioration may be most effective through team sports because of their added social component (Boone and Leadbeater, 2006; Sabiston et al., 2016). The sense of community and the relationships that youth build on teams with peers and adults promote feelings of comfort and acceptance and may reduce emotional problems and insecurities (Boone and Leadbeater, 2006; Eime et al., 2013; Sabiston et al., 2016). Although the benefits of individual sports are evident, they may be grounded in the general effects of physical activity rather than the culture of teamwork in which group athletes train and compete.

A higher proportion of adolescent individual sport athletes also reported training year round in a sport and playing only one sport year round. This type of consistent attention to one sport may suggest a challenging investment in a single activity and make single-sport athletes more vulnerable to anxiety and depression (Schaal et al., 2011). We also found that team sport athletes are more likely to work out strenuously three or more times per week, outside of regular practices; having a potentially more balanced schedule and equal distribution of energy among multiple activities could contribute to lower rates of anxiety and depression. Individual athletes could be more likely to suffer from mental health problems, in part, because they may feel increased pressure to perform. Dedicating all of their energy to succeeding in a single athletic pursuit, they may be overly focused on the outcomes and experience greater internal attribution after failure (Nixdorf et al., 2016). Whereas team sport athletes can depend on the support of their teammates, individual sport athletes rely on only their own preparation and skill level to achieve success (Kajbafnezhad et al., 2011; Nixdorf et al., 2016). Competing alone, individual sport athletes can not only experience loneliness, but also, if they do not succeed in accomplishing their goals, may experience the weight of failure alone (Nixdorf et al., 2016). While we did not collect data on the pattern of motivation over the course of the athlete's career, it can be hypothesized that this increased pressure on individual athletes may also result in a change

of their intrinsic motivation from pleasure or enjoyment to goal-oriented reasons such as outperforming others.

This study further identifies a major difference between team and individual sports related to what factors motivate adolescents to play each type of sport (Deci and Ryan, 2000). Given the critical role of motivation in determining behavior and effort, a closer look at what drives athletes to pursue success in their sport has the potential to be quite informative. The achievement goal theory and self-determination theory are the most common in determining what motivates athletes, and common links are found between the two (Ntoumanis, 2001). Achievement goal theory consists of two goal orientations: task, which is the need to perform well, and ego, which is driven by the desire to outperform others. Self-determination theory, on the other hand, “is based on the gratification of the three basic psychological needs for competence, autonomy and relatedness” (Georgiadis et al., 2001, p. 2). Theories provide interesting context when examining athletes in performing “for fun” or for goal-oriented reasons.”

A greater percentage of individual-sport athletes reported playing sports for goal-oriented reasons, as opposed to for fun. The social component of team sports may play a part in this outcome, as team engagement presents more opportunities for fun than the solo training that many individual sports require. While team sports involve a community and network of players, individual sports focus more directly on one player’s singular track to success. In addition, the possible relationship between individual sports and internal attribution could explain the tendency for individual sport athletes to be goal-oriented. Players who internalize and dread failure would be more likely to hyper-focus on results, enduring the sport in order to attain success, instead of enjoying it (Stenling et al., 2014). The nature of scoring for individual sports could also contribute to why athletes are goal-oriented. In sports including running, swimming, and gymnastics, success is usually quantified by a time or number of points (Schaal et al., 2011). As a result, individual sport athletes can easily track their success and set concrete, numerical goals in attempt to achieve it (Schaal et al., 2011). While goal-oriented motivation is still intrinsically driven, such intense focus on outcome has the potential to strip the athlete of enjoyment in training and competition.

The reach of this study is potentially restricted by a few factors, and underscores the need for further study. The participants involved were not randomly selected, as they are all patients at a sports injury prevention center. The sample is also predominantly White athletes < 18 years old. The narrow representation of this group suggests that the results may be limited in their generalizability. Moreover, while we asked participants if they were diagnosed with anxiety or depression, the responses were ultimately self-reported and not confirmed by medical records or independent professional evaluation. In addition, the questionnaire’s joint assessment of depression and anxiety in only one question does not provide a comprehensive mental health evaluation; it neither distinguishes between disorders that athletes are reporting nor gauges the severity of their symptoms.

Prospective studies examining the effect of team and individual sports on adolescent mental health in a longitudinal manner might further reveal both the immediate and long-term impacts of sport participation on mental health. In addition, to reflect a realistic sample of the adolescent population, studies should include participants who represent a diversity of races and ages.

Conclusion

Among young athletes, anxiety and depression are more common in those who play individual sports than those who play team sports. In addition, adolescent individual-sport athletes are more likely to play their sport for goal-oriented reasons, instead of for fun when compared to their counterparts participating in team sports. Researchers should continue to investigate how children’s motivation for participating in sports may relate to or explain why team sports mediate psychological problems more effectively than individual sports. It is possible that the social opportunities associated with team sports promote fun and stress relief, while training for individual sports is lonelier and can lead to less healthy goal setting and internal attribution after failure.

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Key points

- Individual sport athletes are more likely to report anxiety and depression than team sport athletes.
- Reasons for playing sports vary between individual sport athletes and team sport athletes, wherein individual sport athletes play for goal-oriented reasons and team sport athletes play for fun.
- The mental health benefits of participation in organized sports may vary between individual sport athletes and those playing team sports.

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