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The relationship among personality, psychological athletic factors, and sports performance

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THE RELATIONSHIP AMONG PERSONALITY, PSYCHOLOGICAL ATHLETIC FACTORS, AND SPORTS PERFORMANCE

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ABSTRACT

This study aimed to explore the relationship among personality traits, psychological factors, such as self-efficacy, mental energy, and perfectionism, and the ability of college athletes to perform successfully as measured by their level of competition. Fifty-six NCAA Division I college athletes between 18 and 23 years old participated in the study. The questionnaire for this study included four different scales that measured personality traits, energy, individual and social self-efficacy, self-regulation, intrinsic motivation, and perfectionism levels of participants. The study examined the extent to which these psychological variables are important in determining the performance of college athletes. Results from the study revealed that athletes who played individual sports scored higher in openness compared to team sport athletes. Limitations and future research directions were discussed.

Keywords: athletic performance, personality, self-efficacy, energy, perfectionism

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INTRODUCTION

The origin of sport psychology can be traced back to the late nineteenth century when psychologist Norman Triplett conducted his first study, which suggested a correlation between individual performance and competition with others. Triplett's study, which focused on cyclists, found that the presence of other cyclists improved their performance in the race (Triplett, 1898). As a result, he is considered a pioneer psychologist in the research of social facilitation (the improvement in an individual's performance of a task that often occurs when others are present) and sports psychology research. Many decades later, the focus of sport psychology shifted from the simple investigation of behavior, motor learning, and development (Gardner & Moore, 2006, as cited in Meggs & Chen, 2019) to psychological skills training and the application of psychological principles to improve sports performance of athletes (Williams & Straub,1998, as cited in Johnson, 2006). Starting in the 2000s, research has increasingly been conducted to examine factors that affect sports performance in athletes and how to improve it. To address this, characteristics and traits of individuals were often used because they are known to affect performance in other fields, such as the academic and work field. This study will examine the relationship between certain characteristics and athletic performance, which is defined as the efforts made by an athlete to attain specific performance objectives over some time. Some of these characteristics include personality, perfectionism (the tendency to demand of others or oneself an extremely high or even flawless level of performance, over what is required by the situation), mental energy (the ability or willingness to engage in cognitive work), self-efficacy (an individual's belief in their capacity to execute behaviors necessary to produce specific performance attainments) and self-regulation (the mental process individuals use to control their mind's functions, states, and inner processes).

The Big Five Factor Model of Personality and Athletic Performance

Peak performance is directly related to success in many fields, including academics, work, or sports. These areas have competitiveness in common, which is a personality variable (Fletcher & Nusbaum, 2008). Due to this, personality is one of the most widely used predictors of success (e.g., Furnham & Stringfield, 1993; Furnham, 2018; Noftle & Robins, 2007). According to "The Big Five Factor Model," also known as "The Big Five" (McCrae & John, 1992), personality is divided into five traits: Openness (associated with the quality of being receptive to new ideas, opinions, or arguments), Extraversion (characterized by a preference for engaging socially with others), Agreeableness (associated with the ability to put the needs of others before their own), Conscientiousness (associated with wishing to do one's work or duty well and thoroughly) and Neuroticism (associated with a tendency toward experiencing negative affect, including anger, anxiety, self‑consciousness, irritability, and emotional instability). In their research on personality traits as predictors of success in athletes, Allen et al. (2011) demonstrated that higher-level athletes (athletes who are currently or have previously competed professionally, or at national or international level) were more conscientious and emotionally stable than lower-level athletes (athletes who have never competed at a national or international level). Supporting findings by Steca et al. (2018) and Piepiora and Piepiora (2021) indicated that high-level athletes also differed from lower-level ones in agreeableness scores. Steca et al. (2018) attributed these results to the fact that high-level athletes participate in more competitions, spend more time training and traveling, thus working on their perseverance and diligence, and are more familiar with stressful events such as suffering injuries while having the ability to manage them and their emotions more effectively, in comparison to lower-level athletes.

However, some research findings indicate personality traits might be related to the different psychological requirements and skills that the sports disciplines place on the

competitors (Piepiora & Piepiora, 2021). Regarding the type of sport, individual sports champions were found to be more open to new experiences than combat and team sports champions due to their indirect pressure from the opponent (Allen et al., 2011; Piepiora & Piepiora, 2021), while extraversion was higher for participants in team sports than participants in individual sports or nonparticipants (Allen et al., 2011; Eagleton et al., 2007).

The Importance of Self-Efficacy in the Athletic Field

In addition to personality, other psychological factors that influence athletes' performances are self-efficacy and self-regulation, mental and physical energy, as well as perfectionism. According to Bandura (1997), self-efficacy refers to the confidence of individuals in their abilities to overcome adversities and challenges in given situations. Therefore, sports self-efficacy refers to the judgments of each individual about their abilities, based on how they will organize and execute their acts in a way that allows them to achieve the desired sporting performance. A study by Besharat and Pourbohlool (2011) showed a moderate correlation between high levels of self-efficacy and low levels of competitive anxiety in athletes, meaning that athletes who had high confidence in their ability to overcome adversity and challenges were not anxious about their ability to perform at high levels. Furthermore, Teques et al. (2019) showed that self-efficacy, social self-efficacy (an individual's belief in their ability to engage in social interactional tasks necessary to initiate and maintain interpersonal relationships), self-regulation, and intrinsic motivation (the doing of an activity for its inherent satisfaction rather than for some separable consequence) are factors associated with the achievement of elite performance in sports by athletes.

Energy and Athletic Performance

In addition to self-efficacy, another factor that affects sports performance is energy. Mental energy is considered a higher functioning energy because it is composed of the

following characteristics: cognition, perception, abstract thinking (the ability to understand and think about complex concepts that, while accurate, are not tied to concrete experiences, objects, people, or situations), creativity, self-awareness, and self-regulation (Lu et al., 2018). After reviewing the results of 29 studies published from 2009 to 2018, Pageaux and Lepers (2018) found that low mental energy (mental fatigue) differentially affects athletic performance. They concluded that, contrary to endurance performance, motor skill performance, and decision-making performance, maximal force output is not altered by the presence of mental fatigue. This implies that low mental energy does not affect the performance of sports that include anaerobic exercises such as track and field (sprinting), tennis (serving), and football (making a tackle), but it does affect the performance of sports that include mostly aerobic activities such as swimming, cross country, and rowing. A limitation of this theory is that most sports are both aerobic and anaerobic due to the different types of activities that are performed within the same sport. In their research, Steca et al. (2018) were unable to find conclusive evidence that energy level is associated with athletes' performance and sporting success, instead suggesting that energy level is associated with participation in organized sporting activities.

Perfectionism in Sports

The first studies on perfectionism were carried out by clinical researchers as they only thought of it as the trigger of psychological pathology. Flett and Hewitt (2005) understood perfectionism as an undesirable and debilitating characteristic that gives the human being the necessity of achieving non-existent perfection, thus increasing the risk of developing psychological problems. For this reason, they believe that perfectionism is maladaptive for athletes as constantly worrying about achieving perfection often undermines performance and fosters a sense of dissatisfaction with it. Stoeber and Otto (2006) defined perfectionism as a two-dimensional personality trait with positive and negative components of perfectionism.

The first dimension is the positive dimension of perfectionism, known as "Striving for Perfection," which is characterized by having high personal standards and a selfish striving for excellence. The negative dimension of perfectionism is called "Negative Reactions to Imperfection," which encompasses the facets of perfectionism that are related to concerns about not making mistakes, doubts about actions, feelings of difference between expectations and results, and negative reactions. Regarding its relationship with sport, Stoeber (2011) in a review of 16 studies, concluded that the perfectionistic-striving dimension is adaptive for athletes as it captures those aspects of perfectionism associated with a self-oriented striving for perfection and the setting of high personal performance standards. However, the dimension of negative reactions to imperfection is maladaptive because it is associated with concerns over making mistakes and fear of performance failure. A year later, Gotwals et al. (2012) found evidence that supported results obtained by Stoeber et al. (2007) where they established that perfectionistic strivings are adaptive in sports as long as its levels remain aligned with the levels of negative reactions to imperfection of athletes as one perfectionistic dimension does not exist without the other.

Statement of Purpose

The purpose of this study was to explore the relationship among personality traits, psychological factors such as self-efficacy, mental energy, and perfectionism, and the ability of college athletes to perform as defined by the highest level of performance, that is, the competition level at which they played a sport. Both coaches and athletes would benefit from this knowledge as it would allow them to improve in areas in which they were lacking, thus improving their athletic performance and increasing their chances of success. In addition, the study examined the extent to which these psychological variables are essential in determining the performance of college athletes.

Following findings from Allen et al. (2011), Steca et al. (2018), and Piepiora and Piepiora (2021), the following hypotheses were considered:

H1: higher-level athletes will score higher in conscientiousness and agreeableness and lower in neuroticism than lower-level athletes,

H2: individual sports athletes will score higher in openness than team sports athletes,

H3: team sport athletes will score higher in extraversion than individual sport athletes (Allen et al., 2011; Eagleton et al., 2007),

H4: individual sport athletes will score higher in self-efficacy than team sport athletes based on the literature reviewed by Šagát et al. (2021), and

H5: higher-level athletes will score higher in energy factors than lower-level athletes. Based on a review of the role of energy in sports and sporting success (Steca et al., 2018; Pageaux & Lepers, 2018).

Finally, as findings on perfectionism in sports are inconsistent, we explored the relationship between perfectionistic strivings and competition level to determine if higher-level athletes score higher in perfectionistic strivings.

METHOD

Participants

The research participants (N = 57) were athletes from an NCAA Division I university located in the Northeast region of the United States, between the ages of 18 and 23 years old. Fifty participants identified as female while the remaining seven participants identified as

male. Fifty-one percent of them identified as White/Caucasian, 17.5% as Latino/Hispanic, 10.5% as African-American, and seven percent as Asian. Only 2% identified as two or more ethnicities, 3% preferred not to say, and 9% identified as other/unknown. Thirty-seven athletes played team sports such as soccer (6), football (3), water polo (5), field hockey (2), rugby (4), volleyball (3), ice hockey (4), lacrosse (2), basketball (3), rowing (2), and softball (3), while the twenty remaining athletes played individual sports such as tennis (3), golf (5), swimming (7), equestrian (4), bowling (2), fencing (1), and track and field/cross country (2). The athletes from this sample were asked about their participation in different levels of competition such as regional, national, and international levels.

Measures

Big Five Personality Trait Short Questionnaire

The Big Five Personality Trait Short Questionnaire (Morizot, 2014) was used to measure the personality traits of participants. The questionnaire has 50 items, 10 for each trait. The reliabilities, based on this study were Openness (α = .24), Extraversion (α = .30), Agreeableness (α = .12), Conscientiousness (α = .40), and Emotional Stability (α = .67). Due to their low reliability, only emotional stability was used for analyses, although other traits that were specified in the study hypotheses were used and interpreted with caution. The response format uses a 5-point Likert scale (0 = *totally disagree* to 4 = *totally agree).*

Athlete Psychological Factors & Sports Performance Level--Model

The Parenting Practice Perceptions, Athlete Psychological Factors, and Sports Performance Level--Model survey (Teques et al., 2019) was used to measure four factors: Intrinsic Motivation (α = .75,) Social Self-efficacy (α = .88), Self-efficacy (α = .83) and

Self-regulation (α = .74). All measures employed a 4-point Likert scale (1 = *not at all true* to 4 = *very true*).

Athletic Mental Energy Scale

The Athletic Mental Energy Scale (Lu et al., 2018) was used to measure mental and physical energy during practice and competitions. The scale has six subscales: Confidence Factor (α = .77), Motivation Factor (α = .72), Concentration Factor (α = .59), Tiredness Factor (α = .62), Calm Factor (α = .81), and Vigor Factor (α = .52). This scale uses a 6-point Likert scale (1 = *not at all* to 6 = *completely so*).

Perfectionism During Competitions Scale

The Perfectionism During Competitions Scale (Stoeber et al., 2007) has two subscales with five items each: Striving for Perfection (α = .84) and Negative Reactions to Imperfection (α = .79). This scale used a 6-point Likert scale (1 = *never* to 6 = *always*) to measure how participants feel when training or competing.

Additional Questions

Participants also answered a few questions about the sport they play in college, whether it is a team or individual sport, how many years they have played competitively, and at what level (regional, national and international). They also answered demographic questions regarding their age, gender, ethnicity, and their year in school.

Procedure

After receiving approval from the Institutional Review Board and the Associate Director of Athletics for Compliance, an email was sent to all athletes through the university email. The email discussed the purpose of the study and the importance of the athletes'

participation in it. The link to the survey was found at the end of the email for those athletes who wanted to participate. Participants were directed to Qualtrics to complete the online questionnaire. No compensation was given to the participants for completing the survey. Lastly, participants took an average of 15 minutes to complete the questionnaire.

RESULTS

Descriptive Statistics

About 35% of the athletes that participated in this study were between the ages of 18 and 19 years old, 45.6% were between 20 and 21 years old, and 19.3% were between 22 and 23 years old. Most of the participants identified as female (88%), while the remaining identified as male (12%). Regarding years in school, 35% of the participants were juniors, 26% were freshmen, 21% were sophomores, 12% of the participants were seniors, and 6% were graduate students. Sixty-five percent of these athletes played team sports (soccer, football, water polo, field hockey, rugby, volleyball, ice hockey, lacrosse, basketball, rowing, and softball). The remaining 35% played individual sports (tennis, golf, swimming, equestrian, bowling, fencing, and track & field/cross country). Ten percent of the participants have played their sport for one to four years, 28% have played their sport for five to nine years, 39% of the participants have played their sports for 10 to 14 years, and 23% have played for over 14 years. Forty-two percent of the participants have participated in at least one competitive level out of the three presented in the study (regional, national, and international levels). Another 42% have participated in more than one level, leaving 16% not having participated in competitions at any level. The level in which these athletes participated the most was regional (65%), followed by national (51%), and lastly international (33.3%).

Table 1

Descriptive Statistics for Study Variables

Variable	*n*	*M*	*Min*	*Max*	*SD*	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
Openness	56	1.3	.20	2.3	.50	.11	.32	-.51	.63
Extraversion	56	1.4	.30	2.3	.51	-.17	.32	-.71	.63
Agreeableness	56	1.7	.60	2.7	.49	.04	.32	-.57	.63
Conscientiousness	56	1.6	.60	2.8	.55	.13	.32	-.53	.63
Neuroticism	56	2.5	.60	3.7	.76	-.75	.32	.27	.63
Intrinsic Motivation	45	3.6	2.0	4.0	.58	-1.36	.35	.93	.70
Social Self-Efficacy	45	3.3	.00	4.0	.93	-1.84	.35	3.32	.70
Self-Efficacy	45	3.0	1.0	4.0	.94	-8.38	.35	-.62	.70
Self-Regulation	45	3.3	1.0	4.0	.73	-1.26	.35	1.21	.70
Confidence	45	3.4	1.0	6.0	1.41	.50	.35	-.73	.70
Motivation	45	4.6	2.0	6.0	1.31	-.35	.35	-1.20	.70
Concentration	45	3.1	1.0	6.0	1.30	.78	.35	-.32	.70
Tiredness	45	2.4	1.0	6.0	1.15	1.50	.35	2.79	.70
Calm	45	2.7	1.0	6.0	1.49	.92	.35	-.02	.70
Vigor	45	2.4	1.0	6.0	1.02	1.33	.35	2.36	.70
Perfectionistic Strivings	45	2.3	1.0	5.0	1.14	.86	.35	-.35	.70
Negative Reactions to Imperfection	45	2.9	1.0	4.8	1.07	.09	.35	-.12	.70

Table 1 provides means and standard deviations for the study variables. Fifty-six participants completed the personality questionnaire, while only 45 participants completed the rest of the questionnaires. Table 1 shows that scores for all personality traits were low, except for neuroticism. The low results for openness, extraversion, agreeableness, and conscientiousness compared to those for neuroticism were likely due to low reliability (Cronbach's alphas that are less than 0.5 are considered poor). Cronbach's alpha for neuroticism was .67 while the alphas for the remaining personality traits were between .12 and .40. The remaining variables reported moderate to high-reliability scores (α = .52 to .84). Furthermore, participants tended to score closer to the higher values. Most variables from the Athlete Psychological Factors scale were negatively skewed while most variables from the Athletic Mental Energy scale were positively skewed, hence any subsequent analyses were interpreted with caution.

Correlational Study

Table 2

T-test for Differences in Study Variables by Competition at the National Level

	No			Yes				
Variables	*n*	*M*	*SD*	*n*	*M*	*SD*	*t*	One-Sided *p*
Agreeableness	28	1.65	.54	28	1.75	.44	-.82	.21
Conscientiousness	28	1.44	.53	28	1.77	.52	-2.34	.01
Neuroticism	28	2.50	.87	28	2.55	.64	-.28	.39
Confidence Factor	22	3.11	1.30	23	3.65	1.48	-1.31	.10
Motivation Factor	22	4.50	1.36	23	4.65	1.28	-.37	.35
Concentration Factor	22	3.11	1.46	23	3.00	1.15	.30	.38
Tiredness Factor	22	2.44	1.08	23	2.41	1.24	.11	.46
Calm Factor	22	2.38	1.31	23	3.07	1.61	-1.57	.06
Vigor Factor	22	2.42	.92	23	2.38	1.14	.11	.45
Striving for Perfection	22	2.20	1.16	23	2.32	1.15	-.35	.37

For hypothesis testing, t-test analyses were conducted to examine the differences in conscientiousness, agreeableness, neuroticism, energy (confidence, motivation, concentration, tiredness, calm, and vigor factors) and perfectionistic strivings by competition at the national level. Table 2 shows results for conscientiousness differed significantly by competition at the national level, such that athletes who played at a higher level (M = 1.77, SD = .52) scored higher in conscientiousness than those who played at a lower level (M = 1.44, SD = .53). Athletes who played at a higher level (M = 3.07, SD = 1.61) scored marginally higher in the calm factor than those who played at the lower level (M = 2.38, SD = 1.31). Only portions of hypotheses one and five were supported. Despite the level of competition, there were no differences between agreeableness, neuroticism, motivation factor, concentration factor, tiredness factor, vigor factor, and striving for perfection. Athletes who competed at the national level scored higher in conscientiousness, confidence, and concentration than athletes who competed at a lower level. Regardless of the level of competition among the participants, the scores were generally high.

Table 3

T-test for Differences in Extraversion and Self-efficacy by Type of Sport

	Individual			Team				
Variables	*n*	*M*	*SD*	*n*	*M*	*SD*	*t*	One-Sided *p*
Extraversion	24	1.51	.48	32	1.40	.52	.75	.23
Openness	24	1.43	.50	32	1.21	.47	1.63	.05
Self-Efficacy	20	2.96	.96	25	3.05	.95	-.31	.38

An independent sample t-test was conducted to compare the extraversion scores of 24 participants who played individual sports (M = 1.51, SD = .48) to the extraversion scores of 32 participants who played team sports (M = 1.40, SD = .52). As shown in Table 3, there were no significant differences in extraversion and self-efficacy by type of sport. However,

there was a marginal difference in openness by type of sport. Athletes that played individual sports (M = 1.43, SD = .50) scored higher in openness than athletes who played team sports (M = 1.21, SD = .47). We also compared self-efficacy scores for participants who played individual sports (M = 2.7, SD = .96) to the participants who played team sports (M = 3.1, SD = .94). As seen in Table 3, results did not show any significant differences.

Exploratory Analysis

Despite not finding any significant differences in perfectionism by competition level, athletes who played at the national level (M = 2.32, SD = 1.15) scored slightly higher in perfectionistic strivings than athletes who played at a lower level (M = 2.20, SD = 1.16).

Additional Findings

There were other interesting correlations from the data. Results showed a small positive correlation between team sports and intrinsic motivation, r = .33, n = 45, p = .025. That is, individuals who played team sports were more likely to score higher in intrinsic motivation than athletes who played individual sports. Finally, there was a small negative correlation between negative reactions to imperfection and neuroticism, r = -.45, n = 45, p = .002, such that higher scores in neuroticism were related to lower scores in negative reactions to imperfection.

DISCUSSION

Summary of Findings

The hypotheses that stated higher-level athletes would score higher in conscientiousness, agreeableness, and energy factors, while lower-level athletes would score lower in neuroticism, were partially supported. Our data indicated athletes who played

individual sports scored higher in openness. Our other hypotheses, which stated that athletes who played individual sports would obtain higher scores in openness and self-efficacy and lower in extraversion than athletes who played team sports, were not supported. Despite obtaining little evidence to support the study hypotheses, some results were sufficient to back previous findings obtained from the research literature. A small negative correlation was found between neuroticism and negative reactions to imperfection. This finding supported those by Besharat and Shahidi (2010) that the negative dimension of perfectionism, also referred to as negative reactions to imperfection, was related to vulnerability and emotional distress.

Personality and Level of Competition

Hypothesis 1: Higher-level athletes will score higher in conscientiousness and agreeableness and lower in Neuroticism than lower-level athletes

The first hypothesis was partially supported. Athletes that competed at the national level scored higher in conscientiousness than athletes that competed at a lower level. However, the results did not show significant differences in agreeableness and neuroticism by competition level. Results partially supported the findings by Allen et al. (2011) and Steca et al. (2018). Low-reliability values for conscientiousness and agreeableness must be taken into account.

Personality and Type of Sport

Hypothesis 2: Individual sports athletes will score higher in openness than team sports athletes

The second hypothesis was supported. Athletes who played individual sports scored higher in openness than athletes who played team sports. Low-reliability values for openness must be taken into account. Results supported research by Allen et al. (2011) and Piepiora and Piepiora (2021) where individual sports athletes were found to be more open to new experiences than team sports athletes.

Hypothesis 3: Team sports athletes will score higher in extraversion than individual sports athletes

The third hypothesis was not supported. No significant differences were found in extraversion by sport type, although athletes who played individual sports scored slightly higher in extraversion than athletes who played team sports. Results contradicted the findings by Allen et al. (2011) and Eagleton et al. (2007). Low-reliability values for extraversion must be taken into account.

Self-Efficacy and Type of Sport

Hypothesis 4: Athletes who played individual sports will score higher in self-efficacy than athletes who played team sports

The fourth hypothesis was not supported. No significant differences were found in self-efficacy by type of sport. The results did not support the findings by Šagát et al. (2021).

Energy and Level of Competition

Hypothesis 5: Higher-level athletes will score higher in energy factors than lower-level athletes

The fifth hypothesis was partially supported. Athletes who competed at the national level scored marginally higher in calmness (energy factor) than athletes who competed at a lower level. Results partially supported the findings by Steca et al. (2018) and Pageaux and Lepers (2018).

Limitations and Future Research

Regarding the limitations, reliability scores for personality variables were considered poor. The impact on reliability in the study could be due to participants not completing the questionnaire in full, which reduced the number of sample results. Using a test-retest could be another way to increase the reliability of the variables since one of the best ways to measure the performance level of athletes is by following their competition and training statistics over time.

The major steps to improving upon this study include expanding the sample to more than one institution. This will achieve improvements in sample size, a less skewed gender distribution, level of performance, and, possibly a better distribution in the range and type of sports played. In addition to a test-retest design, another measure of personality traits that is more valid and reliable should be added to test for convergent validity. Consideration should be given to using a measure of performance that would be more informative than using the level as which an athlete plays. For example, it may be more informative to collect data on the number of wins over a season or two. Finally and relatedly, a longitudinal design could be employed to determine possible changes in these traits as a function of situational challenges that may occur as a result of wins and losses, and their subsequent changes in relationships over time.

CONCLUSION

Despite having limitations, the evidence provided by this study suggests that the personality variables of conscientiousness, openness, and calmness provide the most information about the athletic performance of college athletes. Results showed how factors such as personality, self-efficacy, energy, and perfectionism are related to athletic performance and should be further explored in the sports field. The fact that each sport individually requires a specific set of skills to be performed, must be taken into consideration, to measure or predict the performance of athletes.

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APPENDIX

Additional Questions on Study Questionnaire

Year in School

- Freshman ( )
- Sophomore ( )
- Junior ( )
- Senior ( )
- Graduate student ( )
- Prefer not to say ( )

Section 2

Are you currently an (name of institution) athlete?

- Yes ( )
- No ( )
- Prefer not to say ( )

What sport/s do you play in college?

_____

Do you play an individual or team sport?

- Individual sport ( )
- Team sport ( )
- Prefer not to say ( )

Years playing on a competitive level

- 1 - 4 years ( )
- 5 - 9 years ( )
- 10 - 14 years ( )
- Over 14 years ( )
- Prefer not to say ( )

Have you ever competed at any of these levels? Please select all that apply.

- Regional ( )
- National ( )
- International ( )
- None of the above ( )
- Prefer not to say ( )