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Personality Profile Analysis of Elite Powerlifting and Strongman/woman Athletes

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Abstract

PURPOSE: Personality profiling with athletes has been used to identify ideal candidates for high-level performance, program more effectively, and develop personality traits that might prove beneficial. A significant amount of research has been targeted using the Big Five Personality traits which are neuroticism, agreeableness, conscientiousness, openness, and extraversion. Self-efficacy has also been studied heavily within elite athletes. However, the personality profiles of elite Powerlifters and Strongman/woman have not been developed or studied. The purpose of this investigation is to identify a general personality profile of elite Powerlifting and Strongman/woman athletes. The secondary aim is to compare the personality profile of the competitive weightlifters against those from athletes competing in team and individual sports.

METHODS: Forty-eight qualified surveys were received from elite Powerlifting and Strongman/woman athletes. The online survey included a demographic questionnaire, the Big Five Inventory, and the General Self-efficacy Scale. One sample t-test was used to compare results against other high-level individual and team sport athletes from previous studies.

RESULTS: Mean scores across the Big Five Personality traits were recorded: Extraversion 26.10 ± 6.64, Agreeableness 33.77 ± 4.65, Conscientiousness 36.58 ± 5.37, Neuroticism 20.19 ± 6.64, Openness 35.52 ± 5.34. General Self-Efficacy was scored as 35.42 ± 3.35. Statistically significant differences were found in the areas of agreeableness, conscientiousness, neuroticism, and self-efficacy when compared to team and individual sport athletes.

CONCLUSION: The study established a baseline personality profile for elite competitive weightlifters similar to recorded personality profiles of elite athletes in other sports. Significant differences with higher levels of agreeableness, conscientiousness, and self-efficacy, and lower

levels of neuroticism add to the limited body of knowledge surrounding these athletes. Greater insight into the personality profile of competitive weightlifters could prove helpful when making programming decisions, possibly aid in identifying those predisposed to reach elite status and direct an athlete's focus on personality areas most important for their development.

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Chapter 1: Introduction

Weightlifting contests can create a highly competitive and pressurized environment that requires certain physical and mental skills to reach peak performance. Despite this environment, competitive weightlifting sports such as Powerlifting and Strongman, which have long been considered fringe sports, have recently gained traction and popularity. The USA Powerlifting Federation had a membership of 6,038 women and 15,856 men competing between the years of 2012-2016 (Ball & Weidman, 2018). Powerlifting focuses on performing several Olympic lifts attempting to achieve the largest combined total weight. These lifts are the squat, bench press, and deadlift. The athlete is allowed three attempts at each lift and the best lifts are added up for their total weight. These events are typically held at local, regional, national, and international levels.

The sport of Strongman has also seen an uptick in popularity across several countries, with competitions being held at local, regional, national, and international levels as well (Winwood et al., 2014). Its growth is such that divisions have been created based on anthropometric characteristics such as age, body mass, gender, and experience. Strongman competitors are tasked with executing different variations of the Olympic lifts that are considered less traditional. Strongman contests incorporate events such as keg tosses, assisted deadlifts, overhead pressing of various objects, and truck pulls just to name a few. Strongman is a sport noted for its spectacle because of the nature of the unique events.

As the popularity of a sport increases, an uptick in the investment of resources to further its growth usually follows. Sports attract significant research attention with concepts such as talent identification or what training program is needed to produce the best results being popular topics (Leite et al., 2021). Weightlifting contests create a highly competitive and pressurized

environment that requires certain physical and mental skills to reach peak performance. Recently, investigators have begun to study the relationship between personality traits and elite performance (Allen & Laborde, 2014; Piepiora, 2021; Piepiora & Piepiora, 2021). Personality profiles have been used across a wide variety of mainstream sports, such as football and soccer, as an effective tool to predict the success of athletes, as well as for development of successful performance programming.

There are many different approaches to measuring personality and how it relates to success in sport. One such measure is the Big Five Factor Model, which is a widely used theoretical approach that explains personality using a hierarchical organization of personality traits in five dimensions (neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience, see figure 1) (Kaiseler et al., 2012). The Big Five Inventory (BFI) instrument was developed based on the Big Five Factor Model and has been widely used to collect personality data based on these dimensions. The BFI was intended to be free and accessible as a public resource.

Trait	**Description**
Extraversion	Assertive, bold, active, or vigorous
Agreeableness	Warm, empathetic, courteous, and generous
Conscientiousness	Orderly, efficient, precise, and persistent

Openness	Insightful, creative, or curious
Neuroticism	Anxious, uptight, nervous, emotional, or agitated
Self-Efficacy	Belief in one's capabilities to organize and execute the courses of action required to produce given attainments

Figure 1. Trait descriptions

The BFI tool has been used in various sport settings with researchers hoping to gain insight into achieving elite performance. Stanford et al. (2022) used the BFI to analyze dynamic relationships between elite coaches and the athletes they work with, specifically focusing on their personality traits. Though the Stanford et al. (2022) study was a small mixed-method study, it made the assertion that these coach and athlete relationships could be stronger in relation to the Big Five-character traits (Stanford et al., 2022). Another study evaluated the personality traits of combat sports and team sports, finding that the combat sport athletes had higher levels of conscientiousness than those in team sports (Bojanić et al., 2019). Further, it showed that team sport competitors had higher levels of neuroticism compared to combat sports (Bojanić et al., 2019). Data from these investigations would suggest that certain personality traits may be more associated with the type of sport, such as individualized or team sports. Certainly, personality traits may even predispose an individual to be more adept at reaching elite status in a team or individual sport.

Recent research interest has focused on how these dimensions of personality can strongly correlate and predict athletic achievement and differences between elite and non-elite athletes (Hazmah, 2022; Kaiseler et al., 2012; Trninic, 2016). Kaiseler et al. (2012) determined that these BFI dimensions can be strongly associated with coping with stress and performance in sport (Kaiseler et al., 2012). Another review article also suggests that there is an extensive amount of literature and studies that have used this model to predict success and development in a variety of sports (Allen & Laborde, 2014). In a brief literature review done by Allen & Laborde (2014) it was concluded that conscientiousness and neuroticism were the two most prominent predictors of athletic performance from the Big Five Model.

Of specific interest within personality and sport research is the concept of an athlete's self-efficacy and how they handle stress. Self-efficacy is defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments," (Zagórska & Guszkowska, 2013, p. 121). Without the belief in oneself to accomplish a goal or a task, in the case of weightlifting, it would be unlikely that an athlete could reach an elite level. Within competitive lifting, the discipline and rigorous training that it takes to be able to make even just small gains on certain lifts can be intimidating and difficult. Further, the ability to perform in the pressurized environments of Powerlifting, and Strongman competitions requires belief and self-control, thus, also self-efficacy. This can be directly connected to the Big Five in regard to conscientiousness and neuroticism. Self-efficacy might be higher in those with high conscientiousness because of the orderly and efficient approach they take to their training. Further, it could be higher as well with those that have low neuroticism because they are less anxious or agitated. Therefore, it is possible to be more confident. The inclusion of self-efficacy will hopefully serve to affirm some of these traits in the Big Five.

Mitic et al. (2021) compared personality traits between elite and non-elite athletes and determined that self-efficacy was the most notably different trait between the two groups. Self-efficacy was a stronger predictor of elite status than traits such as stress coping mechanisms and emotional intelligence (Mitic et al., 2021). Furthermore, researchers have discovered a correlation between self-efficacy and higher self-esteem in addition to a positive correlation between self-esteem and activity level (Nemcek et al., 2017). While these studies highlight the potential importance of self-efficacy, it is important to note that the research has been concentrated primarily on team sports, which limits its application to Powerlifting and Strongman athletes.

Competitive lifting can be viewed as an individual type of sport. Therefore, comparisons could be made with sports such as parkour. A previous study found that self-efficacy could be related to the risk-taking behaviors of parkour athletes in the function of mediating stable behaviors like consciousness and neuroticism (Merritt & Tharp, 2013). There appears to be an association with low levels of consciousness and high levels of neuroticism when it comes to risk taking behaviors (Merritt & Tharp, 2013). Weightlifting, like parkour, is centered around individual performance. A common self-efficacy instrument is the General Self-Efficacy Scale (GSE). The study involving parkour athletes used an adapted version for that sport but did not identify the level of the athletes (Merritt & Tharp, 2013). Rogowska et al. (2022) investigated elite speed-skating athletes comparing their GSE scores to other personality characteristics. The authors found positive correlations between self-efficacy and these characteristics, primarily that self-efficacy plays a mediating role with elite performance and behavioral activation systems (Rogowska et al., 2022). Lastly, Đurović et al. (2021) used the GSE to explore the effects of self-efficacy and cognitive performance anxiety in club level team sports. The authors found that

athletes' levels of self-efficacy appeared to have a more direct effect on the level of sporting achievement, thus suggesting that self-efficacy should be targeted in psychological interventions with athletes (Đurović et al., 2021). This further affirms the important role self-efficacy plays with higher levels of athletic performance. Research evidence suggests understanding the personalities of elite athletes' aids in their potential to reach elite status, with an athlete's self-efficacy of particular importance.

All of this research points to evidence that personality may be linked to sport performance at higher levels. The use of the five dimensions of personality, or some aspects and variations, appears to be a standard tool for evaluating traits within a sport setting. Due to the little to no research on personality profiles of competitive weightlifters, investigations into this area would significantly add to the body of knowledge for these sports. The lack of data within Powerlifting and Strongman/woman sports limits the ability of sport professionals working with the Powerlifting and Strongman/woman athletes to maximize their ability to succeed at the highest levels. Greater information on the personality characteristics of these athletes could provide much needed insight into how best to support their development.

The purpose of this investigation was to gather data related to the personality profile and traits of elite competitive weightlifters, specifically Powerlifting and Strongman athletes. Of specific interest is the trait of self-efficacy as well as the evaluation of the Big Five Personality traits due to their consistent presence in the literature related to performance success. The secondary aim was to compare the personality profiles of competitive weightlifters to those from other individual and team sports. The hypothesis was that these athletes will share some basic personality traits scores that are demonstrated across elite level athletes regardless of sport but might have some unique trait scores that reflect the characteristics of their sport. Self-efficacy

was hypothesized to be recorded at high levels like those found in other elite athletes. The results of this study could offer coaches and athletes some more insight into what personality traits can make them successful. Further, the tools offered here could offer an accessible avenue of analyzing these traits effectively.

Chapter 2: Methodology

Participants

Participants for this study included 48 Powerlifters and Strongman/women athletes (mean age 39.8 ± 11.6 years). This included 29 Powerlifters (20 males and 9 females; mean age 41.1 ± 13.1 years) and 19 Strongman/Women (14 males and 5 females; mean age 37.8 ± 8.8 years). The participants were contacted via social media through group posts and targeted messages on Facebook and Instagram. Athletes who were under the age of 18 years old or those who did not not meet the standards regarding elite status were excluded.

Based on previously reported data by the USA Powerlifting Federation of 6,038 women and 15,856 men competing between 2012-2016 (Ball & Weidman, 2018), this equates to approximately 28 percent of competitors being females. In this study the represented population of females was approximately 29 percent which is comparable statistically to the number of women competing nationally.

Inclusion Criteria

The inclusion criteria were designed to ensure recruited participants were considered high-level Strongman/woman and Powerlifting athletes. However, there is no true classification system to define an elite Strongman/woman. As such, the athletes for this sport were chosen based on having achieved participation in national level competitions or if they have an issued pro-card. Athletes receive a pro-card if they place top two or three in the standings following a high-level event. Further, to go to national events it is a similar structure or approach. The event hosts will invite athletes to higher level or national events based on their placement at the event.

The Wilks score is most widely used to differentiate between competitive status of Powerlifting athletes and is consistently accepted as an entry score into high-level competitions. The Wilks score assesses the total weight lifted amongst the three lifts compared to weight class, gender, and age. A score of 415 is typically considered high enough to enter National Level competitions and was used as the inclusion criteria for Powerlifters. The Wilks Score was addressed in demographic questions at the beginning of each survey and was based on the calculator used by International Powerlifting Federation for classification (https://weighttraining.nz/ipf_calculator.php). The IPF is the largest Powerlifting Federation in the world (Krawczyk, 2017).

Instrumentation

The primary instrument for this study was the Big Five Inventory (BFI) which includes 44 personality self-inventory questions designed to measure the Big Five personality dimensions (neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience (John et al., 2008) (see appendix A). Responses for each question were gathered using a Likert scale that used a rating of 1-5, with 1 being disagree strongly and 5 being agreeing strongly. Participants were asked to rate on what level at which they agreed with a statement about how they characterized themselves (i.e., I am someone…) (John et al., 2008). Higher scores being indicative of higher levels of the personality trait that the question is associated with.

The BFI is a widely accepted instrument with high validity and accuracy relating to the measurement of the big five personality dimensions (Alansari, 2016; Stanford et al., 2022). The Big Five measurement instrument is also free and accessible. Additionally, the instrument provides a breakdown of an individual's association with each trait on a high-low continuum.

To measure self-efficacy the General Self-Efficacy Scale (GSE) developed by Schwarzer and Jerusalem (1995) was employed (see Appendix B). This a brief ten question survey with an internal reliability between α: .76 and α: .90 (Schwarzer & Jerusalem, 1995). The score for this test is found by using a Likert scale results for each question and then finding the sum of all the items on a scale of not true at all (1), hardly true (2), moderately true (3), and exactly true (4). The higher the sum, 40 being the highest, the higher self-efficacy (SE). The questions are based around an individual's ability to handle every day and stressful situations. This measure, like the BFI, is all free to use and open-sourced while being a widely used and accepted measure for SE (Đurović et al., 2021; Rogowska et al., 2022).

Procedures

The collection of the two surveys took place online via Google Forms software from October 2022 to January 2023. Participants were sent a link to the surveys and first asked to fill out an informed consent form digitally before starting the survey. Informed consent was collected virtually within the link to the surveys before participants could access the BFI or GSE.

There were a series of demographic questions at the beginning to ascertain the following information: gender, age, sport they participate in, and length of time in sport. For Powerlifters they were asked weight class and meet totals to confirm elite status. For Strongmen/women they were asked if they had competed at the national or international level or if they had a procard. Upon completion of the demographic questions, participants were asked to fill out the 44 item BFI and then the10 item GSE. The process took participants approximately 10-15 minutes to complete the entire survey.

Design and Analysis

This study used online surveys for data collection. To assess the weightlifter's personality scores for each trait on the continuum, means and standard deviations were used. All statistics were performed using IBM SPSS Statistics Software (Armonk, NY, USA). A one sample t-test was used to compare the mean personality scores of this study to BFI and/or the GSE data from other elite athletes (Bojanic et al., 2019, Đurović et al., 2021; Rogowska et al., 2022). . The results were compared against both team and individual sports. To maintain high validity, comparison studies were chosen based on use of the same survey instrument. One study was used to draw comparisons against a pool of combat sport athletes (wrestling, Jiu Jitsu, taekwondo, karate, MMA, judo, & kickboxing) and team sport athletes (football, basketball, handball, and volleyball) athletes (Bojanic et al., 2019). While two studies were used for the GSE comparison, one which used team sports (Đurović et al., 2021) and one which used individual sport (Rogowska et al., 2022). An original p-value of .05 was to be used to measure statistical significance. Due to the large number of tests being run on the same data (12), a Bonferroni correction was used to account for this. This produced a new p-value of .004.

Ethical Procedures

The only risk to the participants was the possibility of loss of anonymity. To avoid this, there were no identifying questions in any of the parts of the survey process. The researchers obtained IRB approval before distributing the survey and as mentioned previously, informed consent was collected at the beginning of the survey process. The subjects were not able to immediately see the scores of their surveys but were given the opportunity to request the scores if desired. Email addresses were also not collected to avoid any chance of identifying individuals.

Chapter 3: Results

Demographic

Out of 92 completed surveys 48 qualified within the set inclusion criteria. The total is 34 males and 14 females. There were 19 Strongman/woman competitors and 29 Powerlifting competitors.

The mean number of years competing overall was 8.7 ± 7.7 years with a range of 1-5 years. In the Strongman/woman competitors the mean was 7.5 ± 5.5 years with a range of 1-20 years. In the Powerlifters the mean was 8.7 ± 7.7 years with a range of 1-50 years (Table 1).

Table 1. Demographic characteristics of participants (mean ± SD).

Variable	Strongman	Powerlifter	Total Participants
No. of Athletes	19	29	48
Male	14 (74%)	20 (79%)	34 (74%)
Female	5 (26%)	9 (31%)	14 (29%)
Age (years)	37.84 ± 8.8	41.14 ± 13.1	39.83 ± 11.6
Competition Experience (years)	7.58 ± 5.5	9.45 ± 8.9	8.71 ± 7.7

Personality Traits of Weightlifters & Self-Efficacy

The results regarding BFI and GSE scores are given in Table 2. Mean scores and standard deviations are reported for each BFI personality trait and the overall GSE results. These results

were collected as a culmination of the athletes and not differentiated based on gender or respective discipline.

The mean extraversion score for the BFI was 26.10 ± 6.64. Agreeableness scored 33.77 ± 4.65. Conscientiousness scored 36.58 ± 5.37. Neuroticism scored a 20.19 ± 6.64. And finally, openness scored a 35.52 ± 5.34. These scores created the BFI personality profile. These scores reflect higher levels of agreeableness, conscientiousness, and openness while having lower levels of extraversion and neuroticism.

The GSE was 35.42 ± 3.35. Which indicates a high level of self-efficacy. A cumulative profile of these weightlifting athletes for this study could be described as having high levels of self-efficacy, agreeableness, conscientiousness, and openness, while having lower levels of neuroticism and extraversion (Table 2.)

Table 2. Personality Profile of Competitive Weightlifters (mean ± SD).

	Mean Scores
BFI Personality Traits	
Extraversion	26.10 ±6.64
Agreeableness	33.77 ± 4.65
Conscientiousness	36.58 ± 5.37
Neuroticism	20.19 ± 6.64
Openness	35.42 ± 5.34
GSE General Self-Efficacy	35.42 ± 3.35

Comparison to Other Elite Athletes

BFI Comparison

A comparison across elite athletes from other sports is represented in Table 3. Statistically significant differences were found in the dimensions of agreeableness, conscientiousness, and neuroticism for weightlifters when compared to combat and team sport athletes. Weightlifting athletes scored higher in agreeableness and conscientiousness, and lower in neuroticism. No statistically significant differences were found regarding extraversion and openness traits when compared to either athlete pool (Table 3.).

Table 3. Represents the comparisons of BFI personality traits (mean ± SD) across other sport disciplines.

BFI Categories	**Weightlifters**	**Team sports (Bojanić et. al.)**	**Combat Sports (Bojanić et. al.)**
Extraversion	26.10 ± 6.64	26.59 ± 3.30	26.90 ± 2.97
*Agreeableness**	33.77 ± 4.65*	31.00 ± 3.37	31.72 ± 3.40
*Conscientiousness**	36.58 ± 5.37*	30.63 ± 4.19	32.32 ± 3.28
*Neuroticism**	20.19 ± 6.64*	26.28 ± 3.69	25.05 ± 3.50
Openness	35.52 ± 5.34	35.80 ± 6.08	36.87 ± 6.38

*Denotes a statistically significant difference from weightlifters to other sports (<.004 p-value)

GSE Comparison

GSE score comparison was made against elite team sport (handball, football, & waterpolo) (Đurović et al., 2021) and speed skating (Rogowska et al., 2022) athletes. Statistically significant differences were found between weightlifters when compared to speed skaters and team sport athletes. Specifically, the weightlifters scored higher in general self-efficacy than the other athletes. GSE comparison data can be viewed in Table 4.

Table 4. Represents the comparison of General Self-Efficacy (mean ± SD) across other sport disciplines.

Sports	Weightlifters	Team Sports (Đurović et al.)	Speedskaters (Rogowska et al.)
General Self-Efficacy*	35.42 ± 3.35*	33.45 ± 5.24	31.92 ± 4.52

*Denotes a statistically significant difference from weightlifters to other sports (<.004 p-value)

Chapter 4: Discussion

Limited to no data currently exists that describes the personality profile of elite weightlifting athletes. The assessment of these traits and recording of the general profiles contributes to the scarce body of knowledge surrounding this growing sport. Greater insight into the personality profile of competitive weightlifters could prove helpful when making programming decisions for athletes, possibly aid in identifying those predisposed to reach elite status in Powerlifting or Strongman and direct an athlete's focus on personality areas most important for their development.

The research hypothesis suggested that there may be some differences in personality profiles of Powerlifting and Strongman competitors in comparison to other elite level athletes in team and individual sports. It also was hypothesized that there would be some similarities between athlete types for certain personality traits. Specifically, it was thought that there would be a difference in the personality trait of extroversion, but a similar level of self-efficacy would be recorded. The results partially supported the original hypothesis with more profound results ascertained. This study is the first of its kind conducted with competitive weightlifting athletes. This study identified statistically significant differences from Powerlifting and Strongman/woman athletes in the areas of agreeableness, conscientiousness, neuroticism, and self-efficacy from other athlete populations.

General Profile of Powerlifters and Strongmen/women

The personality profile for elite Powerlifters and Strongman/woman was classified as having high levels of agreeableness, conscientiousness, and openness with moderate to low levels of extroversion, and low levels of neuroticism. These athletes also possessed high levels of self-efficacy. These findings appear to affirm conclusions from other studies that report high

levels of conscientiousness and low levels of neuroticism in high level or elite athletes (Allen & Laborde, 2014; Bojanic, 2019; Piepiora, 2021; Piepiora & Piepiora, 2021). These results also support previous research suggesting high levels of self-efficacy play an important role in the success of elite level athletes in other sports (Đurović et al., 2021; Mitic et al., 2021; Rogowska, et al., 2022).

Using a different BFI trait assessment instrument, the NEO-Five Figure Inventory (NEO-FFI), researchers have drawn a similar pattern related to personality profiles of elite athletes (Piepiora, 2021; Piepiora & Piepiora, 2021). Piepiora (2021) found that the champion level athletes' profiles contained low levels of neuroticism and high levels of conscientiousness, openness, and agreeableness. This would suggest competitive weightlifters may share some similar personality characteristics that allow them to reach elite performance within their chosen discipline. However, within the result of this study agreeableness, conscientiousness, and openness were even significantly higher.

Big Five Inventory Traits

The Big Five Personality traits are constituted of agreeableness, neuroticism, conscientiousness, agreeableness, and openness. Agreeableness can be described as having the characteristics of being warm, empathetic, courteous, and generous (Dyce, 1997). Weightlifters scored significantly higher than both the combat sport and team sport athletes in the trait of agreeableness. Although competitive weightlifting is categorized as an individual sport, it has a highly collaborative nature. The competition environment is very supportive with competitors often seen cheering on and helping other athletes even within the most competitive meets and events. Athletes are often heard referencing the idea of “me vs. the weight” as opposed to “you

vs. me." It is widely established that a supportive training environment, among other factors, can lead to better results at the time of competition (Woods et al., 2020). Therefore, it could also stand to reason that a highly supportive environment, such as competitive weightlifting, could produce higher levels of agreeableness and possibly lead to better results. It may be that athletes who possess higher levels of agreeableness are drawn to competitive lifting because they feel a connection to the supportive environment.

Conscientiousness is described as being orderly, efficient, precise, and persistent (Dyce, 1997). Powerlifters and Strongman/woman athletes scored higher in this trait when compared to other elite athletes. Underlying this score could be the effort and persistence an athlete needs to demonstrate in order to reach an elite status. Any athlete that is willing to put in the effort to make it to a high level would logically have some of these characteristics present. Within weightlifting, exponential progression can cut off abruptly and "plateaus" can happen often. In a longitudinal study done by Latella et al. (2020) the researchers observed over a period of 15 years that strength progression was the slowest in the strongest male subjects, with many reaching a "ceiling effect." In other words, at a certain point the body can only get so much stronger. These minimal progressions or plateaus could prove to be too much for individuals with lower levels of conscientiousness. Further, discipline and persistence with the programming presented is essential to continued progression.

Neuroticism describes characteristics such as anxious, uptight, nervous, emotional, or agitated (Dyce, 1997). The Powerlifters and Strongmen/women scored significantly lower in this category than either the team or combat athletes. However, it is important to acknowledge the scores were not very high for any of them. To reach an elite or high level in any sport it would stand to reason that control of one's own emotions and anxiety would be essential.

Neuroticism could be lower than both comparison groups due to less external pressures and less uncontrollable factors that may influence success. Typically, in individual style sports, this fear of failing others is not as prevalent and can lead to lower neuroticism (Allen & Laborde, 2014). In both combat and team sports there is an aspect of another's actions that can influence success, whereas with Powerlifting or Strongman/woman the outcome of performance is almost entirely within one's control. Further, relying on the routine that an athlete has developed in doing a certain movement could lead to lower anxiety about failing the movement or performance (Hazell et al., 2014).

There were no statistically significant differences in the categories of openness or extraversion, thus counter to the original hypothesis. This result showed that there were medium to high levels of both which is in line with other research (Allen & Laborde, 2014; Bojanic, 2019; Piepiora, 2021; Piepiora & Piepiora, 2021). Openness has been described as insightful, creative, or curious, while extraversion refers to characteristics such as assertive, bold, active, or vigorous (Dyce, 1997). It may be that these characteristics are the least impactful as it relates to sport performance and therefore similar across elite athletes. It can be assumed that reaching elite status will require some level of extraversion as performances would usually take place in front of a crowd. Even at the highest levels of Strongman competition especially, famous athletes engage with the fans in a highly interactive way, implying higher levels of extraversion. The same could be said for openness, as it could be argued that openness to new and sometimes nerve-wracking experiences. Also, it may take a similar level of creativity to be able to effectively train and/or compete at a high level in any sport.

GSE

General self-efficacy is effectively the belief in oneself to accomplish a goal or self-confidence (Zagórska & Guszkowska, 2013, p. 121). Powerlifters and Strongmen/women scored higher than the other athlete populations. The underlying reasons for this could be drawn from the previous discussion related to the BFI traits. Parallels between the trait of conscientiousness and self-efficacy can be drawn. Characteristics such as being orderly, efficient, and persistent, and engaging in routine have related to higher levels of confidence and performance (Orbach & Blumenstein, 2022). Further, low levels of neuroticism, or the ability to handle anxiety and stressful situations (i.e., competitions) could also result in bolstered confidence in one's abilities.

Since Powerlifting and Strongman/woman could be considered sports with a more internalized focus, goal setting could be different compared to team sports or even some individual sports. As mentioned before, with the sports this study used for comparison (team sports, speedskating) much of what classifies as good is based around an externally controlled outcome. Did a team win or lose? Did you win the race or did someone else? Whereas competitive weightlifting could be more internally performance based. Did you achieve a certain total weight score in powerlifting or were you able to get a deadlift personal record in a strongman competition? Though placement is important to reach a certain level of elite, it is not as prevalent when it comes to goal setting. Performance-based goals could possibly put less pressure on an athlete since they are internally focused as opposed to externally which could possibly lead to higher self-efficacy (Williamson et al., 2022).

Limitations

There are several notable limitations with this study. Firstly, it is possible that this study did not get the most “elite” level respondents due to the difficulty of contacting these individuals.

Several world-class competitive weightlifters reside in other countries, with this study only surveying a population based in the United States, it is possible the data does not provide a complete representation of these athletes. Gender differences were not being directly studied. Though there were identified male and female participants, the differences between their personality profiles were not the central focus of the study and therefore not analyzed. There is also a distinct difference between the sports of Powerlifting and Strongman/woman. Though they are both considered strength sports, the approach and training can be very different. The data analysis of both subgroups was combined for personality profiling, thus there may be differences between the two sports that were not identified. The self-reported nature of an online survey could also have resulted in false reporting by the participants. Meet totals, body weights, or competition levels were used for inclusion criteria with participants potentially being dishonest and therefore potentially skewed some results. Lastly, the sample population for this study was also quite small. Due to this, it is possible that the study was not representative of either or both sports polled.

Suggestions for Future Research

As this study is thought to be the first of its kind to provide a personality profile of elite competitive weightlifters, several directions for future research are warranted. Firstly, more quantitative research using a greater number of participants to either confirm or disprove the results of this investigation would be essential. Further classification of personality profiles for sub-groups of athletes underneath the competitive weightlifters is also needed to determine if trait differences exist. Similarly, sub-categorizing based on the demographic (age, gender, etc.) aspects of this group of athletes is also needed. Lastly, more qualitative research exploring the

"theoretical why" behind these trait scores would add to the general body of knowledge within this sport.

Conclusion

This investigation sought to develop a general personality profile for elite competitive weightlifters. The personality profile for elite Powerlifters and Strongman/woman was classified as having high levels of agreeableness, conscientiousness, openness, high to moderate levels of extroversion, and low levels of neuroticism. These athletes also possessed high levels of self-efficacy. The statistically significant differences in conscientiousness, agreeableness, neuroticism, and self-efficacy suggest traits specific to these elite athletes may help with their attraction to this sport and overall performance. The limitations within this novel study leave several areas for future research, including the need for a larger sample size, sub-categorizing of participants, and further exploration of theoretical understanding regarding the relationship between personality traits and performance success.

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Tables and Figures

Table 1. Demographic characteristics of participants (mean ± SD).

Variable	**Strongman**	**Powerlifter**	**Total Participants**
No. of Athletes	19	29	48
Male	14 (74%)	20 (79%)	34 (74%)
Female	5 (26%)	9 (31%)	14 (29%)
Age (years)	37.84 ± 8.8	41.14 ± 13.1	39.83 ± 11.6
Competition Experience (years)	7.58 ± 5.5	9.45 ± 8.9	8.71 ± 7.7

Table 2. Personality Profile of Competitive Weightlifters (mean ± SD).

	Mean Scores
BFI Personality Traits	
Extraversion	26.10 ±6.64
Agreeableness	33.77 ± 4.65
Conscientiousness	36.58 ± 5.37
Neuroticism	20.19 ± 6.64
Openness	35.42 ± 5.34
GSE General Self-Efficacy	35.42 ± 3.35

Table 3. Represents the comparisons of BFI personality traits (mean ± SD) across other sport disciplines.

BFI Categories	Weightlifters	Team sports (Bojanić et. al.)	Combat Sports (Bojanić et. al.)
Extraversion	26.10 ± 6.64	26.59 ± 3.30	26.90 ± 2.97
*Agreeableness**	33.77 ± 4.65*	31.00 ± 3.37	31.72 ± 3.40
*Conscientiousness**	36.58 ± 5.37*	30.63 ± 4.19	32.32 ± 3.28
*Neuroticism**	20.19 ± 6.64*	26.28 ± 3.69	25.05 ± 3.50
Openness	35.52 ± 5.34	35.80 ± 6.08	36.87 ± 6.38

*Denotes a statistically significant difference from weightlifters to other sports (<.004 p-value)

Table 4. Represents the comparison of General Self-Efficacy (mean ± SD) across other sport disciplines.

Sports	Weightlifters	Team Sports (Đurović et al.)	Speedskaters (Rogowska et al.)
General Self-Efficacy*	35.42 ± 3.35*	33.45 ± 5.24	31.92 ± 4.52

*Denotes a statistically significant difference from weightlifters to other sports (<.004 p-value)

Trait	Description
Extraversion	Assertive, bold, active, or vigorous
Agreeableness	Warm, empathetic, courteous, and generous
Conscientiousness	Orderly, efficient, precise, and persistent
Openness	Insightful, creative or curious

Neuroticism	Anxious, uptight, nervous, emotional, or agitated
Self-Efficacy	Belief in one's capabilities to organize and execute the courses of action required to produce given attainments

Figure 1. Trait descriptions

Appendix A BFI

How I am in general

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

1	**2**	**3**	**4**	**5**
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

I am someone who…

1. _____ Is talkative
2. _____ Tends to find fault with others
3. _____ Does a thorough job
4. _____ Is depressed, blue
5. _____ Is original, comes up with new ideas

6. _____ Is reserved

7. _____ Is helpful and unselfish with others

8. _____ Can be somewhat careless

9. _____ Is relaxed, handles stress well.

10. _____ Is curious about many different things

11. _____ Is full of energy

12. _____ Starts quarrels with others

13. _____ Is a reliable worker

14. _____ Can be tense

15. _____ Is ingenious, a deep thinker

16. _____ Generates a lot of enthusiasm

17. _____ Has a forgiving nature

18. _____ Tends to be disorganized

19. _____ Worries a lot

20. _____ Has an active imagination

21. _____ Tends to be quiet

22. _____ Is generally trusting

23. _____ Tends to be lazy

24. _____ Is emotionally stable, not easily upset

25. _____ Is inventive

26. _____ Has an assertive personality

27. _____ Can be cold and aloof

28. _____ Perseveres until the task is finished

29. _____ Can be moody

30. _____ Values artistic, aesthetic experiences

31. _____ Is sometimes shy, inhibited

32. _____ Is considerate and kind to almost everyone

33. _____ Does things efficiently

34. _____ Remains calm in tense situations

35. _____ Prefers work that is routine

36. _____ Is outgoing, sociable

37. _____ Is sometimes rude to others

38. _____ Makes plans and follows through with them

39. _____ Gets nervous easily

40. _____ Likes to reflect, play with ideas

41. _____ Has few artistic interests

42. _____ Likes to cooperate with others

43. _____ Is easily distracted

44. _____ Is sophisticated in art, music, or literature

SCORING INSTRUCTIONS

To score the BFI, you'll first need to **reverse-score** all negatively-keyed items:

Extraversion: 6, 21, 31

Agreeableness: 2, 12, 27, 37

Conscientiousness: 8, 18, 23, 43

Neuroticism: 9, 24, 34

Openness: 35, 41

To recode these items, you should subtract your score for all reverse-scored items from 6. For example, if you gave yourself a 5, compute 6 minus 5 and your recoded score is 1. That is, a score of 1 becomes 5, 2 becomes 4, 3 remains 3, 4 becomes 2, and 5 becomes 1.

Next, you will create scale scores by ***averaging*** the following items for each B5 domain (where R indicates using the reverse-scored item).

Extraversion: 1, 6R 11, 16, 21R, 26, 31R, 36

Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42

Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R

Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39

Openness: 5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44

Appendix B GSE

General Self-Efficacy Scale (GSE)

	Not at all true	Hardly true	Moderately true	Exactly true
1. I can always manage to solve difficult problems if I try hard enough	☐	☐	☐	☐
2. If someone opposes me, I can find the means and ways to get what I want.	☐	☐	☐	☐
3. It is easy for me to stick to my aims and accomplish my goals.	☐	☐	☐	☐
4. I am confident that I could deal efficiently with unexpected events.	☐	☐	☐	☐
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	☐	☐	☐	☐
6. I can solve most problems if I invest the necessary effort.	☐	☐	☐	☐
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	☐	☐	☐	☐
8. When I am confronted with a problem, I can usually find several solutions.	☐	☐	☐	☐
9. If I am in trouble, I can usually think of a solution	☐	☐	☐	☐
10. I can usually handle whatever comes my way.	☐	☐	☐	☐

Appendix C Means and Standard Deviations

TABLE 1 | Means, standard deviations, *t*-tests, standardized discriminant function coefficients, and correlations between discriminant scores and variable raw scores for competitors in combat and team sports.

	Sports	Mean	*SD*	*F*	Stand. Can. Disc. Fun. Coeff.	Corr. Disc. Var. Raw
Self-esteem	Combat	23.38	1.705	4.518*	0.617	0.496
	Team	24.10	1.874			
Neuroticism	Combat	25.05	3.507	4.109*	0.729	0.473
	Team	26.28	3.696			
Extraversion	Combat	26.90	2.976	0.100	−0.137	−0.074
	Team	26.59	3.304			
Agreeableness	Combat	31.72	3.404	1.684	−0.229	−0.303
	Team	31.00	3.373			
Conscientiousness	Combat	32.32	3.284	5.649*	−0.562	−0.555
	Team	30.63	4.194			
Openness	Combat	36.87	6.389	0.864	0.198	−0.217
	Team	35.80	6.085			

*Differences are significant at the 0.05 level; Stand. Can. Disc. Fun. Coeff., Standardized Discriminant Function Coefficients; Corr. Disc. Var. Raw, Correlations Between Discriminant Scores and Variable Raw Scores For competitors in combat and team sports.

(Bojanić, Ž. et. al. 2019)

Table 1
Descriptive statistics for variables in the study

Scale	Theo-retical range	Achieved range	*M*	*SD*	α	*Sk*	*Ku*
General Self-Efficacy	10-40	16-40	33.45	5.24	.89	-0.95	1.28
Cognitive anxiety	4-20	4-20	8.72	4.04	.82	0.74	-1.15
Somatic anxiety	8-40	8-40	21.48	9.32	.92	0.35	-1.18
Sport achievement	6-42	20-42	35.23	5.60	.83	-.1.06	0.77

Note. *M* – mean; *SD* – standard deviation; α - alpha reliability; *Sk* – skewness; *Ku* – kurtosis.

(Đurović et al., 2021)

Variable	Range	*M*	*SD*	Skewness	Kurtosis	Correlations *r*	
						BAS	SSS
Behavioral Activation System (BAS)	1–4	2.80	0.40	−0.23	1.12		
Sport Success Scale (SSS)	35–165	127.48	17.03	−1.16	4.94	0.23 **	
General Self-Efficacy Scale (GSES)	16–40	31.92	4.52	−0.32	0.82	0.43 **	0.36 **

** $p < 0.01$.

(Rogowska et al., 2022).