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Brawn and Brains: An Exploration of Personality Differences Between Strength Sports Athletes

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ABSTRACT

Strength sports like bodybuilding, powerlifting, weightlifting, strongman/strongwoman, and CrossFit® all revolve around resistance training but differ in the way they are trained for, performed, and judged. While personality is known to influence physical activity choices, little is known about whether different strength sports attract athletes with distinct personality profiles. This study explored whether personality dimensions and their more specific facets differ between athletes from these five strength disciplines. A total of 187 competitive strength sport athletes (73.8% male, 26.2% female) completed the IPIP-NEO-120 personality inventory. One-way ANCOVAs were used to examine differences across sports, with sex controlled as a covariate. Results showed that while the only significant difference at the dimension level was for neuroticism (ηp^2 = .076), with CrossFit® athletes scoring lowest, several meaningful differences emerged at the facet level. Bodybuilders scored higher in artistic interest, orderliness, and cautiousness, while strongman/strongwoman athletes scored higher in immoderation and vulnerability, and lower in cautiousness. Weightlifters demonstrated the highest liberalism scores, and CrossFit® athletes showed the lowest vulnerability. Effect sizes for facet-level differences ranged from small to medium (ηp^2 = .051 to .074). These findings suggest that although athletes may appear similar when grouped under the umbrella of strength sports, there are meaningful psychological differences between disciplines. These insights may help explain sport selection and could inform future research on how personality interacts with training over time.

Keywords: Personality, Strength sports.

INTRODUCTION

In recent years, strength sports have experienced significant growth in popularity (Kraemer et al., 2017; Steele et al., 2022). Within this expanding landscape, athletes can choose from a range of disciplines, each characterised by distinct physical demands, training priorities, and psychological profiles. Bodybuilding, for instance, emphasises aesthetics and muscular hypertrophy (IFBB, 2021; Alves et al., 2020) and is characterised by normative descriptions of training structure and intensity that underscore its distinct performance culture (Alves et al., 2020). Weightlifting develops muscular power and technical proficiency through the high-velocity lifts of the snatch and clean and jerk (Garhammer, 1993; Storey & Smith, 2012), offering comparative benchmarks in elite competitors via performance normalisation across bodyweight and sex categories (Gillen, 2024). Powerlifting focuses on maximal strength, establishing percentile-based standards across three core movements: the squat, bench press, and deadlift (van den Hoek et al., 2024; Hackett et al., 2020). Strongman and strongwoman competitions combine maximal strength and muscular endurance across a diverse range of event-specific tasks, with emerging evidence from novice-level events linking anthropometrics and maximal strength to event outcomes (Winwood et al.,

2011, 2016). Finally, CrossFit® integrates elements of these disciplines in varied, high-intensity workouts that blend strength, endurance, and skill-based training (Claudino et al., 2018; Martinho et al., 2024) and has produced normative performance scores from over a decade of open competitions (Mangine et al., 2023). Although the aforementioned strength sports prioritise strength development through resistance training, the distinctions in performance focus across disciplines suggest that athletes may also differ in their psychological profiles. While comprehensive data on strength sport participation and performance are limited, existing datasets provide a foundation for examining the psychological profiles of athletes across different disciplines. Examining the underlying psychological dimensions that contribute to sport selection may therefore enhance our understanding of the unique personalities within each sport and highlight how different temperaments may align with particular strength disciplines.

In the 20th century, personality researchers identified five distinct dimensions of personality, commonly known as the Five-Factor Model (Goldberg, 1992; McCrae & Costa, 1987). The dimensions include openness, conscientiousness, extraversion, agreeableness, and neuroticism (Goldberg, 1992). These personality dimensions are observed across cultures, races, and genders (Schmitt et al., 2007; Weisberg et al., 2011). The dimensions represent the differences in motives, feelings, and behaviours between individuals. Although the Five-Factor Model has faced some criticism, particularly regarding self-report biases, it continues to demonstrate strong reliability, validity, and predictive utility, both at the broad dimension level and in its narrower facets (McCrae & Costa, 1987; Johnson, 2014; Nielsen & Kajonius, 2024). While personality dimensions provide merit for assessing broad aspects of personality, each dimension also contains six narrower facets that have high predictive value on behaviour compared to the dimensions alone (Paunonen & Ashton, 2001; see Appendix A for facet descriptions). The exploration of personality dimensions and facets offers valuable insights that could potentially enhance adherence rates of resistance training modalities and foster better health outcomes.

Physical activity, with regard to frequency and intensity, was found to significantly correlate with personality dimensions, such as extraversion ($r = 0.23$), conscientiousness ($r = 0.20$) and neuroticism ($r = -0.11$) (Rhodes & Smith, 2006; Wilson & Dishman, 2015). Within the sports domain, personality dimensions have been noted to distinguish between certain sports, levels of participation (Piepiora et al., 2020; Piepiora et al., 2019), and the likelihood of success (Piepiora, 2021). However, there is a dearth of information about whether strength sports athletes display unique personality characteristics. Bodybuilding is the most extensively explored strength sport in terms of temperament, with a focus on dysfunctional behaviour and negative affect (Emini & Bond, 2014; Steele et al., 2019). Bodybuilders have been shown to have higher neuroticism than other athletes (Witkowski & Piepiora, 2018). The research also implies that bodybuilders present with higher conscientiousness through higher reported perfectionism (Blouin & Goldfield, 1995). Weightlifters have also been included in personality research regarding individual sport athletes, with higher rates of openness, conscientiousness, and extraversion than team sport athletes (Darden, 1972; Ilyasi & Salehian, 2011). CrossFit®, as a modality of training, has recently shown no personality difference from other forms of training (Box et al., 2019); however, this research lacked facet-level analysis within each dimension and did not target athletes specifically. Thus far, personality research has lacked a comprehensive understanding of the temperament of strength sports athletes, with several strength sports being absent from the literature altogether. Therefore, examining a range of strength sports athletes will provide valuable insights into the personalities of athletes aligned with distinctive styles of resistance training.

Research consistently finds that males and females differ not only in broad personality dimensions but also in the narrower facets that constitute those dimensions (Costa et al., 2001; Weisberg et al., 2011). Therefore, the main analysis will control for sex to isolate the effects of sport selection on these parameters. Sex differences in participation and performance are evident in strength sports, with males and females showing distinct patterns of competitive engagement and normative performance (Latella, 2024; van den Hoek et al., 2024). Controlling for sex in analyses ensures that these differences do not confound associations between personality and sport type.

This study aims to examine sex differences in personality dimensions and facets among strength sport athletes; to determine whether personality dimensions differ across strength sport disciplines while controlling for sex; and to assess whether

facets within those dimensions also differ across strength sport types when sex is accounted for. Based on these aims, it is hypothesised that bodybuilding athletes and athletes from other strength sports will differ in conscientiousness and neuroticism, and that additional facet-level differences will emerge beyond the overarching personality dimensions.

METHODS

Design

This study recruited athletes actively participating in strength sports, including bodybuilding, powerlifting, strongman/woman, weightlifting, and CrossFit®. An online questionnaire enabled digital administration of the survey. The survey was distributed via social media, using a snowball sampling approach to reach a specific sample of strength sports athletes (Atkinson & Flint, 2004). The online application Qualtrics was used to provide an anonymous link to the survey and to collect responses (Qualtrics, Inc., Provo, Utah, USA). The link was sent with the acknowledgement that the survey would explore the personalities of strength sports athletes and would take approximately 15 minutes to complete.

Participants

A total of 219 strength sports athletes began the personality survey. Inclusion criteria were active participation in competitive events within 24 months and being over 16 years of age. Prior to starting the survey, all participants received clear information about the study's purpose, benefits, and risks, and provided informed consent. Ethics approval was granted by the Auckland University of Technology Ethics Committee (22/215).

Survey

The survey used in this study consisted of the International Personality Item Pool (IPIP) 120 questionnaire, along with a section to collect demographic information: sex (male, female), and strength sport (bodybuilder, powerlifter, strongman/woman, weightlifter, CrossFitter). The IPIP-NEO-120 is a well-established inventory designed to assess five personality dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism (Kajonius & Johnson, 2019; McCrae & Costa Jr, 2004). The inventory comprises 120 items that capture different facets of these personality dimensions, measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Facet scores were calculated by summing the scores of the four corresponding items for each facet, resulting in scores ranging from 4 to 20 points per facet. Subsequently, the scores for each personality dimension were calculated by summing the scores of the six associated facets, resulting in dimension scores ranging from 24 to 120 points.

Statistical Analysis

Descriptive analyses were performed using JASP version 0.16.3 (University of Amsterdam, Netherlands) to summarise sample characteristics and variables of interest. For personality dimensions and facets, means and standard deviations (±SD) were calculated. Sex and strength sport type (categorical variables) were summarised using frequencies and percentages.

Independent t-tests were conducted to examine sex differences in personality dimensions and facets. For significant differences, mean differences and 95% confidence intervals are reported to indicate the magnitude and precision of these effects.

One-way Analysis of Covariance (ANCOVA) was employed to examine differences in personality dimensions and facets across strength sports athletes while controlling for sex. Due to a smaller-than-anticipated sample size, competition level and age were removed as covariates to minimise the risk of overfitting. Effect sizes were reported as partial eta squared (ηp^2), which represents the proportion of variance in the strength sports athletes by the personality variable while controlling for sex. Values of ηp^2 .01, .06, and .14 were interpreted as small, medium, and large effects, respectively (Richardson, 2011). When significant main effects were detected, post hoc analyses with Bonferroni correction were conducted to examine pairwise differences between strength sports groups.

All analyses used an alpha level of $p < .05$. While interaction effects between sex and strength sport type would have been informative, the sample size was insufficient to support this analysis with adequate statistical power.

RESULTS

Sample Characteristics

A total of 219 strength sport athletes began the survey. After excluding 32 incomplete responses, 187 participants were included in the final analysis. The sample comprised 138 males (73.8%) and 49 females (26.2%). Athletes self-identified their primary sport as bodybuilding (n = 31; 6.5% female), CrossFit® (n = 14; 57.1% female), powerlifting (n = 86; 27.9% female), strongman/strongwoman (n = 22; 27.3% female), and weightlifting (n = 34; 20.6% female).

Assumption Checks

Normality was assessed via Shapiro–Wilk tests and Q-Q plots. All dependent variables were normally distributed, indicating that the assumption of normality was satisfied for the ANCOVAs. Homogeneity of variance was assessed using Levene's test, and the assumption was met for analysis ($p > .05$). Homogeneity of regression slopes was tested by examining interactions between each covariate and independent variable, and all interactions were non-significant ($p > .05$).

Sex Differences in Personality

Independent samples t-tests were conducted to compare personality dimensions between male and female athletes. Female athletes scored significantly higher in the following dimensions and facets: Conscientiousness ($t(187) = 2.036$, $p = 0.043$), Agreeableness ($t(187) = 3.214$, $p = 0.002$), Anxiety ($t(187) = 3.048$, $p = 0.003$), Morality ($t(187) = 2.086$, $p = 0.038$), Emotionality ($t(187) = 3.506$, $p < 0.001$), Dutifulness ($t(187) = 3.304$, $p < 0.001$), Activity Level ($t(187) = 2.071$, $p = 0.040$), Cooperation ($t(187) = 4.265$, $p < 0.001$), and Achievement Striving ($t(187) = 3.564$, $p < 0.001$). Conversely, male athletes scored significantly higher on Excitement-Seeking ($t(187) = 3.987$, $p < 0.001$) and Intellect ($t(187) = 3.973$, $p < 0.001$). These findings confirm the importance of including sex as a covariate in subsequent analyses.

Between-Group Differences by Strength Sport

Dimensional Differences

An ANCOVA controlling for sex revealed significant differences across strength sports only for Neuroticism (see Table 1). Strongman/Strongwoman athletes had the highest adjusted Neuroticism scores (adjusted M = 74.23, SE = 2.93), followed by weightlifters (adjusted M = 72.24, SE = 2.42), with CrossFit® athletes reporting the lowest scores (adjusted M = 58.58, SE = 3.62).

No statistically significant differences were found between strength sports for Openness ($p = .170$), Conscientiousness ($p = .068$), Extraversion ($p = .826$), and Agreeableness ($p = .668$). Notably, Bodybuilders had marginally higher Conscientiousness scores (adjusted M = 89.90, SE = 2.21) compared to Strongman/Strongwoman athletes (adjusted M = 80.95, SE = 2.46), though this difference did not reach statistical significance (see S1 and Figure 1).

Facet-Level Differences

Further ANCOVA analyses were conducted for personality facets within each of the five domains, controlling for sex.

Openness: Significant between-group differences were observed in Artistic Interest ($p = .014$, $\eta p^2 = .066$). Bodybuilders scored highest for Artistic Interest, while CrossFit® athletes reported the lowest (see S2 and Figure 2).

Conscientiousness: Differences were found for Orderliness ($p = .018$, $\eta p^2 = .063$), with bodybuilders scoring notably higher than strongman/strongwoman and powerlifters, and Cautiousness ($p = .038$, $\eta p^2 = .054$), where bodybuilders again scored highest and strongman/strongwoman lowest (see S3 and Figure 3).

Neuroticism: Group differences emerged in Immoderation ($p = .008$, $\eta p^2 = .074$), with strongman/strongwoman athletes scoring highest and bodybuilders lowest, and Vulnerability ($p = .022$, $\eta p^2 = .061$), with strongman/strongwoman again reporting the highest and CrossFit® athletes the lowest (see S6 and Figure 6).

No statistically significant facet-level differences were observed across sports for Extraversion (see S4 and Figure 4) or Agreeableness (see S5 and Figure 5).

DISCUSSION

Although there is some research examining personality in sport (Allen & Laborde, 2014), little

Table 1. Significant Dimension and Facet Differences Across Strength Sports

Dimension/Facet	N	Factor	df	F	*p*	ηp² [90% CI]
Artistic Interest	187	Strength Sport	4, 182	3.220	.014	.066 [.008, .117]
Orderliness	187	Strength Sport	4, 182	3.063	.018	.063 [.006, .113]
Cautiousness	187	Strength Sport	4, 182	2.589	.038	.054 [.002, .1]
Neuroticism	187	Strength Sport	4, 182	3.698	.006	.076 [.013, .129]
Immoderation	187	Strength Sport	4, 182	3.594	.008	.074 [.012, .127]
Vulnerability	187	Strength Sport	4, 182	2.945	.022	.061 [.005, .110]

Note. N = total number of participants for each dependent variable. df = numerator, denominator degrees of freedom for the ANCOVA. F, p, and ηp² reflect the effect of Strength Sport, adjusted for sex. Full descriptive statistics for each sport and facet are provided in Supplementary Material (Table S1-S6).

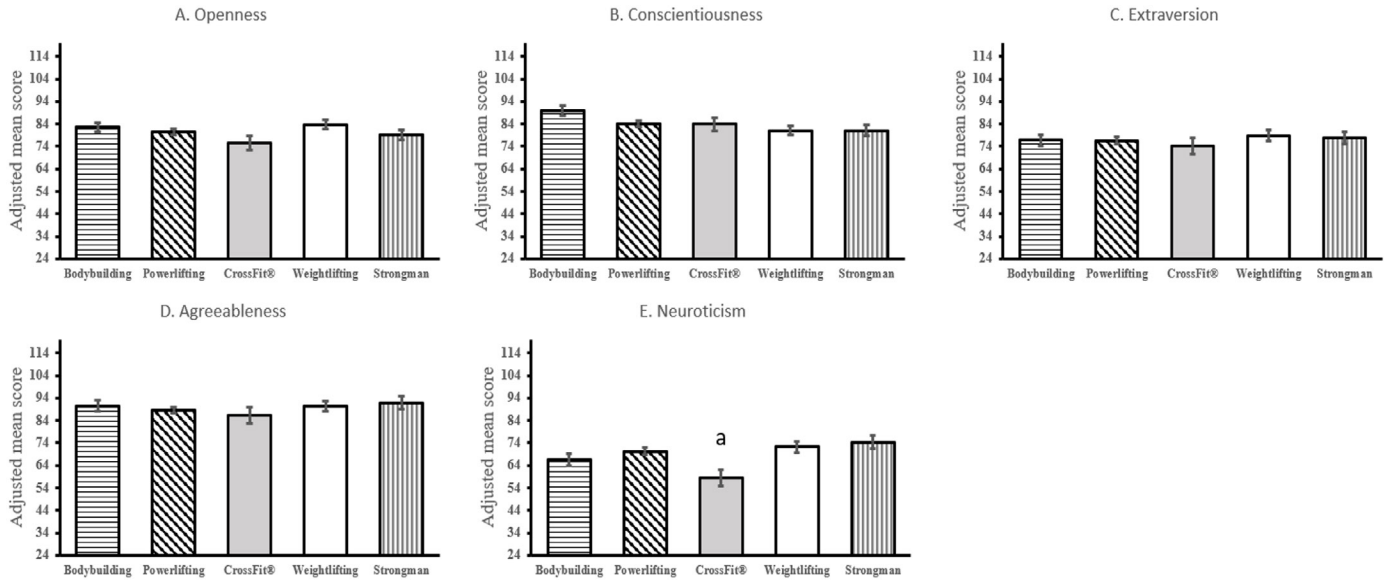

Figure 1. Adjusted Means of Personality Dimensions in Strength Sport Athletes.
Note. Error bars represent ±1 SE of adjusted means (controlling for sex). Bars labelled a differ significantly from Strongman/Strongwoman (p < .05). Strongman = Strongman/Strongwoman.

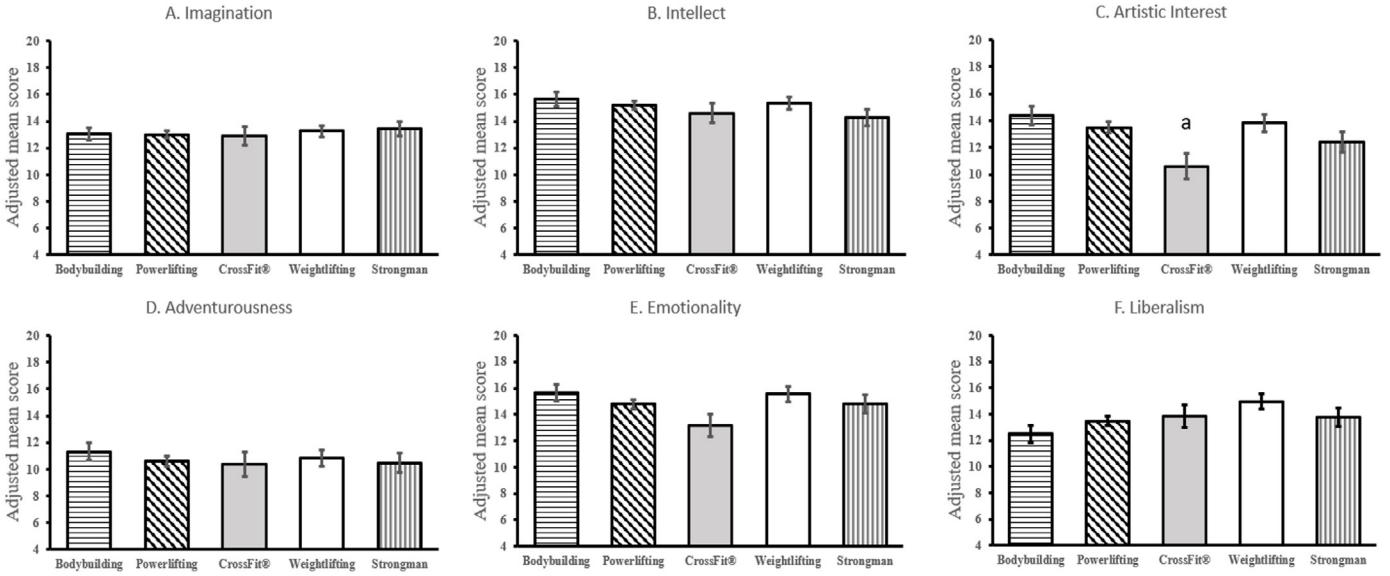

Figure 2. Adjusted Means of Openness Facets in Strength Sport Athletes
Note. Error bars represent ±1 SE of adjusted means (controlling for sex). Bars labelled a differ significantly from Bodybuilding (p < .05). Strongman = Strongman/Strongwoman.

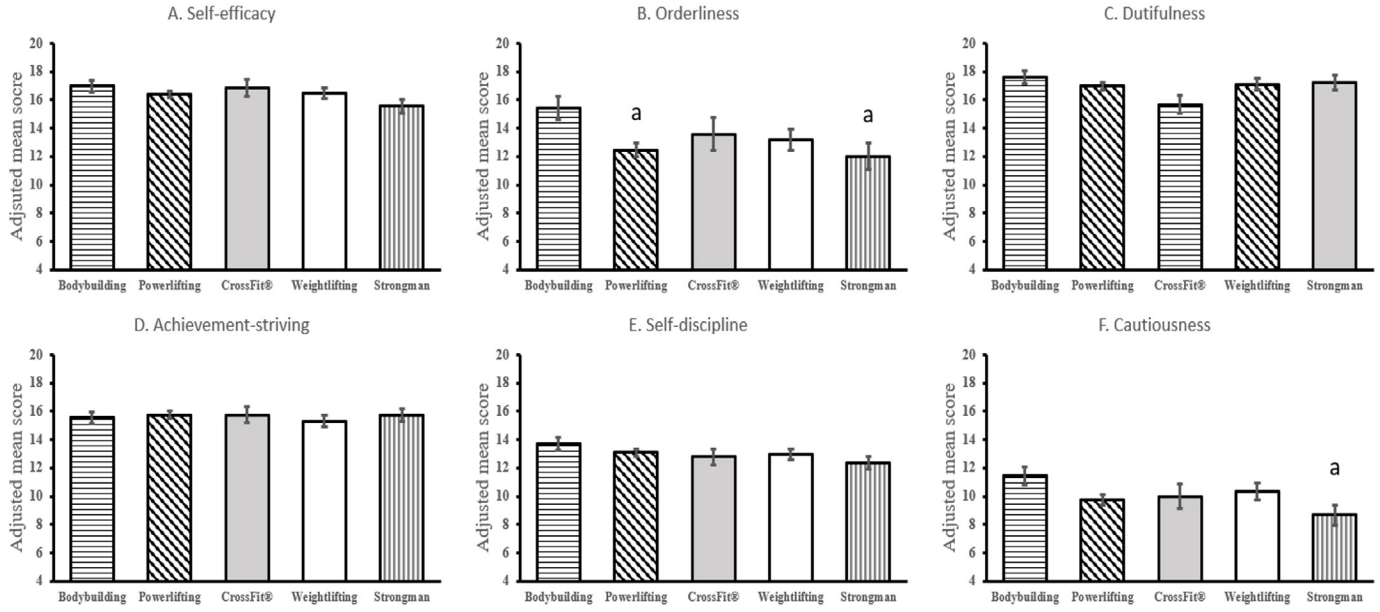

Figure 3. Adjusted Means of Conscientiousness Facets in Strength Sport Athletes
Note. Error bars represent ±1 SE of adjusted means (controlling for sex). Bars labelled a differ significantly from Bodybuilding (p < .05). Strongman = Strongman/Strongwoman.

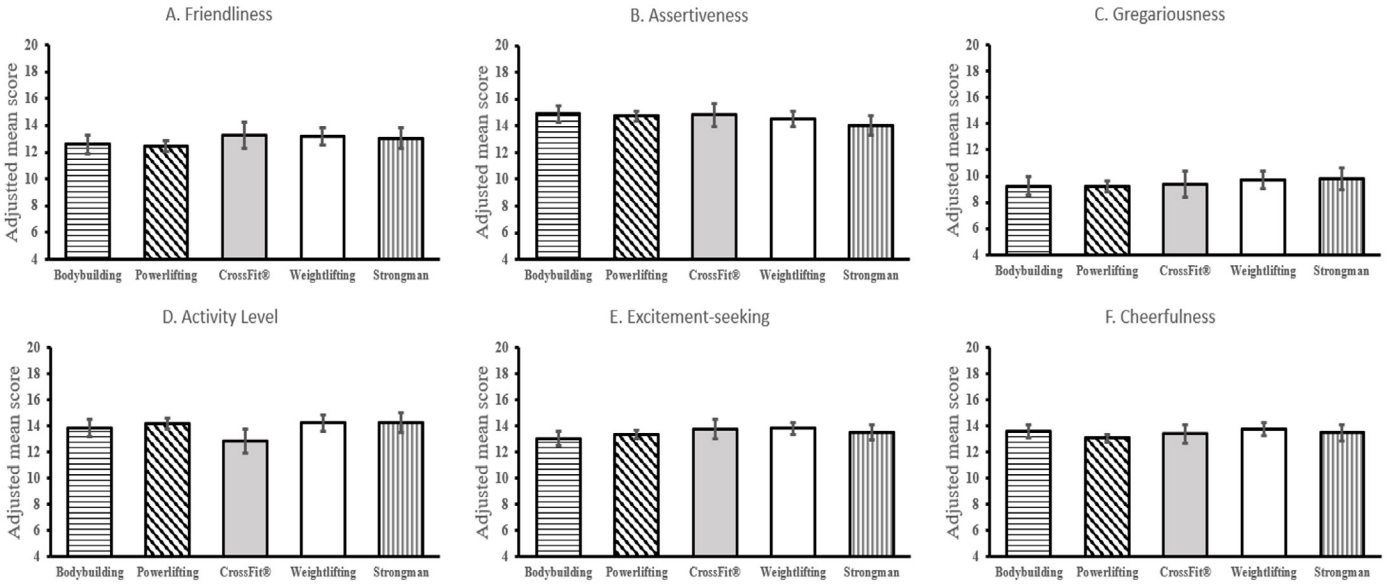

Figure 4. Adjusted Means of Extraversion Facets in Strength Sport Athletes
Note. Error bars represent ±1 SE of adjusted means (controlling for sex). Strongman = Strongman/Strongwoman.

is known about the temperaments and differences among strength sport athletes. In this study, we investigated personality dimensions and facets across five strength-based sport disciplines. Previous research has explored personality differences using the five-factor model (Piepiora, 2021; Piepiora et al., 2020; Piepiora et al., 2019; Witkowski & Piepiora, 2018). We extended this work by incorporating facet-level analyses to identify nuanced differences and provide insights that may be overlooked at the broader dimensional level (Laborde et al., 2020). Our findings highlight both shared and unique personality dimensions and facets across resistance training modalities, reflecting the distinct approaches and physiological demands associated with each discipline.

At the dimensional level, we observed differences between strength sport athletes only for neuroticism. CrossFit® athletes exhibited lower neuroticism than athletes in three other strength sports (ηp^2 = .076), contrary to our hypothesis. This finding contrasts with previous research suggesting no personality differences between CrossFit® modalities and other training modalities (Box et al., 2019) and with findings of higher neuroticism in bodybuilders compared to other strength sport athletes (Witkowski & Piepiora, 2018). Additionally, the finding that CrossFit® athletes are lower in neuroticism is particularly intriguing, given that the majority of

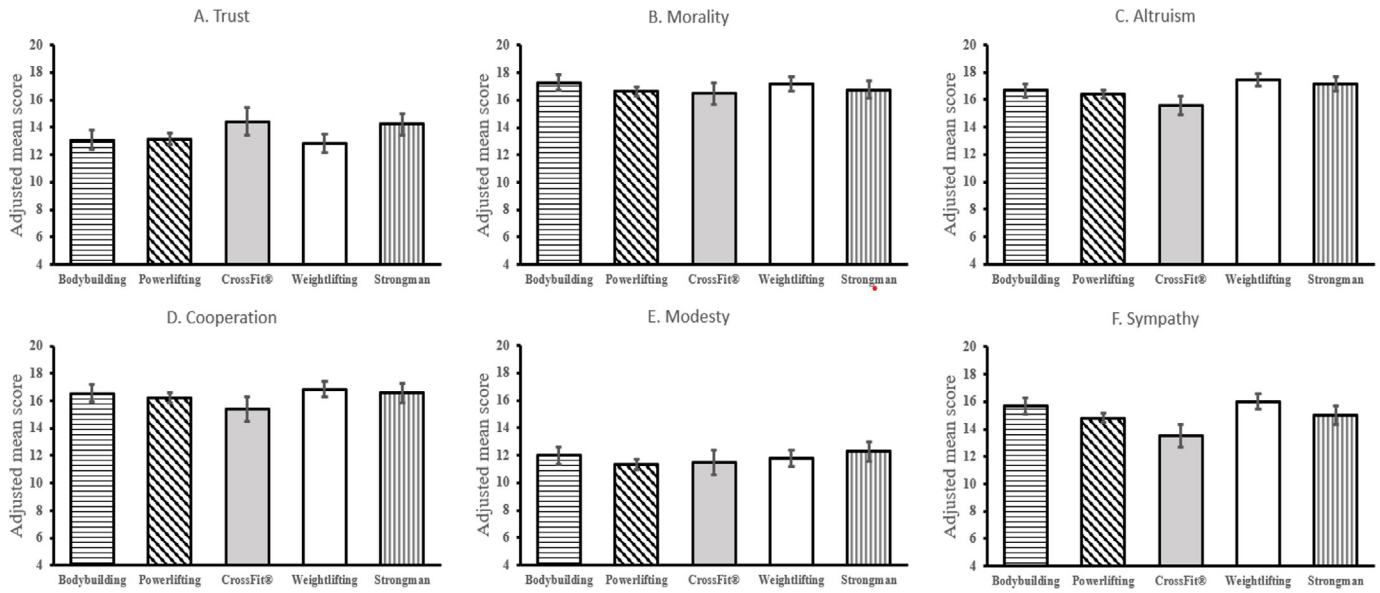

Figure 5. Adjusted Means of Agreeableness Facets in Strength Sport Athletes
Note. Error bars represent ±1 SE of adjusted means (controlling for sex). Strongman = Strongman/Strongwoman.

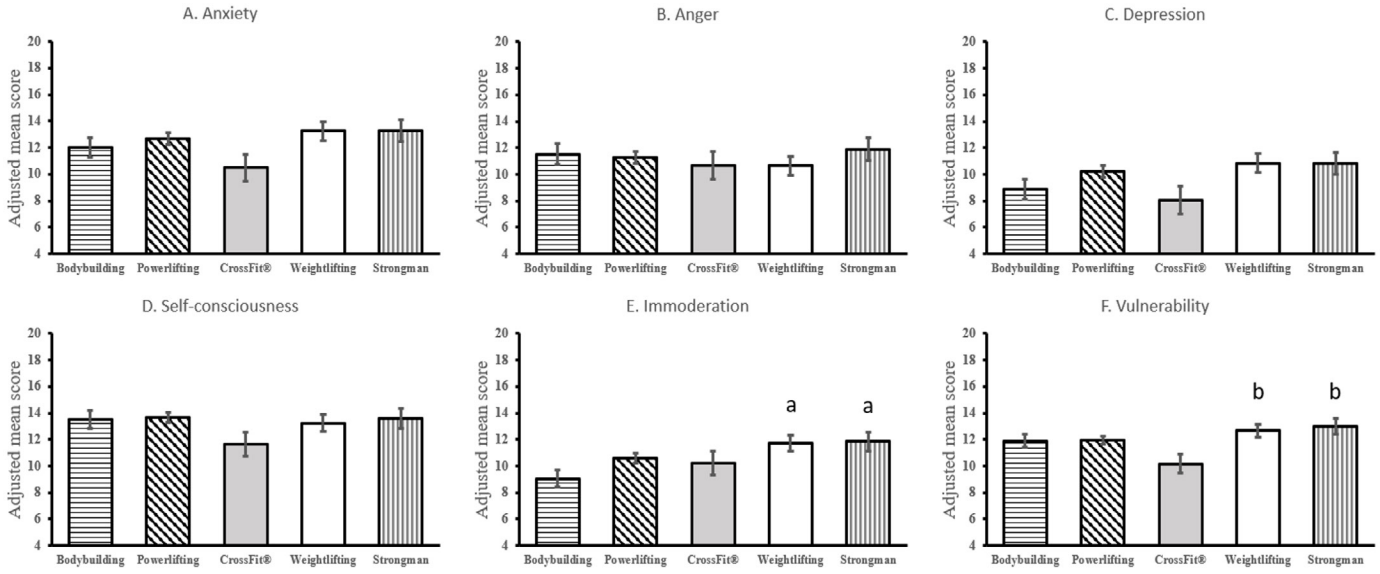

Figure 6. Adjusted Means of Neuroticism Facets in Strength Sport Athletes
Note. Error bars represent ±1 SE of adjusted means (controlling for sex). Bars labelled a differ significantly from Bodybuilding ($p < .05$). Bars labelled b differ significantly from CrossFit® ($p < .05$). Strongman = Strongman/Strongwoman.

this group was female, a population that generally ranks higher on neuroticism (Weisberg et al., 2011). While this pattern may reflect characteristics unique to the current sample, it suggests a distinctive psychological profile among female CrossFit® athletes that deviates from the general population. Moreover, this study provided insight into the nuanced personality facets of these athletes. The facet-level findings were consistent with our prediction that additional information would emerge beyond dimensional analysis. Specifically, facet-level differences were observed within openness, conscientiousness, and neuroticism, concerning artistic interest, orderliness, cautiousness, immoderation, and vulnerability.

Bodybuilding was the only strength sport assessed in which aesthetic criteria form the basis of competition, with athletes' physiques being judged on symmetry, muscularity, definition, and overall impression (IFBB, 2021). The higher artistic interest observed in bodybuilders ($\eta p^2 = .066$) aligns with findings from other aesthetic-based athletes, such as dancers and gymnasts, who also score high on openness (Fink & Woschnjak, 2011). This facet-level difference underscores the importance of examining personality beyond the broad dimensions.

Overall, conscientiousness did not differ significantly between strength sport athletes; however, significant differences emerged at the facet level. Facet-level differences in conscientiousness appear to buffer the total dimensional score in bodybuilders, similarly to openness. Specifically, orderliness was moderately higher in bodybuilders than in both powerlifters and strongman/strongwoman athletes (ηp^2 = .063). This higher orderliness may reflect a greater need for autonomy and self-regulation, consistent with self-determination theory (Ryan & Deci, 2000), in which individuals with high autonomy are more likely to engage in structured, self-directed training to achieve personally meaningful goals. Thus, individuals who seek to control their environment, such as through tidying or meticulous planning, may be drawn to bodybuilding. Additionally, bodybuilders exhibited moderately lower levels of immoderation compared to strongman/strongwoman athletes (ηp^2 = .074). Taken together, these facets are consistent with the strict dietary and training practices required to achieve extreme leanness for competitive physique sports (Helms et al., 2019).

Cautiousness, an inhibitory facet, was lower in strongman/strongwoman athletes than in bodybuilders, with a moderate effect size (ηp^2 = .054), and trended lower than in all other strength sport athletes. This likely reflects the high-risk movements inherent in strongman competitions, such as keg tosses and atlas stones (Winwood et al., 2014). For example, the keg toss involves throwing a heavy keg backward over the athlete's head, which may result in the keg falling on them. CrossFit® athletes perform technically demanding movements under fatigue, but these movements are practised and controlled, limiting actual injury risk. In contrast, hypertrophy training for bodybuilders, though challenging, has the lowest injury rates among strength sports (Keogh & Winwood, 2017). Bodybuilders often use controlled tempo techniques and machines that dictate the movement path of the load (Li et al., 2023). Thus, cautiousness appears to reflect how athletes adapt to the perceived risk of their sport, whereas taking higher risks in other strength sports may lead to greater potential rewards.

In this sample, levels of agreeableness did not differ significantly between strength sport groups. The indirect nature of competition may explain the generally high agreeableness across all strength sport athletes. According to Witkowski and Piepiora (2018), agreeableness tends to be higher in sports where competition is indirect, characterised by a lack of direct contact with a competitor. All strength sports measured in this study compete indirectly in most events, even though some events involve head-to-head competition (e.g., atlas stones, rope climbs). Competitiveness is generally correlated with lower agreeableness (Fong et al., 2021); however, indirect competition may provide a context in which more agreeable athletes can still engage competitively.

Neuroticism, also known as emotional stability, was the only personality dimension found to differ significantly between strength sport athletes. Specifically, CrossFit® athletes exhibited lower neuroticism than powerlifters, strongman/strongwoman, and weightlifters. These findings align with previous research showing that higher levels of physical activity are correlated with lower neuroticism (Rhodes & Smith, 2006; Wilson & Dishman, 2015). CrossFit® requires athletes to develop both strength and cardiorespiratory endurance concurrently (Claudino et al., 2018), and training these components has been found to ameliorate both depression (Gordon et al., 2018; Kandola et al., 2019) and anxiety (Gordon et al., 2017). Thus, the lower neuroticism observed in CrossFit® athletes may be associated with the mixed strength and endurance training inherent in this modality, which has been linked to reduced anxiety and improved emotional regulation (Gordon et al., 2017, 2018). Supporting this further, CrossFit® athletes also displayed lower vulnerability relative to other strength sport athletes (ηp^2 = .061). Vulnerability is inversely correlated with resilience and is often conceptualised on a continuum (Haddadi & Besharat, 2010). Future research examining changes in neuroticism and vulnerability over time in strength sport athletes may clarify whether these personality differences are influenced by training behaviours.

There are indications from this study that strength sport athletes display somewhat unique personality characteristics based on sport-specific demands and training processes. However, this study only investigated strength sport athletes; thus, generalising these findings to other populations, such as athletes in other sports or non-competitive individuals, is limited. The relatively low response rate, combined with the use of only a single time point for personality assessment, limits the statistical power of the study. The small sample sizes in the CrossFit® and strongman/strongwoman groups further constrain generalisability to these

populations. Additionally, as this research was cross-sectional, causal effects of training modalities and environments cannot be established. Participant recruitment via snowballing and social media may have influenced sample composition, potentially biasing the types of athletes who participated (Leighton et al., 2021). Cultural or ethnic background information was not collected, and performance level was not included as a covariate, which may have influenced the observed personality differences. Future studies employing multiple time points and larger, more diverse samples will enable a deeper understanding of the development and change of personality in response to different training modalities and environments over time, building on the work of Piepiora (2021).

CONCLUSION

This is, to our knowledge, the first study to comprehensively explore the personality of strength sport athletes. As noted by Laborde et al. (2020), most sport and exercise research focuses on narrow psychological phenomena because they are considered more predictive. By adopting both a dimensional and facet-level approach, this study sheds light on the specific similarities and differences between strength sport athletes and provides insight into which temperaments are associated with similar, yet subtly distinct, behaviours. Key differences were identified, particularly between bodybuilders and other strength athletes, within the openness, conscientiousness, and neuroticism dimensions. Overall, most personality characteristics were relatively consistent across sports, though subtle differences may influence the type of strength sport an athlete chooses to engage in. These observations suggest potential links between personality and sport engagement, although causal relationships and the influence of training environments on personality remain unknown.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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ETHICAL APPROVAL

Ethics approval was granted by the Auckland University of Technology Ethics Committee (22/215).

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REFERENCES

1. Allen, M. S., & Laborde, S. (2014). The Role of Personality in Sport and Physical Activity. Current Directions in Psychological Science, 23(6), 460-465. https://doi.org/10.1177/0963721414550705
2. Alves, R. C., Prestes, J., Enes, A., de Moraes, W. M. A., Trindade, T. B., de Salles, B. F., Aragon, A. A., & Souza-Junior, T. P. (2020). Training programs designed for muscle hypertrophy in bodybuilders: A narrative review. Sports, 8(11), 149. https://doi.org/10.3390/sports8110149
3. Aspridis, A., O'Halloran, P., & Liamputtong, P. (2014). Female bodybuilding: Perceived social and psychological effects of participating in the figure class. Women in Sport and Physical Activity Journal, 22(1), 24-29.
4. Atkinson, R., & Flint, J. (2004). Snowball sampling. In M. Lewis-Beck, A. Bryman, & T. Futing Liao (Eds.), The SAGE Encyclopedia of Social Science Research Methods (Vol. 2, pp. 1044-1045). SAGE Publications.Blouin, A. G., & Goldfield, G. S. (1995). Body image and steroid use in male bodybuilders. International Journal of Eating Disorders, 18(2), 159-165.
5. Box, A. G., Feito, Y., Brown, C., & Petruzzello, S. J. (2019). Individual differences influence exercise behavior: how personality, motivation, and behavioral regulation vary among exercise mode preferences. Heliyon, 5(4), e01459. https://doi.org/10.1016/j.heliyon.2019.e01459
6. Claudino, J. G., Gabbett, T. J., Bourgeois, F., Souza, H. d. S., Miranda, R. C., Mezêncio, B., Soncin, R., Cardoso Filho, C. A., Bottaro, M., Hernandez, A. J., Amadio, A. C., & Serrão, J. C. (2018). CrossFit Overview: Systematic Review and Meta-analysis. Sports Medicine - Open, 4(1), 11. https://doi.org/10.1186/s40798-018-0124-5
7. Costa, P. T., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: robust and surprising findings. J Pers Soc Psychol, 81(2), 322-331. https://doi.org/10.1037/0022-3514.81.2.322
8. Darden, E. (1972). Sixteen Personality Factor Profiles of Competitive Bodybuilders and Weightlifters. Research Quarterly. American Association for Health, Physical Education and Recreation, 43(2), 142-147. https://doi.org/10.1080/10671188.1972.10615125
9. DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. J Pers Soc Psychol, 93(5), 880-896. https://doi.org/10.1037/0022-3514.93.5.880
10. Emini, N. N., & Bond, M. J. (2014). Motivational and psychological correlates of bodybuilding dependence. Journal of behavioral addictions, 3(3), 182-188.
11. Fabris, M. A., Longobardi, C., Prino, L. E., & Settanni, M. (2018). Attachment style and risk of muscle dysmorphia

in a sample of male bodybuilders. Psychology of Men & Masculinity, 19(2), 273.
12. Fink, A., & Woschnjak, S. (2011). Creativity and personality in professional dancers. Personality and Individual Differences, 51(6), 754–758. https://doi.org/10.1016/j.paid.2011.06.024
13. Fong, M., Zhao, K., & Smillie, L. D. (2021). Personality and competitiveness: Extraversion, agreeableness, and their aspects predict self-reported competitiveness and competitive bidding in experimental auctions. Personality and Individual Differences, 169, 109907. https://doi.org/10.1016/j.paid.2020.109907
14. Garhammer, J. (1993). A review of power output studies of Olympic and powerlifting: Methodology, performance prediction, and evaluation tests. Journal of Strength and Conditioning Research, 7(2), 76–89.
15. Gillen, Z. (2024). Percentile rankings and normalization of performance for International Weightlifting Federation World Championships competitors. International Journal of Strength and Conditioning, 4(1). https://doi.org/10.47206/ijsc.v4i1.252
16. Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. Psychological assessment, 4(1), 26.
17. Gordon, B. R., McDowell, C. P., Hallgren, M., Meyer, J. D., Lyons, M., & Herring, M. P. (2018). Association of efficacy of resistance exercise training with depressive symptoms: meta-analysis and meta-regression analysis of randomized clinical trials. JAMA Psychiatry, 75(6), 566-576.
18. Gordon, B. R., McDowell, C. P., Lyons, M., & Herring, M. P. (2017). The effects of resistance exercise training on anxiety: a meta-analysis and meta-regression analysis of randomized controlled trials. Sports Medicine, 47(12), 2521-2532.
19. Hackett, D. A., Wilson, G. C., Mitchell, L., Haghighi, M. M., Clarke, J. L., Mavros, Y., O'Connor, H., Hagstrom, A. D., Slater, G. J., Keogh, J., & McLellan, C. (2020). Effect of Training Phase on Physical and Physiological Parameters of Male Powerlifters. Sports (Basel), 8(8). https://doi.org/10.3390/sports8080106
20. Haddadi, P., & Besharat, M. A. (2010). Resilience, vulnerability and mental health. Procedia-Social and Behavioral Sciences, 5, 639-642.
21. Helms, E. R., Prnjak, K., & Linardon, J. (2019). Towards a Sustainable Nutrition Paradigm in Physique Sport: A Narrative Review. Sports, 7(7), 172. https://www.mdpi.com/2075-4663/7/7/172
22. IFBB. (2021). IFBB Rules of Bodybuilding and Fitness. Retrieved 24/2/2023 from https://ifbb.com/wp-content/uploads/2023/01/01-IFBB-General-Rules-2021-edition-F-1.pdf
23. Ilyasi, G., & Salehian, M. H. (2011). Comparison of personality traits between individual and team athletes. Middle-East Journal of Scientific Research, 9(4), 527-530.
24. Johnson, J. A. (2014). Measuring thirty facets of the Five Factor Model with a 120-item public domain inventory: Development of the IPIP-NEO-120. Journal of Research in Personality, 51, 78-89.
25. Kajonius, P. J., & Johnson, J. A. (2019). Assessing the structure of the Five Factor Model of Personality (IPIP-NEO-120) in the public domain. Europe's Journal of Psychology, 15(2), 260.
26. Kandola, A., Ashdown-Franks, G., Stubbs, B., Osborn, D. P. J., & Hayes, J. F. (2019). The association between cardiorespiratory fitness and the incidence of common mental health disorders: A systematic review and meta-analysis. Journal of Affective Disorders, 257, 748-757. https://doi.org/https://doi.org/10.1016/j.jad.2019.07.088
27. Keogh, J. W. L., & Winwood, P. W. (2017). The epidemiology of injuries across the weight-training sports. Sports Medicine, 47(3), 479–501. https://doi.org/10.1007/s40279-016-0575-0
28. Kraemer, W. J., Ratamess, N. A., Flanagan, S. D., Shurley, J. P., Todd, J. S., & Todd, T. C. (2017). Understanding the Science of Resistance Training: An Evolutionary Perspective. Sports Med, 47(12), 2415-2435. https://doi.org/10.1007/s40279-017-0779-y
29. Laborde, S., Allen, M. S., Katschak, K., Mattonet, K., & Lachner, N. (2020). Trait personality in sport and exercise psychology: A mapping review and research agenda. International Journal of Sport and Exercise Psychology, 18(6), 701–716. https://doi.org/10.1080/1612197X.2019.1570536
30. Leighton, K., Kardong-Edgren, S., Schneidereith, T., & Foisy-Doll, C. (2021). Using social media and snowball sampling as an alternative recruitment strategy for research. Clinical Simulation in Nursing, 55, 37–42. https://doi.org/10.1016/j.ecns.2021.03.006
31. Li, J., Davies, T. B., & Hackett, D. A. (2023). Self-Reported Training and Supplementation Practices Between Performance-Enhancing Drug-User Bodybuilders Compared with Natural Bodybuilders. J Strength Cond Res, 37(5), 1079-1088. https://doi.org/10.1519/jsc.0000000000004356
32. Mangine, G. T., Nuzzo, J. L., Mikat, R. P., et al. (2023). Normative scores for CrossFit® Open workouts: 2011–2022. Sports, 11(2), 24. https://doi.org/10.3390/sports11020024
33. Martinho, D. V., Rebelo, A., Gouveia, É. R., Marques, M. C., & Figueiredo, P. (2024). The physical demands and physiological responses to CrossFit®: A scoping review with evidence gap map and meta-correlation. BMC Sports Science, Medicine and Rehabilitation, 16, 196. https://doi.org/10.1186/s13102-024-00986-3
34. McCrae, R. R., & Costa Jr, P. T. (2004). A contemplated revision of the NEO Five-Factor Inventory. Personality and individual differences, 36(3), 587-596.
35. McCrae, R. R., & Costa, P. T., Jr. (1987). Validation of the five-factor model of personality across instruments and observers. Journal of personality and social psychology, 52(1), 81-90. https://doi.org/10.1037//0022-3514.52.1.81
36. McCrae, R. R., Kurtz, J. E., Yamagata, S., & Terracciano, A. (2010). Internal Consistency, Retest Reliability, and Their Implications for Personality Scale Validity. Personality and Social Psychology Review, 15(1), 28-50. https://doi.org/10.1177/1088868310366253
37. Nielsen, M.D., Kajonius, P. Beyond the Big Five factors: using facets and nuances for enhanced prediction in life outcomes. Curr Psychol 43, 18621–18630 (2024). https://doi.org/10.1007/s12144-024-05662-w
38. Paunonen, S. V., & Ashton, M. C. (2001). Big five factors and facets and the prediction of behavior. J Pers Soc Psychol, 81(3), 524-539.
39. Piepiora, P. (2021). Personality profile of individual sports champions. Brain and Behavior, 11(6), e02145.
40. Piepiora, P., Maśliński, J., Gumienna, R., & Cynarski, W. (2020). Sport technique as a determinant of athletes' personality. Quality in Sport, 6(1), 33-43.
41. Piepiora, P., Migasiewicz, J., & Napieraj, D. (2019). Personality profile of athletes practising endurance disciplines. Journal of Education, Health and Sport, 9(4), 394-402.
42. Rhodes, R. E., & Smith, N. E. (2006). Personality correlates

of physical activity: a review and meta-analysis. Br J Sports Med, 40(12), 958-965. https://doi.org/10.1136/bjsm.2006.028860
43. Robinson, S. L., Lambeth-Mansell, A., Gillibrand, G., Smith-Ryan, A., & Bannock, L. (2015). A nutrition and conditioning intervention for natural bodybuilding contest preparation: case study. Journal of the International Society of Sports Nutrition, 12(1), 20. https://doi.org/10.1186/s12970-015-0083-x
44. Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68
45. Schmitt, D. P., Allik, J., McCrae, R. R., & Benet-Martínez, V. (2007). The Geographic Distribution of Big Five Personality Traits: Patterns and Profiles of Human Self-Description Across 56 Nations. Journal of Cross-Cultural Psychology, 38(2), 173-212. https://doi.org/10.1177/0022022106297299
46. Steele, I. H., Pope, H. G. J., & Kanayama, G. (2019). Competitive Bodybuilding: Fitness, Pathology, or Both? Harvard Review of Psychiatry, 27(4), 233-240. https://doi.org/10.1097/hrp.0000000000000211
47. Steele, J., Keogh, J., & Loenneke, J. P. (2022). Editorial: Understanding & Improving Performance in Strength Sports [Editorial]. Frontiers in Sports and Active Living, 4. https://doi.org/10.3389/fspor.2022.807941
48. Storey, A., & Smith, H. K. (2012). Unique Aspects of Competitive Weightlifting. Sports Medicine, 42(9), 769-790. https://doi.org/10.1007/BF03262294
49. van den Hoek, D. J., Beaumont, P. L., van den Hoek, A. K., Owen, P. J., Garrett, J. M., Buhmann, R., & Latella, C. (2024). Normative data for the squat, bench press and deadlift exercises in powerlifting: Data from 809,986 competition entries. Journal of Science and Medicine in Sport, 27(10), 734–742. https://doi.org/10.1016/j.jsams.2024.07.005
50. van den Hoek, D. J., Mallard, A., Garrett, J. M., Beaumont, P. L., Howells, R. J., Spathis, J. G., Pearson, J., & Latella, C. (2024). Powerlifting participation and engagement across all ages: A retrospective, longitudinal, population analysis with comparison to community strength norms. International Journal of Sports Science & Coaching, 19(5), 2199–2209. https://doi.org/10.1177/17479541241244481
51. Weisberg, Y., DeYoung, C., & Hirsh, J. (2011). Gender Differences in Personality across the Ten Aspects of the Big Five [Original Research]. Frontiers in Psychology, 2. https://doi.org/10.3389/fpsyg.2011.00178
52. Wilson, K. E., & Dishman, R. K. (2015). Personality and physical activity: A systematic review and meta-analysis. Personality and individual differences, 72, 230-242. https://doi.org/https://doi.org/10.1016/j.paid.2014.08.023
53. Winwood, P. W., Hume, P. A., Cronin, J. B., & Keogh, J. W. L. (2014). Retrospective injury epidemiology of strongman athletes. Journal of Strength and Conditioning Research, 28(1), 28–42. https://doi.org/10.1519/JSC.0b013e3182986c0c
54. Winwood, P. W., Keogh, J. W., & Harris, N. K. (2011). The strength and conditioning practices of strongman competitors. Journal of strength and conditioning research, 25(11), 3118–3128. https://doi.org/10.1519/JSC.0b013e318212daea
55. Winwood, P. W., Keogh, J. W. L., Harris, N. K., & Weaver, L. M. (2012). Interrelationships between strength, anthropometrics, and strongman performance in novice strongman athletes. Journal of Strength and Conditioning Research, 26(2), 513–522.
56. Witkowski, K., & Piepiora, P. (2018). Personality traits of competitive athletes according to type of pressure exerted on opponents. South African Journal for Research in Sport, Physical Education and Recreation, 40(1), 97-109.

APPENDIX

Table A1. Personality Dimensions and Facets

Openness		
	Imagination	Enjoys exploring ideas and envisioning possibilities.
	Intellect	Enjoys intellectual discussions and abstract thinking.
	Artistic Interest	Appreciates art, music, and creativity.
	Adventurousness	Willing to try new activities and embrace novel experiences.
	Emotionality	Experiences emotions deeply and is in touch with feelings.
	Liberalism	Open to rethinking traditional values and authority.
Conscientiousness		
	Self-efficacy	Confident in one's ability to achieve goals.
	Orderliness	Values organisation, structure, and tidiness.
	Dutifulness	Strong sense of moral obligation and responsibility.
	Achievement-striving	Driven to achieve excellence and meet high standards.
	Self-discipline	Capable of persisting through challenges to reach goals.
	Cautiousness	Thinks carefully before making decisions.
Extraversion		
	Friendliness	Comfortable and open in social situations.
	Assertiveness	Takes charge and speaks up confidently.
	Gregariousness	Seeks out company and enjoys being with others.
	Activity level	Prefers to stay busy and energetic.
	Excitement-seeking	Thrives on stimulation and excitement.
	Cheerfulness	Generally upbeat and positive.
Agreeableness		
	Trust	Believes others are generally well-intentioned.
	Morality	Honest and sincere in interactions.
	Altruism	Enjoys helping others and showing kindness.
	Cooperation	Prefers compromise and avoids conflict.
	Modesty	Humble and unassuming in behaviour.
	Sympathy	Sensitive to others' needs and emotions.
Neuroticism		
	Anxiety	Prone to worry and stress.
	Anger	Easily frustrated or irritated.
	Depression	Tends to feel sadness or hopelessness.
	Self-consciousness	Feels awkward or embarrassed easily.
	Immoderation	Struggles to resist urges or cravings.
	Vulnerability	Feels overwhelmed under pressure.

Derived from (Johnson, 2014)

Table A2. Raw Descriptive Statistics by Sex for Personality Dimensions

Dimension	Male M (SD)	Female M (SD)	n (Male)	n (Female)
Openness	81.75 (11.07)	79.57 (11.61)	138	49
Conscientiousness	82.64 (11.16)	86.53 (12.41)	138	49
Extraversion	77.94 (12.12)	75.86 (14.87)	138	49
Agreeableness	85.82 (13.10)	92.69 (12.16)	138	49
Neuroticism	67.96 (13.76)	70.92 (14.30)	138	49

Note. Values are presented as M (SD). M = mean; SD = standard deviation.

Table A3. Raw Descriptive Statistics by Sex for Openness Facets

Facet	Male M (SD)	Female M (SD)	n (Male)	n (Female)
Imagination	13.38 (2.39)	12.80 (2.57)	138	49
Intellect	15.99 (2.64)	14.25 (2.87)	138	49
Artistic Interest	13.64 (3.54)	12.84 (3.83)	138	49
Adventurousness	10.93 (3.31)	10.47 (3.42)	138	49
Emotionality	13.92 (3.23)	15.78 (3.03)	138	49
Liberalism	13.91 (3.42)	13.45 (3.07)	138	49

Note. Values are presented as M (SD). M = mean; SD = standard deviation.

Table A4. Raw Descriptive Statistics by Sex for Conscientiousness Facets

Facet	Male M (SD)	Female M (SD)	n (Male)	n (Female)
Self-efficacy	16.24 (2.11)	16.63 (2.55)	138	49
Orderliness	12.43 (4.29)	13.61 (4.78)	138	49
Dutifulness	16.33 (2.37)	17.61 (2.22)	138	49
Achievement-striving	15.03 (2.13)	16.29 (2.09)	138	49
Self-discipline	12.73 (2.13)	13.35 (2.23)	138	49
Cautiousness	10.11 (3.31)	9.82 (3.33)	138	49

Note. Values are presented as M (SD). M = mean; SD = standard deviation.

Table A5. Raw Descriptive Statistics by Sex for Extraversion Facets

Facet	Male M (SD)	Female M (SD)	n (Male)	n (Female)
Friendliness	12.92 (3.46)	12.59 (3.87)	138	49
Assertiveness	14.80 (3.10)	14.49 (3.59)	138	49
Gregariousness	9.60 (3.76)	9.20 (3.66)	138	49
Activity Level	13.42 (3.38)	14.59 (3.46)	138	49
Excitement-seeking	14.33 (2.52)	12.57 (3.03)	138	49
Cheerfulness	13.23 (2.65)	13.41 (2.76)	138	49

Note. Values are presented as M (SD). M = mean; SD = standard deviation.

Table A6. Raw Descriptive Statistics by Sex for Agreeableness Facets

Facet	Male M (SD)	Female M (SD)	n (Male)	n (Female)
Trust	13.27 (3.61)	13.45 (3.82)	138	49
Morality	16.30 (3.03)	17.33 (2.69)	138	49
Altruism	16.11 (2.61)	17.14 (2.25)	138	49
Cooperation	15.17 (3.35)	17.51 (3.15)	138	49
Modesty	11.10 (3.27)	12.12 (3.13)	138	49
Sympathy	14.79 (3.02)	15.25 (3.25)	138	49

Note. Values are presented as M (SD). M = mean; SD = standard deviation.

Table A7. Raw Descriptive Statistics by Sex for Neuroticism Facets

Facet	Male M (SD)	Female M (SD)	n (Male)	n (Female)
Anxiety	11.57 (3.83)	13.51 (3.86)	138	49
Anger	11.05 (4.07)	11.37 (3.74)	138	49
Depression	10.33 (3.85)	9.67 (4.36)	138	49
Self-consciousness	12.92 (3.34)	13.78 (3.72)	138	49
Immoderation	10.73 (3.40)	10.69 (3.27)	138	49
Vulnerability	11.36 (2.76)	12.67 (2.39)	138	49

Note. Values are presented as M (SD). M = mean; SD = standard deviation.