

Personality and Mental Toughness of the Marathon Maniac

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Abstract

Extreme and fringe-type sports have been known to attract distinct personality types compared to traditional sports (references needed). In the present study, we examine one such specialized group of runners called the Marathon Maniacs, who focus on frequency of marathons rather than speed or “winning”. The personality traits and mental toughness of Marathon Maniacs were assessed in an effort to understand the factors that contribute to their interest and participation in such an extreme lifestyle. A total of forty-two participants (Age $M = 47.95$, $SD = 9.68$; 20 males (47.6%), 22 females (52.4%)) filled out two measures of personality, the NEO Five-Factor Inventory 3 (NEO-FFI-3) and the Myers-Briggs Type Indicator (MBTI Form M), and one measure of mental toughness, the Inventory of Mental Toughness Factors in Sport (IMTF-S). Finally, participants were asked two qualitative questions (“How did you first get into running?” and “Why do you run now?”) to provide a deeper understanding of participants’ motivational source. Results showed that Marathon Maniac members were low in neuroticism, high in openness and conscientiousness, displayed significantly different proportions of MBTI type including a highly overrepresented type INTJ, and lower in mental toughness than the norm sample. The interpretation of these results is discussed along with participants’ responses to their motivational source for continued participation in this extreme lifestyle.

Keywords

Personality, Running, Endurance Athlete

1. Introduction

Recreational running has become a significant part of many people’s lives, so much so that 2016 presented a peak in global running participation at 9.1 million runners (Andersen, 2019). Of these, 1.1 million runners participated in ma-

rathons globally in 2018, making up only about 12% of all runners (Galic, 2021). Training and completing a marathon is a difficult task that requires commitment, perseverance, and the willingness to push one's body through fatigue and discomfort for multiple hours. Thus, it is no surprise that only a small percentage of runners run marathons. Even rarer are the recreational runners who make a lifestyle out of running marathons. The current study focuses on a specialized group of runners called the Marathon Maniacs who fit this profile, in an aim to understand the personality and qualities necessary for individuals to commit to and maintain such a lifestyle.

The Marathon Maniacs is a recreational running group honors the frequency and close proximity of marathons, and places little to no priority on speed. In order to become a member, runners must complete two full marathons in 16 days or three full marathons in ninety days. There are multiple levels, with higher frequency and closer proximity of marathons leading to higher levels (i.e. 6 marathons in 6 months leads to silver level, 4 marathons in thirty-seven days leads to gold level). To run this much may come at a high cost to the runner's personal life and physical health. Training for marathons is very time and energy intensive and physically draining. In addition, these runners are at risk for injury as they put their bodies under extreme physical stress (Hreljac, 2004; Messier et al., 2018). There is also the financial cost incurred by the runner to register for and travel to marathons.

Given the many costs of participating in this lifestyle, it does not appear that these runners are externally motivated by financial gains or a balanced lifestyle. Because of this unique willingness and devotion to be a Marathon Maniac, it is worth trying to understand what personality traits drive such devotion, and what qualities allow the runner to stay devoted to this behavior. Some motivational factors underlying marathon participation have been cited as health, weight-loss, competition, mood enhancement and management, personal achievement, social status, and drive to achieve personal goals (eg. Gill et al., 1996; Ogles et al., 1995; Thornton & Scott, 1995; Roebuck et al., 2020). However, Marathon Maniacs may be classified as a more unique, extreme group compared to traditional marathoners and thus a more specific understanding of this group is necessary.

The only existing study on Marathon Maniacs examined their motivation from a sociological perspective (Cohen & Hanold, 2015). Researchers conducted semi-structured interviews with 30 Marathon Maniac members (16 men, 14 women) at two marathon race expos that have a high attendance from this group (Marathon Maniac Reunion Race held at the Louisiana Marathon in 2014 and the Tacoma City Marathon, held near the Marathon Maniac headquarters). Interestingly, they found Marathon Maniacs were motivated by social capital gained within the Marathon Maniac community, as well cultural capital gained from the general population, including the general marathon community. Frequency of marathon participation, and the proximity of these to each other, is what defines the rank of the Marathon Maniac. The stats and rank of all members are published on the Marathon Maniac website and thus are highly visible

and a topic of conversation between members. Frequent participation in marathons, and the close proximity of those marathons, sets the Marathon Maniac apart from the typical marathon runner. As marathon runners are already considered an extreme group, this gives the Marathon Maniac a cultural status as an extreme “fringe” group with potentially variant personality tendencies from traditional marathoners.

In order to discuss correlation between personality type and sport, one is faced with the chicken or the egg dilemma. Are the athletes drawn to the sport because of their personality traits, or do they develop these traits as a result of participating in the sport? Historically, three classic theories were proposed, gravitational (athletes are drawn to specific sports because of their particular personality), developmental (athletes’ personalities change in reaction to the specific sport they participate in), and attrition theory (athletes stay in or quit their sport depending on if their personal characteristics lead to them succeeding in that sport) (Cox, 2007; Wann, 1997). Studies have found little evidence of personality change from onset of sport participation to later time periods, thereby supporting the gravitational theory (Eagleton, McKeivlie, & deMan, 2007; McKelvie, Lemieux, & Stout, 2003; Allen et al., 2013). However, whether athletes are drawn to or succeed in a specific sport due to their personality or the sport they engage in alters their personality is still of debate. Given the extreme nature of the Marathon Maniac lifestyle, we expect that distinct personality traits are strongly correlated with Marathon Maniac participation, as certain individuals would be drawn to such an extreme lifestyle.

Traditional marathoners have been found to be less depressed, more self-sufficient, and more imaginative than the general population, as well as have higher levels of hardy personality (i.e. a group of traits related to perception of control, commitment, and challenges) (Hartung & Farge, 1977; Morgan & Costil, 1996; Nikolaidis et al., 2018). However, the personality of other extreme or alternative sport athletes may provide more insight into what we may predict attracts individuals to the extreme nature of the Marathon Maniac lifestyle. For example, when examining ultramarathoners and triathletes, these extreme athletes were found to have lower levels of anxiety and higher self-confidence (Nikolaidis et al., 2018). Further, Rhea & Martin (2010) found that alternative sport athletes tend to be more reserved, self-sufficient, and sensation seeking than traditional athletes. Similarly, Reuter & Holder (2013) noted that extreme athletes tend to have higher introversion, perceiving, and sensation seeking scores on the Myers-Briggs Type Indicator compared to traditional athletes, potentially making them more adept to being flexible, being spontaneous, and adapting to situations. Extreme athletes were also found to score higher on Zuckerman’s Sensation Seeking Scale, which examines four constructs pertaining to one’s need for varied, novel and complex sensations and resulting willingness to take physical and social risks for the sake of such experience (Reuter & Holder, 2013). Perhaps the personality of Marathon Maniacs may be unique from other runners due to the extreme frequency of marathons they complete and potential risks they take to

accomplish this regularity.

Individuals may be attracted to the Marathon Maniac community due to certain personality traits. However, the ability to remain a devoted member to such a taxing and potentially risky lifestyle may be more dependent on other qualities. A runner's level of mental toughness may be indicative of this ability (Gucciardi et al., 2016). Mental toughness has been defined as the psychological capacity to deliver high performance on a regular basis despite varying degrees of situational demands (Gucciardi et al., 2015). Running distance requires the endurance runner to be alone for long periods of time, engaging in a rather simple and repetitive task (albeit quite taxing) with few distractions to keep their mind off of their fatigue. Gucciardi et al. (2016) conducted a study on Australian footballers in which a positive correlation between mental toughness and perseverance was displayed. Similarly, Jaeschke et al. (2016) discussed mental toughness with ultramarathoners and found themes of perseverance, overcoming adversity, perspective, life experience, psychological skills use, and camaraderie in the community.

In the present study, we aim to understand what personality traits are associated with the participation of the Marathon Maniac community, as well as whether mental toughness plays a role in the continued behavior. In accordance with previous literature on personality types of extreme sport athletes, we hypothesize that 1) Marathon Maniacs will display higher scores of introversion, perceiving, and sensing on the Myers-Briggs Type Indicator (Reuter & Holder, 2013; Myers & McCaulley, 1985). We also predict that 2) we will see significantly different trends on the NEO Five-Factor Inventory 3 in Marathon Maniacs compared to norm populations, specifically we predict that Marathon Maniacs will display significantly lower scores of extroversion and neuroticism and high levels of conscientiousness and openness compared to the norm (NEO-FFI-3; McCrae & Costa, 2005). Finally, we hypothesize 3) that Marathon Maniacs will display higher levels of mental toughness on the Mental Toughness Factors in Sport (IMTF-S) scale compared to the norm sample (Stonkus, 2011).

2. Methods

2.1. Participants

Forty-four participants began the surveys, but four either failed to complete all questions from at least one measure ($n = 2$). The remaining forty-two Marathon Maniac members were between the age of 30 and 71 ($M = 47.95$, $SD = 9.68$), and had been a Maniac for an average of 8.73 years ($SD = 3.59$). There was an almost even split of males and females (20 males (47.6%), 22 females (52.4%)) with 52% holding a Master's degree, 38% holding a Bachelor's degree, 7% with a high school degree, and 2% holding a Ph.D. (3 HS, 17 BA, 22 Masters, 1 PhD). All of the participants were Caucasian except for 2 who were of Asian/Islander descent.

2.2. Materials

2.2.1. NEO Five-Factor Inventory 3 (NEO-FFI-3)

The NEO Five-Factor Inventory (NEO-FFI-3; [McCrae & Costa, 2005](#)) is a 60-item instrument personality measure that assesses five factors—openness, conscientiousness, extroversion, agreeableness, and neuroticism. It consists of a 5-point Likert scale ranging from “Strongly Agree” to “Strongly Disagree.” Example questions include, “I am not a worrier” and “I try to perform all the tasks assigned to me conscientiously.” It has internal consistency of 0.88 and construct validity all exceeding the factor for replicability ([Haven & ten Berge, 1977](#)).

2.2.2. Myers-Briggs Type Indicator (MBTI)

The Myers-Briggs Type Indicator (MBTI; [Myers & McCaulley, 1985](#)) is a measure historically used for employee selection and tailoring and has been used in a vast amount of psychological research. Because of this prevalence in previous research, the MBTI was selected for this study as a foundational comparison for the more recently developed NEO-FFI-3, as well as to compare the current sample to a well-established normative population. The questionnaire consists of 93-items which are forced response. Each question provides participants with two choices, and the participant is asked to respond with whichever sentence best describes them (e.g. At a party I like to: 1) tell jokes to others, or 2) listen to others). The MBTI questionnaire has reliability scores that fall between 0.61 and 0.87.

2.2.3. Inventory of Mental Toughness Factors in Sport (IMTF-S)

The Inventory of Mental Toughness Factors in Sport (IMTF-S; [Stonkus, 2011](#)) was used to measure mental toughness. Developed by [Stonkus \(2011\)](#), the IMTF-S is comprised of themes relating to the theoretical sources of Coping, Hardiness, Optimism, Mindset, Resilience, and Self-Efficacy, which are used to best operationally define and measure mental toughness. The IMTF-S ([Stonkus, 2011](#)) is a 50-item instrument which uses a 5-point Likert scale with points ranging from Never to Always. Example items from this measure include, “Setbacks and failure allow me to learn” and “If I feel like I can’t win, I tend to not try as hard.” The IMTF-S has a full instrument reliability of >0.92 and initial evidence of construct validity from several indicators, but without confirmation of external validity ([Stonkus & Royal, 2015](#)).

2.2.4. Qualitative Questions

Two qualitative questions were included asking the questions, “How did you first get into running?” and “Why do you run now?”. These questions probed respondent’s personal opinions as to their incentive to join and continue with the lifestyle of a Marathon Maniac. Responses were reviewed and categorized according to themes pulled inductively. Two reviewers separately completed this process and then compared themes to come to a consensus on what was observed. Then, the frequency of comments relating to each theme for why participants started to run vs why participants continue to run were compared. Inclu-

sion of this qualitative data was prioritized in order to provide a more comprehensive understanding for the underlying factors of participation.

2.3. Procedures

All procedures were reviewed and approved by the Institutional Review Board at California Baptist University before any data collection began. Participants were recruited through an ad placed in the Marathon Maniac Newsletter, a newsletter that is published monthly and sent to all Marathon Maniacs worldwide via email. The ad provided the researcher's contact information for those interested and promised a profile of their results for participating. Those that responded to the ad were sent an email containing instructions on how to access the surveys and two links, one to a survey created in SurveyMonkey that contained some general demographic questions, two questions on their reasons for running (in the beginning and currently), the NEO Five-Factor Inventory 3 (NEO-FFI-3; McCrae & Costa, 2007, 2005) and the Inventory of Mental Toughness Factors in Sport (IMTF-S; Stonkus, 2011). The second link was to an online version of the Myers-Briggs Type Indicator (MBTI Form M; Myers & McCaulley, 1985) administered through the Skills One online assessment system. The survey took approximately 30 minutes to complete.

Marathon Maniac membership was verified for all participants by searching up their profile on the Marathon Maniac website using their name. Data for all three surveys was downloaded and summarized. A profile summary report was created and emailed to each of the participants, along with the researcher's contact information and offer to answer any questions the participant may have.

2.4. Analysis

IBM-SPSS and Microsoft Excel were used to analyze the data. The scores of the Marathon Maniac members were compared to the normative data reported for each of the assessments used. The normative sample used for the NEO-FFI-3 consisted of 417 participants composed of 182 males (44%) and 235 females (56%) all over the age of 31 (McCrae & Costa, 2007). The norm sample used for the MBTI was their National Representative Sample (Myers & McCaulley, 1998). This normative sample consisted of 3009 participants composed of 1474 males (49%) and 1535 females (51%) with an average age of 46 ($SD = 17$) and composed primarily of Caucasians (83.3% Caucasian, 13.7% African-American, 3% other). The normative sample used for the IMTF-S consisted of 329 sport participants composed of 170 males (51.7%) and 159 females (48.3%) with an average age of 17.49 ($SD = 3.17$; Stonkus, 2011).

For the IMTF-S and the NEO-FFI-3, Welch's unequal variance t-test was conducted as well as effect size and CIs given to buttress the outcomes. We had a sample size greater than 30 so we were able to assume normality of the sampling distribution (Field, 2013). For the MBTI, a Pearson's chi-square test was conducted to compare our sample to general sample norms. The reasons given by participants for starting to run and for continuing to run were sorted into

themes by two reviewers (authors K. Mauldin and K. Hart) and compared. Additional exploratory analyses were conducted to check for differences in gender and age.

3. Results

3.1. MBTI

Of the 42 total participants, three did not complete all of the questions and, thus, were eliminated from the analysis. For the remaining 39 participants, the proportion of each personality type was compared to the national norm (Myers & McCaulley, 1998; **Figure 1**) using a likelihood ratio test and found to have significantly different proportions of type than the national norm ($X^2(15) = 28.87, p = 0.017$). Notably, Marathon Maniac members were 7.52 times more likely to be classified as INTJ types, 3.10 times more likely to be classified as INFJ types, 2.47 times more likely to be classified as INFP types, 1.88 times more likely to be represented as ENFJ types, and 1.81 times more likely to be classified as ENTJ types than would be expected in the general population (See **Figure 1**). Overrepresentation was also examined for trait pairings and found a strong overrepresentation of IN, NT, and TJ as these were 2.72, 1.94 and 1.76 times more frequent than what is represented in the normal population (Myers & McCaulley, 1998), respectively (See **Figure 2**).

3.2. NEO-FFI-3

Of the 42 total participants, three did not complete all of the questions for the NEO-FFI-3 and, thus, were eliminated from the analysis. The remaining 39 participants' scores on the NEO-FFI-3 were compared to the published normative sample (McCrae & Costa, 2007) using Welch's unequal variance's t-test (**Figure 3**). Effect size was calculated using Hedges' g , including Neuroticism ($M = 13.26$,

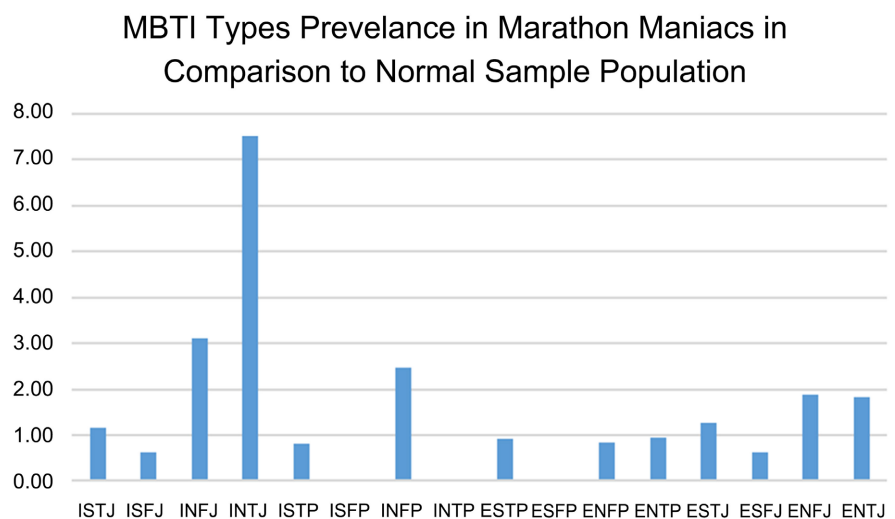


Figure 1. Proportion of each MBTI personality type for maniacs in comparison to the normative sample.

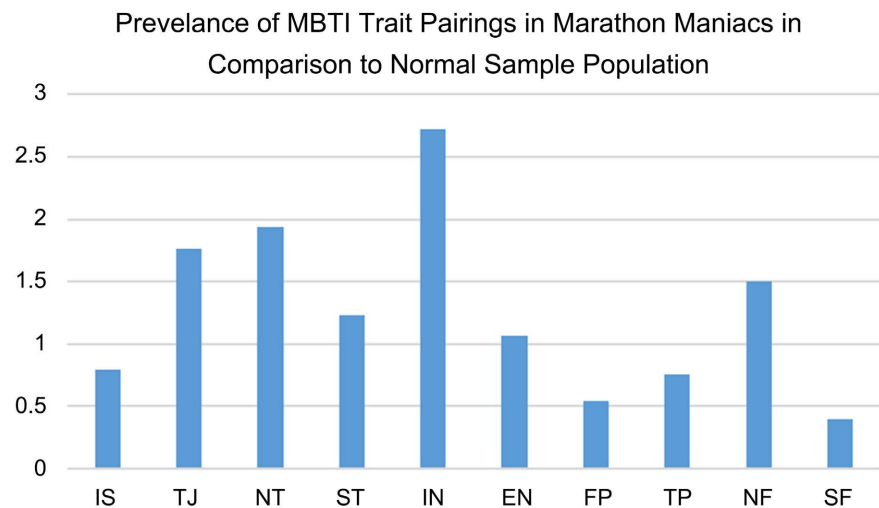


Figure 2. Prevalence of MBTI trait pairings in marathon maniacs in comparison to normal sample population.

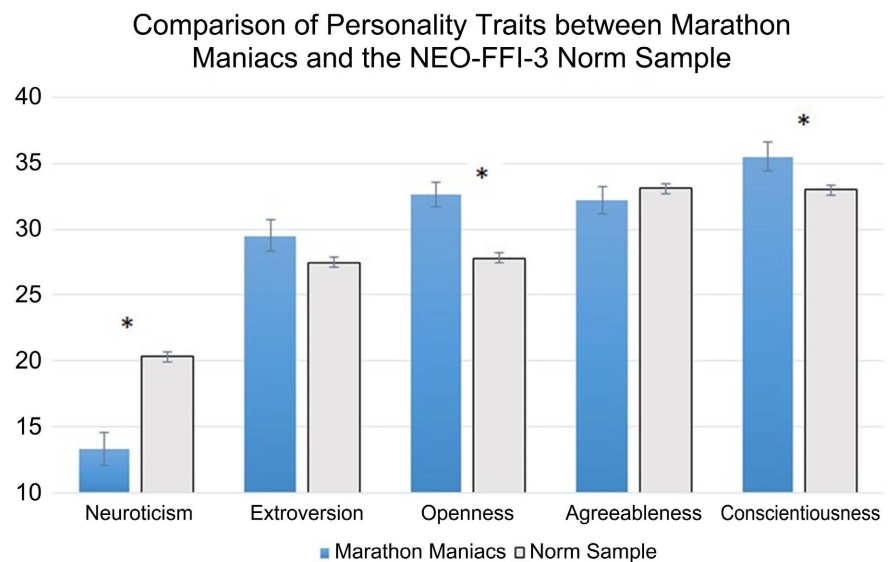


Figure 3. Comparison of personality traits between marathon maniacs and the NEO-FFI-3 norm sample.

$SD = 7.79$; $M = 20.3$, $SD = 7.6$), $t(45) = -5.41$, $p < 0.001$, $M_d = -7.04$, $SD_d = 1.3$, 95% CI $(-9.66, -4.42)$, $g = 0.92$); Openness ($M = 32.64$, $SD = 5.93$; $M = 27.8$, $SD = 6$), $t(45) = 4.87$, $p < 0.001$, $M_d = 4.84$, $SD_d = 0.99$, 95% CI $(2.84, 6.84)$, $g = 0.81$); Conscientiousness ($M = 35.49$, $SD = 6.83$; $M = 33$, $SD = 6$), $t(43) = 2.20$, $p = 0.033$, $M_d = 2.49$, $SD_d = 1.13$, 95% CI $(0.206, 4.77)$, $g = 0.41$); Extroversion ($M = 29.51$, $SD = 7.42$; $M = 27.5$, $SD = 6.3$), $t(43) = 1.64$, $p = 0.109$, $M_d = 2.01$, $SD_d = 1.22$, 95% CI $(-0.466, 4.486)$, $g = 0.31$); and Agreeableness ($M = 32.21$, $SD = 6.55$; $M = 33.1$, $SD = 5.5$), $t(43) = -0.822$, $p = 0.416$, $M_d = -0.89$, $SD_d = 1.08$, 95% CI $(-3.07, 1.29)$, $g = 0.16$).

Marathon Maniac members' scores in comparison to those of the normative sample were found to be low in neuroticism, high in openness, and high in con-

scientiousness (See **Figure 3**). There were no significant differences between Marathon Maniac members and the normative sample on extroversion and agreeableness (See **Figure 3**).

3.3. IMTF-S

Of the 42 total participants, two did not complete all of the questions on this measure and, thus, were eliminated from the analysis. The remaining 40 participant results were summarized and compared to the published norms (Stonkus & Royal, 2015) using Welch's unequal variance's t-test and Hedges' g to calculate the effect size. Marathon Maniac members had significantly lower scores on the IMTF-S ($M = 176.38$, $SD = 15.70$) in comparison to the norm sample ($M = 185$, $SD = 16$), $t(49) = -3.27$, $p = 0.002$, $M_d = -8.62$, $SD_d = 2.63$, 95% CI $(-13.91, -3.33)$, $g = 0.54$.

Scores for each of the four factors was averaged and found to be quite similar to each other: Identification ($M = 43.28$, $SD = 5.86$), Negation ($M = 44.28$, $SD = 6.06$), Determination ($M = 42.85$, $SD = 5.53$), and Motivation ($M = 45.98$, $SD = 5.26$). An exploratory analysis was conducted to see if age or gender influenced the IMTF-S score, but no significance was found ($p > 0.05$).

3.4. Qualitative Analysis

All 42 participants responded to the questions: "How did you first get into running?" and "Why do you run now?" These responses were compiled and categorized into themes derived from the answers by two of the authors (Hart and Mauldin). Themes for the question "How did you first get into running?" were organization/club requirement, to improve physical health, to improve mental health, self-challenge, and to impress someone else. The frequency of responses given in each category was compared to see if these changed from why they started to run to reasons for why they continue to run. The categorical themes that applied to both questions, and the frequencies of responses given to each, are: organization/club requirement (*start*: 18, *current*: 0), to improve physical health (*start*: 15, *current*: 17), to improve mental health (*start*: 2, *current*: 9), impress someone else (*start*: 2, *current*: 0) social relationships (*start*: 4, *current*: 5), and self-challenge (*start*: 2, *current*: 10). Additional themes were added for the question "why do you run now?" These were: the love of travel (3), enjoyment (18), and to get outdoors (5).

4. Discussion

The current study examined the personality traits and mental toughness of Marathon Maniacs in an effort to understand what factors may contribute to their interest and participation in such an extreme lifestyle. In accordance with our first hypothesis, Marathon Maniacs displayed higher levels of introversion compared to the normative population on the MBTI. This is consistent with other findings from extreme sport athletes, however contrary to this paper we did not

find that Marathon Maniacs displayed higher proportions of perceiving or sensing on the MBTI (Reuter & Holder, 2013). Our second hypothesis was supported in that Marathon Maniacs were found to be significantly lower in neuroticism and higher in openness and conscientiousness than the normative population on the NEO-FFI-3. Finally, our third hypothesis was rejected as Marathon Maniac scores were actually found to be significantly lower on the IMTF-S compared to the normative population.

The finding of low levels of neuroticism and high levels of openness and conscientiousness in Marathon Maniac members is in line with previous findings with individual athletes and ultra-runners (Allen, Greenlees, & Jones, 2013; Hashimoto et al., 2006; Hartung & Farge, 1977; Hughes et al., 2003; Morgan & Costill, 1996; Nia & Besharat, 2010; Steca et al., 2018). Further, our finding that Marathon Maniacs score higher on introversion is in line with previous literature on extreme sport athletes (Reuter & Holder, 2013). These consistencies may support the theory that individuals with these personality traits tend to be more drawn to the lifestyle of a marathon runner. For example, high levels of openness may seem intuitive, as the running lifestyle of being outdoors in new locations could offer quite a lot of appeal to someone high in openness. High levels of conscientious would suit the lifestyle well, as these runners need to spend a lot of time preparing for and tracking their runs. Alternately, regularly engaging in marathons may teach someone to become more conscientious. Finally, higher scores of introversion are in line with the long hours of solitude Maniacs experience on runs.

We are also intrigued by the possibility that their lower neuroticism scores may be, in part, a result of their extensive running. Neuroticism refers to one's tendency to change mood levels and worry. Multiple studies have shown that increasing exercise leads to elevated and more stable moods (for review see Chan et al., 2019). In fact, exercise prescriptions are one of the options given to help patients who struggle with mood disorders and high anxiety. If simply adding in 3-4 exercise routines a week can have that strong of an effect on mood and stress regulation, we can only imagine what a difference training for and running frequent marathons would do. Perhaps particular aspects of an athlete's personality draw them to certain sports, but other aspects are molded and shaped by their experiences in that environment (Allen et al., 2013). Further research is necessary to fully understand the complexities in this area.

Participants were also 7.3 times more likely to be classified as INTJ types and 3 times more likely to be classified as INFJ types than would be expected in the general population on the MBTI. INTJs, or the Architect type, are introverted, intuiting, thinking, and judging. That is, they tend to think in complex manners, getting lost in their heads, are more logic based in their thinking, and are goal oriented. A long, quiet run where the INTJ can get lost in their thoughts while accomplishing a large goal could be seen as an ideal pursuit for an INTJ. The same can be said for the INFJ, whose only major difference is in having more Feeling based thinking or thinking that places importance on the impact of oth-

ers. The consistency of introversion in these findings is consistent with previous literature, however it is worth noting that we did not find high scores of perceiving and sensation as found in other extreme sport athletes (Reuter & Holder, 2013). Perhaps Marathon Maniacs do differ from extreme athletes in their desire for varied, novel, and complex sensations which require potential physical and social risks. On the other hand, because running is not typically perceived as a risky endeavor but the frequency at which Maniacs run is, perhaps the Marathon Maniac runners do not perceive their lifestyle as a risk and thus scored lower on the sensation factor. Another contributing factor to the lower scores on sensation for Maniacs compared to extreme athletes is that individuals who err toward sensing tend to be more in the present, while those who err on the side of intuition tend to get lost in their own thoughts. Because of the nature of the Marathon Maniac lifestyle, in which time is not as important as frequency, it would be advantageous for Maniacs to get lost in their own thoughts in order to run for such long distances.

We found that the inclusion of the qualitative questions asking why the Marathon Maniacs started to run vs why they continue to run shed some interesting light on the difference between these two motivations. Consistent with our insight as to the low levels of neuroticism, it appears that from the start of running to the time of response that participants self-reported lessened neurotic traits, as displayed by the fact that all of the increased and newly thematic responses relate to enjoyment, self-challenge, and increased well-being (e.g. “I love it and it gives me energy, strength, and joy”). Our ideology regarding heightened openness was also supported by the report of 2 people reporting they continue to run because they love the opportunity to experience new things through travel (e.g. “it... includes roadtrips and destination travel”). Overall, we saw a general theme that participants began running for more external reasons (e.g. organization/club requirement or to impress someone else; 20) to internal enjoyment (18).

This transition to internal enjoyment of extreme running begs the question of how these individuals are able to maintain such perseverance despite significant physical and mental challenges. Surprisingly, our results showed that Marathon Maniacs scored significantly lower in mental toughness than the normative population. However, we recognize that there may be significant confounds relating to our use of the IMFT-S which may have resulted in serious limitations.

4.1. Limitations

This was a quantitative study with two additional questions added in to shed light as to what motivated our participants. The analysis of the responses was conducted by two of the authors (Hart and Mauldin) by reviewing them and classifying them by their commonalities. Thus, no software analysis was applied, and the number of reviewers was limited to two. Therefore, the interpretation of these responses should be regarded with caution.

The use of the IMFT-S to measure mental toughness proved to encompass several limitations which may have significantly impacted the results of the scale.

First, the scale was developed using a normative sample of athletes who were significantly younger than our population ($M = 17$ vs $M = 47.95$; [Stonkus, 2011](#)). Second, several of the participants commented that the IMTF-S seemed more oriented towards team sports than individual sports. With questions such “Changes in momentum in games have an effect on how I play.” and “Too much criticism from coaches and teammates interferes with my performance.”, answering these questions as an endurance runner may be difficult, an issue that could undermine its ability to measure mental toughness in this particular population of athletes. Future research using a more generalizable scale of mental toughness would greatly benefit this area of study.

The use of the MBTI we knew was a risk due to its recent fallout from the social science community due to findings of limited reliability and questionable validity. However, its extensive use in academic and applied fields and known correlations to the NEO-FFI led us to decide to use it here. We think that the significant findings we have found from the NEO-FFI-3 provide support for the significant findings from the MBTI. For example, openness on the NEO-FFI is positively correlated with intuitiveness on the MBTI ([Furnham, et al., 2003](#)), both of which were significantly overrepresented in the current study. However, one should still be cautious when interpreting the MBTI results presented here.

Another limitation of this study was the limited number of participants and the lack of diversity. Although recruitment was intensive, the study could have benefited from a larger, more diverse sample. However, in accordance with [Field's \(2013\)](#) suggestions, the sample size did meet sufficient power for this study. In terms of diversity, it appears that the population is not very diverse. The majority of participants held college degrees were Caucasian, and were middle-aged. The sampling procedure should not have led to a sampling bias as it was done through an advertisement in the Marathon Maniac newsletter, a newsletter sent out to all Marathon Maniacs. While data on SES was not collected, it is likely that these participants had a moderate to high level of income given their high education level. It may be that the financial cost of participating in multiple marathons and the large amount of time necessary for training limits those who are able to meet the requirements to become a Marathon Maniac. In addition, the Marathon Maniacs originated and is still firmly established in the state of Washington, where 71.74% of residents are classified as “white” ([World Population Review, 2023](#)). This demographic was very similar to the normative populations they were compared to for the MBTI and NEO-FFI-3 ([McCrae & Costa, 2007](#); [Myers & McCaulley, 1998](#)). Previous studies examining differences in race and SES on personality type did not find any significant differences ([Krok-Schoen & Baker, 2014](#); [Sutin et al., 2013](#)), though a more thorough investigation is warranted. Thus, the demographics of our sample do not explain the findings of this study (i.e. higher educated, middle-aged Caucasians tend to be more conscientious and open INTJs), but the generalizability of this study is limited to those of similar demographics (a more diverse sample may not show the same trend towards these particular personality types/traits). Further ex-

amination into how SES impacts extreme/endurance sport participation and how diverse and/or underserved populations are represented in these groups as a whole would be greatly beneficial to understanding potential barriers to these groups.

In addition, this study may have been limited due to it being a rather long survey with multiple questions, which can lead to participant burnout and rushing through questions. However, the population we recruited from does appear to be a highly motivated population and thus may have been more willing than average participants to fill out a longer survey. Further, because this is an understudied population the participants may have been personally motivated to fill out the survey for their own knowledge of their group.

4.2. Future Research

Future research can expand on the present study by examining how these personality traits effect the motivational tendencies of Marathon Maniac runners and by conducting a similar study with a more diverse population. Qualitative responses from our respondents mentioned certain intrinsic and extrinsic motivational factors which would benefit from being expanded upon in a longitudinal study from start of running to lifestyle running. Further, the personality traits in this fringe-type running group could be expanded to see if other types of extreme sports display consistency with our results. Specifically, it would be of interest to see if other types of extreme runners, such as ultramarathoners or Ironman participants, have similar personality profiles to the Marathon Maniacs, or if different running events attract variant personalities.

4.3. Conclusion

This study examined the personality traits and mental toughness of Marathon Maniacs in an effort to understand what factors may contribute to their interest and participation in such an extreme lifestyle. We found certain consistencies with other extreme sport athletes, such as introversion, as well as distinct traits such as lower neuroticism and higher openness and conscientiousness compared to norm samples. The attraction to join such a community and the traits leading to continued participation provide greater insight into the characteristics of extreme sport athletes, however, this insight is limited to populations with demographics similar to the Marathon Maniacs, a highly homogeneous population. Understanding these qualities can enhance the overall knowledge and understanding of this unique population.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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