

Meaning in life matters: A mediational investigation of stress resilience in collegiate athletes

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Abstract:

While there is evidence suggesting that athletes display greater resilience to stress than non-athletes, the presence of mixed results in the literature invites inquiries to better understand the manner in which being an athlete relates to the expression of stress resilience. Grounded in self categorization theory, we proposed that participation in athletics affords access to the socially relevant identity of “athlete” which can enhance perceived meaning in life and resilience to stress. We then proceeded to evaluate hypothesized the mediational effects that perceived meaning in life has on the relationship between athletic participation and stress resilience. Our sample consisted of 334 college students (158 athletes and 176 non-athletes) who completed questionnaires assessing meaning in life, stress resilience, strength of athlete identity, and a range of demographic and athletic participation information. We also collected data pertaining to athletic team success. Results broadly supported the hypothesis that meaning in life mediated the relationship between athletic participation and stress resilience, but neither strength of one’s athletic identity nor team success displayed relations with either meaning in life or stress resilience. Therefore, while athletes did display greater levels of meaning in life and greater stress resilience, and while meaning in life did mediate the relationship between athletic participation and stress resilience, the specific predictions of self categorization theory were not supported with the present data. Future work is encouraged to utilize a broader sample of athletes from a range of competitive levels to more fully evaluate the specific predictions of self categorization theory to explain the observed relationship between athletic participation and stress resilience, while also controlling for potential confounding variables such as physical fitness.

Keywords: sport, performance, self-categorization, identity, competence

Introduction

Since the emergence of the classic “iceberg profile” (Morgan, 1980), it has become ever more clear that the mental characteristics of athletes are different from non-athletes. More recent work continues to suggest that, compared to the general population, athletes tend to display higher levels of sociability (Aries et al., 2004; Lepir & Pedović, 2025), lower levels of neuroticism (Dhimmar, 2019; McKelvie et al., 2003), and in general have more positive personality traits (Laborde, Guillén, & Mosley, 2016) while displaying indicators of reduced anxiety (Caramés et al., 2024; Verner et al., 2010). Collectively, these data can be synthesized to support the conclusion that athletes display greater levels of psychological well-being and, of particular relevance to the present investigation, resilience to stress compared to non-athletes (de Melo & Noce, 2020; Galli & Gonzalez, 2015). Other work, however, notes the under certain conditions of uncertainty or challenge (i.e., injury, retirement, or lockdown), resilience in athletes can drop to levels similar to or below non-athletes (Knowles et al., 2021; Patel & Sandhu, 2026; Sarkar & Fletcher, 2014). Therefore, there remains a need to better understand the manner in which being an athlete relates to the expression of stress resilience.

Self categorization theory (Turner, 1999), an extension of social identity theory (Tajfel, 1978; Tajfel & Turner, 1979), postulates that as much as individuals have identified personal attributes, the self is also described as belonging to broader socially-relevant categories. Importantly, just as words can acquire their meanings by way of their connections to objects or processes out in the world, our lives can acquire their meanings through our membership and participation in social categories, through associations and connections to entities larger than or beyond ourselves out in the world (Park, 2022; Huddy, 2002; Oakes, 2002; Oakes et al., 1999). Indeed, current work suggests that efficacious associations with socially-relevant identities bolster one’s sense of meaning in life, as well as resilience to stress (Negru-Subtirica et al., 2016; Smith et al., 2024; Zhou et al., 2025). Perceived presence of meaning in life has also been identified as a core principle of mental health and societal flourishing (Fusar-Poli et al., 2020; King & Hicks, 2021; Li, Dou, & Liang, 2021; Routledge & FioRito, 2021). Notably, in a sample of medical volunteers, Thoits (2012) further displayed that one’s sense of meaning in life mediated the relationship between the strength of one’s socially-relevant identity of “volunteer” and one’s mental and physical well-being. Thus, it has been shown that not only is perceived meaning in life related to

stress resilience, but it is also observed that meaning in life can be informed by perceived membership in socially relevant categories. As a result of such work, it is possible that not only might athletes be able to report greater levels of perceived meaning in their lives compared to non-athletes (Breivik, 2022), the strength of the subjective sense that one's life has meaning might mediate the relationship between athletic participation and stress resilience.

In addition to the potential impact that being an athlete, and having that athletic identity, can have on stress resilience and meaning in life, being an athlete also affords an additional possibility to affiliate oneself with competence through team membership. Being a basic psychological need according to self-determination theory (Flannery, 2017; Ryan & Deci, 2000), perceived competence itself has been observed to positively relate to both sense of meaning in life (Demirbaş-Çelik & Keklik, 2019; Martela et al., 2024) and stress resilience (Orkaizagirre-Gómara et al., 2020; Sagone, Elvira De Caroli, et al., 2020; Schwarzer & Warner, 2012). While it is possible to associate with competence directly through displays of individual sporting prowess, self categorization theory (Turner, 1999) would also suggest that this can also occur through membership on successful teams. For example, there is evidence that judgements of self-esteem and self-efficacy, informers of meaning in life and related to stress resilience (Heine et al., 2006; Mouatsou & Koutra, 2023; Sagone, De Caroli, et al., 2020), are higher in members of desirable groups (Feltz & Lirgg, 1998; Jetten et al., 2015; Monteiro & Vieira, 2016). Therefore, amongst athletes themselves, it is expected that membership on high performing teams also positively relates to stress resilience and meaning in life.

The present investigation was conducted with the purpose of further evaluating the relationships between aspects of athletic membership and identity, meaning in life, and stress resilience via self-report questionnaires in a sample of collegiate athletes. The specific purpose of the present research is to explore the potential mediatory effect meaning in life has on the relationship between athletic participation and stress resilience. In relation to this purpose and the literature reviewed above, we proposed a number of hypotheses, graphically displayed in Figure 1:

Hypothesis 1) Athlete participation will be positively related to stress resilience, as measured by the Nicholson-McBride Resilience Questionnaire (Clarke & Nicholson, 2010).

Hypotheses 2a) The strength of athletic identity, as measured by the Athlete Identity Measurement Scale (Lochbaum, Cooper, & Limp, 2022) will positively relate to stress resilience in athletes.

Hypothesis 2b) Association with athletic success, as assessed by the team win-ratio of the athlete's team's most recent competitive season, will positively relate to stress resilience in athletes.

Hypothesis 3) Athlete participation will be positively related to meaning in life, as measured by the Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006).

Hypothesis 4a) The strength of athletic identity will positively relate to meaning in life in athletes.

Hypothesis 4b) Association with athletic success will positively relate to meaning in life in athletes.

Hypothesis 5) Meaning in life will be positively related to stress resilience.

Hypothesis 6) Meaning in life will mediate the relationship between athletic participation and stress resilience.

Hypothesis 7a) Meaning in life will mediate the relationship between athletic identity and stress resilience.

Hypothesis 7b) Meaning in life will mediate the relationship between association with athletic success and stress resilience.

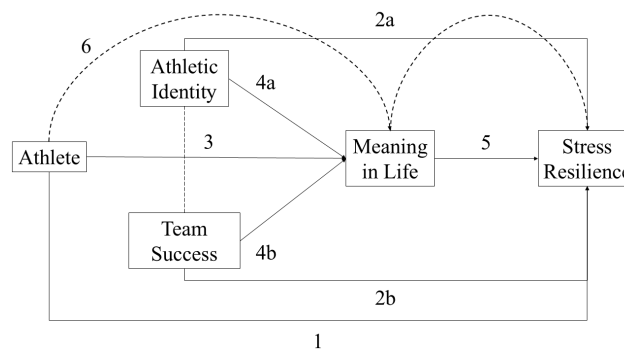


Figure 1. Model to be evaluated in this study. Hypothesis 6, stating that meaning in life will mediate the relationship between athletic participation and stress resilience, is represented via the dashed lines. Hypotheses 7a and 7b are not visualized.

Material & Methods

Participants

A total of 334 individuals (158 athletes and 176 non-athletes [122 males, 204 females, 8 other]), aged 18-26, taking introductory psychology courses from a small Division III liberal arts college in a rural portion of the American mid-Atlantic region gave their informed consent and participated in this study. The athlete sample consisted of individuals from a wide array of sports teams spanning individual and team sports (sp., football, basketball, baseball, track and field, rugby, soccer, volleyball, golf, cross country, tennis, lacrosse, field hockey,

swimming, cheerleading, softball, and esports). Participants received course credit for completing the study. This research was conducted under the ethical supervision of the local institutional review board.

Materials

Our variables of interest were primarily assessed via a series of self-report questionnaires. Resilience to stress was assessed by the Nicholson-McBride Resilience Questionnaire (NMRQ) (Clarke & Nicholson, 2010), which consists of a series of statements pertaining to the participants typical response to stressful situations. Participants responded using a 5-point scale ranging from “Strongly disagree” (1) to “Strongly agree” (5). The strength of the participants’ athletic identity was assessed via the Athlete Identity Measurement Scale (AIMS) (Lochbaum et al., 2022), which consists of a series of seven statements. Participants responded using a 7-point scale ranging from “Strongly disagree” (1) to “Strongly agree” (7). Meaning in life was assessed via the Meaning in Life Questionnaire (MLQ) (Steger, Frazier, Oishi, & Kaler, 2006), which consists of a series of statements pertaining to perceived meaning and purpose. The current investigation utilized only the items pertaining to the “presence” subscale of the MLQ, which assesses the degree to which respondents report presently having meaning in their lives. Participants responded using a 7-point scale ranging from “Absolutely untrue” (1) to “Absolutely true” (7). Other information pertaining to type of athletic involvement (i.e., which sports team(s) is the participant participating in, if any) and demographics (sp., age & gender) was also gathered via self-report. All questionnaires were hosted through Qualtrics (Provo, UT). Team athletic performance records from the most recent completed athletic performance season were accessed through publicly available team statistics.

Procedure

Participants were presented with a brief description of the study, informed of risks and benefits of participation, and asked to provide their informed consent. Upon providing that consent, participants were first asked to indicate their current athletic status. Self-reported athletes were then asked to indicate which specific intercollegiate sports team(s) they were presently participating members of and asked to complete the AIMS. Subsequent to this, participants were asked to complete the NMRQ and MLQ. Last, demographic information (i.e., age and gender) was provided. Participants who indicated that they are not athletes followed this same sequence, but they were not asked which sport team(s) they were presently a part of and were not asked to complete the AIMS.

Statistical Analyses

All statistical tests were conducted in either R (v4.5.0; R Core Team, 2025, Vienna, Austria) or Jamovi (v2.6; The Jamovi Project, 2025, Sydney, Australia), a statistical package built with a foundation in R. Simple pairwise comparisons (hypotheses 1 and 3) were conducted via independent t-tests or Mann-Whitney U tests, depending on whether there were concerns regarding normality in the data (i.e., Shapiro-Wilk: $p < 0.05$). Similarly, simple bivariate relationships (hypothesis 5) were assessed via Kendall’s Tau B. Hypotheses 2 and 4 were assessed with linear regression analyses which are resilient in the presence of non-normal data; residuals were normally distributed. To assess if meaning in life mediates the relationship between athletic identity and stress resilience (hypothesis 6), a non-parametric mediation analysis was performed using R. Model coefficients were estimated using a residual bootstrapping procedure. Consistent with the methodology described by Efron and Tibshirani (1994), percentile-based 95% bootstrap confidence intervals were constructed from the empirical distributions of the resampled estimates, and p-values were computed accordingly. Bootstrap estimates of the indirect effect, direct effect, total effect, and proportion mediated were derived using the relationships described by Baron and Kenny (1986). Then, percentile-based 95% bootstrap confidence intervals and p-values were computed for these quantities allowing for the assessment of mediation effects in a non-parametric manner.

Results

To assess the strength of the relationship between athlete status and stress resilience (hypothesis 1), an independent t-test was conducted which revealed that athletes displayed greater levels of stress resilience than non-athletes ($t(332) = 4.89$, $p < 0.001$, 95% CI = [0.310, 0.727], Cohen’s $d = 0.536$). Next, to assess the strength of the relationship between athlete status and meaning in life (hypothesis 3), a Mann-Whitney U test was conducted as the meaning in life data were not normally distributed (Shapiro-Wilk $W = 0.982$, $p < 0.001$). The analysis revealed that athletes also displayed greater levels of meaning in life than non-athletes ($U = 11775$, $p = 0.015$, 95% CI = [4.21e-5, 0.431], rank biserial correlation = 0.153). Finally, to assess the strength of the relationship between meaning in life and stress resilience (hypothesis 5), a Kendall’s Tau B test revealed a positive relationship between the two variables as expected ($\tau = 0.257$, $p < 0.001$). Therefore, hypotheses 1, 3, and 5 were all supported.

Assessments of hypotheses 2a and 2b, pertaining to the effects athlete identity and team success had on stress resilience in the athlete sample, via a linear regression analysis did not yield a significant result ($F(2, 117) = 0.138$, $p = 0.871$, Adj $R^2 = -0.0147$). Therefore, neither athlete identity nor team win-ratio were related to stress resilience in the athlete group, counter to expectations. Further evaluations of hypotheses 4a and 4b, pertaining to the effects athlete identity and team success had on meaning in life in the athlete sample, via linear regression analysis also revealed no significant effect ($F(2,117) = 1.39$, $p = 0.254$, Adj $R^2 = 0.00645$). Specifically, neither athlete identity nor team win-ratio were related to meaning in life in the athlete group,

counter to expectations. Due to the lack of effect of athlete identity and team success on other variables of interest, the planned mediational analyses featuring these variables (pertaining to hypotheses 7a and 7b) were not evaluated as there were no relationships revealed to mediate.

However, given the support for hypotheses 1, 3, and 5, evaluation of hypothesis 6 proceeded. Mediational analysis revealed an indirect effect of athlete status on stress resilience through meaning in life (Estimate: 0.105, 95% CI [0.028, 0.194], $p = 0.003$). The direct effect between athlete status and stress resilience was also significant (Estimate: 0.413, 95% [0.227, 0.611], $p < 0.001$), as was the total effect (Estimate: 0.518, 95% CI [0.309, 0.733]). This result, therefore, indicates that meaning in life partially mediated the relationship between athletic participation and stress resilience. See Figure 2.

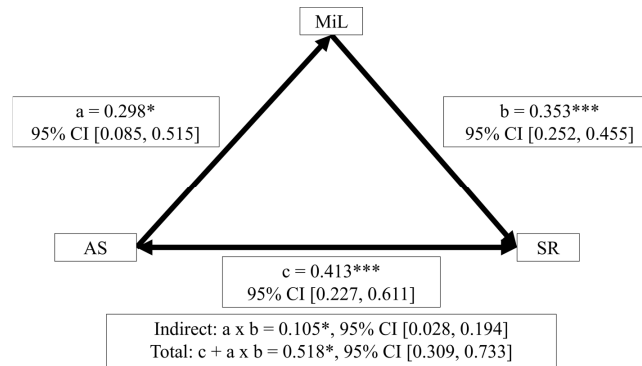


Figure 2. Meaning in Life (MiL) mediates the relationship between Athletic Status (AS) and Stress Resilience (SR). *: $p < 0.01$. **: $p < 0.01$. ***: $p < 0.001$.

Discussion

In this study, we investigated potential psychological elements that distinguish collegiate athletes from their non-athlete peers, focusing on the relationships between aspects of athletic membership and identity, meaning in life, and stress resilience. Specifically, we examined if meaning in life served as a mediator between athletic participation and stress resilience. Some previous results have revealed that athletes display more resilience to stress than non-athletes (de Melo & Noce, 2020; Galli & Gonzalez, 2015), while others have reported opposite or null results (Knowles et al., 2021; Patel & Sandhu, 2026; Sarkar & Fletcher, 2014). The presence of mixed results in the literature is suggestive of interactive or mediatory factors which influence the strength and direction of the relationship. Given that meaning in life positively relates to stress resilience (Negru-Subtirica et al., 2016; Smith et al., 2024; Thoits, 2012; Zhou et al., 2025), and there is reason to believe that athletic participation can augment perceptions of meaning in life (Breivik, 2022; Huddy, 2002; Oakes, 2002; Oakes et al., 1999), our primary hypothesis was that meaning in life mediated relationships between aspects of athletic participation and stress resilience, while other specific hypotheses focused on relations between the individual elements of the broader mediational model.

Consistent with Hypothesis 1, athletes in our sample reported significantly greater stress resilience than non-athletes. Again, this finding aligns with the body of work suggesting that athletes possess higher levels of psychological resilience (de Melo & Noce, 2020; Galli & Gonzalez, 2015). Compared to the general population, athletes have often been found to show lower neuroticism, reduced anxiety, and more positive personality characteristics (Caramés et al., 2024; Dhimmarr, 2019; Laborde et al., 2016; McKelvie et al., 2003; Verner et al., 2010). A recent scoping review by Patel and Sandhu (2026) synthesizes evidence that competitive athletes often develop enhanced emotional regulation and social self-efficacy compared to non-athletes, consistent with elevated stress resilience.

Further, and consistent with Hypothesis 3, athletes in our sample reported greater meaning in life than non-athletes. This finding aligns with ideas that membership in socially valued groups can provide a sense of purpose, coherence, and significance to one's life (Huddy, 2002; Oakes, 2002; Oakes et al., 1999; Tajfel, 1978; Tajfel & Turner, 1979; Turner, 1999). This result is also consistent with empirical work suggesting that associations with socially- and culturally-relevant groups bolster one's sense of meaning in life in addition to augmenting one's stress resilience (Negru-Subtirica et al., 2016; Smith et al., 2024; Zhou et al., 2025). Given the important social roles sport can play, aiding in the formation of cultural identity and being a means through which peoples can unite (Evens et al., 2013), it is reasonable that participating in sport in the capacity of an athlete allows for such individuals to experience an enhancement of meaning in life.

In spite of this, and contrary to expectations, athletic identity and team-win ratio themselves did not predict either stress resilience or meaning in life. Therefore hypotheses 2 and 4 were not supported. This null finding is noteworthy and suggests that simply identifying strongly as an athlete, or being on a successful team, is not sufficient to obtain resilience benefits. Patel and Sandhu (2026) similarly conclude that athletic participation does not exert a uniform effect on mental health outcomes; rather, results depend on sport type, competitive level, and individual psychological characteristics. Additionally, in the present context of Division

III American intercollegiate athletics, where student-athletes maintain multiple meaningful identities and efficacious activities above and beyond their sport, the strength of athletic identity alone may be less consequential to perceived stress resilience than one's broader experiences, activities, and commitments.

That said, current data did reveal an expected positive relationship between meaning in life and stress resilience consistent with Hypothesis 5. This finding is in alignment with a substantial literature indicating that a sense of purpose and coherence in life buffers against stress (Negru-Subtirica et al., 2016; Smith et al., 2024; Zhou et al., 2025). Specifically, individuals with a stronger sense of meaning in life may be better able to interpret stressful experiences within a broader existential or value-based framework. For example, viewing a setback, or perhaps even a trauma (Henson et al., 2021; Tedeschi & Calhoun, 2004), as part of a meaningful journey, a learning opportunity, or a challenge that aligns with one's core values can mitigate the stressor's negative psychophysiological effect. This broader framework can thus help prevent stress from feeling overwhelming or senseless (Park, 2022).

Supporting Hypothesis 6, meaning in life was found to partially mediate the relationship between athlete status and stress resilience. The partial mediation result is important because it suggests that meaning in life is one mechanism through which athletic participation may relate to resilience, even if it is not the only one. It is worth remembering that meaning in life is related to a range of positive outcomes including physical health (Czekierda et al., 2017) and psychological well-being (Weziak-Bialowolska & Bialowolski, 2024; Zika & Chamberlain, 1992) as well as resilience to stress (Miao & Cao, 2024; Ostafin & Proulx, 2020). In societies reporting increased levels of nihilism (Jahangiri & Ghareh, 2015; Marinovic, 2022; Scott & Cohen, 2022; Twenge et al., 2012) and rising rates of mental illness (Richter et al., 2019; Tkacz & Brady, 2021; Witters, 2025), results illustrating the potential and particular benefits of a strong sense of meaning in life become even more valuable.

Above and beyond meaning in life, however, several additional pathways deserve consideration in helping to explain why athletes may have displayed higher levels of stress resilience. First, physical fitness is an obvious candidate. Many athletes engage in regular, structured physical activity, which has well-documented effects on stress resilience (Neumann et al., 2022; Silverman & Deuster, 2014). For example, in an athletic sample, Terres-Barcala et al. (2022) found that female athletes performing vigorous physical activity exhibited significantly lower levels of impulsiveness and higher mindfulness traits compared to those performing only light-to-moderate activity. These psychological elements may, in turn, help to buffer against negative stress-related outcomes. Our study did not measure fitness levels or physical activity intensity, so it remains plausible that fitness differences between athletes and non-athletes further contribute to the resilience gap, independent of meaning in life. Also, athletic participation may foster resilience through perceived social support, development of positive personal qualities, regular exposure to challenge, and opportunities to develop coping skills under pressure (Fletcher & Sarkar, 2012; Galli & Vealey, 2008; Raglin, 2001).

From a theoretical standpoint, the present findings are not consistent with the claim that the perceived strength of socially relevant identities, per se, promotes well-being and its indicators. Therefore, self-categorization theory (Turner, 1999) was not supported as an explanation for the observed group difference. While athletes in our sample were indeed more stress resilient than non-athletes, and they did report greater meaning in life, it was not because of their athletic identity or their affiliation with successful teams. This pattern suggests that the broader experiences of being an athlete matter more than differences in how strongly one subjectively identifies with the athlete role or the objective success of one's team.

One possible explanation is that athletic identity is not uniformly adaptive. Although athletic identity can provide structure and purpose, strong identification with the athlete role has also been linked in some contexts to vulnerability when self-worth becomes overly dependent on athletic performance (Gustafsson et al., 2018). Similarly, there is reason to think that team-based affiliation with competence supports psychological functioning (Deci & Ryan, 2008; Flannery, 2017), but team win-ratio may not be the best indicator to reflect athletes' lived experiences of competence, belonging, or value. While prior work suggests that judgments of self-esteem and self-efficacy may be shaped by group membership (Feltz & Lirgg, 1998; Jetten et al., 2015; Monteiro & Vieira, 2016), objective team success may not map directly onto athletes' subjective experiences. Recent work supports this distinction, suggesting that psychological outcomes are more closely tied to individual-level factors such as perceived competence, social self-efficacy, and emotional regulation than to objective performance metrics (Terres-Barcala et al., 2022; Yildirim et al., 2024). Future research may therefore benefit from examining more psychologically proximal variables, such as perceived competence, role satisfaction, perceived contribution to team outcomes, and social connectedness.

Limitations

Several limitations must be noted. First, given the nature of the current study, we must advise readers against drawing causal conclusions from the observed relationships. Future research should consider employing longitudinal designs that track individuals before, during, and after their athletic participation. Second, the sample was obtained from a small liberal arts college located in a rural area of Mid-Atlantic region of the United States, meaning that the present results have limited generalizability. Future studies should consider recruiting more participants from various institutions across regions and across levels of competitive sport (ex: Division I, II, and III) to address this concern. It is also recommended that, in future work, researchers assess perceived

team success, perceived athletic contribution, and subjective competence directly, alongside objective measurements of performance to allow researchers to disentangle the objective and subjective components of athletic success.

Conclusion

Overall, athletes in the present sample reported greater resilience and greater meaning in life than non-athletes, and meaning in life partially mediated the relationship between athletic participation and stress resilience. The present findings contribute to the literature by identifying meaning in life as one plausible means of linking athletic participation to greater stress resilience.

Theoretically, this study was grounded in self-categorization theory (Turner, 1999), which posits that as much as individuals have identified personal attributes, the self can also be described as belonging to broader social categories, from which one's meaning in life can also be informed. However, our findings did not provide support to the theory, as both athletic identity and team win-ratio, which may inform one's sense of meaning and identity by way of an indication that one is a member of a successful team (Demirbaş-Çelik & Keklik, 2019; Jetten et al., 2015; Martela et al., 2024; Turner, 1999), were unrelated to stress resilience or meaning in life. This raises the question of what aspects of athletic participation drive the observed relationships with and between meaning in life and stress resilience.

To our knowledge, there has been limited prior work directly comparing perceived meaning in life between (student-) athletes and non-athletes. The present findings suggest that athletic participation functions as a facilitator of meaning in life and stress resilience, which opens the door for potential investigations involving the design of novel programs to support student-athlete well-being (Breivik, 2022; Manco & Hamby, 2021). Such investigations would also clarify the presence of causal relationships between the present variables. These findings also point to the potential value of continuing to investigate the manner in which participation in sport may support psychological well-being and adaptive functioning in the wider population (Galli & Gonzalez, 2015; Negru-Subtirica et al., 2016; Thoits, 2012), particularly within cultural landscapes threatened by nihilism (Jahangiri & Ghareh, 2015; Marinovic, 2022; Scott & Cohen, 2022; Twenge et al., 2012). We further recommend that future work elucidate pathways through which sport participation enhances meaning in life, stress resilience, and well-being more broadly.

Conflicts of Interest - We have no known conflicts of interest to disclose.

Declaration of generative AI and AI-assisted technologies in the writing process – No artificial intelligence systems or large language models were used at any point in the generation of this manuscript.

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