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Analysis of the Effect of High Impact Sports and Minimal Impact Sports on the Stress Indicators in Collegiate Athletes: A Survey Based Study

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ABSTRACT

Background College students juggle academic pressure, personal challenges, and athletic commitments simultaneously — a combination that makes stress management genuinely difficult. While sports are widely recommended for mental wellbeing, little attention has been paid to whether high-impact and low-impact sports affect stress differently.

Methodology 150 collegiate students aged 18–25 from the Moradabad region were equally divided into two groups — high-impact sport participants (football, basketball) and low-impact sport participants (swimming, yoga). Stress was measured using the validated College Student-Athletes' Life Stress Scale (CSALSS).

Results High-impact athletes recorded a mean stress score of 48.29, compared to just 35.63 among low-impact athletes — a clinically meaningful difference of nearly 13 points, confirmed as highly statistically significant ($p < 0.001$). Age and gender showed no meaningful influence on stress levels.

Discussion The intensity, competition, and injury risk inherent to high-impact sports appear to compound existing academic stress, whereas low-impact activities deliver exercise's neurobiological benefits without the added psychological burden.
Conclusion Sport type significantly shapes collegiate stress experience. Low-impact physical activity emerges as a more effective stress-reduction strategy for college students seeking relief through athletics.
Keywords: Academic stress, Collegiate athletes, High-impact sports, Minimal-impact sports, College Student-Athletes' Life Stress Scale (CSALSS), Stress indicators, Sport-type differentiation, Indian collegiate setting.

INTRODUCTION:

One of the most important and psychologically taxing periods of a person's life is their college years. Academic workload, financial hardship, relationship difficulties, peer competition, and the difficulty of adopting complete independence are all factors that students entering higher education must deal with at the same time. Academic stress has been found to be perhaps the most significant stress factor on college students' mental health, and its effects are seen in every aspect of their lives.[1] Alarming epidemiological figures demonstrate the scope of this problem: up to 94% of American college students report feeling overburdened by their coursework, 44% show symptoms of despair, and 41% indicate symptoms of anxiety.[2] This image is further supported by data from the 2022–2023 academic year, which showed that anxiety was the most common issue among college students, according to 24.8% of mental health physicians, followed by depression at 14.4%. According to epidemiological estimates, 47% to 55% of college students worldwide report having moderate levels of academic stress. Together, these numbers show that student mental health is a major dilemma in contemporary higher education rather than a side issue.[1,2]

Physiologically speaking, stress occurs when a person's perceived demands beyond their capacity for coping, which activates the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis. Sleep disturbances, elevated sympathetic nervous system activity, and changed cortisol production patterns have all been linked to long-term high psychological stress. These stressors can upset the body's homeostatic balance, resulting in physiological changes like blood pressure and heart rate. Students who are overburdened by stressful situations frequently report symptoms like fatigue, irritability, and a decline in academic performance. An individual's chance of developing anxiety, depression, or metabolic problems may increase as acute stresses turn chronic, and research has linked cumulative stress to an increased vulnerability to disease and harm.[3] Stress has an individualistic and subjective effect, and how people react to a stressor is frequently based on how they personally perceive the situation. This perception can take the form of either eustress, which produces positive mental energy, or distress, which produces anxiety.[4] Participating in sports and regular physical activity is one of the most research-backed non-pharmacological methods for stress management among students. College students who participate in sports report far lower levels of stress, and there are notable variations in stress, happiness, and psychological wellbeing between athletes and non-athletes. Sport has been shown to help prevent or treat mental illness, including depressive symptoms and anxiety or stress-related diseases. It has also been linked to reduced levels of perceived stress, enhanced vitality, social functioning, mental health, and life satisfaction.[5,6]
Positive improvements in anxiety, depression, and stress symptoms were found in a systematic review and meta-analysis of physical activity interventions in undergraduate students, which is in line with the larger body of research showing that physical activity improves university students' mental health. These results suggest that physical activity is an affordable, easily accessible therapeutic approach that almost all students can use.[7]

Exercise and sports have a variety of well-established neurobiological mechanisms that reduce stress. Exercise initially increases the body's stress response, but after periods of physical activity, people experience lower levels of stress hormones like cortisol and adrenaline; norepinephrine, in particular, may help the brain handle stress more effectively by increasing its concentrations in brain regions involved in the body's stress response.[8] A natural analgesic and euphoric effect that lowers anxiety and enhances affective states is produced by serotonergic enhancement in conjunction with exercise-induced endorphin release from the pituitary gland and hypothalamus. These neurochemical adaptations are especially important for students because they may mitigate the psychological stressors present in their competitive academic environments.[9]

For brain-derived neurotrophic factor (BDNF) elevation, aerobic activity at 60–80% of maximal heart rate for at least 30 minutes seems to be ideal. The benefits peak right after exercise and last for several hours. Aerobic exercise has a variety of beneficial impacts on mood and depressive symptoms, including endorphin release, higher serotonin production, BDNF release, cortisol management, better sleep, and the benefits of social contacts and diversion.[10]

Considered by many to be the primary biomarker of physiological stress, cortisol is essential to comprehending how various sports and their intensities impact the stress response. Through a combination of hemoconcentration and HPA axis stimulation via adrenocorticotrophic hormone (ACTH), moderate to high-intensity exercise raises circulating cortisol levels. This intensity-dependent response is followed by a distinct threshold effect. With higher-intensity interval training showing noticeably higher rates of change in cortisol compared to lower-intensity running, salivary cortisol concentrations and the testosterone-to-cortisol ratio can reliably distinguish between exercises at different intensities, making these biomarkers useful for identifying variations in stress responses among individuals.[11] High levels of physical activity have been linked to lower physiological stress reactivity over time, and chronic endurance training has both a preventive and therapeutic effect on the experience of stress, so the acute cortisol elevation seen in vigorous exercise is not intrinsically harmful.[12,13]

There is a clinically significant difference between high-impact and minimal-impact (low-impact) sports across the wide range of physical activity. Football, basketball, volleyball, running, martial arts, and contact sports are examples of high-impact sports. These games are distinguished by their rapid, explosive motions, high ground reaction forces, and frequent musculoskeletal system loading. Swimming, yoga, cycling, walking, tai chi, and Pilates are examples of low-impact or minimal-impact sports that minimize compressive joint forces while still providing cardiovascular and neuromuscular benefits by keeping one limb in contact with a surface or using a supportive medium.[14,15]

While high-impact activities increase endorphins but may be physically taxing and less immediately calming, low-impact activities encourage relaxation and mental clarity while lowering symptoms of stress and anxiety. Importantly, regular exercise at lower intensities may help reduce symptoms of anxiety and depression by improving sleep, elevating mood, and promoting emotional well-being. Exercises like cycling, swimming, and strength training can increase muscle, improve cardiovascular health, and boost endurance just as effectively as higher-impact workouts.[14,15]

Lu and colleagues created the College Student-Athletes' Life Stress Scale (CSALSS) as a specialized measurement tool to methodically capture this distinct constellation of stresses in athletic populations. With Cronbach's α coefficients ranging from.72 to.88, the CSALSS, a 24-item scale with eight variables, exhibits strong reliability. Eight stress categories—sports injuries, performance demands, connections with coaches, training adaptability, interpersonal relationships, romantic relationships, family

relationships, and academic requirements—were validated by factor analysis. The CSALSS can be divided into two main categories, according to its creators: general life stressors (which include interpersonal relationships, romantic relationships, family relationships, and academic requirements) and sport-specific stressors (which include sports injury, performance demand, coach relationships, and training adaptation). On a six-point Likert scale from 1 (never) to 6 (often), participants indicate how frequently they experience stress. The researchers suggest the CSALSS as a tool for researchers and practitioners to evaluate the stress levels of college student-athletes because it showed sufficient factorial structure, criterion validity, and reliability.[16]

There is a strong need for research that systematically compares the stress profiles of students playing high-impact versus low-impact sports using validated, specially designed measurement tools, given the multifaceted nature of stress in collegiate populations, which includes physiological, psychological, academic, and sport-specific dimensions. Although previous research has shown that both kinds of sports have psychological benefits, no study conducted in the Indian college setting has used a rigorous comparative survey-based design to ascertain which kind of sport participation is more successful in lowering stress indicators in this particular population.

As a result, the current study has five specific goals: to measure stress levels independently among athletes who participate in high-impact sports, to measure stress levels independently among athletes who participate in minimal-impact sports, to compare stress indicators between the two groups, to ascertain whether sport type has a statistically significant impact on stress indicators, and to determine which sport category is more effective at reducing stress among college students.

AIMS & OBJECTIVES

College life in India carries a particular kind of pressure that is difficult to fully articulate— competitive entrance culture, family expectations and the academic overload. Against this backdrop, sports participation is frequently recommended as a natural remedy. But somewhere in that well-meaning advice, a critical distinction gets lost entirely: not all sports are created equal, and the experience of a student waking up at five in the morning for football drills is worlds apart from one heading to an evening swimming session. This is precisely the gap this study set out to address.

In terms of the research gap, the overwhelming majority of existing literature treats physical activity to be universally beneficial. The situation is even more pronounced in the Indian academic setting, where stress is shaped by distinctly local pressures — competitive examination culture, limited institutional mental health infrastructure, and deeply rooted family expectations — making direct extrapolation from Western or East Asian research genuinely inappropriate. Furthermore, despite the College Student-Athletes' Life Stress Scale being a well-established and psychometrically robust instrument, no published study had ever used it to compare multi-dimensional stress profiles across sport categories within the same institutional cohort.

Recognising these gaps, the aims of this study was to produce evidence that is both scientifically credible and practically useful for the people who design sports and wellness programs in Indian higher education institutions.

The objectives were structured in a logical sequence that moved from measurement to comparison to application. First, stress levels were independently assessed among high-impact sport participants — students engaged in physically demanding, competitive activities like football, basketball, and martial arts. Second, the same assessment was conducted among low-impact sport participants — students involved in activities like swimming, yoga, and cycling, where joint loading is minimised and the competitive pressure is considerably lower. Third, these two profiles were directly compared to identify meaningful differences. Finally, the study examined whether demographic factors like age and gender had any bearing on stress outcomes.

The null hypotheses proposed, as convention requires that sport type would have no significant effect on stress levels — that a student playing basketball and a student practising yoga would score comparably on a validated stress instrument. The alternate hypotheses proposed that meaningful, statistically significant difference in stress indicators would emerge between the two groups, and that the type of sport would prove to be a consequential determinant of how much stress a college student carries.

METHODOLOGY

The study was conducted across the Moradabad Mandal region of Uttar Pradesh, India, and was designed as a mixed-method, survey-based cross-sectional investigation — meaning data was collected at a single point in time rather than tracked across months or years. Initially 150 college level athletes were identified as potential participants, and upon carefully applying the inclusion and exclusion criteria, all 150 were confirmed eligible and retained in the study. Participants were young adults between the ages of 18 and 25 — the classic college-going demographic — and both male and female athletes were welcomed into the study, provided they gave informed consent and were willing to complete the survey in full. Athletes were excluded if they fell outside the specified age range, were unwilling to participate, submitted incomplete questionnaires, carried a diagnosed psychiatric condition, or were actively receiving treatment for severe stress, anxiety, or depression. This last criterion was particularly important, as including students already undergoing mental health treatment could have artificially skewed the stress scores and muddied the comparisons between groups. Students who were simply absent during data collection were also excluded, keeping the dataset clean and reliable.

Once eligibility was confirmed, participants were divided into two equally sized groups of 75 each. Group A consisted of students actively engaged in high-impact sports — activities characterised by explosive movements, intense physical loading, and competitive pressure, including football, basketball, volleyball, martial arts, and similar contact or high-exertion sports. Group B comprised students participating in low-impact or minimal-impact sports — activities that are gentler on the musculoskeletal system while still delivering genuine cardiovascular and psychological benefits, such as swimming, yoga, and cycling. Crucially, the two groups were well-matched on baseline demographic variables: statistical testing confirmed no significant differences in age or gender distribution between them, meaning any differences found in stress scores could be attributed to sport type rather than to background characteristics.

The primary measurement tool used was the College Student-Athletes' Life Stress Scale, more commonly referred to as the CSALSS — a validated, 24-item instrument specifically designed to capture the unique constellation of stressors that college athletes face. Unlike generic stress questionnaires, the CSALSS reaches into eight distinct domains of student-athlete life: sports injury, performance demand, coach relationships, training adaptation, interpersonal relationships, romantic relationships, family relationships, and academic requirements. Participants responded on a six-point Likert scale ranging from one, meaning never, to six, meaning always, reflecting how frequently they experienced stress across each of these areas. The tool has demonstrated strong reliability, with Cronbach's alpha coefficients ranging from 0.72 to 0.88, making it well-suited for a comparative study of this nature. Survey responses were collected using printed questionnaire forms, with informed consent obtained from every participant prior to data collection. The entire data collection process was documented photographically and conducted in person across multiple campus locations within the Moradabad Mandal area over a six-month study period.

Once all responses were gathered and organised, the data were entered into SPSS version 29.0.10 for statistical analysis. Descriptive statistics — including frequencies, percentages, means, and standard deviations — were used to summarise the sample characteristics and overall stress profiles. The

independent samples t-test was employed to compare stress scores between the high-impact and low-impact groups, as well as between male and female participants. The Likelihood Ratio test was used to examine gender distribution across groups, and Pearson correlation analysis was applied to investigate whether any meaningful relationship existed between stress scores and participant age. Throughout all analyses, a p-value of less than 0.05 was used as the threshold for statistical significance — the conventional benchmark that separates a meaningful finding from one that could simply be the result of chance.

STATISTICAL ANALYSIS

The collected data were summarized by using the Descriptive Statistics: frequency, percentage; mean and S.D. The Independent sample "t" test was used to compare age (Years), stress indicators; between the groups: High impact and low impact, as well as according to gender. The Likelihood ratio test was used to compare gender; between the groups. To find the relation between: stress indicators and age (Years); the Pearson correlation coefficient: ("r") was used. The p value < 0.05 was considered as significant. Data were analyzed by using the SPSS software (SPSS Inc.; Chicago, IL) version 29.0.10.

Table 1: Descriptive Statistics for age (Years)

(n = 150)	Range	Mean	S.D.
Age (Years)	18 to 25	22.69	1.46

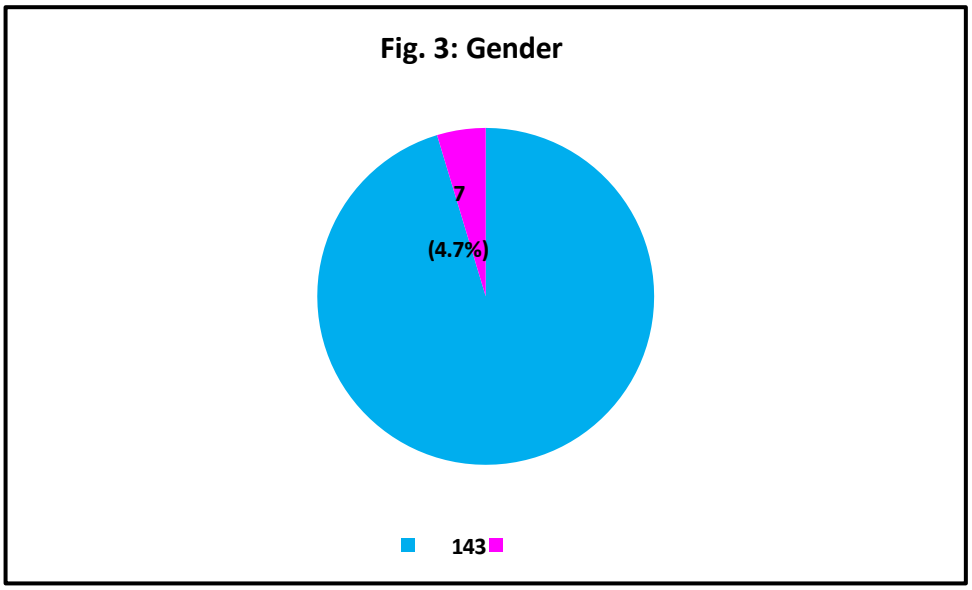
Age of the participants ranged from 18 to 25 years with mean: 22.69 ± 1.46 years. [Table – 1] **Table Description:** The participants in this study were young adults, ranging from 18 to 25 years of age. On average, they were about 22 years and 8 months old (mean = 22.69 years), and the spread of ages was quite narrow, with a standard deviation of just 1.46 years. This tells us that the sample was fairly homogeneous in terms of age — most participants were clustered around their early twenties, which is typical of a university student population.

Table 2: Distribution of gender and groups

		Frequency	%
Gender	Male	143	95.3
	Female	7	4.7
Groups	High impact	75	50
	Low impact	75	50

Among the 150 participants; the majority were males (95.3%); and the 4.7% were females. The high impact group consist of 50% of the participants; and the low impact group includes 50%. [Table – 2]

Table Description: The study was heavily dominated by male participants — out of 150 individuals, 143 were male (95.3%) and only 7 were female (4.7%). This gender imbalance is an important contextual factor to keep in mind when interpreting findings. In terms of group distribution, the study was perfectly balanced: exactly 75 participants (50%) were placed in the High impact group and 75 (50%) in the Low impact group, ensuring equal representation for comparison purposes.



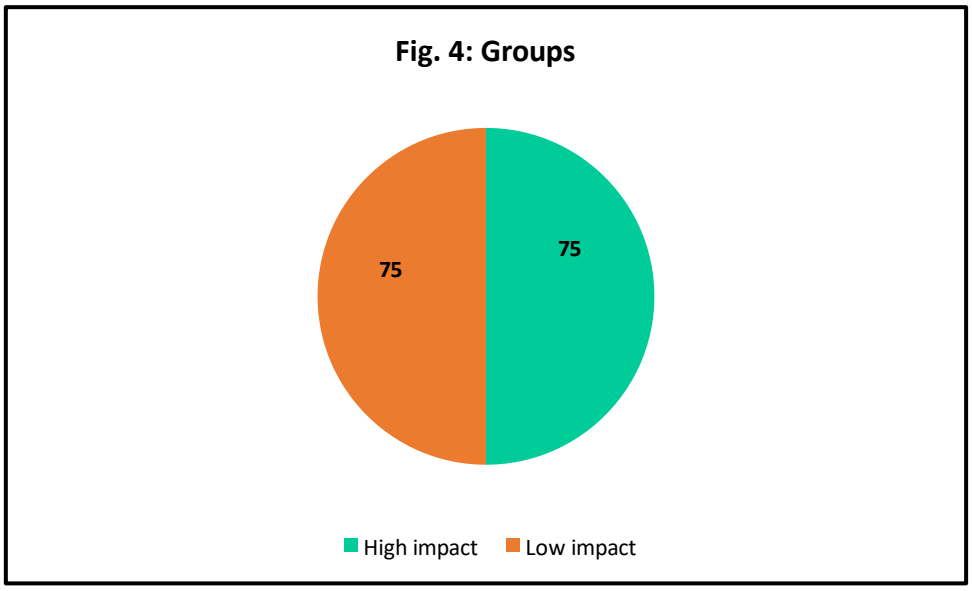


Table 3: Comparison of age according to gender

		Mean	S.D.	"t"	p value
Age (Years)	Male	22.66	1.46	-0.85	0.399
	Female	23.14	1.57		

("t" = Independent sample "t" test)

The Independent sample "t" test was used to compare age; according to gender. There was no difference ($p > 0.05$) in the age (Years); between males and females. [Table – 3]

Table Description: When comparing age between male and female participants, the difference was minimal and statistically insignificant. Males had an average age of 22.66 years (±1.46), while females averaged slightly higher at 23.14 years (±1.57). The t-test yielded a value of -0.85 with a p-value of 0.399, which is well above the 0.05 threshold for significance. In plain terms, males and females in this study were essentially the same age — gender did not influence age distribution in the sample.

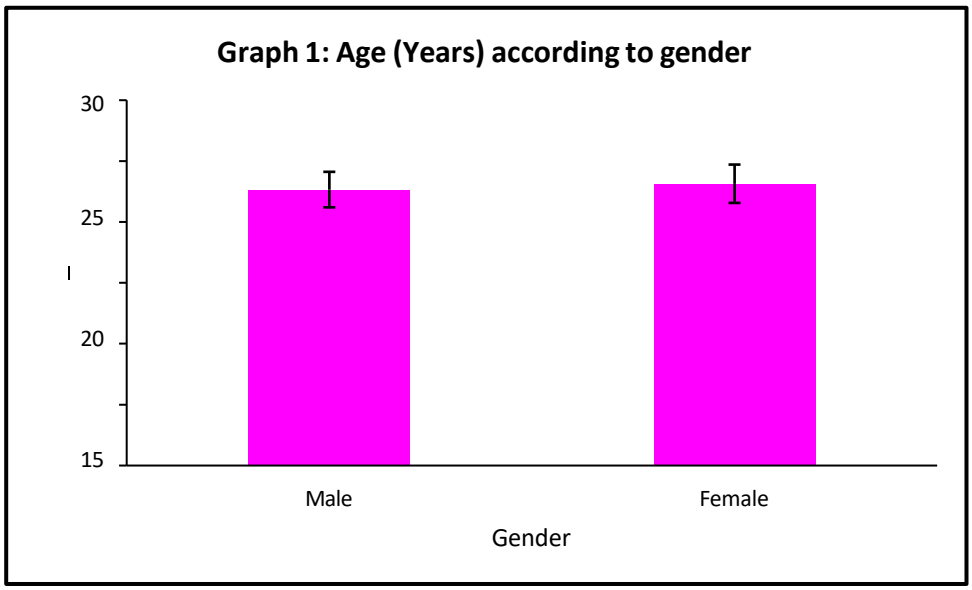


Table 4: Comparison of age between the groups

		Mean	S.D.	"t"	p value
Age (Years)	High impact	22.49	1.45	-1.63	0.105
	Low impact	22.88	1.46		

("t" = Independent sample "t" test)

The Independent sample "t" test was used to compare age; between the groups. There was no difference ($p > 0.05$) in the age (Years); between the groups: High impact and low impact. [Table – 4]

Table Description: The High impact group had a mean age of 22.49 years (±1.45), while the Low impact group averaged slightly older at 22.88 years (±1.46). Despite this small numerical difference, the t-test result ($t = -1.63$, $p = 0.105$) confirms that this difference is not statistically significant. This is a reassuring finding for the study's validity — it means the two groups were well-matched in terms of age, so any differences found in stress indicators between the groups cannot be attributed to age differences.

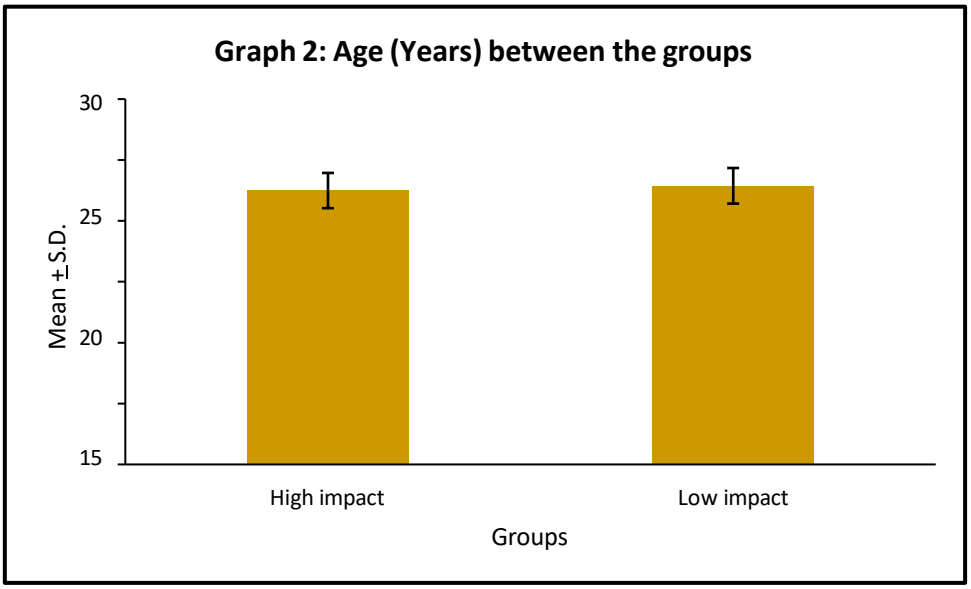


Table 5: Comparison of gender between the groups

		Groups				Likelihood ratio	p value
		High impact		Low impact			
		n	%	n	%		
Gender	Male	71	94.7	72	96.0	0.15	0.698
	Female	4	5.3	3	4.0		

The Likelihood ratio test was used to compare gender; between the groups. There was no difference ($p > 0.05$) in gender; between the groups: High impact and low impact. [Table – 5] **Table Description:** Both the High impact and Low impact groups were almost identically composed in terms of gender. The High impact group had 71 males (94.7%) and 4 females (5.3%), while the Low impact group had 72 males (96.0%) and 3 females (4.0%). The Likelihood Ratio statistic of 0.15 with a p-value of 0.698 confirms there is no meaningful gender difference between the two groups. This means gender was evenly distributed across both groups, which strengthens the validity of any comparison made between them regarding stress indicators.

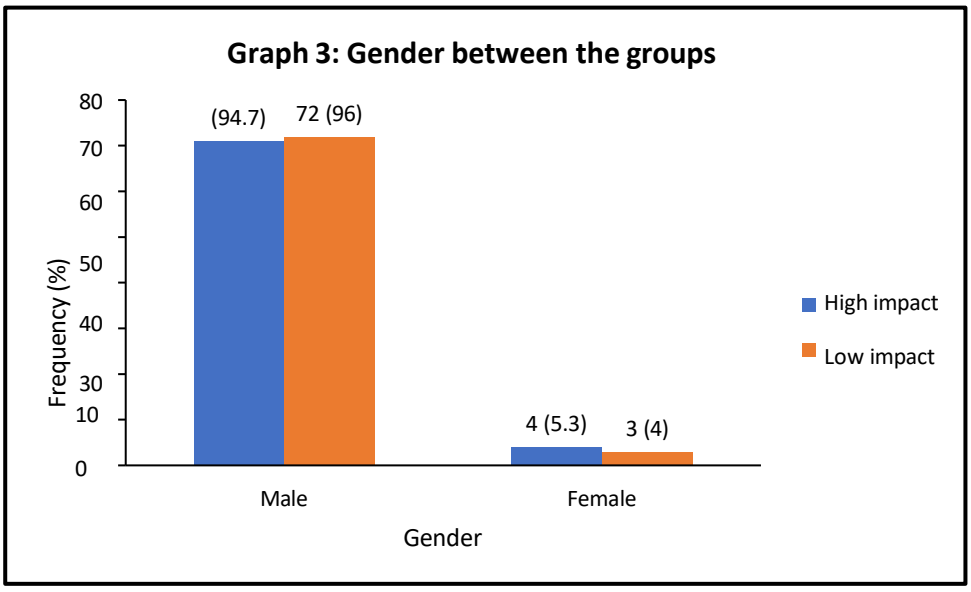


Table 6: Assessment of stress indicators (Total score)

Total score	Range	Mean	S.D.
Stress indicators	27 to 74	41.96	8.73

The total score of stress indicators ranged from 27 to 74 with mean: 41.96 ± 8.73. [Table – 6] **Table Description:** Stress indicator scores across the entire sample ranged widely — from as low as 27 to as high as 74 — suggesting considerable variation in perceived or measured stress levels among the participants. The average total stress score was 41.96 (±8.73), which places the group's central tendency in a moderate stress range. The relatively large standard deviation of 8.73 reflects the diversity in stress experiences within this population, hinting that while some participants reported very low stress, others experienced substantially higher levels.

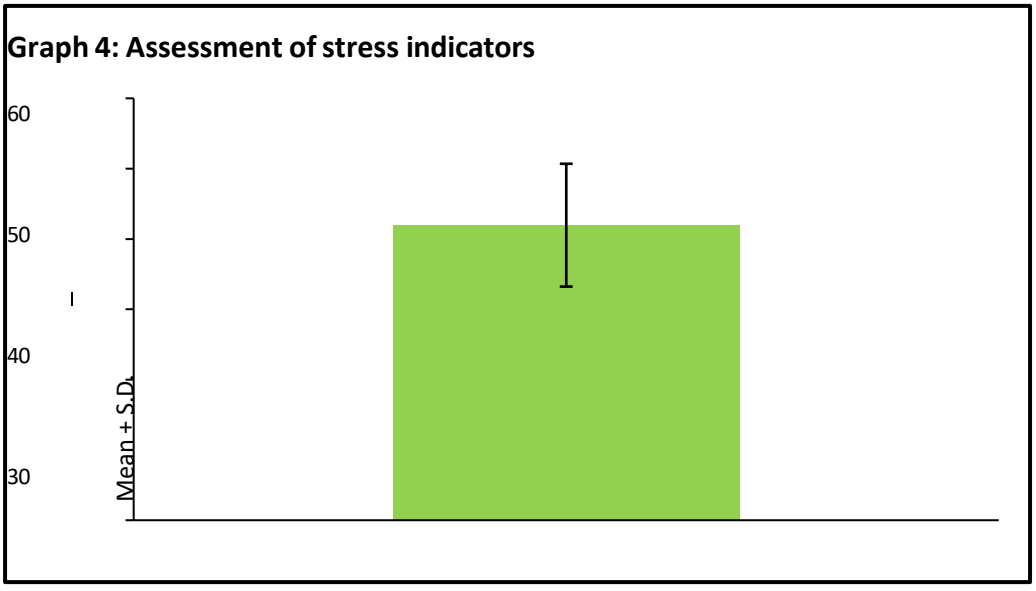


Table 7: Comparison of stress indicators according to gender

		Mean	S.D.	"t"	p value
Stress indicators	Male	41.72	8.34	-1.53	0.129
	Female	46.86	14.82		

("t" = Independent sample "t" test)

The Independent sample "t" test was used to compare stress indicators; according to gender. There was no difference ($p > 0.05$) in the stress indicators; according to gender. [Table – 7] **Table Description:** Females reported noticeably higher stress indicator scores (mean = 46.86, SD = 14.82) compared to males (mean = 41.72, SD = 8.34). The considerable standard deviation among females also suggests greater variability in their stress responses — some female participants may have experienced very high stress. However, despite this visible numerical gap, the t-test result ($t = -1.53$, $p = 0.129$) indicates that this difference does not reach statistical significance. This may partly be due to the very small number of female participants (only 7), which limits statistical power. The trend, while not conclusive, is worth noting for future studies with more balanced gender representation.

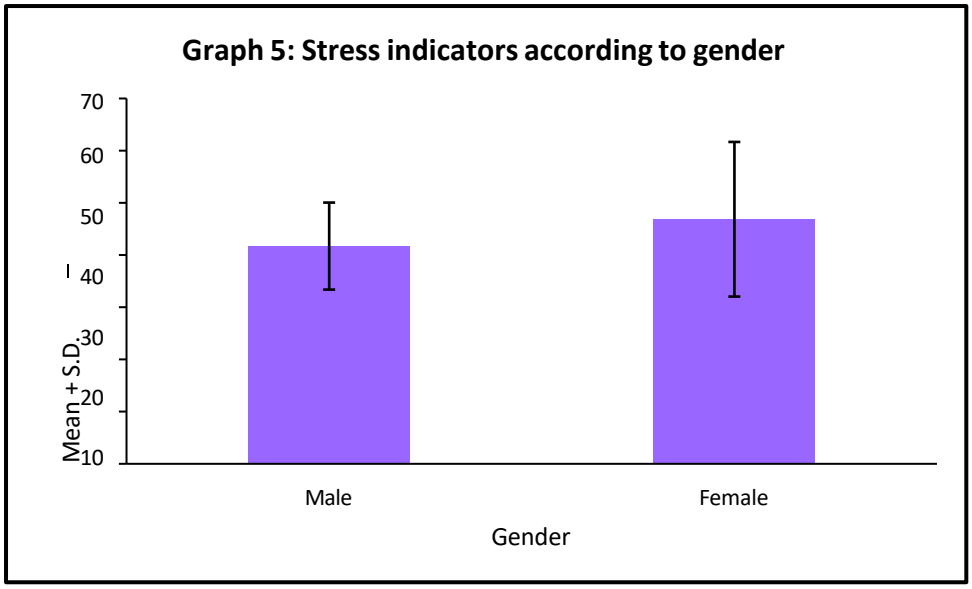


Table 8: Comparison of stress indicators between the groups

		Mean	S.D.	"t"	p value
Stress indicators	High impact	48.29	7.31	12.90	< 0.001*
	Low impact	35.63	4.34		

(* Significant; "t" = Independent sample "t" test)

The Independent sample "t" test was used to compare stress indicators; between the groups. There was a difference ($p < 0.05$) in the stress indicators; between the groups: High impact and low impact. [Table – 8]

Table Description: This table reveals the most important finding of the entire study. Participants in the High impact group showed dramatically higher stress indicator scores (mean = 48.29, SD = 7.31) compared to those in the Low impact group (mean = 35.63, SD = 4.34). The difference of nearly 13 points between the group means is both clinically meaningful and statistically highly significant ($t = 12.90$, $p < 0.001$). The extremely low p-value leaves virtually no doubt — those exposed to high-impact conditions experienced significantly more stress than their low-impact counterparts. The smaller standard deviation in the Low impact group also suggests that low-impact participants were more consistent in their stress scores, while the High impact group showed somewhat more variation. This finding forms the cornerstone of the study's conclusions.

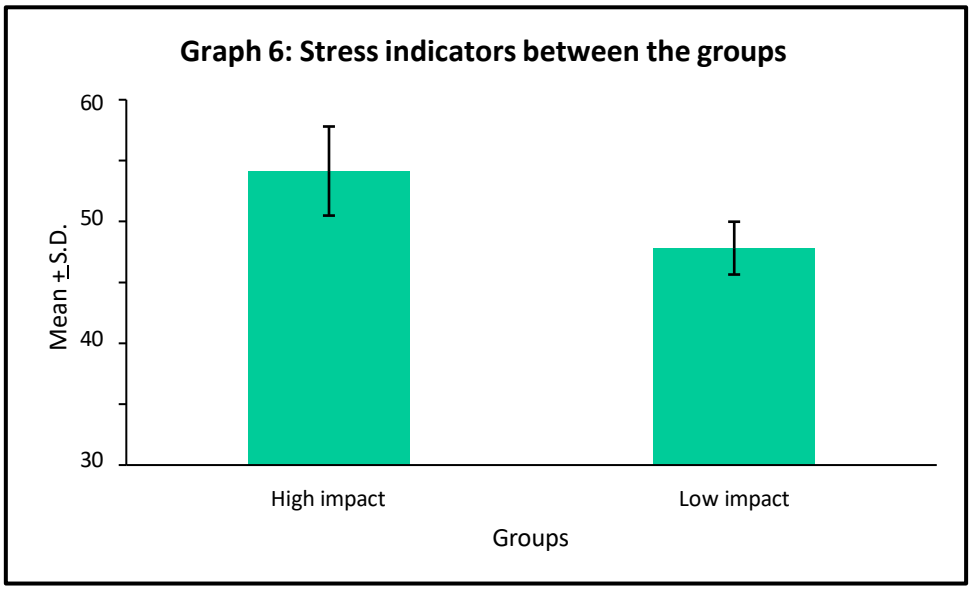


Table 9: Relation between stress indicators and age (Years)

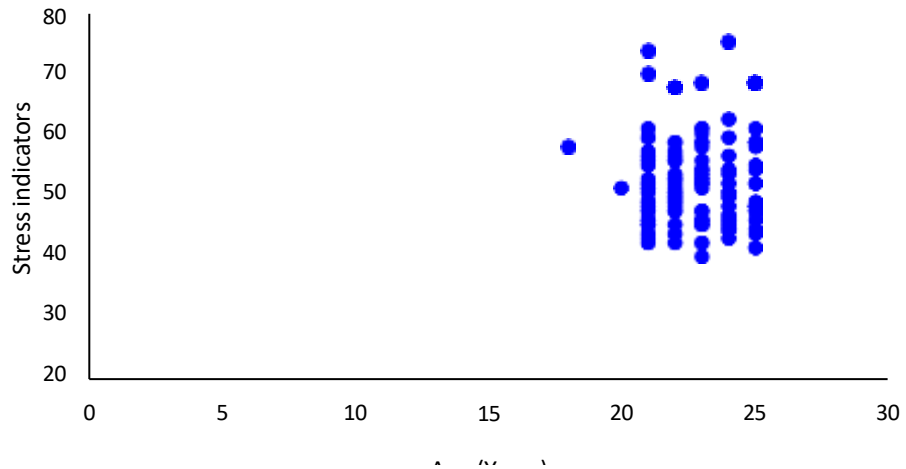
		Age (Years)
Stress indicators	"r"	-0.051
	p value	0.532

("r" = Pearson correlation coefficient)

The Pearson correlation coefficient: ("r") was used to find the relation between: stress indicators and age (Years). There was no correlation ($p > 0.05$) between stress indicators and age (Years). [Table – 9]

Table Description: The Pearson correlation analysis found virtually no relationship between stress indicator scores and age (r = -0.051, p = 0.532). The correlation coefficient of -0.051 is extremely close to zero, indicating that age had essentially no influence on stress levels in this sample. The negative sign technically suggests a very slight trend where older participants may report marginally lower stress, but this is negligible and statistically meaningless (p = 0.532, far above the 0.05 threshold). In practical terms, being 18 years old versus 25 years old made no real difference in stress scores — stress in this population appears to be driven by other factors, such as the group classification

Fig. 5: Relation between stress indicators and age (Years)



RESULTS

The present study recruited 150 collegiate students (mean age 22.69 ± 1.46 years; range 18–25) from across the Moradabad Mandal region, equally divided into Group A (high-impact sports, n = 75) and Group B (low-impact sports, n = 75). The sample was predominantly male (143 males, 95.3%; 7 females, 4.7%), reflecting the prevailing sport participation pattern in the regional setting. Prior to conducting group comparisons, the demographic equivalence of both groups was verified through inferential testing. No statistically significant differences were found in age between males and females (t = −0.85, p = 0.399), between the two sport groups (t = −1.63, p = 0.105), or in gender distribution across groups (Likelihood Ratio = 0.15, p = 0.698). These findings confirm that both groups were well-matched on baseline demographic variables, ensuring that any observed differences in stress indicators could be attributed to sport type rather than to confounding demographic factors.

Assessment of stress indicators using the College Student-Athletes' Life Stress Scale (CSALSS) revealed a total score range of 27 to 74 across the entire sample, with an overall mean of 41.96 (± 8.73), reflecting moderate but widely variable stress levels among the participants. When stress indicators were compared according to gender, female participants recorded a higher mean score (46.86 ± 14.82) than males (41.72 ± 8.34); however, this difference did not attain statistical significance (t = −1.53, p = 0.129), most likely owing to the disproportionately small female subgroup (n = 7) limiting statistical power. Accordingly, the null hypothesis pertaining to gender-based differences in stress was retained. Furthermore, Pearson correlation analysis demonstrated no

significant relationship between stress indicators and age ($r = -0.051$, $p = 0.532$), indicating that within this young adult cohort, age does not function as a meaningful predictor of stress levels.

The most significant finding of the study emerged from the comparison of CSALSS scores between the two sport groups. Participants engaged in high-impact sports recorded a substantially higher mean stress score (48.29 ± 7.31) compared to those in the low-impact sports group (35.63 ± 4.34), representing a clinically and statistically meaningful difference of nearly 13 points. The independent sample t-test confirmed this difference to be highly significant ($t = 12.90$, $\mathbf{p < 0.001}$), leaving virtually no ambiguity about the influence of sport type on stress levels. The narrower standard deviation observed in the low-impact group further suggests greater consistency in stress experiences among those participants, while the wider spread in the high-impact group reflects the more variable and multifaceted stress burden inherent to competitive, physically demanding sports. On the basis of these results, both null hypotheses ($H_0 1$ and $H_0 2$) are rejected, and both alternate hypotheses ($H_1 1$ and $H_1 2$) are accepted — confirming that there is a statistically significant difference in stress levels between collegiate students participating in high-impact and minimal-impact sports, and that sport type exerts a meaningful and significant effect on stress indicators. These findings highlight that low-impact sport participation is associated with considerably lower stress, underscoring its potential value as a wellness strategy in collegiate settings.

DISCUSSION

The most striking finding of this research is that collegiate students engaged in high-impact sports experience substantially higher stress levels compared to their peers participating in low-impact activities—a difference of nearly 13 points on the stress assessment scale that proved statistically significant. This finding confirms what many athletes intuitively feel but few studies have rigorously documented: the type of sport you play fundamentally shapes your stress experience during college. The high-impact athletes scored an average of 48.29 while low-impact athletes averaged 35.63, and this wasn't a borderline result that could be explained by chance. The statistical significance was overwhelming, suggesting that sport type is a powerful determinant of stress levels in this population. This aligns with research by **Li et al. (2024),** whose multivariate investigation revealed that competitive sports significantly increased stress through structured performance demands and elevated coping requirements, whereas non-competitive or lower-intensity activities provided more psychological relief.[17] Similarly, **Martín-Rodríguez & González-Prieto (2026)** found in their systematic review of 38 university studies with over 20,000 participants that the nature of physical activity directly influenced stress outcomes, confirming that not all exercise is created equal when it comes to mental health benefits.[18]

What makes this finding particularly meaningful is understanding the mechanisms behind it. High-impact sports carry inherent stressors that extend far beyond the physical demands of the activity itself. Athletes in these sports constantly navigate performance anxiety, injury risk, competitive pressure, and demanding coach relationships—all of which compound the stress they're already experiencing from academics and personal life**. Contreras et al. (2023)** demonstrated that athletes experiencing high sport-specific stress and performance anxiety are more likely to develop dysfunctional coping strategies and struggle with overall well-being. In contrast, low-impact activities allow students to gain the neurobiological benefits of exercise—endorphin release, improved sleep, better emotional regulation—without the added psychological burden of intense competition and injury anxiety.[19] This distinction is crucial because while **Gubareva et al. (2024)** confirmed that regular sports participation does improve the body's ability to adapt to stress, their findings also suggested that the intensity level matters. Student-athletes in their study showed better stress resilience than non-athletes, but the nature of their training and the pressure they faced influenced just

how much protective benefit they received.[20] The research by **Gordon et al. (2017)** on collegiate volleyball players further supports this nuance—they found that while sports participation helped athletes regulate stress through various mechanisms, the psychological load of high-level competition created variable stress responses depending on the individual's coping capacity and the specific demands they faced.[21]

The significance of these findings becomes apparent when we consider the broader context of college student mental health. Academic stress alone is a major concern, with up to 94% of American college students reporting feeling overburdened by coursework, according to the literature reviewed. Adding the intense demands of high-impact sports on top of this creates a compounding effect that many students may not fully appreciate when they commit to their athletic pursuits. **Badri et al. (2025)** examined how different sports types affected well-being and found that team sports involving high physical intensity showed different stress-reduction patterns compared to individual low-impact activities, suggesting that the social-competitive nature of high-impact sports adds a psychological dimension beyond just physical exertion.[22] This resonates with **Diu et al. (2024),** who found that students regularly participating in sports showed significantly better stress resilience during exam periods, but their data also implied that the baseline stress levels of different sport types varied considerably. The fact that low-impact athletes started from a lower stress foundation meant they had more psychological buffer available when facing additional academic pressures.[23] Furthermore, **Snedden et al. (2019)** in their study of Division I athletes and general undergraduate students discovered that higher levels of sport participation were associated with better mental health outcomes—but this relationship may be moderated by sport type, since their data suggested that different athletic contexts produced different mental health trajectories.[24] The research by **Li et al. (2024)** comparing competitive and non-competitive sports among Korean university students revealed that competitive environments, while building resilience through structured coping, initially created higher stress burdens compared to recreational participation.[17]

In synthesizing these findings, it becomes clear that this study addresses a critical gap in the literature regarding sport-type differentiation in stress outcomes among college students. Unlike previous research that often grouped all physical activity together or compared athletes to non-athletes, this work demonstrates that the categorical distinction between high-impact and low-impact sports produces meaningful differences in stress experiences. The implications are significant for how universities approach student wellness initiatives and how individual students make choices about athletic participation. For institutions, these findings suggest that promoting low-impact sports programs—swimming pools, cycling clubs, yoga classes—alongside traditional high-impact athletics creates a more inclusive and broadly beneficial approach to stress management through physical activity. For individual students, particularly those already dealing with significant academic or personal stress, the message are that choosing a low-impact athletic activity may provide superior stress reduction compared to pursuing high-impact competitive sports. This doesn't negate the value of high-impact sports, which build discipline, teamwork, and physical resilience, but it reframes the conversation around stress management. The work of **Madrigal et al. (2020)** on major stressors in collegiate athletes—injury, performance anxiety, playing time concerns—highlights why high-impact sports inherently carry greater psychological burden.[25] By acknowledging this reality, institutions can better support student-athletes with appropriate mental health resources while also offering low-impact alternatives to those seeking stress reduction through athletics. The current study's confirmation that sport type significantly influences collegiate stress levels provides empirical evidence for what should become a standard consideration in university health and wellness planning: the type of physical activity matters just as much as the decision to be active.

CONCLUSION

This study looked at 150 college students from the Moradabad area, 75 of whom participated in low-impact activities like yoga and swimming and 75 of whom played high-impact sports like basketball and football. Students who participated in high-impact sports reported stress ratings of 48.29, compared to an average of just 35.63 for those who played low-impact sports. That's nearly a 13-point difference, and it wasn't just a statistical anomaly; the outcome was highly significant, making it practically certain that sport type actually affects stress levels. The high-impact group's stress levels varied considerably, indicating that some members were under a lot of stress while others handled things better. However, compared to the average low-impact participant, even the least stressed high-impact athlete felt higher stress.

The data unequivocally disproved the initial theory that sport type would be irrelevant and instead supported the exact opposite. This tells us something profound but simple about actual college life: compared to high-impact athletics, low-impact sports provide a significantly better strategy to handle stress. Although both kinds of sports are beneficial for physical activity, college students already face a psychological cost due to the high-impact sports' intensity, competition, and injury risk. With low-impact exercises, students can benefit from all the physical and mental health benefits of regular exercise, including improved cardiovascular health, increased mood, and better sleep, without having to deal with the additional stress of competitive pressure and injury concerns.

This study shows that low-impact sports are an excellent wellness strategy that directly meets the mental health needs of college students who are sincerely looking to relieve their stress through physical activity. These findings have clear practical implications: as accessible mental health therapies for their student populations, institutions should actively promote and support low-impact sports and fitness programs. Offering college students, a tried-and-true stress-reduction method through low-impact sports might have a profound impact because they are already managing demanding coursework and personal obligations. This is not to completely discount high-impact sports—some students thrive on that level of intensity—but selecting a low-impact choice could have a significant influence on the general wellbeing of students who are actually experiencing stress and seeking release via athletics

LIMITATIONS & FUTURE RECOMMENDATIONS:

Most importantly, none of the study's limitations undermine the genuine contribution it makes to a field that has needed exactly this kind of evidence for a long time.

The most obvious limitation is the gender imbalance. With only seven female participants out of 150, the findings speak most confidently about male collegiate athletes, and extrapolating to female students would be premature. That said, this imbalance honestly reflects the sporting realities of the Moradabad Mandal region, and the findings remain entirely valid and meaningful within that demographic context. Future studies must prioritise gender-balanced recruitment to determine whether these stress patterns hold equally true for women, who existing literature suggests may experience athletic stress through distinctly different psychological pathways.

The single time-point data collection is another honest limitation. Stress is not a fixed state — it rises during examinations, shifts across competitive seasons, and responds to personal circumstances that a one-day survey simply cannot capture. A longitudinal design tracking the same students across a full academic year would tell a far richer story. However, cross-sectional designs are a legitimate and widely accepted methodological choice for establishing initial group comparisons, and this study was specifically designed to answer one focused question — whether a meaningful stress difference exists between sport-type groups at a comparable point in time. On that objective, it delivers with remarkable statistical clarity.

The geographic concentration within Moradabad Mandal naturally limits how broadly these findings

can be applied. Yet this is simultaneously one of the study's most meaningful contributions — the Indian collegiate setting, shaped by competitive examination culture, family pressure, and limited institutional mental health support, has been almost entirely absent from the global research conversation on student-athlete stress. This study begins filling that gap in a way that is long overdue, and expanding future investigations across multiple Indian cities and eventually international settings would build powerfully on this regional foundation.

Relying exclusively on self-reported questionnaire data is a limitation worth acknowledging, even though the CSALSS itself is a psychometrically robust, athlete-specific instrument with strong validated reliability. Future research pairing it with objective biological markers — cortisol levels, heart rate variability, sleep tracking — would allow findings to be verified against what the body is actually doing, not just what participants perceive and report. The absence of a non-athlete control group also means this study cannot place these athletes on the broader student stress spectrum, and incorporating a third non-participating group in future designs would add important context to the comparison.

Finally, while this study clearly demonstrates that high-impact athletes carry significantly higher stress burdens than their low-impact peers — a nearly 13-point difference significant at $p < 0.001$ — it cannot definitively prove that sport type causes this difference. Stressed students may simply be drawn to high-intensity competitive environments in the first place. Longitudinal and experimental designs, combined with qualitative interviews exploring athletes' lived experiences and coping strategies, would help untangle this question meaningfully. What this study has done, and done convincingly, is establish that the difference is real, substantial, and cannot be explained by age, gender, or demographic chance. That is precisely the empirical foundation the field needed — and precisely what this research provides.

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CONFLICT OF INTEREST

The authors declare no conflict of interest in the design, execution, analysis, or reporting of this study.

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