

Decoding Social Anxiety: The Interplay Of Personality And Sensory Processing Sensitivity Among Young Adults

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Abstract

Background: Social anxiety was associated with the big five personality traits. SPS is a biologically based dimension of temperament that reflects individual differences in responsivity and reactivity to sensory and social stimuli. The authors hypothesized social anxiety to be related to both trait measures.

Purpose: This study investigated the relation between SPS and Big Five traits and social anxiety, and tested whether the addition of SPS beyond the Big Five provided incremental prediction on social anxiety.

Methods: A cross-sectional study was conducted on a non-clinical sample of 148 young adults aged 18 to 25 years selected through convenience sampling procedure from four universities in Gujarat, India. The study utilized Highly Sensitive Person Scale, Social Interaction Anxiety Scale and 50 item Big Five Personality Test as assessment tools. The statistical analysis procedure involved Spearman correlation coefficients and hierarchical multiple regression analysis through Statistical Package for Social Sciences (SPSS) version 30.0.

Results: SPS correlated positively with social anxiety ($r = .359, p < .001$). Social anxiety exhibited negative correlations with Extraversion ($r = -.448$), Conscientiousness ($r = -.296$), and Openness ($r = -.316$). SPS accounted for unique variance beyond the Big Five ($\Delta R^2 = .065, p < .001$), with SPS ($\beta = .289$), Extraversion ($\beta = -.364$), and Openness ($\beta = -.281$) emerging as significant predictors in the final model. High-SPS individuals demonstrated higher social anxiety compared to low-SPS counterparts ($U = 1835.00, p = .001, r = .285$). Neuroticism revealed no significant associations, and no SPS $\times$ Big Five interactions emerged, suggesting additive associations in this sample.

Conclusion: SPS demonstrated incremental utility relative to the Big Five in this sample. These findings may therefore have implications for identifying dispositional vulnerability for further investigation and, with prospective validation, for young-adult mental-health screening and intervention research.

Keywords:

Sensory processing sensitivity, social anxiety, personality, extraversion, openness, neuroticism.

Introduction

Social anxiety is one of the most common and harmful psychological conditions that can occur in young people. It results from individual peculiarities of temperament and personality, as well as the influence of the environment. The awareness of the sources of individual vulnerability is essential for their timely detection and prevention.

Social anxiety disorder (SAD) is among the most prevalent mental health conditions globally, characterised by persistent and excessive fear of social situations in which the individual fears possible scrutiny or negative evaluation, typically emerging in adolescence or early adulthood¹. Individuals with SAD often experience anticipatory anxiety, in-situation distress, and post-event rumination, impairing academic, occupational, and interpersonal functioning². The disorder is associated with significant avoidance behavior, fewer close relationships, and underachievement in academic and professional domains³.

Social anxiety arises from interactions between genetic susceptibility, neurobiological vulnerabilities, and environmental factors⁴. Neurobiologically, it is consistently associated with heightened amygdala reactivity to socially threatening stimuli⁵, along with exaggerated autonomic nervous system responses to expected social situations and disturbed cognition, such as ruminating about negative social outcomes, threat-related attentional biases, and catastrophizing⁶. These distorted thought patterns fuel avoidance patterns and help maintain the disorder over time⁷.

SPS is a biologically determined temperament characterized by deeper cognitive processing of stimuli, heightened emotional sensitivity, and greater susceptibility to overstimulation⁸. Though not a clinical diagnosis, SPS is a stable individual difference trait found in about 15-20% of the population, and not seen just in humans, but in diverse species of animals, with evolutionary

significance⁹. Current models place SPS in a differential-susceptibility model, where highly sensitive individuals are more susceptible to environmental influences "for better and for worse"—when they are exposed to adverse environments, their performance is worse than that of non-sensitive individuals, while when exposed to supportive or enriched environments, their performance is better^{10,11}.

Aron and Aron⁸ operationalized SPS by using the Highly Sensitive Person Scale (HSPS), and later Smolewska, McCabe and Woody¹² found three dimensions: ease of excitation (EOE), low sensory threshold (LST) and aesthetic sensitivity (AES), related differently with different personality traits. EOE and LST have been positively correlated with anxiety and neuroticism, suggesting that individuals high in these facets are more prone to respond socially with heightened emotional responses that can potentiate fear and distress, while AES is positively correlated with openness to experience^{13,14}, resulting in capturing aesthetic awareness.

The Big Five personality factors, which include Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness, are the most widely accepted structural taxonomy of personality¹⁵. In this context, social anxiety has been positively related to Neuroticism and negatively to Extraversion^{16,17} reflecting general emotional instability and reduced sociability, respectively. Beyond the Big Five, person-centred studies revealed two sensitivity types: a 'vulnerable' type characterized by above-average Neuroticism, below-average Extraversion, and only slightly above-average Openness and a 'confident' type characterized by average Neuroticism, significantly above-average Openness, and slightly above-average Extraversion¹⁸. That a single sensitivity construct fractures into two personality profiles with different social implications argues against treating SPS as simply Neuroticism or Openness under another name, and suggests instead that sensitivity, Neuroticism, and Openness are related but distinct constructs, each carrying its own relevance to social outcomes such as social anxiety.

To begin with, this study attempts to answer a new question, regarding whether SPS predicts social anxiety beyond broad personality traits that partially overlap with it. Conceptually, this study considers personality traits as broad behavioral tendencies, whereas SPS is viewed as a specific sensitivity-related temperamental characteristic that may have unique relations with young adults' experiences of socially evaluative situations. Another strength of this study is that most of the existing SPS-personality literature comes from Western settings, and the theorized links between SPS and personality are not known to be universal. Testing these links in an Indian sample helps address this limitation.

Study Objectives and Hypotheses

Consequently, the study had two goals. First, the paper aimed to identify the bivariate relationships between SPS, big five personality traits, and social anxiety. Second, the study intended to test whether the SPS could explain unique variance in social anxiety beyond big five personality traits. The paper formulated four hypotheses and one additional prediction. First, there was a positive relationship between SPS and social anxiety. Second, SPS was positively related to neuroticism and openness and negatively related to extraversion. Third, social anxiety had a positive relationship with neuroticism and negative with extraversion. Fourth, the big five personality traits predicted social anxiety uniquely. Finally, the SPS explained unique variance in social anxiety (prediction).

Methods

Participants

Young adults were defined as those aged between 18 and 25 years. Convenience sampling was conducted among four different universities in Gujarat, India. The targets of this study were undergraduate, postgraduate students and research scholars aged between 18 and 25 years who gave informed consents and participated in the online survey. However, those who did not meet the age criteria, those with psychological disorders and those who provided partial information were excluded from the study. Of the 160 participants who entered the study, 12 were excluded because of incomplete questionnaires, leaving a final non-clinical sample of 148 (valid response rate = 92.5%). The demographic characteristics of the final sample are presented in Table 1.

Since the study was intended as an exploratory pilot investigation, no formal a priori power analysis was conducted prior to data collection. A sensitivity analysis¹⁹ indicates that the achieved sample of $N = 148$ offers approximately 80% power ($\alpha = .05$, two-tailed) to detect a medium incremental effect of $f^2 = 0.15$ for a single predictor entered at Block 2 of a six-predictor hierarchical regression, but is underpowered to detect small incremental effects ($f^2 \approx 0.05-0.08$), for which an N of approximately 200-250 would be required. As a result, the incremental-validity results should be interpreted in light of the fact that the observed $\Delta R^2 = .065$ ($f^2 \approx 0.07$) is close to the lower bound of what the current sample can reliably detect.

Table 1 Sociodemographic characteristics of the sample

Characteristic	N (%)	M±SD
Continuous variable		

Characteristic	N (%)	M±SD
Age (years)	148	(21.52) ± 2.00
Categorical variables		
Gender		
Female	122 (82.4%)	—
Male	25 (16.9%)	—
Other	1 (0.7%)	—
Level of study		
Undergraduate	56 (37.8%)	—
Postgraduate	89 (60.1%)	—
Research Scholars	3 (2.0%)	—

Measures

Big Five Personality Test (BFPT): The Big Five personality traits were measured using the 50-item Big Five Personality Test (BFPT), a free, public-domain instrument retrieved from openpsychometrics.org²⁰ that draws on the International Personality Item Pool Big Five Markers. It assesses Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience using 10 items per trait. Items were scored on a five-point Likert scale (0 = disagree to 4 = agree) so that all domains had a 0 – 40 score range, with higher scores reflecting a more intense expression of the domain. The domain structure reflects the five major factors in the five-factor model. Internal consistency reliability for the domains was $\alpha = .83$ for Extraversion, $\alpha = .62$ for Agreeableness, $\alpha = .75$ for Conscientiousness, $\alpha = .87$ for Neuroticism, and $\alpha = .82$ for Openness. The low Agreeableness reliability should be taken into account while analyzing results related to this domain.

Social Interaction Anxiety Scale (SIAS): The fear of social interactions in general was measured using the 20-item SIAS21. The items were measured using a five-point Likert scale that ranged from 0 to 4, with the total score ranging from 0 to 80. A high score implies high levels of social anxiety. A score of 34 was used as a cut-off point for determining the presence of clinically significant symptoms of social anxiety. This does not mean that a score of 34 or above indicates the presence of clinically significant social anxiety since the cut-off was determined in a clinical population. In the current non-clinical sample, the scale demonstrated very good internal consistency ($\alpha = .93$).

The Highly Sensitive Person Scale (HSPS): SPS was measured using the 27-item HSPS8. Items are scored on a seven-point scale (1-7) and summed up to obtain the total score that ranges from 27 to 189; the higher the score, the higher the level of SPS. The HSPS has been proven to have good internal reliability and validity in previous studies.^{8,12} Although later psychometric work identified the EOE, LST, and AES dimensions, the present analysis used the total HSPS score in accordance with the study objectives. Internal consistency for the HSPS total score in the present sample was good (Cronbach's $\alpha = .87$).

Procedure

Four universities in Gujarat, India, were selected for data collection. The study was explained to the heads of the relevant university departments, who were requested to circulate the study information within their departments. Participants were approached through an online Google Form, and informed consent was obtained before questionnaire completion. The approximate completion time was 25-30 minutes. After participation, a note of thanks was distributed to each participant.

Ethical Considerations

The study was approved by the National Forensic Sciences University Institutional Ethics Committee (Certificate Ref. No. NFSU/SDSR/IEC/Certificate/494/2025) on September 25, 2025. Written informed consent was obtained from all participants before data collection. Participant information and study data were handled confidentially in accordance with the approved ethical protocol.

Data Analysis

Analyses were organized to correspond directly to the study objectives and hypotheses: Spearman correlations tested H1-H3, while hierarchical multiple regression tested H4a-H4b; the SPS group comparison and SPS × Big Five interaction models were

supplementary analyses. IBM SPSS 30.0 was used for data analysis of this study. Before analysis, the dataset was checked for missing values, and 12 participants with missing values were excluded. All study variables were analysed by descriptive statistics (mean, standard deviation, range, skewness, kurtosis). Normality was assessed prior to bivariate analysis using the Shapiro-Wilk test. Spearman's rank-order correlations were used for all bivariate analyses because of significant differences from normality for SA Total ($W = .968, p = .002$), Extraversion ($W = .977, p = .015$), and Openness ($W = .973, p = .005$). Hierarchical multiple regression was used in a sequential (forced entry) design: Block 1 entered all Big Five personality traits, and Block 2 entered SPS Total; the increment in the model (ΔR^2) for Block 2 represents the unique variance explained by SPS beyond the personality traits. Before interpreting the regression model, all standard assumptions were tested: normal probability plots of residuals and the Kolmogorov-Smirnov test were used to assess normality. All regression assumptions were judged to be satisfactorily met. The SPS scores were divided using a median split into high ($SPS \geq \text{median}$) and low ($SPS < \text{median}$), and the groups were compared using a Mann-Whitney U test. While median splits reduce statistical power and may attenuate effect sizes²², this analysis was conducted as a supplementary illustration of the continuous regression findings; the primary inferential conclusions are based on the regression analyses. Given that the outcome (SA Total) and two predictors (Extraversion, Openness) were not normally distributed, an alternative approach to estimation and inference, specifically, the bias-corrected and accelerated bootstrap (5,000 resamples), was used to supplement the OLS regression. Table 4 provides 95% bootstrap confidence intervals for all unstandardized coefficients. For both models, p values are reported using the APA 6th edition format (italicized). The level of significance adopted for all tests was $p < .05$ (two-tailed). Since the study was cross-sectional, regression coefficients, correlations, and differences tests should be interpreted as statistical associations and predictive strengths, respectively, and not as causal statements.

Results

Descriptive Statistics

Table 2 contains descriptive statistics for all the study variables, including such measures as skewness and kurtosis. The mean score on the SPS was 130.75 ($SD = \pm 20.56$; range: 65-178). The mean score on social anxiety was 37.29 ($SD = \pm 14.93$; range: 12-77), which is above the SIAS screening cut-off point estimated at approximately 34. This cut-off point was established using clinical samples²¹ and thus has not been validated in non-clinical populations. Therefore, the comparison with the cut-off point was performed to indicate an approximate descriptive benchmark that does not necessarily suggest the presence of clinically significant social anxiety in the present sample. Personality trait means were: Neuroticism $M = 15.91$ ($SD = \pm 6.52$), Extraversion $M = 18.06$ ($SD = \pm 8.20$), Agreeableness $M = 29.22$ ($SD = \pm 5.19$), Conscientiousness $M = 25.04$ ($SD = \pm 6.92$), and Openness $M = 27.66$ ($SD = \pm 6.46$).

Internal consistency reliabilities (Cronbach's alpha) for the present sample were as follows: Neuroticism $\alpha = .87$, Extraversion $\alpha = .83$, Openness $\alpha = .82$, Agreeableness $\alpha = .62$, Conscientiousness $\alpha = .75$, SA total $\alpha = .93$, and HSPS total $\alpha = .87$. All coefficients are reported in Table 2.

Table 2 Descriptive statistics and internal consistency (Cronbach's α) for all study variables

Variable	N	Mean	SD	Min	Max	Skewness	Kurtosis	α
SPS Total	148	130.75	± 20.56	65	178	-0.41	-0.12	.87
SA Total	148	37.29	± 14.93	12	77	0.50	-0.08	.93
Neuroticism	148	15.91	± 6.52	2	36	0.20	-0.18	.87
Extraversion	148	18.06	± 8.20	1	40	0.43	-0.25	.83
Agreeableness	148	29.22	± 5.19	16	40	-0.26	-0.09	.62
Conscientiousness	148	25.04	± 6.92	9	40	-0.07	-0.36	.75
Openness	148	27.66	± 6.46	11	40	-0.36	-0.14	.82

Note. SD = standard deviation; SPS = Sensory Processing Sensitivity; SA = Social Anxiety; α = Cronbach's alpha (present sample). Kurtosis values are reported as excess kurtosis.

Bivariate Correlations

Table 3 presents Spearman correlations among all study variables. Supporting Hypothesis 1, SPS was significantly and positively correlated with social anxiety ($r = .359, p < .001$). SPS showed a significant positive association with Agreeableness — a finding not predicted by Hypothesis 2 — ($r = .289, p < .001$), along with the hypothesized positive association with Openness ($r = .185, p$

= .024), and a significant negative association with Extraversion ($r = -.213$, $p = .009$), consistent with the Extraversion and Openness components of Hypothesis 2. Contrary to prediction, however, SPS was not significantly associated with Neuroticism ($r = .027$, $p = .743$) or Conscientiousness ($r = -.140$, $p = .089$). Taken together, Hypothesis 2 was therefore only partially supported: the predicted associations with Extraversion and Openness were confirmed, but the predicted association with Neuroticism was not, and the significant association with Agreeableness had not been hypothesized and is treated as exploratory. Hypothesis 3 was partially supported. As predicted, social anxiety was significantly and negatively correlated with Extraversion ($r = -.448$, $p < .001$). Contrary to the hypothesis, Neuroticism was not significantly associated with social anxiety ($r = .040$, $p = .633$). Social anxiety also showed significant negative correlations with Conscientiousness ($r = -.296$, $p < .001$) and Openness ($r = -.316$, $p < .001$); these associations were additional findings not specified in H3. Agreeableness was not significantly correlated with social anxiety ($r = -.100$, $p = .225$).

Table 3 Spearman rank-order correlations among study variables

Variable	1	2	3	4	5	6	7
1. SPS	—						
2. SA	.359**	—					
3. Neuroticism	.027	.040	—				
4. Extraversion	-.213**	-.448**	-.225**	—			
5. Agreeableness	.289**	-.100	-.050	.224**	—		
6. Conscientiousness	-.140	-.296**	.039	.102	.102	—	
7. Openness	.185*	-.316**	-.008	.159	.502**	.313**	—

Note. * $p < .05$. ** $p < .01$ (two-tailed). SPS = Sensory Processing Sensitivity; SA = Social Anxiety.

Hierarchical Regression Analysis

To test Hypotheses 4a and 4b, hierarchical multiple regression was conducted with social anxiety as the outcome. Block 1 entered all five Big Five personality traits; Block 2 added SPS. Results are presented in Table 4.

Block 1 (Big Five traits) accounted for 33.2% of variance in social anxiety ($R^2 = .332$, $F(5, 142) = 14.135$, $p < .001$). The addition of SPS in Block 2 resulted in a large increase in explained variance, $\Delta R^2 = .065$, $\Delta F(1, 141) = 15.293$, $p < .001$, containing 39.8% of variance ($R^2 = .398$, adjusted $R^2 = .372$, $F(6, 141) = 15.514$, $p < .001$). Both results support H4a and H4b that SPS accounts for unique variance in the prediction of social anxiety beyond the Big Five personality traits.

In the final model, three of these predictors yielded statistically significant results. Thus, SPS was found to be the best positive predictor ($\beta = .289$, $t = 3.911$, $p < .001$; 95% CI for B [0.104, 0.316]). In turn, Extraversion emerged as the best negative predictor ($\beta = -.364$, $t = -4.955$, $p < .001$; 95% CI for B [-0.927, -0.398]), followed by Openness ($\beta = -.281$, $t = -3.527$, $p = .001$; 95% CI for B [-1.013, -0.285]). Table 4 provides 95% confidence intervals for the unstandardized coefficients (B) for all predictors, in accordance with the APA 7th edition. In particular, for the final model, the squared semi-partial correlation for SPS was $sr^2 = .065$ ($sr = .255$). Hence, this variable uniquely predicted approximately 6.5% of variance in social anxiety on top of all the five big five predictors entered. Finally, Neuroticism ($\beta = -.040$, $p = .554$), Agreeableness ($\beta = .077$, $p = .333$), and Conscientiousness ($\beta = -.131$, $p = .066$) were found to be non-significant predictors. Moreover, all the VIF values were below 1.5, which ruled out the possibility of multicollinearity. The standardized residuals ranged from -2.16 to 2.69.

Table 4 Hierarchical multiple regression predicting social anxiety

Predictor	Block 1 β	Block 2 β	B	SE B	t	p	VIF	95% CI
Neuroticism	-.057	-.040	-.091	.154	-.594	.554	1.059	[-0.395, 0.213]
Extraversion	-.452**	-.364**	-.663	.134	-4.955	< .001	1.262	[-0.927, -0.398]
Agreeableness	.172*	.077	.222	.228	.971	.333	1.478	[-0.229, 0.673]

Predictor	Block 1 β	Block 2 β	B	SE B	t	p	VIF	95% CI
Conscientiousness	-.192**	-.131	-.283	.153	-1.854	.066	1.173	[-0.585, 0.019]
Openness	-.239**	-.281**	-.649	.184	-3.527	.001	1.484	[-1.013, -0.285]
SPS Total	—	.289**	.210	.054	3.911	< .001	1.275	[0.104, 0.316]
R ²	.332	.398						
Adjusted R ²	.309	.372						
ΔR^2	—	.065						
ΔF	—	15.293**						

Note. β = standardized regression coefficient; B = unstandardized regression coefficient; SE B = standard error; VIF = variance inflation factor; 95% CI = 95% confidence interval for B. Predictors were entered by forced (simultaneous) entry within two sequential blocks: Block 1 = the five Big Five traits; Block 2 added SPS Total. * $p < .05$. ** $p < .01$.

Group Comparison by SPS Level

To explore the relationship between SPS level and social anxiety, we split subjects into high SPS ($SPS \geq 133$, $n = 75$) and low SPS ($SPS < 133$, $n = 73$) groups based on a median split of the continuous SPS distribution ($Md = 133$). As mentioned, this supplementary analysis is limited in statistical power due to the dichotomisation of a continuous variable²². The Mann-Whitney U test indicated that individuals with high SPS ($Mdn = 39.0$, $M = 41.56$, $SD = 15.17$) experienced significantly more social anxiety than individuals with low SPS ($Md = 30.0$, $M = 32.90$, $SD = 13.42$), $U = 1835.00$, $Z = -3.463$, $p = .001$, $r = .285$. The effect size $r = .285$, which is a medium-sized effect²³, gives additional support for Hypothesis 1.

Supplementary Analysis: Testing SPS $\times$ Big Five Interactions

Because Differential Susceptibility Theory predicts that SPS moderates, rather than simply adds to, the influence of other dispositional and environmental factors, a supplementary hierarchical regression tested whether the Big Five traits moderated the SPS–social anxiety association. Following Aiken and West's centering convention, SPS and each Big Five trait were mean-centered and product terms were computed. A block of five SPS $\times$ Big Five interaction terms, added after the Block 2 main-effects model reported above, did not significantly improve model fit ($\Delta R^2 = .025$, $F(5, 136) = 1.20$, $p = .314$). A more parsimonious model retaining only the three theoretically motivated interaction terms (SPS $\times$ Neuroticism, SPS $\times$ Extraversion, SPS $\times$ Openness) was similarly non-significant ($\Delta R^2 = .019$, $F(3, 138) = 1.55$, $p = .204$). Entered individually, controlling for all main effects, none of the five SPS $\times$ trait interactions reached significance (SPS $\times$ Neuroticism: $b = -.007$, $p = .320$; SPS $\times$ Extraversion: $b = -.009$, $p = .111$; SPS $\times$ Agreeableness: $b = .014$, $p = .158$; SPS $\times$ Conscientiousness: $b = .0003$, $p = .961$; SPS $\times$ Openness: $b = .004$, $p = .608$). SPS $\times$ Extraversion showed the numerically largest, though non-significant, interaction term, consistent with a possible small amplifying effect of low Extraversion on the SPS–social anxiety link that the present sample was not powered to detect. Taken together, these findings indicate that SPS and the Big Five traits relate to social anxiety additively rather than interactively in this sample: SPS's contribution to social anxiety does not depend on a person's standing on any single Big Five trait, and vice versa.

Discussion

The present study examined the relationships among SPS, Big Five personality traits, and social anxiety. The results provided support for H1 as well as both the aspects of H4, partially supporting H2 and H3. Overall, the outcome added to research on dispositional correlates of social anxiety by contributing both findings congruent with the extant Western literature and some contradictory results.

SPS and Social Anxiety

SPS was not only correlated with social anxiety in this sample, but it also accounted for an additional 6.5% of the variance ($\Delta R^2 = .065$, $p < .001$) after adjusting for all five of the Big Five traits simultaneously. Conventional standards for effect sizes would deem $\Delta R^2 = .065$ as a small-to-medium effect ($f^2 \approx 0.07$), by Cohen's criteria, comparable to several of the individual Big Five predictors retained in the final model. A more direct comparison comes from social anxiety disorder research: Hofmann and Bitran²⁴ found that SPS was elevated in patients diagnosed with social anxiety disorder, but it was empirically separable from social anxiety symptom severity itself and more strongly related to harm avoidance (using the Tridimensional Personality Questionnaire, not the

Big Five) than to social anxiety per se, suggesting that it serves as a distinct vulnerability factor from social anxiety itself, not just a re-labeling thereof. The present pattern in a non-clinical, South Asian sample supports a similar interpretation, albeit from a different perspective: SPS is not simply a proxy for a Big Five trait or a symptom re-labelled as temperament, but a dispositional characteristic that contributes unique statistical information.

The same pattern was also observed in the group comparison, with high-SPS participants reporting about 9 points higher social anxiety than low-SPS participants (Mdn = 39.0 vs. 30.0), a medium effect ($r = .285$)²³. Differential Susceptibility Theory is compatible with this vulnerability-side pattern, in which highly sensitive individuals are theorized to fare worse in adverse environments and better in supportive environments^{10,11}. Because the design is cross-sectional, it can only address the vulnerability side of this framework: whether highly sensitive individuals would perform better than their less sensitive counterparts under supportive conditions cannot be determined from this dataset. This asymmetry should be acknowledged because it limits the strength of the differential-susceptibility interpretation that can be drawn from the present data.

Personality Correlates of Social Anxiety

The strongest standardized predictor in the final regression model was Extraversion ($\beta = -.36$, $p < .001$), which also emerged as the strongest zero-order correlate ($r = -.45$) among the five traits. This fits the hierarchical structure of social anxiety from Naragon-Gainey and Watson (2011)¹⁶ well, which demonstrated that low sociability was nested closer to social anxiety than any other personality traits. The dataset below appears to follow almost the same pattern, though to a slightly lower degree.

Openness to Experience was the second-strongest independent predictor ($\beta = -.28$, $p < .01$). “Openness,” in turn, is “associated with less social anxiety in the literature¹⁶; however, this relationship is not entirely consistent¹⁷. What makes this finding intriguing is that openness appears to be a significant predictor beyond Extraversion, which is not typically the case in such studies.” The article claims that this phenomenon might be explained by the fact that openness was linked more to cognitive flexibility than aesthetic sensitivity in this study, which distinguished it from SPS.

Conscientiousness, by contrast, demonstrated a meaningful association at the zero-order level ($r = -.30$). However, once Extraversion and SPS were entered into the model, its association with social anxiety fell outside the threshold of statistical significance ($p = .066$). This attenuation indicates that the association between Conscientiousness and social anxiety overlaps substantially with variance shared with Extraversion and SPS in the present model.

Finally, Agreeableness demonstrated an interesting pattern — it was unrelated to social anxiety at the zero-order level ($r = -.10$, ns), but was a significant positive predictor in Block 1 of the regression ($\beta = .17$, $p < .05$), before becoming unimportant again once SPS was added in Block 2 ($\beta = .08$). A non-significant, negative zero-order correlation becoming a significant, positive predictor when controlling for the effects of other variables in the model is the textbook definition of suppression effect. Here, Agreeableness’ variance shared with the other traits seems to have masked its positive association with social anxiety that unmasked when controlling for this shared variance. With the low internal consistency of the Agreeableness subscale in this sample ($\alpha = .62$), such a pattern should be treated as an exploratory finding, and a study employing a more trustworthy psychometric assessment of Agreeableness is needed to confirm this suppression effect.

The Unexpected Null Finding for Neuroticism

The results of our analysis demonstrated that the links between social anxiety and personality traits were not equal for these university students ($N = 148$). Indeed, while the level of dispositional Neuroticism was not significantly connected to social anxiety, there was a strong negative correlation with Extraversion ($r = -.45$, $p < .001$). Thus, for the given sample, social anxiety appeared to be related primarily to variation in extraversion manifestations, such as being talkative/sociable, unsociable/timid, and so forth, rather than overall levels of Neuroticism. However, this result does not imply that, in general, Extraversion is a causal factor for social anxiety or that Neuroticism plays no role in other populations.

Methodologically, this paradox could be explained by the design of the Big 5 personality test itself. Due to the nature of the 50 items, which measure personality on a large scale, the Big Five personality test combines various low-level traits, for instance, moodiness, and irritation, into one high-level trait of neuroticism. As a result, such personality characteristics as self-consciousness or sensitivity, which are associated with social fears, might have been missed by the test.

From a developmental point of view university life puts students in to many social settings which they must present in and network at, also out of which they grow as individuals. In young adulthood social anxiety in these settings may present more in terms of low base levels of social energy and introversion rather than in terms of wide spread negative affect. We see in our data that there is a case for what we may term a group of people who are very emotionally stable but at the same time very introverted which does not see their social anxiety related to high levels of trait Neuroticism; but we will need longitudinal and clinical studies to confirm this.

Personality Traits and SPS

SPS showed positive relations with Openness ($r = .185$), as the aesthetic-sensitivity literature suggests^{12,25}, and negative relations with Extraversion ($r = -.213$), as the introversion literature suggests⁸. However, neither correlation was large enough to suggest redundancy, and the relationship between SPS and Neuroticism was minimal ($r = .027$)—the trait SPS is most commonly alleged to duplicate¹³. Together with the incremental-validity result, this pattern supports the interpretation that SPS captures a distinct dispositional construct rather than repackaged Neuroticism or introversion.

The positive relationship with Agreeableness ($r = .289$) was not anticipated from the literature reviewed in the Introduction, which generally suggests only a weak relationship between Agreeableness and SPS¹². One possible explanation is that the empathic, interpersonally attuned dimension of high sensitivity may relate to the warmth facet of Agreeableness more strongly in this sample than previous HSPS research—predominantly conducted in Western samples—would suggest. Another possibility is that the finding is sample-specific, particularly because the internal consistency of the Agreeableness subscale in this sample fell below conventional standards ($\alpha = .62$). Replication with a more reliable measure of Agreeableness is therefore needed before this association can be considered established. The finding that facets of SPS relate differently to well-being²⁶, as Sobocko and Zelenski reported, further supports the value of examining SPS multidimensionally in future research.

Implications for Early Intervention

The statistical findings should be differentiated from the clinical utility. SPS explained 6.5% of the unique variance in social anxiety beyond the Big Five, and the high-SPS versus low-SPS comparison demonstrated a medium effect ($r = .285$). These are significant results for hypothesis generation, but the statistical significance does not determine the diagnostic accuracy, clinical relevance, or criterion for individual-level classification. The SIAS cutoff applied in the descriptive analysis has not been validated for the current non-clinical sample, and SPS itself is not a clinical diagnosis. Therefore, the high SPS should not be considered as a stand-alone screening criterion based on the present study.

With these qualifications, the findings provide a basis for considering supplementary evaluation of SPS as a potential supplementary dispositional indicator in young-adult mental-health research. Prospective studies should assess whether the addition of SPS to current social-anxiety screening practices improves identification of students who might benefit from assessment or intervention and whether such interventions have differential value for students higher in sensory sensitivity.

Limitations

This study has several limitations. First, the sample size ($n = 148$) was sufficient only for detecting medium effects (Cohen, 1992), whereas the detected effect could have been small or even an interaction; thus, the study should be regarded as a pilot one that requires replications. Second, the study was conducted among students of only 4 universities in Gujarat, which limits the generalizability of the findings. Third, the cross-sectional design does not permit causal or temporal conclusions. Fourth, all measures were self-report, introducing potential shared method variance and response bias. Fifth, the sample was markedly gender-imbalanced (82% female), and no sex or gender differences in SPS, personality, or social anxiety were modelled; given documented sex differences in social anxiety²⁷ and SPS¹⁵, the present findings may primarily reflect female patterns and cannot be assumed to generalize to men. Sixth, the Agreeableness subscale showed modest internal consistency ($\alpha = .62$), which may have contributed to unstable associations involving that trait. Seventh, the HSPS was analysed as a unitary total score; future studies should employ a validated multidimensional form such as the HSP-SF to examine the differential contributions of EOE, LST, and AES to social anxiety.

Future Directions

Future studies should confirm these results in larger, multi-institutional and more gender-balanced samples and investigate the reproducibility of the null association between Neuroticism and social anxiety. Longitudinal designs would allow examination of whether SPS prospectively predicts changes in social anxiety independent of broader personality traits. The inclusion of physiological or behavioural measures alongside self-report could strengthen construct validity. Screening-focused studies should also evaluate whether SPS provides incremental classification value beyond established social-anxiety measures, including sensitivity, specificity, and practical feasibility, before any clinical or counselling application is considered.

Conclusion

This exploratory study examined the relationships among SPS, Big Five personality traits, and social anxiety in 148 young adults. SPS was significantly and positively associated with social anxiety and accounted for unique variance beyond the Big Five personality traits. Social anxiety was significantly higher in the high-SPS group than in the low-SPS group, while Extraversion and Openness were the strongest negative personality predictors in the final regression model. Overall, SPS emerged as a meaningful dispositional correlate in this sample. Prospective validation is required before SPS can be considered for young-adult mental-health screening or intervention planning.

Abbreviations

AES — Aesthetic Sensitivity, BFPT — Big Five Personality Test, EOE — Ease of Excitation, HSPS — Highly Sensitive Person Scale, HSP-SF — Highly Sensitive Person Scale–Short Form, LST — Low Sensory Threshold, OLS — Ordinary Least Squares, SA — Social Anxiety, SAD — Social Anxiety Disorder, SIAS — Social Interaction Anxiety Scale, SPS — Sensory Processing Sensitivity, VIF — Variance Inflation Factor

Declarations

Ethics Approval

The study was carried out in compliance with ethical standards for human-subjects research and was approved by the National Forensic Sciences University Institutional Ethics Committee (Certificate Ref. No. NFSU/SDSR/IEC/Certificate/494/2025) on September 25, 2025.

Consent to Participate

Written informed consent was obtained from all participants, as approved by the National Forensic Sciences University Ethics Committee.

Data Availability

The data generated and analysed during this study are not publicly available because of privacy and ethical restrictions related to participant confidentiality and cannot be shared.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Author Contributions

Muskan Sharma: Conceptualisation, Methodology, Investigation, Formal analysis, Writing - original draft. Priyaranjan Maral: Data collection, Data analysis, Supervision, Validation. Aparna: Data analysis, Writing, Formatting.

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