

Investigating the Effects of Social Comparison and Neuroticism on Social Anxiety in Greece

¹Gemeliaris, A., ¹Kordali, M.O., ¹Lymperatos, A., ¹Apostolatou, E., ¹Ivanovich, M., ¹Ioannou, C., & ¹Louka, P.

¹Mediterranean College, Greece & University of Derby, UK

Abstract

Prior research has examined the relationship between social comparison, neuroticism, and social anxiety separately. Social comparison and neuroticism have been found to be strongly related to social anxiety [1,2], but the effect of their interaction on social anxiety remains understudied. The present study aimed to tackle the gap by investigating the separate and interaction effects that social comparison and neuroticism may have on social anxiety. Due to the Covid-19 restrictions an opportunity sample of 100 participants completed three online questionnaires; the Social Comparison Orientation Scale [3], the Neuroticism Scale, developed by the researchers and the Social Interaction Anxiety Scale (SIAS) [4]. Data were analysed using a 2 (social comparison) x 2 (neuroticism) independent measures ANOVA and the results indicated a significant effect of neuroticism on social anxiety, suggesting that high levels of neuroticism led to higher levels of social anxiety. However, social comparison did not have an effect of social anxiety and there was no significant interaction with neuroticism. The findings provide important practical and theoretical limitations concerning the design of the study in this digital era. Further research suggestions are also discussed.

Keywords:

Social comparison, Neuroticism, Social anxiety, Greece, Online Survey

Introduction

With a prevalence of 18% in the population, anxiety disorders constitute one of the most widespread type of psychiatric disorders [5]. Prior research indicates that social anxiety disorder (SAD) is the most frequent one with an early onset of 12 years of age for 50% of the cases and of 20 years of age for 80% of the cases, and it constitutes a risk factor for the development of depression and substance abuse [6]. The 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [7] as well as the International Classification of Diseases 11 (ICD 11) [8] classifies SAD as a phobic disorder, along with agoraphobia and other specific phobias, from which it was differentiated just 50 years ago [9]. Schlenker and Leary [10] described the term social anxiety as one's avoidance of and inhibition in social interactions with others. It is well known that individuals with SAD tend to evade and fear others' attention, a fact which leads them to shun most interpersonal experiences, or to face such conditions with extreme discomfort [6]. Heimberg's et al. [11] cognitive-behavioural model of SAD stresses the significance of the perception of the audience, that is one's belief about being evaluated by others, as a causal factor for the onset of social anxiety. According to this model, an anxious individual believes that the audience holds some unattainable and extremely high standards for their performance, which strengthen its negative self-imagery by creating negative social experiences or misleading self-perception [12]. From the biological perspective, however, genetic studies are progressively focusing on certain behavioural traits (e.g., introversion and neuroticism) assuming a correlation between them and SAD [13,14,15]. Despite the progress made in this area, the origins of SAD and its pathogenesis seem to not be clarified yet [6].

Social anxiety has also been documented to have a positive relationship with social comparison [1] which could impact on one's feelings of social anxiousness. Social comparison refers to the biological tendency of individuals to determine their condition-ability, and overall identity in a constant comparison to other people, based on the knowledge they possess about others [16]. Several lines of re-

search suggest that both upward (comparison of oneself with those perceived as superior) and downward (comparison of oneself with those perceived as inferior) social comparison, can enhance a person's social anxiety levels [17,18]. The persistent concern deriving from social comparison may gradually result in the person's sense of lack of social skills and its dread of social interplay [7]. Critically, a recent systematic review [19] suggests that a person's assumptions relating to social comparisons play a major role in shaping SAD. This is supported by an identified positive correlation between social comparison and social anxiety [20].

At the same time, another personality trait directly linked to SAD is neuroticism, who refers to an individual's inclination to experience distressing emotions, such as timidity and fearfulness, low self-esteem and irritability, weak impulse inhibition, and helplessness [21,22]. Naragon-Gainey and Watson [23] have shown a mild correlation between social anxiety and neuroticism, claiming that neuroticism can predict social anxiety. Previous researchers have demonstrated that individuals who strongly compare socially and individuals with high levels of neuroticism show increased social anxiety [1,2,26]. However, although previous studies examined the effect of neuroticism on social anxiety, they did not specifically focus on neuroticism facets such as depression [24,25], suggesting a limitation that the present study aims to tackle.

To shed light to the disparities, the present study aims to investigate the individual and combined effects of social comparison and neuroticism on social anxiety. With the creation and use of a new scale for the neuroticism personality trait, this research intends to obtain data through alternative means than what has been done before. Critically, although the above effects have been investigated in a variety of countries across the world, no relevant empirical evidence has been produced in Greece. Thus, by acquiring data from a Greek population sample, this study appears to be innovative and aims to contribute to bibliography considering a new cultural context.

Three hypotheses are tested in the current research:

Social comparison will have a significant main effect on social anxiety, where it is expected that participants with high social comparison will show higher levels of social anxiety than those with low.

Neuroticism will have a significant main effect on social anxiety, where it is expected that participants with high levels of neuroticism will show higher levels of social anxiety than those with low.

Social comparison and neuroticism will have a significant interaction effect on social anxiety, where it is expected that participants with high levels of social comparison and neuroticism will score higher on social anxiety than those with low levels.

Method

Design: In this experimental design, independent measures (2 x 2 Independent Measures ANOVA) were used. Social comparison is the first independent variable consisting of two levels, low and high. Neuroticism is the second independent variable consisting respectively by low and high levels. Social anxiety signifies the dependent variable, measured by the total score in the Social Interaction Anxiety Scale (SIAS) [4].

Participants: 100 participants, 43 males and 57 females, ranging from 18 to 30 years old with a mean age of 24.11 (SD = 3.9) were recruited for the purposes of this study via opportunity sampling. The inclusion criteria applied for this study related to age above 18th year. Exclusion criteria referred to individuals with chronic health issues who are on medication and to those who have been diagnosed with a mental illness.

Materials: Three on-line questionnaires with the use of google forms were given to participants for the conduction of the study. The first was Gibbon's and Buunk's [3] Social Comparison Orientation Scale (Cronbach's $\alpha = .87$), which contained 11 items ranking on a 5-point Likert scale from 1 to 5, with 1 being strongly disagree and 5 being strongly agree, with 2 reversed coded items (e.g., I always pay a lot

of attention to how I do things compared with how others do things). The second was the Neuroticism Scale, which was developed by the researchers. Initially, it consisted of 16 items and was measured on a 5-point Likert scale from 1 to 5, with 1 being strongly disagree and 5 being strongly agree, with 4 reversed coded items (e.g., I have worries about things going wrong). Following the internal reliability analysis (initial $\alpha = .817$), 2 items had to be removed because of low item-total correlation ($r < .2$). The remaining questionnaire including 14 items, was characterized by high internal consistency ($\alpha = .849$). Lastly, Mattick's & Clarke's [4] Social Interaction Anxiety Scale (SIAS) (Cronbach's $\alpha = 0.90$) included 19 items ranking likewise on a 5-point Likert scale from 1 to 5, this time with 1 being not at all characteristic or true for me and 5 being extremely characteristic or true for me, with 2 reversed coded items (e.g., I worry about expressing myself in case I appear awkward). Overall, the responders were asked to answer with regards to the degree that they felt the statement, indicating that the higher the score the higher the levels of social comparison, neuroticism and social anxiety.

Procedure: Due to the Covid-19 related issues, participants were recruited via social network services and were asked to complete the three on-line questionnaires, starting with the Social Comparison Orientation Scale and finishing with the Social Interaction Anxiety Scale (SIAS), once they had consented to take part. The duration of the task was 15 minutes. At the end of the task, participants had access to the debriefing form, where the intent of the study was introduced to them.

Data Handling: Following the data collection, the total scores for each participant were calculated by summing the scores individually for each questionnaire after adjusting the reversed coded items. The participants were then divided in the experimental conditions via median split, where participants with social comparison scores below 35 formed the Low Social Comparison Group and those over 35 the High Social Comparison one. Similarly, participants with scores below 44 on the neuroticism scale, formed the Low Neuroticism Group and those above 44 the High Neuroticism one.

Finally, all participants were matched to their social anxiety scores and the data were ready to be analyzed in the SPSS.

Ethical considerations: The current study was conducted based on the BPS Code of Ethics and Conduct, which ensures the protection of both researchers and participants. As provided by the code of ethics, there was an appropriate supervision of the research by a competent professor. In addition, participants were given informed consent and the right to withdraw from the research within 14 days through the respective forms. Regarding confidentiality, the researchers were the only ones capable accessing the database. The anonymity of the participants was also ensured with the use of a unique personal code.

Results

Data were screened and not all parametric assumptions were met, given that three outliers were detected. The method of winsorizing was followed to eliminate the outliers, changing the problematic values by adding the mean of each condition with double the standard deviation of the same condition [27]. Table 1 shows the mean social anxiety scores, standard deviations and totals for low and high social comparison and neuroticism.

Table 1: Mean number of social anxiety scores (with standard deviations) for low and high social comparison and neuroticism

	Low Social Comparison	High Social Comparison	Total
Low Neuroticism	37.72 (9.39)	42.08 (9.48)	39.9 (9.59)
High Neuroticism	46.24 (16.35)	49.4 (11.28)	47.82 (13.99)
Total	41.98 (13.88)	45.74 (10.95)	

The means and SDs indicate that participants with high levels of neuroticism demonstrate much higher social anxiety than those with low. On the contrary, it can be noted that participants with high social comparison do not show much greater social anxiety than those with low (Figure 1).

Figure 1: Mean Social Anxiety scores and standard errors per condition.

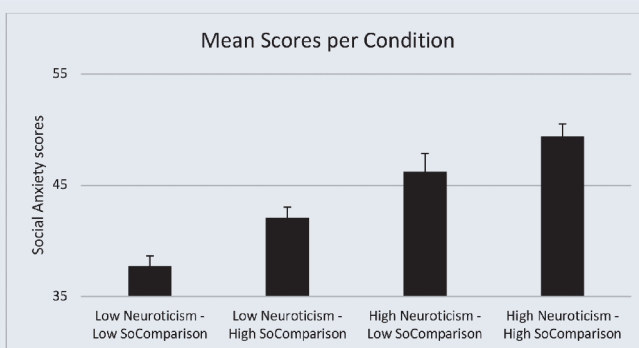
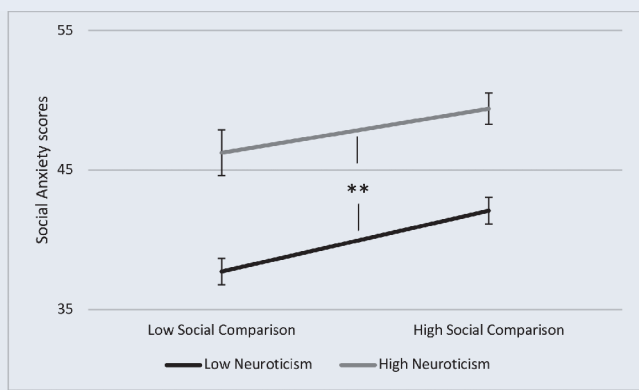


Figure 2: Neuroticism and Social Comparison interaction on Social Anxiety Scores and effect of Neuroticism on Social Anxiety at $p = .001$.**



Data were analyzed using a 2 (social comparison) x 2 (neuroticism) independent measures ANOVA. Effect sizes were calculated and power analysis was also performed. Levene's test was significant ($p = .001$) indicating that the assumption of equality of error variances was violated; the alpha level for the ANOVA was therefore adjusted to the more conservative level of 0.01 [27]. There was no significant main effect of social comparison on social anxiety, $F(1,96) = 2.467$, $p = .12$, $p^2 = 0.022$, power = .06. Furthermore, there was no significant interaction effect between social comparison and neuroticism on social anxiety, $F(1,96) = .063$, $p = .803$, $p^2 = 0.00057$, power = .05. However, there was a significant main effect of neuroticism on social anxiety, $F(1,96) = 10.946$, $p =$

.001, $p^2 = 0.999$, power = 1.00, demonstrating that there was higher social anxiety in participants with high levels of neuroticism than in those with low levels irrespective of their level of social comparison (Figure 2).

Discussion

The primary aim of the present study was to establish whether social comparison and neuroticism produce separate and interacting effects on social anxiety. The findings reveal that only neuroticism had a significant effect on the participants' levels of social anxiety, so that individuals with high levels of neuroticism exhibited higher levels of social anxiety than the ones with low levels of neuroticism. However, neither social comparison alone nor interacting with neuroticism impacted on the participants' levels of social anxiety. The findings seem to support the existing literature in the field of neuroticism in relation to social anxiety and provide direct support for the studies by Newby et al. [2] and Bienvenu et al. [25] who revealed that higher levels of neuroticism are positively correlated with higher levels of social anxiety. Unlike the studies of Buunk et al. [26] and Newby et al. [2], which used Eysenck's Personality Questionnaire (EPQ) [28] and NEO Personality Inventory-Revised-Neuroticism Subscale (NEO-PI-RN) [29] respectively to measure neuroticism, this study used its own developed scale of neuroticism, and still obtained comparable results. This is a critical strength of the present study, which reproduced the same findings, using an adapted scale, which produced high internal consistency, and was therefore reliable. It is also worth noting that the developed scale had a higher internal consistency than the EPQ (Cronbach's $\alpha = .81$) [26], which has been widely used for the measurement of neuroticism. However, to validate this scale's overall validity and reliability, further experimental testing is needed.

On the other hand, the non-significant effect of social comparison on social anxiety does not seem to support prior findings. The current results contradict with most of the research claiming a strong association between social comparison and SAD [1,17,18,19]. This may be attributed

to the fact that this study did not investigate the effects of the direction of social comparison (upward or downward), since the Social Comparison Orientation Scale [3] does not include questions related to the direction of social comparison. The lack of direction constitutes a flaw for Wheeler [30], who suggests that the degree to which an individual compares with another, should be examined in combination with the direction of the comparison. This assertion may also be responsible for the non-significance of the interaction effect of social comparison and neuroticism on social anxiety, along with individual differences. However, this cannot be assumed with certainty, since it appears that no research has examined those variables together. Therefore, the causes for this finding should be investigated anew for the better understanding of this phenomenon.

The reported effect sizes, according to Cohen's [31] suggested values, reveals the strong impact of neuroticism on social anxiety. A large effect of neuroticism on social anxiety ($\eta^2 = .99$) suggests that that 99% of the variance in social anxiety levels can be explained by the neuroticism levels of the participants. Therefore, it can be assumed that magnitude effect of neuroticism was enough to influence social anxiety levels. Additionally, the perfect statistical power (1.00) verifies the results' validity and excludes any probability of statistical error. On the other hand, the low percentages of effect sizes and statistical power of both social comparison ($\eta^2 = .022$, power = .06) and its interaction with neuroticism ($\eta^2 = .0057$, power = .05) highlight their inability to fulfill the normality requirements, directing the research attention to the limitations that might have prevented positive statistical outcomes.

Firstly, attention needs to be drawn to the use of the median split. By using this method, participants who scored higher in one category were placed in the same condition as those who scored around the median. Thus, the condition in which a participant close to the median should be categorized, does not seem to be that unambiguous with the median split. It is recommended that in future studies, the participants need to be divided into three groups (low, moderate, and high) to produce more accurate results.

Furthermore, the COVID-19 restrictions which led to the recruitment of a small and convenience sample restrict the generalization of the findings [1]. Therefore, future research should preferably use probability samples with a larger sample size that cover a broader spectrum of participants, to address this constraint and produce a significant interaction effect. Lastly, the fact that the study was performed online poses another theoretical limitation, mostly due to participants' personal biases and the lack of observation by a researcher. However, for Campell et al. [32], statistical significance and accurate findings can also be obtained via digital environments. The increasing use of the online environment for the realization of studies will shed light into such opportunities for research as well as into their benefits and limitations.

Conclusion

Separately, social comparison and neuroticism personality trait have been found to influence one's social anxiety. The present study examined the interaction effect that the variables could have on social anxiety. The findings showed that higher levels of neuroticism alone could significantly demonstrate higher levels of social anxiety. However, social comparison alone as well as the interaction effect appeared not to have a statistically significant effect on social anxiety. The practical and the theoretical limitations of this research were discussed. Future research should investigate deeper the impacts of social comparison and neuroticism on social anxiety to shed light in this area and help health educators support the public via innovative programs.

References

- Jiang, S., & Ngien, A. (2020). The Effects of Instagram Use, Social Comparison, and Self-Esteem on Social Anxiety: A Survey Study in Singapore. *Social Media + Society*, 6(2). doi: 10.1177/2056305120912488
- Newby, J., Pitura, V. A., Penney, A. M., Klein, R. G., Flett, G. L., & Hewitt, P. L. (2017). Neuroticism and perfectionism as predictors of social anxiety. *Personality and Individual Differences*, 106, 263–267. doi: 10.1016/j.paid.2016.10.057
- Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: Development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, 76(1), 129–142. doi: 10.1037/0022-3514.76.1.129
- Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*, 36(4), 455–470. doi: 10.1016/s0005-7967(97)10031-6
- Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, Severity, and Comorbidity of 12-Month DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 617. doi: 10.1001/archpsyc.62.6.617
- Stein, M. B., & Stein, D. J. (2008). Social anxiety disorder. *The Lancet*, 371(9618), 1115–1125. doi: 10.1016/s0140-6736(08)60488-2
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition: DSM-5* (5th ed.). American Psychiatric Publishing.
- World Health Organization. (2018). *International Classification of Diseases for mortality and morbidity statistics (ICD 11)* (11th Revision).
- Marks, I. M., & Gelder, M. G. (1966). Different Ages of Onset in Varieties of Phobia. *American Journal of Psychiatry*, 123(2), 218–221. doi: 10.1176/ajp.123.2.218
- Schlenker, B. R., & Leary, M. R. (1982). Social anxiety and self-presentation: A conceptualization model. *Psychological Bulletin*, 92(3), 641–669. doi: 10.1037/0033-2909.92.3.641
- Heimberg, R. G., Brozovich, F. A., & Rapee, R. M. (2010). A Cognitive Behavioral Model of Social Anxiety Disorder. *Social Anxiety*, 395–422. doi: 10.1016/b978-0-12-375096-9.00015-8
- Morrison, A. S., & Heimberg, R. G. (2013). Social Anxiety and Social Anxiety Disorder. *Annual Review of Clinical Psychology*, 9(1), 249–274. doi: 10.1146/annurev-clinpsy-050212-185631
- Bienvendu, O. J., Hettema, J. M., Neale, M. C., Prescott, C. A., & Kendler, K. S. (2007). Low Extraversion and High Neuroticism as Indices of Genetic and Environmental Risk for Social Phobia, Agoraphobia, and Animal Phobia. *American*

- Journal of Psychiatry*, 164(11), 1714–1721. doi: 10.1176/appi.ajp.2007.06101667
14. Hirshfeld-Becker, D. R., Biederman, J., Henin, A., Faraone, S. V., Davis, S., Harrington, K., & Rosenbaum, J. F. (2007). Behavioral Inhibition in Preschool Children At Risk Is a Specific Predictor of Middle Childhood Social Anxiety: A Five-Year Follow-up. *Journal of Developmental & Behavioral Pediatrics*, 28(3), 225–233. doi: 10.1097/01.dbp.0000268559.34463.d0
 15. Stein, M. B., Chartier, M. J., Lizak, M. V., & Jang, K. L. (2001). Familial aggregation of anxiety-related quantitative traits in generalized social phobia: Clues to understanding “disorder” heritability. *American Journal of Medical Genetics*, 105(1), 79–83. doi: 10.1002/1096-8628(20010108)105
 16. Festinger, L. (1954). A Theory of Social Comparison Processes. *Human Relations*, 7(2), 117–140. doi: 10.1177/001872675400700202
 17. Antony, M. M., Rowa, K., Liss, A., Swallow, S. R., & Swinson, R. P. (2005). Social comparison processes in social phobia. *Behavior Therapy*, 36(1), 65–75. doi: 10.1016/s0005-7894(05)80055-3
 18. Gilbert, P. (2000). The relationship of shame, social anxiety and depression: the role of the evaluation of social rank. *Clinical Psychology & Psychotherapy*, 7(3), 174–189. doi: 10.1002/1099-0879(200007)7
 19. Gregory, B., & Peters, L. (2017). Changes in the self during cognitive behavioural therapy for social anxiety disorder: A systematic review. *Clinical Psychology Review*, 52, 1–18. doi: 10.1016/j.cpr.2016.11.008
 20. Weeks, J. W., Rodebaugh, T. L., Heimberg, R. G., Norton, P. J., & Jakatdar, T. A. (2008). “To Avoid Evaluation, Withdraw”: Fears of Evaluation and Depressive Cognitions Lead to Social Anxiety and Submissive Withdrawal. *Cognitive Therapy and Research*, 33(4), 375–389. doi: 10.1007/s10608-008-9203-0
 21. Costa, P. T., & McCrae, R. R. (1985). *The NEO Personality Inventory*. Psychological Resources Assessment.
 22. McCrae, R. R. (2010). The Place of the FFM in Personality Psychology. *Psychological Inquiry*, 21(1), 57–64. doi: 10.1080/10478401003648773
 23. Naragon-Gainey, K., & Watson, D. (2011). Clarifying the dispositional basis of social anxiety: A hierarchical perspective. *Personality and Individual Differences*, 50(7), 926–934. doi: 10.1016/j.paid.2010.07.012
 24. Gamez, W., Watson, D., & Doebbeling, B. N. (2007). Abnormal personality and the mood and anxiety disorders: Implications for structural models of anxiety and depression. *Journal of Anxiety Disorders*, 21(4), 526–539. doi: 10.1016/j.janxdis.2006.08.003
 25. Bienvenu, O. J., Samuels, J. F., Costa, P. T., Reti, I. M., Eaton, W. W., & Nestadt, G. (2004). Anxiety and depressive disorders and the five-factor model of personality: A higher- and lower-order personality trait investigation in a community sample. *Depression and Anxiety*, 20(2), 92–97. doi: 10.1002/da.20026
 26. Buunk, A. P., Brakel, T. M., Bennenbroek, F. T. C., Stiegelis, H. E., Sanderman, R., Van den Bergh, A. C. M., & Hagedoorn, M. (2009). Neuroticism and responses to social comparison among cancer patients. *European Journal of Personality*, 23(6), 475–487. doi: 10.1002/per.720
 27. Field, A. (2018). *Discovering Statistics Using IBM SPSS Statistics* (Fifth ed.). SAGE Publications Ltd.
 28. Eysenck, H. J., & Eysenck, S. B. G. (1991). *Manual of the Eysenck Personality Scales (EPS adult)*. London: Hodder & Stoughton.
 29. Costa, P. T., & McCrae, R. R. (1992). *Revised NEO personality inventory (NEO PI-R) and NEO five-factor inventory (NEO FFI): Professional manual*. Odessa, FL: Psychological Assessment Resources.
 30. Wheeler, L. (2000). Individual Differences in Social Comparison. *Handbook of Social Comparison*, 141–158. doi: 10.1007/978-1-4615-4237-7_8
 31. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences (2nd Edition)* (2nd ed.). Routledge.
 32. Campbell, M., Gibson, W., Hall, A., Richards, D., & Callery, P. (2008). Online vs. face-to-face discussion in a web-based research methods course for postgraduate nursing students: A quasi-experimental study. *International Journal of Nursing Studies*, 45(5), 750–759. doi: 10.1016/j.ijnurs-tu.2006.12.011