

# Dental Anxiety and Personality: Investigating the Relationship Between Dental Anxiety and Self-Consciousness

**George C. Economou, Honours B.Sc.**

*Abstract:* This study investigated whether personality plays a role in a condition called dental anxiety. Specifically, the study examined the relationship between dental anxiety (the negative response to the stress elicited from a dental interaction) and self-consciousness (the tendency to evaluate aspects of oneself that are subject to private and public display). The purpose of this study was to identify the characteristics possessed by dentally anxious individuals who face potential health risks because of their avoidance. Sixty York University undergraduate students were recruited by convenience sampling to participate. These subjects completed Corah's Dental Anxiety Scale and the Self-Consciousness Scale. The Self-Consciousness Scale consists of three subscales, including private self-consciousness, public self-consciousness, and social anxiety. Results indicated an 0.54 significant correlation between dental anxiety and self-consciousness. The public self-consciousness and social anxiety subscales correlated the most with dental anxiety. Furthermore, the data did not indicate a significant moderating relationship for gender between the two aforementioned variables. These results contribute to the establishment of personality characteristics as one of the dimensions determining dental anxiety.

Mr. Economou is a first-year dental student at the University of Toronto. Direct correspondence and requests for reprints to him at 370 Bristol Road West, Mississauga, Ontario, Canada, L5R 2J7; 416-979-4750 (x3614) phone; 416-979-4936 fax; georgeeconomou@hotmail.com.

*Key words:* dental anxiety, personality, self-consciousness, social anxiety

*Submitted for publication 4/16/03; accepted 7/20/03*

Over the last decade the demand for dental services has increased, mostly due to increased awareness among the public of the consequences of poor dental health. Alongside this increase in demand of dental services, there has been a proportional increase in the number of people who experience symptoms ranging from dislike to phobia regarding dental treatment. These individuals find dental procedures so distressing that they experience acute anxiety symptoms such as increased sympathetic nervous system output, uneasiness, apprehension, tension from anticipating danger, irritability, and avoidance when in a dental environment.

Dental anxiety is defined as a patient's response to the stress that is specific to the dental situation.<sup>1</sup> A study by Stouthard and Hoogstraten revealed that more than 50 percent of the population in industrialized countries were apprehensive while attending the dentist, whereas 15 percent regularly avoid dental care because of their anxiety.<sup>2</sup> Furthermore, Gatchell et al. indicated that 70 percent of patients visiting the dentist exhibit feelings of apprehension and 15 percent avoid dental visits due to their anxiety.<sup>3</sup> Other

studies have shown more conservative ranges such as 2.6 percent to 20.4 percent of the general population exhibiting dental anxiety.<sup>4</sup> Rowe and Moore indicated that in the United States there were 45 million people suffering from dental fear.<sup>5</sup> This type of phobic or anxious behavior regarding dental practitioners and procedures could have acute consequences for the oral and psychological health of those affected.

Most people recognize the importance of dental health, but a significant proportion of the population finds dental procedures so extremely distressing that it has elicited attention from both medical and psychological investigations. Agras et al., for example, asked individuals to identify commonly feared situations.<sup>6</sup> Dental anxiety ranked fifth among all situations most feared by the subjects in this study. Although there have been many findings regarding dental anxiety, many gaps in knowledge still exist. Studies have indicated the possibility of a relationship between dental anxiety with social anxiety as well as physical self-perception.<sup>7,8</sup> To further this line of research, this study was designed to examine the

relationship between dental anxiety and self-consciousness, whose definition encompasses the constructs of social anxiety as well as self-perception.

Generally, self-consciousness is defined as being conscious of oneself as an object of the observation of others. Specifically, self-consciousness is the tendency to think and evaluate those aspects of oneself that are subject to private and public display. As a concept, it is the tendency to focus on one's inner thoughts, feelings, awareness of the self as a social object, and discomfort in the presence of others, which in turn may act to partially induce a reaction elicited during oral procedures. Consequently, the subconcepts included in self-consciousness are self-perceptions of oneself, in both a public and private domain.<sup>9</sup> Seeman and Molin showed that the largest proportion of dentally anxious participants had a self-perception of being inferior with respect to some area of bodily appearance or function.<sup>8</sup> There has been very little research on the examination of self-perception by individuals with dental anxiety. Furthermore, Phillips et al. found that 73 percent of their participants with body dysmorphic disorder, a condition in which an abnormal physical self-perception exists, is exhibited as an anxiety disorder. In addition, they found that these participants responded very poorly to dental, surgical, and dermatologic treatments.<sup>7</sup> These observations were further substantiated by Ackerman who utilized Endler's interaction model of anxiety.<sup>10</sup> This study revealed that social-evaluation anxiety is a significant component in dental anxiety, more so than perception of physical danger and ambiguity. There have not been any attempts to examine the correlation between dental anxiety and a more generalized measure that includes the concepts of social anxiety and perception of the self as subscales.

In the investigations of dental anxiety since the 1960s, the occurrence of dental anxiety has been attributed to many factors: personality characteristics; traumatic or painful dental experiences in childhood (conditioning experiences); learned attitudes toward dental services that elicit fear from dentally anxious family members or peers (vicarious learning/modeling); perception of body image; blood-injury fears; coping styles (vigilant, avoidant, and emotion-focused); and pain reactivity.<sup>4,8,11-14</sup>

Investigations of the association between personality and dental anxiety have yielded inconclusive results. Personality is the characteristic behavior-response pattern that each person develops, both consciously and unconsciously, as his or her style of

life. Studies that examined the Big Five personality traits (openness, conscientiousness, extroversion, agreeableness, and neuroticism) found that neuroticism is the only trait that exhibits a significant correlation with dental anxiety.<sup>11,13</sup> Neuroticism is a relatively stable, enduring aspect of the personality. Individuals who score high on this trait tend to experience more negative affect, such as anxiety, fear, sadness, embarrassment, and guilt. Interestingly, studies that examined highly specific categories of personality have usually resulted in nonsignificant results. A number of studies that examined the relationship between state-trait anxiety and dental anxiety, for example, found nonsignificant correlations between the two variables.<sup>11,15</sup> Moreover, results regarding self-esteem mostly have yielded nonsignificant correlations to dental anxiety.<sup>11,16</sup> Interestingly enough, these studies asserted that self-esteem was too narrow a concept and it possibly needed to be coupled with more generalized concepts for its effects to be seen. The only personality characteristic found to significantly relate to dental anxiety is neuroticism, which is defined as a personality trait that involves one experiencing negative emotions—such as anxiety, anger, and depression—accompanied by disruptive behavior and distressed thinking.<sup>17</sup> According to Benjamin et al.'s research, the correlation between Corah's Dental Anxiety Scale and four other neuroticism measures ranged from 0.17 to 0.42, with only two reaching significance.<sup>11</sup> In this study, it was reasoned that distressed thinking and possible transference of generalized anxiety were the most likely variables to significantly affect one's level of dental anxiety. Furthermore, a personality concept such as self-consciousness is widely encompassing, including subconcepts that past evidence suggests could be linked to dental anxiety.

A few studies have examined moderating variables in relation to dental anxiety. Those that have yielded significant findings have found that variables such as the attractiveness of the waiting room, age, gender, and harm avoidance were significantly related to anxiety.<sup>5,18</sup> However, other studies have shown less consistency concerning how gender moderates levels of dental anxiety. For example, a study by Franco and Croft<sup>18</sup> found that women exhibited more dental anxiety than men, whereas a study by Rowe and Moore<sup>5</sup> found that men were more dentally anxious than women. In our investigation, gender was examined in relation to dental anxiety and self-consciousness because of the lack of consensus from past research regarding this variable.

The general consensus in previous studies is that dental anxiety is a multidimensional phenomenon, involving many diagnostic categories and responses.<sup>7,11,19</sup> Not until additional facets of this issue are investigated and understood will we be able to formulate useful methods to effectively treat this psychopathologic occurrence or better understand why certain methods are effective and others are not.

The purpose of this study was to examine the relationship between dental anxiety and self-consciousness as well as the moderating effects of gender with these variables. It was hypothesized that there would be a positive correlation between dental anxiety and self-consciousness—that is, people with increased self-consciousness would also tend to exhibit higher dental anxiety. As well, it was predicted that the gender of the individual would significantly moderate the interaction of these two variables. Specifically, it was hypothesized that female participants would significantly exhibit both higher dental anxiety and self-consciousness scores. Regarding the subscales in the Self-Consciousness Scale, it was predicted that the public self-consciousness and social anxiety subscales would be more highly correlated with the Dental Anxiety Scale scores than private self-consciousness. Finally, because social anxiety and public self-consciousness share similarities in their conceptual definitions, it was also hypothesized that these two subscales would show the highest relatedness in scores.

---

## Method

### Participants

The participants in this experiment were sixty undergraduate students from York University, studying in different years and belonging to varied majors/programs. The participants' age ranged from nineteen to forty years, although 97 percent of the sample belonged to the nineteen to twenty-five age bracket. The method used for sampling was an integration of convenience and quota sampling. Any willing student was allowed to participate in the study, but at the same time an attempt was made to have equal representation of both genders. This was done in order to examine the possible moderating effects of gender on the relationship of dental anxiety and self-consciousness.

### Measures

Dental anxiety was measured using Corah's Dental Anxiety Scale (DAS).<sup>20</sup> The DAS is a four-item scale that measures anxiety about dental treatment. Values for each answer range from 1 to 5, giving a total range of 4 to 20 for the entire measure. The dental anxiety scale was scored by adding the individual item scores of each participant. The test-retest stability of this scale has been found to indicate an 0.82 correlation between answers over a three-month period between administrations. In the first attempt to establish reliability, the Kuder-Richardson formula was used to assess both internal consistency and stability over time. Results indicated an 0.86 coefficient ( $n=313$ ), which is very high for a four-item test. Another examination revealed that this measure has an internal consistency reliability coefficient alpha of 0.95 and has good concurrent validity when compared to other measures involving anxiety in relation to dental procedures.<sup>1</sup> One of the measures of validity for this scale indicated that the correlation between dentists' ratings and patients' test scores was found to be significant. Corah measured validity of the instrument by administering the DAS to dental patients following treatment in a dental clinic, followed by dentists' rating whether the patients fell in the upper, middle, or lower third regarding the amount of anxiety elicited during the dental procedure. The results from the two validation studies using this methodology indicated coefficients of 0.42 and 0.41 (0.01) between patients' total test scores on the DAS and the dentists' ratings.<sup>20</sup>

Self-consciousness was measured through use of a revised version of the Self-Consciousness Scale (SCS).<sup>9</sup> The SCS is a twenty-two-item scale that measures public self-consciousness, private self-consciousness, and social anxiety. According to Scheier and Carver, private self-consciousness is the tendency to think about more covert or hidden aspects of the self; public self-consciousness is the tendency to think about those aspects of oneself that are matters of public display; and social anxiety is a fearfulness about being evaluated by others. This measure was scored through summing the answers of a four-point scale, whose values range from 0 ("Not at all like me") to 3 ("A lot like me"), and a total range of 0 to 66. The Cronbach alphas obtained for the SCS indicated an internal consistency of 0.75, 0.84, and 0.79 for private self-consciousness, public self-consciousness, and social anxiety, respectively.<sup>9</sup> The test-retest correlations over a four-week interval were 0.76

for private self-consciousness, 0.74 for public self-consciousness, and 0.77 for social anxiety.

## Procedure

Once the students agreed to participate in the research, they were all given the same brief explanation of the purpose of the study and what their participation entailed and were told that the investigation concerned the examination of dental anxiety and personality and that these constructs were measured through the completion of two questionnaires. Before distributing the measures, the participants were given the opportunity to withdraw from the study if they felt uncomfortable in completing the measures. Subsequently, the participants were asked to read an informed consent form stating their understanding of the investigation and their willingness to participate. To eliminate any order effects in the way the measures were presented, the participants were randomly assigned one of two different test versions. One group completed the DAS followed by the SCS, and the other completed the SCS first and then the DAS. In addition, the participants were asked to indicate several demographic variables including age, gender, language, and years of study in a post-secondary institution by checking off a box or filling in a blank space on a sheet provided along with the two questionnaires.

Following completion of questionnaires, the participants were debriefed. The debriefing consisted of reading a brief explanation of the study, the rationale behind it, the hypotheses, and how the input would be applied to this research area. In addition, those interested in receiving the results of the study were offered a sign-up sheet where they could provide their names and email addresses.

## Results

Reliability analysis was used to evaluate the multiple-item additive scales used in this experiment. The procedure provides a large number of reliability coefficients for multiple-item scales. This approach was used to observe the accuracy, on average, of the estimate of the true score in a population of objects to be measured. Table 1 presents the reliability of the DAS, which resulted in an 0.87 alpha value between the four items. The self-consciousness scale in this study was shown to have an 0.84 alpha value, as seen in Table 1. As a result, these values indicate

**Table 1. Reliability of DAS and SCS**

|             | Dental Anxiety Scale | Self-Consciousness Scale |
|-------------|----------------------|--------------------------|
| Alpha Value | 0.872                | 0.840                    |

that both scales were substantially reliable for the purposes of this study.

The SCS subscales were also evaluated for reliability. The reliability analysis for these subscales used the covariance matrix method as well. As shown in Table 2, results revealed that public self-consciousness had an alpha of 0.76, private self-consciousness had an alpha value of 0.50; and the social anxiety subscale was found to possess an alpha of 0.78.

Scores were collected from sixty participants in this study from the DAS and SCS and were added to give a score total. Question number 11 on the SCS was recoded because it was stated in a negative direction. Out of a possible score of 20, the mean score from the dental anxiety scale was a 9.23, with a standard deviation of 3.50 (Table 3). This value is higher than the mean originally obtained from Corah, which was 8.89, using a total of 1,232 undergraduate psychology students.<sup>20</sup> The SCS score had a mean of 35.98 out of a possible score of 66, with a standard deviation of 10.57. Scheier and Carver reported a mean score of 38.95 from a sample of 298 undergraduate participants.<sup>9</sup> Since the scores for both measures did not differ markedly from the original studies that used larger sample sizes, the possible problems of interfering variables due to random error from the smaller sample size used in this study were allayed. In this study, ten of the participants classified as acutely dentally anxious, corresponding to 16.7 percent of the sample. In addition, there was only one participant who could possibly be classified as possessing a maladaptive level of self-consciousness. This corresponded to only 1.7 percent of the sample.

A bivariate statistical correlation was conducted in order to analyze the relationship between the scores gathered from the DAS and the SCS. As shown in Table 4, a Pearson correlation was employed, and it was revealed that an 0.54 correlation existed between the two variables, which was significant at the 0.01 level, using a two-tailed test. These results were in accordance with the aforementioned hypothesis that there is both a significant and positive correlation between dental anxiety and self-consciousness. Figure 1 presents a graphical interpretation of the re-

**Table 2. Reliability of SCS subscales**

|             | Private Self-Consciousness | Public Self-Consciousness | Social Anxiety |
|-------------|----------------------------|---------------------------|----------------|
| Alpha Value | 0.504                      | 0.760                     | 0.783          |

**Table 3. Descriptive statistics of dental anxiety and self-consciousness scores**

|     | Mean  | Standard Deviation | Sample Size (N) |
|-----|-------|--------------------|-----------------|
| DAS | 9.23  | 3.50               | 60              |
| SCS | 35.98 | 10.57              | 60              |

**Table 4. Correlation between dental anxiety scores and self-consciousness scores**

|                           |                              | Dental Anxiety Scores | Self-Consciousness Scores |
|---------------------------|------------------------------|-----------------------|---------------------------|
| Dental Anxiety Scores     | Pearson Correlation          | 1                     | 0.535*                    |
|                           | Significance (2-tailed test) |                       | 0.000                     |
|                           | N                            | 60                    | 60                        |
| Self-Consciousness Scores | Pearson Correlation          | 0.535*                | 1                         |
|                           | Significance(2-tailed test)  | 0.000                 |                           |
|                           | N                            | 60                    | 60                        |

\* Correlation is significant at the 0.01 level (2-tailed).

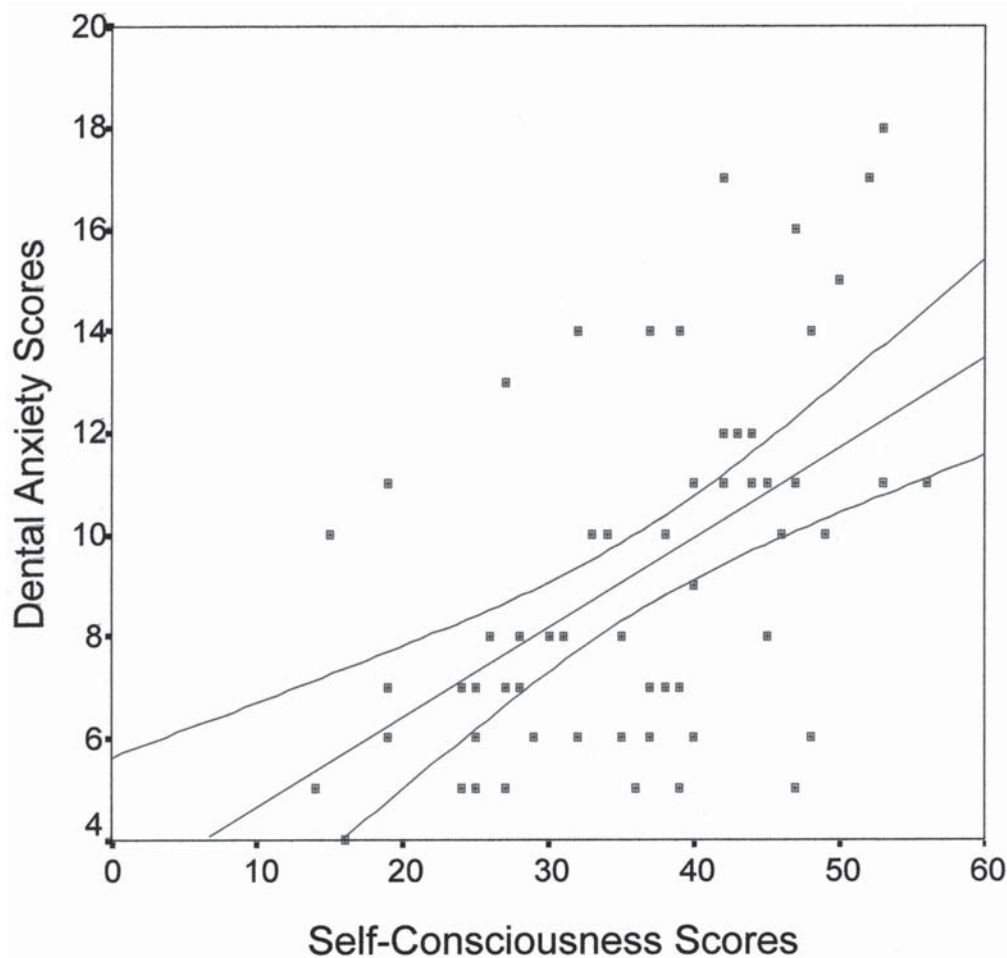
sults in the form of a scatterplot design with the mean line, surrounded by two 95 percent confidence-interval lines. As shown in this illustration, there was a positive linear relationship between self-consciousness and dental anxiety. In addition, there was a greater range in the confidence intervals as maximum and minimum values are approached, suggesting that there were few participants who possessed both extremes of self-consciousness and dental anxiety.

As previously mentioned, the SCS is composed of three subscales: private self-consciousness, public self-consciousness, and social anxiety. A bivariate correlational analysis was conducted to examine the likelihood of a particularly strong correlation between the obtained dental anxiety scores and the scores on each subscale. Seven items represented public self-consciousness, nine items represented private self-consciousness, and six items represented social anxiety. Table 5 illustrates the Pearson correlations that were conducted between the subscales of the SCS and the DAS scores. The results revealed that each subscale of the SCS was significantly correlated to dental anxiety. The strongest correlation between the subscales and dental anxiety was the public self-consciousness subscale ( $r=0.49$ ), followed by the social anxiety subscale ( $r=0.42$ ); the private

self-consciousness subscale was last, although significant ( $r=0.36$ ).

Examination of the intercorrelations of the subscales in the SCS indicated that social anxiety and public self-consciousness, which possess similar conceptual definitions, were the most highly correlated variables ( $r=0.63$ ) (Table 5). The public with private self-consciousness subscales were next in degree of relatedness ( $r=0.44$ ), and the private self-consciousness with social anxiety subscales revealed the least amount of correlation ( $r=0.39$ ).

To examine the possible contamination of results from the low reliability and correlation of the private self-consciousness subscale, we dropped its scores from the analysis and correlated the other two subscales with the DAS. Correlational analysis showed that there was a relationship of 0.51, which was significant at the 0.01 level using a two-tailed test, between the DAS scores and the SCS, when the private self-consciousness subscale was removed. In view of the fact that there was only an 0.03 difference between the correlation of dental anxiety with the original SCS and the SCS with the private self-consciousness subscale removed, the results from the subscale were not discarded.



**Figure 1. Dental anxiety and self-consciousness scores scatterplot**

*Straight line represents the mean, while the two curved lines are the 95 percent confidence interval.*

It was hypothesized that the gender of the participants would be a moderating factor between the dental anxiety and self-consciousness relationship. As shown in Table 6, the mean scores on the DAS were 8.90 for males and 9.57 for females, with standard deviations of 3.41 and 3.61, respectively. For self-consciousness, the mean score for males was 36.90 and the mean score for females was 35.07, with a standard deviation of 11.46 and 9.70, respectively. This resulted in a mean difference of only 0.67 between genders on the DAS and only a 1.83 difference on the SCS.

Furthermore, we performed an independent samples t-test to analyze this relationship. In contrast to the original hypothesis, as seen in Table 7, there were no significant relationships found between gender and self-consciousness, resulting in a t-score

value of -0.74 ( $t(58) = 0.74$ ), with only a  $p < 0.47$  level of significance. In addition, no significant relationships were revealed among dental anxiety and self-consciousness, resulting in a t-score value of 0.67 ( $t(58) = 0.67$ ), with a  $p < 0.51$  level of significance. Figures 2 and 3 illustrate these relationships graphically. As can be seen, there was generally very little difference in dental anxiety and self-consciousness scores between the two genders, as the sum of their score-totals increase.

## Discussion

The purpose of this study was to explore the multidimensionality of dental anxiety through its relationship to personality. Since other maladaptive

personality traits such as neuroticism were found to be related to dental anxiety, this study focused on self-consciousness—the tendency to think about aspects of oneself that are subject to public display and covert aspects of oneself. Due to the wide scope of behaviors and situations that it can be applied to, self-consciousness seemed suitable for examining its relationship to dental anxiety. It was expected that there would be a significantly positive correlation between dental anxiety and self-consciousness. Further, it was hypothesized that gender differences in both self-consciousness and dental anxiety would moderate the relationship between dental anxiety and self-consciousness; specifically, it was hypothesized that female participants would exhibit greater scores on both measures. It was also hypothesized that public

self-consciousness and social anxiety would be more correlated to dental anxiety. Finally, it was predicted that public self-consciousness and social anxiety would be the most correlated subscales on the SCS.

Studies have supported the validity of the DAS by indicating that individuals who exhibited high dental anxiety were worse patients because they have a negative perception of treatment.<sup>1</sup> The scale's predictive validity was supported by a study revealing that DAS scores predicted differential elevation in the state of anxiety during dental procedures.<sup>1</sup> Furthermore, Corah pointed out that this measure was virtually free of response biases based on the reasoning that in North American society it is socially acceptable to be afraid of the dentist and that few would feel defensive about such a topic.<sup>20</sup> A study

**Table 5. Correlation of SCS subscale scores with DAS scores**

|                                   |                         | Private Self-Consciousness Scores | Public Self-Consciousness Scores | Social Anxiety Scores | Dental Anxiety Scores |
|-----------------------------------|-------------------------|-----------------------------------|----------------------------------|-----------------------|-----------------------|
| Private Self-Consciousness Scores | Pearson Correlation     | 1                                 | 0.436*                           | 0.393*                | 0.364*                |
|                                   | Significance (2-tailed) |                                   | 0.001                            | 0.002                 | 0.004                 |
|                                   | N                       | 60                                | 60                               | 60                    | 60                    |
| Public Self-Consciousness Scores  | Pearson Correlation     | 0.436*                            | 1                                | 0.631*                | 0.493*                |
|                                   | Significance (2-tailed) | 0.001                             |                                  | 0.000                 | 0.000                 |
|                                   | N                       | 60                                | 60                               | 60                    | 60                    |
| Social Anxiety Scores             | Pearson Correlation     | 0.393*                            | 0.631*                           | 1                     | 0.421*                |
|                                   | Significance (2-tailed) | 0.002                             | 0.000                            |                       | 0.001                 |
|                                   | N                       | 60                                | 60                               | 60                    | 60                    |
| Dental Anxiety Scores             | Pearson Correlation     | 0.364*                            | 0.493*                           | 0.421*                | 1                     |
|                                   | Significance (2-tailed) | 0.004                             | 0.000                            | 0.001                 |                       |
|                                   | N                       | 60                                | 60                               | 60                    | 60                    |

\* Correlation is significant at the 0.01 level (2-tailed)

**Table 6. Descriptive statistics of gender in dental anxiety and self-consciousness**

|                           | Gender | N  | Mean  | Standard Deviation | Standard Error Mean |
|---------------------------|--------|----|-------|--------------------|---------------------|
| Dental Anxiety Scores     | Male   | 30 | 8.90  | 3.41               | 0.622               |
|                           | Female | 30 | 9.57  | 3.61               | 0.659               |
| Self-Consciousness Scores | Male   | 30 | 36.90 | 11.46              | 2.09                |
|                           | Female | 30 | 35.07 | 9.70               | 1.78                |

**Table 7. Independent samples t-test for moderating effects of gender**

|            | t     | Degrees of Freedom | Significance (2-tailed) | Mean Difference | Standard Error Difference | 95 percent Confidence Interval of the Differences |       |
|------------|-------|--------------------|-------------------------|-----------------|---------------------------|---|-------|
|            |       |                    |                         |                 |                           | Lower   | Upper |
| DAS Scores | -0.74 | 58                 | 0.47                    | -0.67           | 0.91                      | -2.48   | 1.15  |
|            | -0.74 | 57.81              | 0.47                    | -0.67           | 0.91                      | -2.48   | 1.15  |
| SCS Scores | 0.67  | 58                 | 0.51                    | 1.83            | 2.74                      | -3.65   | 7.32  |
|            | 0.67  | 56.45              | 0.51                    | 1.83            | 2.74                      | -3.66   | 7.32  |

by Newton and Buck examined anxiety and pain measures used in dentistry in terms of their quality and application.<sup>21</sup> It was revealed that, of all the articles they examined, 92 percent of such studies used Corah's DAS, making it the most widely used measure of anxiety in dental medicine. It was recommended as the measure of choice because it provides good reliability, validity, and easy application.

The mean scores calculated from the DAS and SCS were fairly consistent with results from past studies. Concerning the DAS, Corah classified people with acute dental anxiety as those identifiable with a score one standard deviation above the mean.<sup>20</sup> As previously mentioned, ten of the participants classified as acutely dentally anxious, corresponding to 16.7 percent of the sample. This remains consistent with the values obtained from many past studies examining the prevalence of dental anxiety in society.<sup>3,19,22</sup> Concerning the SCS, Scheier and Carver indicated that people with a maladaptive degree of self-consciousness are those who score two standard deviations above the mean.<sup>9</sup> There was only one participant who could possibly be classified as possessing a maladaptive level of self-consciousness. This corresponded to only 1.7 percent of the sample. These data support the notion that there is not a threshold level of self-consciousness that can elicit dental anxiety.

This is consistent with previous studies, which indicated that both extremes of dental anxiety and self-consciousness were rare in most given populations.<sup>8,19,22</sup>

Results were consistent with earlier expectations, which hypothesized that a significant relationship exists between dental anxiety and self-consciousness. An 0.54 positive correlation was found, with an alpha value of 0.01. Thus, the results suggested that the participants who exhibited higher levels of self-consciousness were also more likely to exhibit higher levels of dental anxiety. The 0.54 correlation between these two variables is of medium strength, which met the expectation that deemed dental anxiety as a multidimensional phenomenon and thus no single variable could entirely account for its incidence. The correlation between dental anxiety and self-consciousness in this study was stronger than the correlation between dental anxiety and neuroticism reported by Benjamin et al.<sup>11</sup> These findings lend support to the aforementioned rationale that only the subconcepts of distressed thinking and transference of generalized anxiety from neuroticism were strictly related to dental anxiety. The findings also provided further support to the establishment of personality as a legitimate factor contributing to the multidimensionality of dental anxiety. Furthermore,

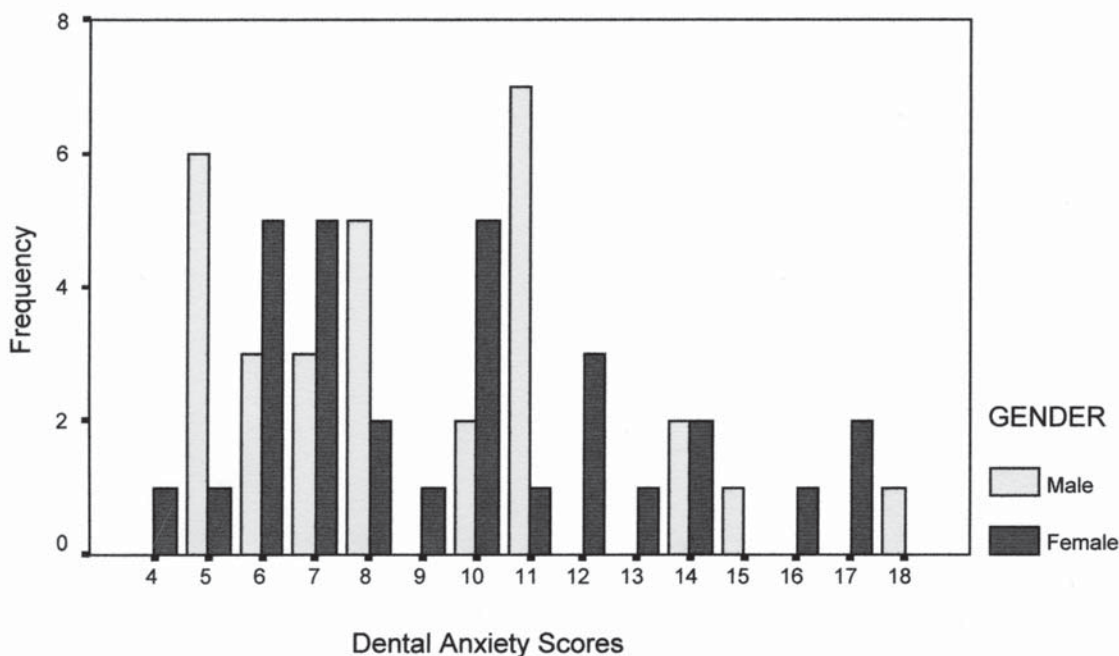


Figure 2. DAS scores and gender

the results support the theory that certain personality features can predict an individual's response to the stimuli encountered during a dental interaction.

Overall, the results support the notion that one's self-focused attention—the tendency to focus on one's inner thoughts, feelings, awareness of the self as a social object, and discomfort in the presence of others—acts to partially induce the reaction elicited during oral procedures.

Analysis of the SCS subscale scores revealed that all three subscales were significantly related to dental anxiety. There was an 0.49 correlation for public self-consciousness, 0.42 correlation for social anxiety, and 0.36 correlation for private self-consciousness in relation to dental anxiety. Research hypotheses were confirmed in that both public self-consciousness and social anxiety proved to correlate the most with dental anxiety. Results supported the previous argument, with respect to self-consciousness, that anxiety caused during dental treatment situations is mostly derived from the awareness and concern of the self as a social stimulus. In contrast to previous findings by King and Endler, which found a -0.14 correlation between multidimensional anxiety and social anxiety, analysis of the data in this study demonstrated discomfort in the presence of others to be significantly correlated with dental anxiety.

ety.<sup>23</sup> This could be explained by the use of Corah's DAS, which specifically measures anxiety elicited in dental interactions, instead of the use of a general multidimensional anxiety scale. Consequently, the evidence in this study reveals that some statistically significant variables that contribute to the multitude of factors eliciting dental anxiety include all three subscales utilized in the SCS.

In accordance with the aforementioned expectations, examination of the intercorrelations of the subscales of the SCS revealed that public self-consciousness and social anxiety elicited the highest correlation, resulting in a coefficient of 0.63. Compared to the Fenigstein et al. study,<sup>24</sup> subscale correlations in our study were far stronger than that obtained from their data. Their findings showed correlation coefficients ranging from -0.06 for private self-consciousness with social anxiety to 0.26 for public with private self-consciousness. Furthermore, in contrast to the evidence of the present study, the Fenigstein et al. research showed that public consciousness and private self-consciousness were the most correlated subscales.<sup>24</sup> Interestingly, their reasoning is consistent with the results obtained from our study, which state that public self-consciousness and social anxiety are interrelated, suggesting that public self-consciousness may be a necessary antecedent of social anxiety.

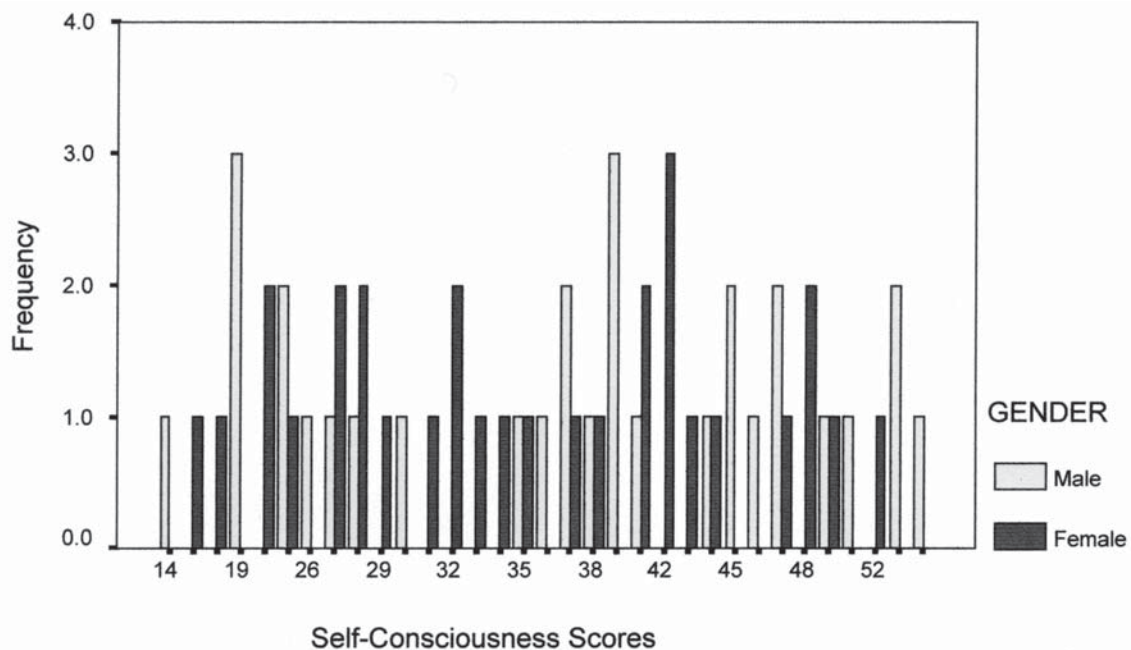


Figure 3. SCS scores and gender

The examination of the moderating effects of gender on self-consciousness and dental anxiety yielded nonsignificant results. Contrary to the aforementioned hypothesis, there was generally an even distribution of men and women at all score-totals on both the dental anxiety and the self-consciousness scale. In contrast, most studies conducted on dental anxiety in the past have generally indicated higher scores for the female participants,<sup>9,20</sup> whereas few studies have shown higher scores for males.<sup>5</sup> Proper interpretation of the results regarding gender distribution of scores can be explained in many possible ways. The first possible explanation is that since dental anxiety and self-consciousness have infrequently been researched, some historical effects may have taken place. Consequently, it is possible that due to changes in social beliefs, both genders' self-perceptions and anxieties have equilibrated over time. Second, the sample size and sample characteristics could have contributed to these results. Both Corah's DAS and Scheier's SCS used much larger samples and were able to indicate gender differences.<sup>1,20</sup> Also, many of these studies did not limit their samples to undergraduate students, who were of approximately the same age.<sup>1,8,18,22,25</sup>

The primary limitations in this study—establishing causality and accounting for moderating or mediating variables—are embedded within all correlational designs. In our study, it could not be determined whether dental anxiety was causally related to self-consciousness, despite the fact that this was never the original intention. Rather, this study was conducted in order to gain a greater understanding of the relationship between these two variables and of the multidimensionality of dental anxiety. Additionally, the nature of these variables does not allow experimental manipulation. Neither dental anxiety nor self-esteem can be treated as independent variables and hence manipulated; it would be extremely difficult and unethical if this were attempted.

Another limitation in our study was the exclusive use of undergraduate students. Given the imposed financial and time restraints, selecting from undergraduate students was the most viable solution. A study by Corah indicated that younger cohorts exhibited higher DAS scores than cohorts that were eight years older.<sup>1</sup> In addition, Scheier and Carver indicated that scores on the SCS were significantly lower for middle-aged individuals than for undergraduate students.<sup>9</sup> Although the use of undergraduate students decreases the practical applicability of the results, this study provides a slight advantage

because it did not rely solely on psychology undergraduate students, which is a common feature in most studies of this nature.

Another factor that may have affected the strength of the relationship between dental anxiety and self-consciousness could have been the environment in which the DAS was administered. The DAS asks the participant to disclose his or her level of anxiety during various common events usually experienced during one's visit to the dentist. One would logically expect participants to more accurately disclose their level of anxiety if they were in a dental health environment, whether in an office or hospital. Corah indicated that participants in outpatient emergency clinics, where procedures were usually more invasive and painful, were the only group that revealed a higher mean than undergraduate university students.<sup>1</sup> More importantly, the same study revealed that participants in private practice and dental school clinics revealed lower mean scores than undergraduate students. Consequently, it can be assumed that there is a greater likelihood that the participants in this study had a tendency to give less accurate descriptions of their dental anxiety levels.

The nature of self-consciousness itself as a concept may have acted to increase the amount of error in measurement. In North American society, self-consciousness is perceived as a personality attribute that is maladaptive to one's functioning in society. Hence, those who possess such traits are often ostracized. It logically follows then that people would be less likely to disclose or admit their self-conscious tendencies. Regarding private self-consciousness, it might be that people are not even aware of those behaviors or cognitions. Since convenience sampling was utilized in this study, participants were often seated beside their friends or peers when completing the questionnaire. Error in the measurements may have increased because social desirability could have contributed to a lack of full disclosure of the participant's true self-consciousness levels, hence leading to a response bias.

In conclusion, it is believed that self-consciousness is a variable that significantly and practically determines in part one's general predisposition regarding dental-health interactions, specifically, his or her level of dental anxiety. Moreover, gender does not appear to moderate the interaction between dental anxiety and self-consciousness. Evidence supports personality meriting its own niche as part of the complex of conditions that elicit fear and anxiety during dental interactions. Given that dental anxiety is be-

coming an increasingly recognized hindrance to effective dental care, it is imperative that dentists are able to properly diagnose the presence of this fear. Diagnosis will allow dentists to assess the severity of the anxiety and help them determine if they will be able to manage these patients themselves or should refer them for appropriate psychotherapy. Current techniques used to treat generalized anxiety disorders should be tested on these with dental anxiety since it is a multidimensional condition.

---

## Acknowledgments

The author thanks Dr. Paul Kohn and Dawn Brandlmayr for their assistance in the preparation of this manuscript.

---

## REFERENCES

1. Corah NL, Gale EN, Illig SJ. Assessment of a dental anxiety scale. *J Am Dent Assoc* 1978;97:816-9.
2. Stouthard MEA, Hoogstraten J. Prevalence of dental anxiety in The Netherlands. *Community Dent Oral Epidemiol* 1990;18:139-42.
3. Gatchell RJ, Ingersoll BD, Bowman L, Robertson MC, Walker C. The prevalence of dental fear and avoidance: a recent survey study. *J Am Dent Assoc* 1983;107:609-10.
4. Locker D, Shapiro D, Liddell A. Overlap between dental anxiety and blood-injury fears: psychological characteristics and response to dental treatment. *Behav Res Ther* 1997;35:583-90.
5. Rowe M, Moore T. Self-report measures of dental fear: gender differences. *Am J Health Behav* 1998;22:243-7.
6. Agras S, Sylvester D, Oliveau D. The epidemiology of common fears and phobia. *Compr Psychiatry* 1969;10:151-6.
7. Phillips KA, McElroy SL, Keck PE, Pope HG. Body dysmorphic disorder: 30 cases of imagined ugliness. *Am J Psychiatry* 1993;150:302-8.
8. Seeman K, Molin C. Psychopathology, feelings of confinement and helplessness in the dental chair, and the relationship to the dentist in patients with disproportionate dental anxiety. *Acta Psychiatry Scand* 1976;54:81-91.
9. Scheier M, Carver C. The self-consciousness scale: a revised version for use with the general population. *J Appl Social Psychol* 1985;15:687-99.
10. Ackerman CA. The interaction model of anxiety empirically examined in a dental treatment situation. Unpublished master's thesis, York University, Toronto, ON, 1981.
11. Benjamin C, Schuurs A, Kooreman T, Hoogstraten J. Self-reported and physiologically measured dental anxiety, coping styles and personality traits. *Anxiety, Stress, and Coping* 1996;9:151-62.
12. De Jongh A, Muris P, Ter Horst G, Duyx MPMA. Acquisition and maintenance of dental anxiety: the role of conditioning experiences and cognitive factors. *Behav Res Ther* 1995;33:205-10.
13. Ost LG, Hugdahl K. Acquisition of blood and dental phobia and anxiety response in clinical patients. *Behav Res Ther* 1985;23:27-34.
14. Vassend O, Hoffart A. Effects of dental fear treatment on general distress. *Behav Modif* 2000;24:580-99.
15. Schuurs AHB, Duivenvoorden HJ, Makkes PC, Thoden van Velzen SK, Verhage F. Personality traits of patients suffering extreme dental anxiety. *Community Dent Oral Epidemiol* 1988;16:38-41.
16. Frazier M, Hampson S. Some personality factors related to dental anxiety in stressful dental surgery. *Br J Med Psychol* 1988;62:371-80.
17. Nietzel MT, Speltz ML, McCauley EA, Bernstein DA. *Abnormal psychology*. Needham Heights, MA: Allyn & Bacon, 1976.
18. Franco J, Croft D. Personality and environmental variables associated with dental anxiety. *Percept Mot Skills* 1979;49:529-30.
19. Locker D, Liddell A, Shapiro D. Diagnostic categories of dental anxiety: a population-based study. *Behav Res Ther* 1999;27:25-37.
20. Corah NL. Development of a dental anxiety scale. *J Dent Res* 1969;48:596.
21. Newton TJ, Buck DJ. Anxiety and pain measures in dentistry: a guide to their quality and application. *J Am Dent Assoc* 2000;131:1449-57.
22. Poulton R, Thomson W, Davies S, Kruger E, Brown R, Silva P. Good teeth, bad teeth, and fear of the dentist. *Behav Res Ther* 1997;35:327-34.
23. King P, Endler N. Interactional anxiety and dental treatment: an empirical test of a composite predictor for state anxiety. *J Pers Individ Diff* 1992;13:85-9.
24. Fenigstein A, Scheier M, Buss A. Public and private self-consciousness: assessment and theory. *J Consult Clin Psychol* 1975;43:522-7.
25. Muris P, Jongh A, Van Zuuren F, Schoenmakers N. Monitoring-blunting coping styles and cognitive symptoms of dental fear. *Eur J Pers* 1996;10:35-44.