

Investigating the Relationship between Self-reported Oral Health Status, Oral Health-related Behaviours and Self-Consciousness in Romania

Alexandria L. Dumitrescu^a/Makoto Kawamura^b/Beatrice Dogaru^a/Cristian Dogaru^a

Purpose: The aim of the present study was to investigate whether self-consciousness, self-reported oral health status and oral health-related behaviours were associated.

Material and Methods: The present study sample consisted of 253 first year medical students in Romania. The questionnaire included information about socio-demographic factors, behavioural variables, self-reported oral health status and three self-consciousness subscales (Private Self-Consciousness, Public Self-Consciousness, and Social Anxiety).

Results: Significant differences were found in Public Self-Consciousness and Social Anxiety according to several variables: anxiety, stress, depression and current non-treated caries. There were significant differences in Social Anxiety for the variables of gender, smoking, perceived dental health, self-reported gum bleeding and reason for dental visit ($p < 0.05$). A significant difference was found in Public Self-Consciousness for the reason for dental visits ($p < 0.05$). Total Self-Consciousness is correlated with anxiety, stress, depression, current non-treated caries, gingival bleeding and reason for dental visit. Oral health behaviours such as tooth brushing, flossing, mouth washing and last dental visit were not influenced by each of the self-consciousness subscales.

Conclusions: The results suggest that self-consciousness might be a psychosocial risk marker that influences self-reported oral health status.

Key words: oral health behaviour, perceived oral health status, self-consciousness

Oral Health Prev Dent 2008; 6: 95-103.

Submitted for publication: 26.12.06; accepted for publication: 10.03.07.

The maintenance of good oral hygiene is considered a salient issue in dental health promotion. This has been well documented in both periodontal disease and caries research, as reviewed by Chu and Craig (1996) and Löe (2000). According to previous studies, tooth-brushing frequency is associated with various psychological traits, including self-esteem (Knecht et

al, 1999a; Macgregor et al, 1997), self-efficacy (Syrjälä et al, 2001; 2004), life satisfaction, optimism (Ylöstalo et al, 2003), sense of coherence (Freire et al, 2001; Ruipérez and Belloch, 2003), anxiety (Anttila et al, 2006), depression (Kurer et al, 1995; Anttila et al, 2006), locus of control (Knecht et al, 1999b; Hugoson et al, 2002; Mettovaara et al, 2006), stress (Deinzer et al, 2001) and cynical hostility (Mettovaara et al, 2006).

Generally, self-consciousness is defined as being conscious of oneself as an object of the observation of others. Specifically, self-consciousness is a tendency to think and evaluate those aspects of oneself that are subject to private and public display. As a concept, it is a 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

^a University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania

^b Hiroshima University Hospital, Japan

Correspondence: Alexandrina L. Dumitrescu, Aleea Dumbravita nr.2, bloc 28, scara B, etaj 1, ap.49, sector 6, Bucuresti 66, R.O.U. 061572. Tel: (00) 40-722 352 504. E-mail: alexandrina_l_dumitrescu@yahoo.co.uk

procedures. Consequently, the subconcepts included in self-consciousness are self-perceptions in both a public and private domain (Economou, 2003).

Fenigstein et al (1975) developed a Self-Consciousness (SC) scale for assessment, which contains 23 items forming 3 dimensions: Private Self-Consciousness (10 items), Public Self-Consciousness (7 items) and Social Anxiety (6 items). Private Self-Consciousness refers to attention directed to covert or personal aspects of the self, such as feelings and beliefs; Public Self-Consciousness describes attention to public aspects of the self, such as appearance and manners. Finally, Social Anxiety represents apprehensiveness about negative evaluation. The instrument has demonstrated good construct validity in several studies (Jöreskog and Sörbom, 1993; Cramer, 2000; Syrjäla et al, 2001).

Self-consciousness is associated with normal traits. Highly self-conscious individuals are aware of their attitudes and prone to dissonance effects. Being aware of one's feelings and thoughts is essential to well-being as part of self-regulation (Panayiotou and Kokkinos, 2006).

High levels of self-consciousness characterise many psychopathological states. Thus, theories have been developed that situate Social Anxiety within the genesis and maintenance of depression. Likewise, it has also been suggested that Public Self-Consciousness could be a prior condition needed for Social Anxiety to appear. At the same time, correlations have also been found between Private Self-Consciousness and fear of losing control, and of negative social reactions in agoraphobics and socially anxious individuals. It has also been claimed that it is Public, not Private, Self-Consciousness that is most significant in patients with eating disorders. Self-consciousness, particularly the self-reflectiveness of Private Self-Consciousness, is widely implicated in psychological distress symptomatology (Trapnell and Campbell, 1999). Neuroticism may exacerbate this association, whereas other aspects of personality, such as openness and extraversion may buffer the role of self-consciousness in distress (Innes and Kitto, 1989; Jostes et al, 1999; Trapnell and Campbell, 1999; Duberstein et al, 2001; Huprich, 2003; Ruipérez and Belloch, 2003; van den Bree et al, 2004; Ashford et al, 2005; Panayiotou and Kokkinos, 2006).

Self-reported oral health questionnaires are used widely in epidemiological oral health investigations because they are time- and cost-effective and provide detailed information on subjects in a single health examination (Newton et al, 2000; 2003; Airila-Månsson et al, 2004; Honkala and Al-Ansari, 2005). Questions

about gingival bleeding have been included in several epidemiological studies (Kallio et al, 1997; Christensen et al, 2003). Buhlin et al (2002) demonstrated a good correlation between self-reported gingival bleeding and gingival bleeding at the clinical examination, concluding that questionnaires are less reliable for specific periodontal variables, but can still be developed into a valuable tool in epidemiological studies of periodontal health.

The aim of the present study was to investigate the relationship between self-consciousness, self-reported oral health status and oral health behaviour.

MATERIALS AND METHODS

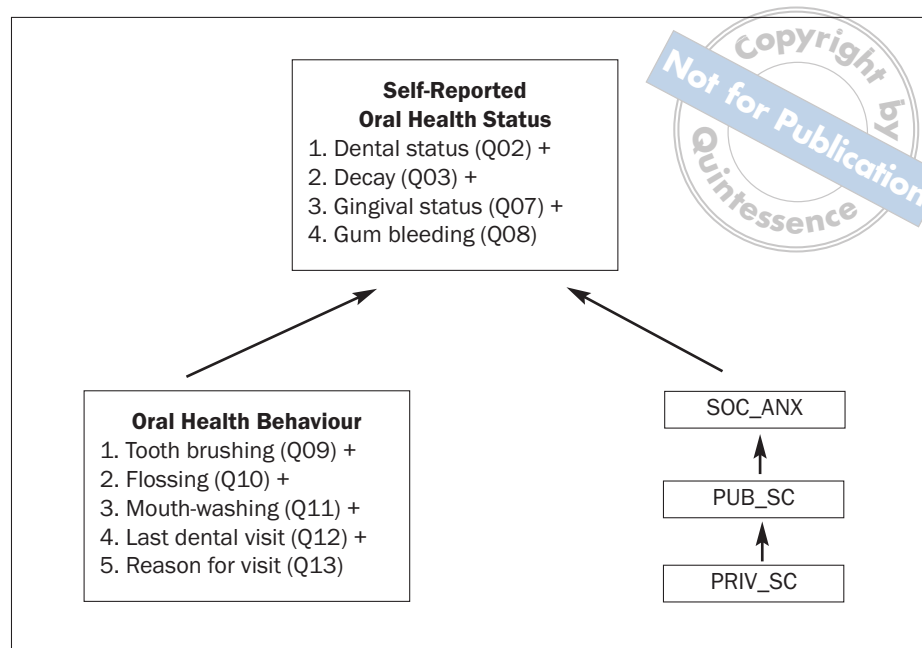
Sample

The subjects of the study were 253 first-year medical students at the University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania who were randomly invited to this survey at the end of the academic year using two anonymous questionnaires. In Romania, there were 12 dental schools at the time of the study. Only minor differences were found between graduates from these schools in assessments of the importance of the subjects studied, probably due to minor differences in curricula. All students selected for the survey answered the questionnaire. A total score was calculated based on the response to each statement. The subjects gave their informed consent to participate in the study. The mean age of medical students was 19.8 (standard deviation [SD] = 1.2) years old. The percentage of female students was high in the sample (69.9%).

Instruments and measures

A structured, anonymous questionnaire was specifically developed for this study and addressed the following: (1) socio-demographic factors (age, gender and smoking); (2) perceived oral health status (dental health, non-treated caries, extracted teeth, satisfaction by appearance of own teeth, dental pain, gingival condition and gum bleeding); (3) oral health habits (tooth brushing, flossing, mouth-rinse frequency and dental visiting). Subjects were classified as smokers, past-smokers and non-smokers. The questionnaire also contained three questions concerning stress, anxiety and depression, namely 'Do you feel anxious (depressed or stressed) in your everyday life?' The response alternatives were: (1) no, never; (2) yes, some-

Fig 1 Construction of a hypothesised model. Influence of both oral health behaviour and self-consciousness subclasses on self-reported oral health status. SOC_ANX = Social Anxiety; PUB_SC = Public Self-Consciousness; PRIV_SC = Private Self-Consciousness.



times; and (3) yes, often. Self-consciousness was measured through use of the Fenigstein et al (1975) SC scale that was translated into Romanian by two bilingual psychologists using back-translation methods. The instrument maintains the original scoring system: each item was rated on a scale of 0 (extremely uncharacteristic) to 4 (extremely characteristic). The SC scale is a 23-item scale that measures Private Self-Consciousness, Public Self-Consciousness and Social Anxiety.

Statistical analysis

Statistical analyses were performed with computerised statistical package software (SPSS, Inc., Chicago, USA). Descriptive statistics were used on all variables. Differences between subgroups' self-consciousness subscales were tested using one-way ANOVA with a 5% significance level.

Based on previous research, an initial model was constructed (Fig 1). It was hypothesised that students' oral health status is linked to oral health behaviour (tooth brushing, flossing, mouth-washing frequency, last dental visit and reason for visit) and to the self-consciousness subclasses: Private Self-Consciousness, Public Self-Consciousness and Social Anxiety. In addition, the LISREL computer program (Jöreskog and Sörbom, 1993) was used to perform structural equation modelling analysis. Several fit indices were displayed such as the Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA), and a chi-square test statistic. The former two indices should reach values > 0.9, with possible values ranging between 0 and 1.0, RMSEA should be < 0.05 and the p value of the chi-square number > 0.05, for a statistically acceptable model. The structural equation modelling analysis also included the Comparative Fit Index (CFI), which ranges from 0 (absolute lack of fit) to 1 (perfect fit). This index reflects a good fit when its value is greater than 0.90.

Table 1 Reliability of the self-consciousness subscales

	Private Self-Consciousness	Public Self-Consciousness	Social Anxiety	Total Self-Consciousness
Alpha value	0.66	0.76	0.83	0.74

Table 2 Comparison of self-consciousness subscales (mean \pm SD) according to some outcome variables

	Private Self-Consciousness	Public Self-Consciousness	Social Anxiety	Total Self-Consciousness
Gender				
Female (68.9)	26.6 \pm 4.1	20.1 \pm 3.2	13.3 \pm 4.5	60.1 \pm 7.6
Male (29.6)	26.7 \pm 4.9	19.4 \pm 4.6	11.8 \pm 4.6	57.9 \pm 8.9
p value	NS	NS	p < 0.05	NS
Smoking status				
Non-smoker (76.3)	26.9 \pm 4.4	19.8 \pm 3.7	13.3 \pm 4.5	60.0 \pm 8.0
Past-smoker (4.3)	25.7 \pm 3.3	19.1 \pm 4.0	11.1 \pm 4.8	55.9 \pm 9.4
Smoker (19.4)	25.9 \pm 4.1	20.1 \pm 3.8	11.7 \pm 4.6	57.5 \pm 7.2
p value	NS	NS	p < 0.05	NS
Anxiety in everyday life				
No (29.6)	26.1 \pm 4.2	18.9 \pm 4.3	10.9 \pm 4.7	55.9 \pm 9.4
Yes, sometimes (66.8)	26.9 \pm 4.3	20.3 \pm 3.2	13.5 \pm 4.2	60.8 \pm 6.9
Yes, often (2.8)	26.7 \pm 6.3	18.4 \pm 7.1	18.4 \pm 2.5	63.6 \pm 7.2
p value	NS	p < 0.05	p < 0.001	p < 0.001
Stress in everyday life				
No (9.1)	26.3 \pm 4.5	18.2 \pm 4.9	11.0 \pm 5.9	55.5 \pm 11.3
Yes, sometimes (52.6)	26.9 \pm 4.0	19.9 \pm 3.2	12.4 \pm 4.7	59.2 \pm 7.8
Yes, often (37.2)	26.6 \pm 4.7	20.3 \pm 4.0	14.0 \pm 4.0	60.8 \pm 7.1
p value	NS	NS (p = 0.059)	p < 0.01	p < 0.05
Depression in everyday life				
No (26.1)	25.8 \pm 4.4	18.9 \pm 3.9	11.3 \pm 4.9	55.9 \pm 10.0
Yes, sometimes (70.0)	27.0 \pm 4.2	20.1 \pm 3.6	13.3 \pm 4.3	60.4 \pm 7.0

Parentheses indicate the percentage (%).
NS: Not significant.

RESULTS

Self-consciousness scale psychometric properties

Table 1 shows the means, standard deviations and Cronbach's alpha reliability coefficients for each self-consciousness subscale. For the entire scale, $\alpha = 0.74$. Private Self-Consciousness was intercorrelated with Public Self-Consciousness ($r = 0.25$, $p < 0.001$).

Descriptive data and group differences (Tables 2–4)

Women scored significantly higher than men on the Social Anxiety subscale (13.3 ± 4.5 vs. 11.8 ± 4.6 , $p < 0.05$), but no differences were observed according to gender on Total Self-Consciousness scores (60.1 ± 7.6 vs. 57.9 ± 8.9 , NS [not significant]) or on Private (26.6 ± 4.1 vs. 26.7 ± 4.9 , NS) and Public (20.1 ± 3.2 vs. 19.4 ± 4.6 , NS) Self-Consciousness subscales. Only 7.9% of the students felt that their dental health was poor/very poor, despite the fact that 51.8% of them re-

ported to have current non-treated caries, and 47.5% had also experienced a toothache during the last year. In total, 95.3% of the students characterised their gingival condition as 'normal to excellent', irrespective of perceived signs of gingival inflammation (gum bleeding: 61.7%). Among those participants who had signs of gingival inflammation, only 6.2% reported that their gingival health was poor or very poor. Of the students, 81.4% brushed more than once a day. Other oral hygiene aids were used: dental floss by 31.6% and mouthwash by 38.3%. In total, 79.1% of students were regular users of the dental-care system (i.e. they had at least one dental visit in the last 2 years) and 35.2% had seen the dentist within 6 months.

Significant differences were found in Public Self-Consciousness and Social Anxiety according to several variables: anxiety, stress, depression, current non-treated caries and reason for the dental visit. There were significant differences in Social Anxiety within the categories of gender, smoking, perceived dental health and self-reported gum bleeding ($p < 0.05$). Oral health behaviours such as tooth brushing, flossing, mouth washing and last dental visit were not influenced by each of the self-consciousness subscales.

Table 3 Comparison of self-consciousness subscales (mean \pm SD) according to self-reported oral health status

	Private Self-Consciousness	Public Self-Consciousness	Social Anxiety	Total Self-Consciousness
Perceived dental health				
Excellent (4.3)	24.9 \pm 4.3	19.1 \pm 3.2	8.6 \pm 6.6	52.6 \pm 10.0
Very good (15.4)	27.8 \pm 4.0	19.8 \pm 5.4	12.0 \pm 4.9	59.7 \pm 10.1
Good (40.3)	26.4 \pm 3.8	19.9 \pm 3.2	13.2 \pm 4.2	59.5 \pm 6.3
Normal (32.0)	26.4 \pm 4.9	19.8 \pm 3.5	13.3 \pm 4.0	59.5 \pm 8.2
Poor/very poor (7.9)	27.7 \pm 4.6	20.5 \pm 3.7	13.2 \pm 5.2	61.3 \pm 8.0
p value	NS	NS	p < 0.05	NS
Current non-treated caries				
No (51.8)	26.2 \pm 4.0	19.2 \pm 4.0	12.0 \pm 4.6	57.4 \pm 8.0
Yes (48.2)	27.1 \pm 4.6	20.6 \pm 3.3	13.8 \pm 4.3	61.5 \pm 7.4
p value	NS	p < 0.01	p < 0.01	p < 0.001
Current extracted teeth (other than the third molars)				
No (66.0)	26.4 \pm 4.1	19.7 \pm 3.7	12.7 \pm 4.3	58.7 \pm 7.7
Yes (16.6)	26.6 \pm 4.6	20.3 \pm 3.9	13.9 \pm 4.5	60.7 \pm 8.8
p value	NS	NS	NS	NS
Satisfied by appearance of own teeth				
Yes (48.6)	26.3 \pm 3.9	19.6 \pm 3.6	12.8 \pm 4.5	58.7 \pm 8.1
No (50.6)	26.9 \pm 4.7	20.1 \pm 3.8	13.0 \pm 4.5	60.0 \pm 7.9
p value	NS	NS	NS	NS
Toothache last time				
Do not remember (33.2)	26.2 \pm 4.4	19.2 \pm 4.2	12.6 \pm 4.6	58.0 \pm 8.1
More than a year ago (19.0)	28.0 \pm 3.9	20.3 \pm 3.1	13.1 \pm 5.0	61.4 \pm 7.3
During last year (20.2)	26.4 \pm 4.3	20.1 \pm 3.6	12.8 \pm 3.6	59.4 \pm 7.5
During last 3 months (19.0)	27.1 \pm 4.4	20.4 \pm 3.2	12.4 \pm 4.6	59.9 \pm 8.4
Last week (8.3)	25.5 \pm 4.4	20.0 \pm 4.0	14.0 \pm 4.8	59.4 \pm 8.5
p value	NS	NS	NS	NS
Self-reported gingival condition				
Excellent (6.7)	26.0 \pm 4.3	19.0 \pm 4.8	11.4 \pm 4.3	56.5 \pm 8.6
Very good (26.1)	27.1 \pm 3.8	20.2 \pm 3.2	12.2 \pm 5.0	59.5 \pm 8.5
Good (43.1)	26.3 \pm 4.2	19.6 \pm 3.9	13.0 \pm 4.2	58.9 \pm 7.4
Normal (19.4)	27.3 \pm 4.4	19.7 \pm 3.6	13.3 \pm 4.3	60.3 \pm 8.4
Poor/very poor (4.7)	25.8 \pm 7.2	22.1 \pm 3.3	15.1 \pm 4.7	63.0 \pm 7.3
p value	NS	NS	NS	NS
Self-reported gum bleeding				
No signs (37.9)	26.3 \pm 3.7	19.6 \pm 3.1	11.9 \pm 4.8	57.9 \pm 7.7
Yes (61.7)	26.9 \pm 4.7	20.0 \pm 4.0	13.4 \pm 4.2	60.3 \pm 8.0
p value	NS	NS	p = 0.01	p < 0.05

Parenttheses indicate the percentage (%).
NS: Not significant.

LISREL-analyses

The initial model (Fig 1) was verified using the LISREL technique (Jöreskog and Sörbom, 1993). Modifications of the model were made based on an inspection of the analysis of the initial model, and then the final model was constructed (Fig 2). This model fitted well: $\chi^2 = 4.709$ (degrees of freedom = 5, $p = 0.452$), GFI = 0.993, AGFI = 0.978, CFI = 1.000, RMSEA = 0.000.

DISCUSSION

The SC scale (Fenigstein et al, 1975) used in the present study has been found to be valid and has also been used in the most recent studies on cynical hostility (Economou, 2003) and in college students' research (Chan, 1996; Trapnell and Campbell, 1999).

The present study showed that the intensity of self-consciousness had a significant association with self-reported oral health status and psychological factors

Table 4 Comparison of self-consciousness subscales (mean \pm SD) according to oral health habits

	Private Self-Consciousness	Public Self-Consciousness	Social Anxiety	Total Self-Consciousness
Daily tooth-brushing frequency				
More than twice a day (24.1)	27.6 \pm 3.8	20.2 \pm 3.7	13.2 \pm 4.5	60.9 \pm 7.6
Twice a day (57.3)	26.2 \pm 4.4	19.7 \pm 3.7	12.4 \pm 4.5	58.4 \pm 8.3
Once a day or less (16.6)	27.2 \pm 4.5	19.9 \pm 3.6	13.5 \pm 4.6	60.6 \pm 7.0
Never/less than once (2.0)	24.5 \pm 5.6	19.4 \pm 7.2	15.0 \pm 4.2	58.9 \pm 8.5
p value	NS	NS	NS	NS
Flossing frequency				
Every day (7.9)	24.3 \pm 3.6	18.5 \pm 4.0	12.1 \pm 4.9	54.8 \pm 7.8
More than once a week (6.7)	26.9 \pm 3.3	20.1 \pm 3.9	13.6 \pm 3.0	60.5 \pm 5.6
Once a week (9.1)	26.6 \pm 5.4	20.8 \pm 3.7	12.4 \pm 5.4	59.8 \pm 7.8
Once a month (7.9)	26.4 \pm 3.5	20.0 \pm 2.7	14.4 \pm 3.5	60.9 \pm 6.2
Never (68.0)	27.0 \pm 4.4	19.9 \pm 3.8	12.8 \pm 4.6	59.6 \pm 8.3
p value	NS	NS	NS	NS
Mouth-washing frequency				
Every day (10.7)	26.9 \pm 3.6	19.2 \pm 4.3	11.8 \pm 5.1	57.9 \pm 8.0
More than once a week (7.5)	26.0 \pm 4.6	19.2 \pm 2.9	13.8 \pm 3.3	59.0 \pm 7.1
Once a week (7.5)	24.8 \pm 4.7	20.5 \pm 2.6	12.3 \pm 4.2	57.7 \pm 7.4
Once a month (12.6)	27.3 \pm 5.1	20.9 \pm 3.6	12.6 \pm 4.8	60.8 \pm 9.0
Never (61.3)	26.8 \pm 4.2	19.7 \pm 3.8	13.0 \pm 4.5	59.6 \pm 8.0
p value	NS	NS	NS	NS
Last dental visit				
Less than 6 months ago (35.2)	27.2 \pm 4.2	20.2 \pm 3.8	13.4 \pm 4.6	60.8 \pm 8.7
6–12 months ago (24.1)	26.6 \pm 4.4	20.2 \pm 3.5	11.8 \pm 4.1	58.6 \pm 7.7
1–2 years ago (19.8)	26.1 \pm 4.5	19.7 \pm 3.0	13.5 \pm 4.2	59.3 \pm 6.9
More than 2 years ago (20.6)	26.3 \pm 4.3	19.2 \pm 4.4	12.4 \pm 4.9	58.0 \pm 7.9
p value	NS	NS	NS	NS
Reason for the dental visit				
For check-up or for tooth cleaning and scaling (36.7)	26.6 \pm 3.8	19.1 \pm 3.7	12.5 \pm 4.6	58.2 \pm 7.9
When treatment is needed or when pain (56.9)	26.8 \pm 4.5	20.6 \pm 3.2	13.2 \pm 4.1	60.6 \pm 7.2
Never (3.9)	28.1 \pm 4.7	17.8 \pm 7.2	8.4 \pm 6.1	54.3 \pm 12.7
p value	NS	p < 0.01	p < 0.01	p < 0.05
Parentheses indicate the percentage (%). NS: Not significant.				

(anxiety, stress and depression). Previously, Raichle et al (2001) has also suggested that individuals high in Public Self-Consciousness are more likely to discontinue habitual behaviour that is perceived as socially undesirable or incorrect. Specifically, individuals with low levels of Public Self-Consciousness were nearly 13 times more likely to continue smoking following oncologic treatment compared to those with relatively higher levels of Public Self-Consciousness. It was also shown that low conscientiousness is a predictor of increased Enhancement-Motivated Drinking (Sheiham and Nicolau, 2005). Similar results were obtained in the present study as non-smokers presented higher

values of total self-consciousness compared with smokers.

In the literature, there is a clear association of periodontal disease with social isolation, socio-economic status, personality factors and character traits (e.g. hostility), anxiety, depression, coping behaviour and life stress (Monteiro da Silva et al, 1995; LeResche and Dworkin, 2002; Savolainen et al, 2005). The relationship between oral hygiene, periodontal diseases and psychological factors has been reported previously (Knecht et al, 1999b; Deinzer et al, 2001; Ruipérez and Belloch, 2003; Castro et al, 2006). In light of these findings, it is not surprising that self-con-

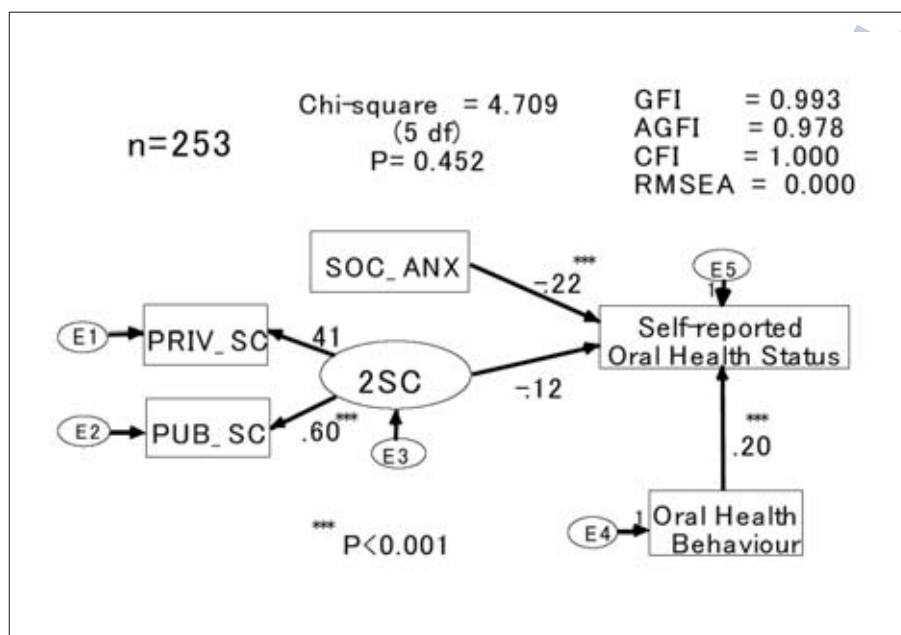


Fig 2 Outline of the final LISREL model: a latent variable is indicated by oval and observed variables by boxes. SOC_ANX = Social Anxiety; PUB_SC = Public Self-Consciousness; PRIV_SC = Private Self-Consciousness. 2SC: latent variable of self-consciousness; df: degrees of freedom; E1–E5: error components. If more than one single-headed arrow leads away from an unobserved variable, the regression weight toward the most reliable indicator variable was fixed to unity. All paths connecting the error components were also set to unity. The overall fit was assessed by five measures: chi-square test, GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index), CFI (Comparative Fit Index) and RMSEA (Root Mean Square Error of Approximation). The standardised regression weights are displayed near single-headed arrows in the path diagram.

sciousness is related to variables reported in the present paper.

It has previously been demonstrated, for example, that self-esteem increases with increasing socio-economic status (Macgregor et al, 1997). However, the authors had no direct measure of social class in the questionnaire, as many young people are vague or defensive about their parents' occupational status, or may not have parents living with them (Macgregor et al, 1997).

Scheier and Carver (1985) revealed that Private Self-Consciousness is a tendency to think about more covert or hidden aspects of oneself, Public Self-Consciousness is a 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. According to the theory of self-awareness, persons with a tendency for raised private self-awareness constantly monitor their thoughts and feelings, are inclined to exaggerate their emotions, have a better

knowledge of their own personality, have a more distinctive concept of their personal values, and are more disposed to self-criticism and self-dissatisfaction. On the other hand, persons exhibiting raised public self-awareness tend to focus on the social impact of their own behaviour and appearance and might be more vulnerable to feelings of shame and negative self-regard when they register minor deviations of their own physical appearance from the ideal norm. It has been shown that Private Self-Consciousness is a moderator of the relationship between dental aesthetics and social appearance concern (Klages et al, 2004).

One limitation in the present study was the exclusive use of undergraduate students, who are only 19 years old on average, a fact that decreases the practical applicability of the results for the general population. Since convenience sampling was utilised 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 (Economou, 2003). The young age of the participants is also a possible explanation for the few significant differences between the self-consciousness subclasses. Another obvious limitation of the present study is that all assessments were self-reported, and no objective oral health outcome data were incorporated. Self-assessment oral status is a validated method for determining the number of remaining teeth and use of removable dentures (Buhlin et al, 2002), and Kallio et al (1994) concluded that self-reporting was a useful tool in screening the gingival health of populations. However, in the present study, there is no way of knowing to what extent these self-reports correspond with the participants' oral and gingival health status. Future studies could benefit from adding clinical measures of oral and periodontal health.

Despite being accepted as important, the tradition of examining psychosocial factors in the field of dentistry has been neglected for a long time. The authors found it important and topical to explore the psychosocial factors related to self-reported oral health because, except for the work of Klages et al (2004, 2005), there were no previous studies on the associations between self-consciousness and oral health.

In conclusion, Social Anxiety is associated with gender, smoking, anxiety, stress, depression, perceived dental health, current non-treated caries, self-reported gum bleeding and reason for dental visit. A significant difference was found in Public Self-Consciousness for the variables of anxiety, current non-treated caries and reason for dental visits. Total Self-Consciousness is correlated with anxiety, stress, depression, current non-treated caries, gingival bleeding and reason for dental visit. However, other oral health behaviours were not influenced by each of the self-consciousness subscales.

REFERENCES

1. Airila-Mansson S, Soder B, Jin LJ, Soder PO, Klinge B. Self-reporting of periodontal diseases and clinical assessment outcome in a Swedish urban population of smokers and non-smokers. *Acta Odontol Scand* 2004;62:111-115.
2. Anttila S, Knuuttila M, Ylostalo P, Joukamaa M. Symptoms of depression and anxiety in relation to dental health behavior and self-perceived dental treatment need. *Eur J Oral Sci* 2006;114:109-114.
3. Ashford KJ, Karageorghis CI, Jackson RC. Modeling the relationship between self-consciousness and competition anxiety. *Pers Individ Dif* 2005;38:903-918.
4. Buhlin K, Gustafsson A, Andersson K, Hakansson J, Klinge B. Validity and limitations of self-reported periodontal health. *Community Dent Oral Epidemiol* 2002;30:431-437.
5. Castro GD, Oppermann RV, Haas AN, Winter R, Alchieri JC. Association between psychosocial factors and periodontitis: a case-control study. *J Clin Periodontol* 2006;33:109-114.
6. Chan DW. Self-consciousness in Chinese college students in Hong Kong. *Pers Individ Dif* 1996;21:557-562.
7. Christensen LB, Jeppe-Jensen D, Petersen PE. Self-reported gingival conditions and self-care in the oral health of Danish women during pregnancy. *J Clin Periodontol* 2003;30:949-953.
8. Chu R, Craig B. Understanding the determinants of preventive oral health behaviors. *Probe* 1996;30:12-18.
9. Cramer KM. Comparing the relative fit of various factor models of the self-consciousness scale in two independent samples. *J Pers Assess* 2000;75:295-307.
10. Deinzer R, Hilpert D, Bach K, Schawacht M, Herforth A. Effects of academic stress on oral hygiene: a potential link between stress and plaque-associated disease? *J Clin Periodontol* 2001;28:459-464.
11. Duberstein PR, Conner KR, Conwell Y, Cox C. Personality correlates of hopelessness in depressed inpatients 50 years of age and older. *J Pers Assess* 2001;77:380-390.
12. Economou GC. Dental anxiety and personality: investigating the relationship between dental anxiety and self-consciousness. *J Dent Educ* 2003;67:970-980.
13. Fenigstein A, Scheier MF, Buss AH. Public and private self-consciousness: assessment and theory. *J Consult Clin Psychol* 1975;43:522-527.
14. Freire MC, Sheiham A, Hardy R. Adolescents' sense of coherence, oral health status, and oral health-related behaviors. *Community Dent Oral Epidemiol* 2001;29:204-212.
15. Honkala S, Al-Ansari J. Self-reported oral health, oral hygiene habits, and dental attendance of pregnant women in Kuwait. *J Clin Periodontol* 2005;32:809-814.
16. Hugoson A, Ljungquist B, Breivik T. The relationship of some negative events and psychological factors to periodontal disease in an adult Swedish population 50 to 80 years of age. *J Clin Periodontol* 2002;29:247-253.
17. Huprich SK. Evaluating facet-level predictions and construct validity of depressive personality disorder. *J Personal Disord* 2003;17:219-232.
18. Innes JM, Kitto S. Neuroticism, self-consciousness and self-consciousness and coping strategies and occupational stress in high school teachers. *Pers Individ Dif* 1989;10:303-312.
19. Jöreskog KG, Sörbom D. LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language. Hillsdale, NJ: Lawrence Erlbaum, 1993.
20. Jostes A, Pook M, Florin I. Public and private self-consciousness as specific psychopathological features. *Pers Individ Dif* 1999;27:1285-1295.
21. Kallio P, Nordblad A, Croucher R, Ainamo J. Self-reported gingivitis and bleeding gums among adolescents in Helsinki. *Community Dent Oral Epidemiol* 1994;22:277-282.
22. Kallio P, Uutela A, Nordblad A, Alvesalo I, Murtomaa H, Croucher R. Self-assessed bleeding and plaque as methods for improving gingival health in adolescents. *Int Dent J* 1997;47:205-212.
23. Klages U, Bruckner A, Zentner A. Dental aesthetics, self-awareness, and oral health-related quality of life in young adults. *Eur J Orthod* 2004;26:507-514.
24. Klages U, Esch M, Wehrbein H. Oral health impact in patients wearing removable prostheses: relations to somatization, pain sensitivity, and body consciousness. *Int J Prosthodont* 2005;18:106-111.

25. Knecht MC, Syrjälä AM, Laukkanen P, Knuuttila ML. Self-efficacy as a common variable in oral health behavior and diabetes adherence. *Eur J Oral Sci* 1999a;107:89-96.
26. Knecht MC, Syrjälä AMH, Knuuttila MLE. Locus of control beliefs predicting oral and diabetes health behavior and health status. *Acta Odontol Scand* 1999b;57:127-131.
27. Kurer JR, Watts TL, Weinman J, Gower DB. Psychological mood of regular dental attenders in relation to oral hygiene behavior and gingival health. *J Clin Periodontol* 1995;22:52-55.
28. LeResche L, Dworkin SF. The role of stress in inflammatory disease, including periodontal disease: review of concepts and current findings. *Periodontol 2000* 2002;30:91-103.
29. Löe H. Oral hygiene in the prevention of caries and periodontal disease. *Int Dent J* 2000;50:129-39.
30. Macgregor ID, Regis D, Balding J. Self-concept and dental health behaviors in adolescents. *J Clin Periodontol* 1997; 24:335-339.
31. Mettovaara HL, Suominen-Taipale AL, Uutela AK, Martelin TP, Knuuttila ML. Cynical hostility as a determinant of tooth-brushing frequency and oral hygiene. *J Clin Periodontol* 2006;33:21-28.
32. Monteiro da Silva AM, Newman HN, Oakley DA. Psychosocial factors in inflammatory periodontal diseases. A review. *J Clin Periodontol* 1995;22:516-526.
33. Newton JT, Corrigan M, Gibbons DE, Locker D. The self-assessed oral health status of individuals from White, Indian, Chinese and Black Caribbean communities in South-east England. *Community Dent Oral Epidemiol* 2003;31:192-199.
34. Newton JT, Khan FA, Bhavnani V, Pitt J, Gelbier S, Gibbons DE. Self-assessed oral health status of ethnic minority residents of South London. *Community Dent Oral Epidemiol* 2000;28:424-434.
35. Panayiotou G, Kokkinos CM. Self-consciousness and psychological distress: a study using the Greek SC scale. *Pers Individ Dif* 2006;41:83-93.
36. Raichle KA, Christensen AJ, Ehlers S, Moran PJ, Karnell L, Funk G. Public and private self-consciousness and smoking behavior in head and neck cancer patients. *Ann Behav Med* 2001;23:120-124.
37. Ruipérez A, Belloch A. Dimensions of the self-consciousness scale and their relationship with psychopathological indicators. *Pers Individ Dif* 2003;35:829-841.
38. Savolainen J, Suominen-Taipale AL, Hausen H, Harju P, Uutela A, Martelin T, Knuuttila M. Sense of coherence as a determinant of the oral health-related quality of life: a national study in Finnish adults. *Eur J Oral Sci* 2005;113:121-127.
39. Scheier M, Carver C. The self-consciousness scale: a revised version for use with the general population. *J Appl Soc Psychol* 1985;15:687-699.
40. Sheiham A, Nicolau B. Evaluation of social and psychological factors in periodontal disease. *Periodontol 2000* 2005; 39: 118-131.
41. Syrjälä AM, Knuuttila ML, Syrjälä LK. Self-efficacy perceptions in oral health behavior. *Acta Odontol Scand* 2001;59:1-6.
42. Syrjälä AM, Ylostalo P, Niskanen MC, Knuuttila ML. Relation of different measures of psychological characteristics to oral health habits, diabetes adherence and related clinical variables among diabetic patients. *Eur J Oral Sci* 2004;112:109-114.
43. Trapnell PD, Campbell JD. Private self-consciousness and the five-factor model of personality: distinguishing rumination from reflection. *J Pers Soc Psychol* 1999;76:284-304.
44. van den Bree MB, Whitmer MD, Pickworth WB. Predictors of smoking development in a population-based sample of adolescents: a prospective study. *J Adolesc Health* 2004;35:172-181.
45. Ylostalo P, Ek E, Knuuttila M. Coping and optimism in relation to dental health behavior - a study among Finnish young adults. *Eur J Oral Sci* 2003;111:477-482.