International Journal of Dental Hygiene

Official Journal of the International Federation of Dental Hygienists

ORIGINAL ARTICLE

AL Dumitrescu
L Zetu
S Teslaru

Instability of self-esteem, self-confidence, self-liking, self-control, self-competence and perfectionism: associations with oral health status and oral health-related behaviours

Authors' affiliations:
AL Dumitrescu, Institute of Clinical Dentistry, University of Tromsø, Tromsø, Norway
L Zetu, *S Teslaru*, University of Medicine and Pharmacy ''Gr. T. Popa'', Iasi, Romania

Correspondence to:
Alexandrina L. Dumitrescu
Institute of Clinical Dentistry
Faculty of Medicine
University of Tromsø
Tromsø
Norway
Tel.: +47 93 65 11 78
E-mail: alexandrina.dumitrescu@uit.no

Dates:
Accepted 13 June 2011

To cite this article:
Int J Dent Hygiene **10**, 2012; 22–29
DOI: 10.1111/j.1601-5037.2011.00519.x
Dumitrescu AL, Zetu L, Teslaru S. Instability of self-esteem, self-confidence, self-liking, self-control, self-competence and perfectionism: associations with oral health status and oral health-related behaviours.

Abstract: *Aim:* Our aim was to explore whether instability of self-esteem, self-confidence, self-liking, self-control, self-competence and perfectionism each has an independent contribution to the self-rated oral health and oral health-related behaviours. *Material and methods:* A cross-sectional study design was used. Data were collected between November 2008 and May 2009. The sample consisted of 205 Romanian adults (mean age: 29.84 years; 65.2% women; 40% married) who were a random population drawn consecutively from the registry file of two private dental practices in the Iasi area. The questionnaire included information about demographic, psychological, self-reported oral health and oral health-related behaviour items. *Results:* The comparison of participants who never flossed their teeth with those who flossed everyday showed statistically significant lower levels of self-confidence ($P < 0.05$), self-liking ($P = 0.001$), self-competence ($P < 0.0001$), self-control ($P < 0.05$) and Perfectionism Scores ($P < 0.05$). Significant higher levels of self-competence were scored in persons who used weekly mouthrinses comparing with never users ($P = 0.012$). Also patients who visited the dentist mainly when treatment is needed or when pain presented lower levels of self-competence and self-control comparing with those who visited the dentist mainly for check-up or for tooth cleaning and scaling ($P < 0.05$). Oral health behaviours (toothbrushing and mouthrinse frequencies) were predicted by multiple regression analyses using sociodemographic (age, gender), self-competence and perfectionism variables. *Conclusions:* Our study showed that instability of self-esteem, self-confidence, self-competence, self-liking, self-control and perfectionism was associated not only with self-rated dental health but also with oral health behaviours. Understanding the psychological factors associated with oral hygiene can further the development and improvement in therapeutic strategies to be used in oral health-improving programs, as well as of programs aimed at prevention and education.

Key words: oral health; perfectionism; self-competence; self-confidence; self-control; self-esteem; self-liking

Introduction

The role of health professionals is to enable people to make sound health choices, by providing information on health and by facilitating skills development. However, even if environments are supportive, making healthy choices will be rather difficult is people do not feel in control over their environment and over their personal circumstances. An important concept in relation to this is empowerment, a concept that became a topical issue in health promotion literature (1). Empowerment can be seen as changing one's self-image or self-evaluation. Two concepts in particular summarize these themes: 'self-esteem' and 'self-confidence' or 'self-efficacy'. Self-esteem will here be seen as an attitude, one that has to do with the person's evaluation of herself as a whole, as a person of some worth. Self-confidence, on the other hand, has to do with beliefs about one's general ability to handle situations and problems in the world, and it can also refer to one's ability to handle a specific task, in which case it is called 'self-efficacy' (2).

Self-esteem is essentially a valuative phenomenon. Individuals are seen as good for what they can do (instrumental and technical value) as well as who they are (character, appearance, social identity and inherent worth as a person). The most explicit classification was offered by Tafarodi and Milne (3), who labelled the two aspects *self-competence* (SC) and *self-liking* (SL). SC is defined as the valuative experience of oneself as a causal agent, an intentional being that can bring about desired outcomes. As a generalized trait, it refers to the overall positive or negative conception of oneself as a source of power and efficacy. The more successful one has been in fulfilling the countless intentions that constitute a lifetime of action, the stronger and more effective one feels. SC is founded on self-efficacy concept. In its generalized form, self-efficacy refers to the overall assurance or faith that individuals have in their ability to achieve their goals (4). Self-efficacy has predicted a range of health behaviours including oral self-care (5–8) and is often included in other health behaviour models, including the Health Belief Model, where it has improved the predictive efficacy of the model (9).

Self-confidence is considered one of the most influential motivators and regulators of behaviour in people's everyday lives. Self-confidence is not a motivational perspective by itself. It is a judgment about capabilities for accomplishment of some goal and, therefore, must be considered within a broader conceptualization of motivation that provides the goal context (10). Self-confidence is associated with gender (11), happiness, loneliness (12), stress (13), anxiety (14), perfectionism (15), physical fitness (13), smoking (16) and drug use (17).

Perfectionism is a multidimensional construct with six individuated dimensions: personal high standards, concern over mistakes, parental criticism, parental expectations, doubts and organization (18). Perfectionism has been linked to many types of psychopathology, including depression, obsessive–compulsive disorder, social phobia and alcoholism, as well as attitudes and behaviours associated with eating disorders (19, 20), depression (21, 22), anxiety (23, 24), stress (18), obsessive–compulsive disorder (25), suicide attempts (26, 27), personality disorders (20) and social phobia (28).

As no studies in adults are available in this area, we explored whether instability of self-esteem, self-confidence, self-liking, self-control, self-competence and perfectionism each has an independent contribution to the self-rated oral health and oral health-related behaviours.

Material and methods

Sample

A cross-sectional study design was used. The study was conducted in accordance with the Helsinki Declaration of 1975, as revised in 2000. The sample consisted of 205 Romanian adults, who were a random population sample drawn consecutively from the registry file of two private dental practices in the Iasi area. The questionnaires were administered personally by a researcher. Data were collected between November 2008 and May 2009. At baseline, data were collected on sex, age, income, marital status and education. Prior to participation, subjects provided written consent to participate in the study. The response rate was 96.5% (198/205).

Instruments and measures

Data were collected through a Romanian self-administered questionnaire and the self-control, self-competence and perfectionism scales. A structured, anonymous questionnaire was used and addressed the following: (i) sociodemographic factors (age, gender, smoking), (ii) perceived oral health status (dental health, non-treated caries, extracted teeth, satisfaction by appearance of own teeth, dental pain, gingival condition, gum bleeding) and (iii) oral health habits (toothbrushing, flossing, mouthrinse frequency, dental visiting) (29–31). Subjects were classified as smokers, past-smokers and non-smokers. The questionnaire contained also three questions concerning stress, anxiety and depression, namely 'do you feel anxious (depressed or stressed) in your every day life' with the response alternatives, (i) no, never, (ii) yes, sometimes and (iii) yes, often.

The instability of self-esteem was evaluated with a four-item scale, Instability of Self-Esteem Scale (ISES) (32). The four items are worded in the same format. The specific wording of the items is organized through the balance of opposed thoughts or feelings about self-worth (e.g. 'Sometimes I feel worthless; at other times I feel that I am worthwhile'). The instructions were: 'Please circle the appropriate number for each statement depending on whether you strongly agree, agree, disagree, or strongly disagree with it'. Participants indicated their agreement with items on a five-point scale (0 = disagree strongly, 4 = agree strongly). Self-confidence was measured with the nine-item subscale of the Modified Competitive State Anxiety Inventory-2 (CSAI-2). The original CSAI-2

consists of 27 items, divided into three nine-item subscales that assess cognitive anxiety, somatic anxiety and self-confidence (33). Participants respond on a four-point scale that ranges from 1 (not at all) to 4 (very much). Each subscale total ranges from 9 to 36. The 20-item Self-Competence/Self-Liking Scale (SLCS) (34) divides into two 10-item subscales, one designed to measure self-competence and the other self-liking. Both subscales have an equal number of positively and negatively worded items. In validating the measure, Tafarodi and Swann (33) found coefficient alphas of 0.89 and 0.92 and uncorrected test–retest (3-week interval) reliabilities of 0.80 and 0.78 for self-liking and self-competence, respectively, with the subscales correlated at 0.69. Self-control was evaluated with the 13-item short form of Self-control scale (35). Participants indicated their agreement with items on a four-point Likert scale from 1 (not at all) to 4 (very much so). Tangney *et al.* (35) reported high internal consistency estimates of reliability. Alphas for the Total Self-Control Scale (SCS) were 0.89, while the Brief SCS was highly reliable (α: 0.83 and 0.85). Thus, the scale appears to have adequate internal reliability. Test–retest reliability was 0.89 for the Total SCS score and 0.87 for the Brief SCS. In this study, a psychometric analysis was performed on the 13 items of the short form of Self-control scale to examine the reliability of the questionnaire. Brief Perfectionism Scale (BPS) (36) is a seven-item measure of perfectionism. Each item is rated on a seven-point scale. The BPS assesses the maladaptive, dichotomous thinking style of perfectionists, as well as their negative emotional reaction to making mistakes across work and leisure domains. The self-control, self-competence and perfectionism scales were translated into Romanian by two bilingual psychologists using back translation methods.

Statistical analysis

Descriptive statistics and statistical analyses were performed with computerized statistical package (SPSS 16.0, Inc., Chicago, IL, USA) software. The internal consistency of the self-control, self-competence and perfectionism scales was examined using Cronbach's α. Descriptive statistics were used on all variables. Differences among groups were identified with the Student's *t*-test and analysis of variance. Multiple linear regression analyses were performed using age, gender, marital status, income, education, instability of self-esteem, self-confidence, self-liking, self-competence, self-control and perfectionism as independent variables. All reported *P* values are two tailed; *P* values <0.05 were considered statistically significant.

Results

Reliability of the scales

Cronbach's reliability coefficients were as follows: 0.82 for Instability of Self-Esteem Scale, 0.83 for Self-confidence subscale of the Modified CSAI-2, 0.73 for the Self-competence subscale, 0.84 for the Self-liking scale, 0.74 for the Self-control scale and 0.76 for BPS. The scales were intercorrelated (Table 1).

Participant characteristics

The mean age of the subjects was 29.84 ± 9.78 years (range: 20–62 years), 65.2% were women, 39.9% were married, 28% reported high income level and 77.3% were at a high education level (Table 2). A significant difference was found in self-confidence with regard to income level per month, perfectionism with regard to educational level and in instability of self-esteem and self-competence with regard to income and educational level (Table 2). When self-rated oral health status was evaluated (Table 3), only 8.6% of the participants believed that their dental health was poor/very poor, despite the fact that 65.2% of them reported current non-treated caries, 54.1% were dissatisfied with the aspect of their teeth and 56.4% had experienced toothache during the past year. Irrespective of perceived signs of gingival inflammation (gum bleeding: 64.5%), 91.3% of the subjects characterized their gingival condition as 'normal to excellent'. Brushing at least twice a day was reported by 76.2% of the participants, whereas dental floss and mouthrinse were never used by 52.0% and 38.7%, respectively; 77.9% of adults were regular users of the dental care system (i.e. they had at least one dental visit within the last 2 years) but mostly (64.9%) when treatment was needed or for pain (Table 3).

Table 1. **Correlations among instability of self-esteem, self-confidence, self-competence, self-liking, self-control and Brief Perfectionism Scales**

Scales	Instability of self-esteem	Self-confidence	Self-competence	Self-liking	Self-control	Perfectionism
Instability of self-esteem	1.00					
Self-confidence	0.41***	1.00				
Self-competence	0.29***	0.48***	1.00			
Self-liking	0.17*	0.30**	0.69***	1.00		
Self-control	0.32**	0.28***	0.30***	0.17*	1.00	
Perfectionism	0.00	0.03	0.12	0.16*	0.13	1.00
Mean	9.27	29.45	42.24	40.93	45.92	29.13
Standard deviation	3.69	4.02	9.54	11.53	7.48	8.74
Cronbach's alpha	0.82	0.83	0.73	0.84	0.74	0.76

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

Table 2. **Instability of self-esteem, self-confidence, self-competence, self-liking, self-control and Brief Perfectionism Scores (mean ± SD) in relation to socioeconomic variables**

Demographic variable	Instability of self-esteem	Self-confidence	Self-liking	Self-competence	Self-control	Perfectionism
Gender						
Female (65.2)	43.01 ± 10.17	9.59 ± 3.49	30.05 ± 4.04	42.35 ± 9.28	46.37 ± 7.35	30.14 ± 8.17
Male (34.8)	39.81 ± 12.09	9.10 ± 3.79	29.13 ± 3.99	42.18 ± 9.72	45.68 ± 7.57	28.58 ± 9.03
P value	NS	NS	NS	NS	NS	NS
Income level (RON per month; %)						
<550 (30.6)	42.00 ± 9.88	9.10 ± 3.65	29.36 ± 3.91	42.21 ± 8.01	43.96 ± 8.82	28.40 ± 8.71
550–1500 (41.4)	38.32 ± 12.35	8.45 ± 3.52	28.80 ± 4.20	40.65 ± 10.10	46.06 ± 6.48	28.77 ± 9.45
>1,500 (28.0)	44.23 ± 9.01	10.30 ± 3.73	30.00 ± 3.95	45.23 ± 6.18	46.96 ± 6.99	31.56 ± 6.42
P value	0.008	<0.05	NS	<0.05	NS	NS
Marital status (%)						
Married (39.9)	39.80 ± 12.83	9.39 ± 4.04	29.68 ± 3.99	41.77 ± 11.05	47.10 ± 6.91	30.04 ± 9.54
Other (60.1)	41.68 ± 10.57	9.19 ± 3.44	29.30 ± 4.04	42.55 ± 8.43	45.14 ± 7.77	28.56 ± 8.19
P value	NS	NS	NS	NS	NS	NS
Educational level (years; %)						
1–4 (2.0)	42.00 ± 3.26	9.50 ± 4.43	31.75 ± 3.77	39.00 ± 6.00	43.00 ± 6.48	26.75 ± 8.77
5–12 (20.7)	36.76 ± 12.32	9.02 ± 3.35	28.39 ± 3.21	38.01 ± 11.68	44.41 ± 8.39	23.89 ± 9.61
>12 (77.3)	42.02 ± 11.24	9.33 ± 3.77	29.67 ± 4.18	43.45 ± 8.65	46.41 ± 7.22	30.54 ± 8.01
P value	<0.05	NS	NS	0.004	NS	<0.0001

Parentheses indicate the percentage (%).
NS, not significant.

Instability of self-esteem, self-confidence, self-competence, self-liking, self-control, perfectionism and self-rated oral health status and health behaviours

Significant differences were found in the instability of self-esteem, self-confidence, self-competence and self-liking scores in relation to perceived dental health, current non-treated caries, current extracted teeth (others than the third molars), satisfaction by appearance of own teeth, toothache last time, self-reported gingival condition and self-reported gum bleeding, while self-control was associated only with current non-treated caries (Table 3). Perfectionism was not associated with self-rated oral health status.

When oral health behaviours were analysed (Table 4), it was revealed that toothbrushing frequency once a day or less was observed in persons with significant low levels of perfectionism compared with those participants who brushed their teeth more than twice a day (27.30 ± 6.76 versus 32.39 ± 8.65, $P < 0.05$). The comparison of participants who never flossed their teeth with those who flossed everyday showed statistically significant lower levels of self-confidence (29.44 ± 3.86 versus 31.40 ± 3.40, $P < 0.05$), self-liking (39.58 ± 12.14 versus 47.09 ± 7.92, $P = 0.001$), self-competence (41.15 ± 10.50 versus 46.71 ± 3.64, $P < 0.0001$), self-control (44.83 ± 7.75 versus 48.65 ± 7.04, $P < 0.05$) and Perfectionism Scores (27.80 ± 8.81 versus 32.04 ± 7.33, $P < 0.05$). Significant higher levels of self-competence were scored in persons who used weekly mouthrinses comparing with never users (45.71 ± 5.90 versus 40.84 ± 10.94, $P = 0.012$). Also patients who visited the dentist mainly when treatment is needed or when pain presented lower levels of self-competence and self-control comparing with those who visited the dentist mainly for check-up or for tooth cleaning and scaling (41.39 ± 10.58 versus 44.23 ± 7.26, $P < 0.05$, respectively, 45.07 ± 7.53 versus 47.66 ± 7.40, $P < 0.05$).

To examine a model using sociodemographic variables and the instability of self-esteem, self-confidence, self-liking, self-competence, self-control and perfectionism scales to predict oral health behaviours, we performed multiple regression analyses with adjustment for various potential confounding variables. Oral health behaviours (toothbrushing and mouthrinse frequencies) were predicted using sociodemographic (age, gender), self-competence and perfectionism variables (Table 5).

Discussion

To our knowledge, this investigation is the first to examine the influence of instability of self-esteem, self-confidence, self-competence, self-liking, self-control and perfectionism on self-reported oral health status and behaviour in adults. It was assumed that high self-esteem can generate feelings of worthiness and self-confidence, which can promote good self-care. On the other hand, success in self-care could strengthen self-esteem. Brushing the teeth regularly as well as daily use of dental floss and mouthrinses demands a persevering character. High and stable self-esteem may be needed with these daily self-care practices that should be performed adequately in aim to obtain long-term advantages, which are not seen until after persistent and regular practicing.

The present study confirmed findings from the previous research (37) examining the role of instability of self-esteem, self-confidence, self-liking, self-competence, self-control and perfectionism in self-rated oral health status and behaviour in samples of first-year students. Significant differences on the instability of self-esteem were reported on the following variables: number of extracted teeth and satisfaction with appear-

Table 3. **Comparison of instability of self-esteem, self-confidence, self-competence, self-liking, self-control and Brief Perfectionism Scores (mean ± SD) according to self-reported oral health status**

	Instability of self-esteem	Self-confidence	Self-liking	Self-competence	Self-control	Perfectionism
Perceived dental health						
Poor/very poor (8.6)	9.56 ± 3.28	28.89 ± 4.17	37.76 ± 15.46	41.54 ± 12.96	47.20 ± 7.38	27.62 ± 10.80
Normal (41.6)	8.79 ± 3.57	28.74 ± 4.04	39.32 ± 11.86	40.18 ± 9.60	44.84 ± 7.28	30.33 ± 7.77
Good (35.0)	8.75 ± 3.88	29.49 ± 3.68	42.23 ± 9.50	43.02 ± 7.86	45.78 ± 6.88	28.42 ± 9.06
Very good/Excellent (14.7)	11.82 ± 3.20	32.05 ± 3.68	46.34 ± 6.13	46.86 ± 5.90	47.63 ± 9.81	29.17 ± 6.84
P value	0.003	0.005	<0.05	<0.05	NS	NS
Current non-treated caries						
Yes (65.2)	8.93 ± 3.51	28.85 ± 4.15	39.81 ± 12.05	41.12 ± 9.82	45.00 ± 7.44	29.33 ± 8.37
No (34.8)	9.93 ± 3.96	30.56 ± 3.53	43.01 ± 10.26	44.32 ± 8.69	47.70 ± 7.29	28.78 ± 9.42
P value	NS	0.004	NS	<0.05	<0.05	NS
Satisfaction by appearance of own teeth						
Yes (45.9)	9.73 ± 3.55	30.25 ± 3.69	43.86 ± 8.46	44.11 ± 7.69	46.95 ± 7.61	29.06 ± 8.03
No (54.1)	8.97 ± 3.77	28.83 ± 4.19	38.46 ± 13.21	40.84 ± 10.58	44.98 ± 7.33	29.20 ± 9.46
P value	NS	0.01	0.001	<0.05	NS	NS
Current dental prosthesis						
Yes (2.1)	14.25 ± 1.70	32.59 ± 1.07	32.50 ± 22.70	37.50 ± 25.00	48.75 ± 5.12	26.00 ± 17.45
No (97.9)	9.22 ± 3.65	29.40 ± 4.05	41.57 ± 10.49	42.85 ± 8.03	45.75 ± 7.55	29.19 ± 8.56
P value	0.007	NS	NS	NS	NS	NS
Toothache last time						
Do not remember (27.2)	9.72 ± 3.80	30.51 ± 4.05	41.50 ± 11.81	42.91 ± 10.00	46.40 ± 7.89	26.84 ± 9.79
More than a year ago (16.49)	10.00 ± 3.72	29.00 ± 3.46	39.30 ± 12.92	40.81 ± 11.72	45.78 ± 7.23	30.06 ± 6.72
During last year (20.5)	7.89 ± 3.36	28.96 ± 3.54	41.63 ± 10.63	40.95 ± 10.51	47.21 ± 6.15	30.73 ± 9.87
During last 3 months (23.1)	9.31 ± 3.85	29.67 ± 3.98	41.91 ± 10.70	42.80 ± 7.93	45.86 ± 7.89	29.93 ± 8.15
Last week (12.8)	9.28 ± 2.73	27.60 ± 4.70	38.46 ± 12.58	42.95 ± 6.76	42.78 ± 7.54	28.83 ± 7.37
P value	NS	<0.05	NS	NS	NS	NS
Self-reported gingival condition						
Poor/very poor (8.6)	9.29 ± 4.39	29.62 ± 4.12	43.62 ± 9.11	45.29 ± 8.15	47.04 ± 9.34	28.00 ± 9.57
Normal (41.6)	9.00 ± 3.19	28.88 ± 4.02	38.26 ± 12.71	38.89 ± 11.19	44.98 ± 7.53	29.58 ± 8.76
Good (35.0)	9.04 ± 3.51	29.18 ± 3.87	41.18 ± 11.56	43.43 ± 7.81	46.23 ± 6.65	29.37 ± 8.61
Very good/Excellent (14.7)	10.82 ± 4.57	31.55 ± 3.87	46.55 ± 6.02	46.96 ± 5.19	47.55 ± 8.08	28.27 ± 8.92
P value	NS	<0.05	0.006	<0.0001	NS	NS
Self-reported gum bleeding						
No signs (35.5)	10.04 ± 3.62	30.12 ± 3.84	42.51 ± 10.50	42.38 ± 8.52	46.43 ± 7.75	29.55 ± 9.07
Yes (64.5)	8.80 ± 3.63	29.03 ± 4.06	39.98 ± 12.02	42.10 ± 10.11	45.60 ± 7.36	28.87 ± 8.61
P value	<0.05	NS	NS	NS	NS	NS

Parentheses indicate the percentage (%).
NS, not significant.

ance of one's own teeth. The level of instability of self-esteem had a consistent association with the self-reported oral health status and satisfaction with appearance of teeth (37). In a sample consisted of 217 first-year dental students, significant differences were found by Dumitrescu *et al.* (38) on self-liking and self-competence scales according to several variables: perceived dental health, current non-treated caries, current extracted teeth, satisfaction by the appearance of own teeth, the last time toothache occurred, self-reported gingival condition and self-reported gum bleeding. When oral health behaviours were analysed, an association between self-liking, self-competence and body investment subscales and flossing, mouthrinse and dental visit pattern was revealed. Toothbrushing frequency once a day or less was observed in persons with low levels of self-liking, body care, body protection and perfectionism (38). In students, it was showed (39) that mean levels of self-confidence in individuals with current extracted teeth and with poor/very poor perceived gingival condition were statistically significant and lower than those with no current extracted teeth and with self-rated excellent gingival health ($P < 0.05$). Also, participants with self-reported gingival bleeding showed lower values of self-control compared with those with healthy non-bleeding gingiva ($P < 0.05$). When oral health behaviour was evaluated, it was shown that students with higher scores of self-control were more likely to use everyday mouthrinses ($P < 0.05$) (39).

Interpretation of findings from this study should be cautious because of some methodological limitations. First, this study used self-reported oral health measurements. This type of assessment is valuable but it may be deficient compared with an objective clinical examination. However, 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 (40–45). Several authors (41, 42, 46) have shown that self-reported gingival bleeding is correlated with gingival bleeding at clinical examination. While few studies have compared self-reported questionnaires and periodontal status, those

Table 4. **Comparison of Instability of self-esteem, self-confidence, self-competence, self-liking, self-control and Brief Perfectionism Scores (mean ± SD) according to self-reported oral health habits**

	Instability of self-esteem	Self-confidence	Self-liking	Self-competence	Self-control	Perfectionism
Daily toothbrushing frequency						
Once a day or less (23.8)	9.02 ± 3.05	29.62 ± 3.25	41.82 ± 9.09	41.71 ± 7.87	45.38 ± 7.02	27.30 ± 6.76
Twice a day (64.0)	9.09 ± 3.77	29.15 ± 4.28	40.81 ± 11.89	42.02 ± 9.87	45.52 ± 7.70	29.96 ± 8.18
More than twice a day (12.2)	10.68 ± 4.21	30.59 ± 3.93	39.41 ± 14.03	44.08 ± 10.96	48.69 ± 6.62	32.39 ± 8.65
P value	NS	NS	NS	NS	NS	<0.05
Flossing frequency						
Never (52.0)	8.98 ± 3.49	29.44 ± 3.86	39.58 ± 12.14	41.15 ± 10.50	44.83 ± 7.75	27.80 ± 8.81
Once a month (10.7)	8.55 ± 2.87	27.94 ± 4.14	41.60 ± 10.46	42.57 ± 9.31	47.13 ± 8.29	30.71 ± 8.52
Once a week (8.7)	9.00 ± 4.01	29.83 ± 4.09	39.41 ± 12.48	41.69 ± 10.11	45.94 ± 7.22	24.11 ± 9.53
More than once a week (17.3)	9.63 ± 4.18	28.96 ± 4.47	40.80 ± 11.13	42.45 ± 8.82	46.49 ± 6.22	32.50 ± 7.48
Everyday (11.2)	11.31 ± 3.42	31.40 ± 3.40	47.09 ± 7.92	46.71 ± 3.64	48.65 ± 7.04	32.04 ± 7.33
P value	NS	NS	NS	NS	NS	0.003
Mouthrinse frequency						
Never (38.7)	9.02 ± 3.62	29.13 ± 4.22	39.89 ± 11.83	40.84 ± 10.94	44.85 ± 7.51	28.04 ± 7.92
Once a month (14.4)	8.11 ± 3.51	29.69 ± 4.06	41.85 ± 9.45	43.57 ± 6.91	45.64 ± 7.77	28.07 ± 7.09
Once a week (9.3)	10.11 ± 4.19	29.58 ± 5.18	40.87 ± 14.47	45.71 ± 5.90	49.05 ± 8.82	30.00 ± 10.71
More than once a week (17.5)	11.03 ± 3.22	29.89 ± 3.17	41.63 ± 12.58	42.82 ± 9.81	46.71 ± 7.00	28.93 ± 7.51
Everyday (20.1)	9.18 ± 3.43	29.63 ± 3.91	41.71 ± 10.65	41.94 ± 9.62	46.77 ± 6.39	31.58 ± 11.00
P value	<0.05	NS	NS	NS	NS	NS
Last dental visit						
More than 2 years ago (22.1)	9.00 ± 3.42	29.62 ± 4.01	40.41 ± 11.41	42.55 ± 6.84	46.37 ± 7.09	28.39 ± 7.93
1–2 years ago (13.3)	8.76 ± 3.36	28.96 ± 3.87	39.15 ± 13.02	41.00 ± 11.16	42.84 ± 5.65	26.79 ± 9.20
6–12 months ago (20.0)	9.08 ± 3.95	29.88 ± 4.35	39.68 ± 12.58	41.40 ± 10.54	46.55 ± 8.19	28.11 ± 9.09
<6 months ago (44.6)	9.65 ± 3.89	29.33 ± 3.92	42.14 ± 10.77	42.84 ± 9.84	46.39 ± 7.80	30.53 ± 8.65
P value	NS	NS	NS	NS	NS	NS
Reason for the dental visit						
Never (2.6)	11.20 ± 2.16	30.60 ± 4.09	46.00 ± 4.89	38.00 ± 8. 00	46.80 ± 7.01	26.80 ± 4.32
When treatment is needed or when pain (64.9)	8.94 ± 3.61	29.06 ± 4.16	39.84 ± 12.89	41.39 ± 10.58	45.07 ± 7.53	29.68 ± 8.81
For check-up or for tooth cleaning and scaling (32.5)	9.96 ± 3.84	30.13 ± 3.74	42.38 ± 8.95	44.23 ± 7.26	47.66 ± 7.40	28.71 ± 8.66
P value	NS	NS	NS	NS	NS	NS

Parentheses indicate the percentage (%).
NS, not significant.

available show good overall agreement (41, 45, 47). Recently, Eke and Dye (48) revealed that multivariable modelling of specific self-report oral health measures is promising for predicting the population prevalence of severe periodontitis. Second limitation: we examined cross-sectional associations rather than the causal pathways presented in our conceptual model. Longitudinal data would be useful for testing such causal pathways. A further limitation in our study is the small sample size that included mainly women, with over average incomes and with a high education level. The sample presented a similar profile with the patients profile at other practices in Romania, but the findings therefore may not be generalizable to a population with a lower level of education and incomes and need to be interpreted with caution. However, despite these shortcomings, it can be stated that the present results extend the earlier findings investigating the present relations between instability of self-esteem, self-confidence, self-competence, self-liking, self-control and perfectionism and oral self-rated health and behaviour in a Romanian student population (37, 38) and offer dentists a better understanding of factors influencing oral hygiene behaviours in adults.

Finally, psychologists have identified oral hygiene behaviour as an interesting target for behaviour change – given its near universality and the central role of behaviour in maintaining oral health. There are several possible targets for interventions, distinguishing between situations where individuals lack the motivation to change their oral hygiene behaviour (a lack of motivation) and those who are so motivated but require support in planning and maintaining behaviour change (a lack of volition). These psychological models of health-related behaviours have contributed to our understanding of patients' self-care and adherence to advice from health care professionals (49).

In summary, our study showed that instability of self-esteem, self-confidence, self-competence, self-liking, self-control and perfectionism was associated not only with self-rated dental health (overall index, current non-treated caries, current extracted teeth, satisfaction by appearance of own teeth, toothache last time, self-reported gingival condition and self-reported

Table 5. **Summary of the hierarchical regression analyses predicting self-reported oral health status and habits (toothbrushing, flossing, mouthrinse frequency, dental visiting and reasons for dental visiting) from instability of self-esteem, self-confidence, self-liking, self-competence, self-control and perfectionism**

			Oral health habits				
Measure	Perceived dental health	Self-reported gingival condition	Toothbrushing frequency	Flossing frequency	Mouthrinse frequency	Dental visiting	Reasons for dental visiting
Age	**−0.263***	**−0.250***	0.075	−0.024	0.098	0.154	−0.008
Gender	−0.078	0.120	**0.389*****	**0.296****	**0.283****	0.161	0.100
Income	0.125	0.011	−0.127	−0.042	−0.007	0.076	0.188
Marital status	−0.026	0.086	0.044	−0.100	−0.053	−0.046	0.162
Education	−0.101	−0.078	0.027	0.097	−0.037	0.159	−0.158
Instability of self-esteem	0.067	0.060	0.089	0.123	0.105	0.123	−0.061
Self-confidence	0.131	0.159	0.057	−0.006	−0.010	−0.077	0.097
Self-competence	−0.048	0.048	**0.211***	−0.016	−0.008	−0.046	0.132
Self-liking	0.120	0.003	−0.174	0.048	0.027	0.157	−0.111
Self-control	−0.065	0.013	−0.009	0.111	0.035	−0.112	0.141
Perfectionism	0.033	0.022	**0.195***	0.136	**0.219****	0.101	−0.021
R^2	0.123	0.097	0.232	0.158	0.180	0.169	0.090
F	1.946	1.479	4.163	2.620	3.000	2.778	1.322
P	<0.05	NS	<0.0001	0.004	0.001	0.003	NS

Bold values are significant at $^*P < 0.05$; $^{**}P < 0.01$; $^{***}P < 0.001$.

gum bleeding) but also with oral health behaviours (toothbrushing, mouthrinse frequency, reason for dental visits). These present findings will enable dental clinicians to better understand the individual psychological factors associated with the self-rated oral health and the practice of good oral hygiene. These data represent an important addition to our understanding of the role of psychological models of health-related behaviour in developing interventions to improve oral hygiene-related behaviours. In clinical practice, the dentists could use the present information, by modifying the home care instruction of their patients, suggesting an enhancement of self-competence, self-control and perfectionism in performing their daily toothbrushing, flossing and mouthrinse behaviours. The moderating effects of this personality trait should be considered when evaluating risk-reduction interventions and tailoring intervention efforts to oral health promotion.

References

1 Koelen MA, Lindstrom B. Making healthy choices easy choices: the role of empowerment. *Eur J Clin Nutr* 2005; **59:** S10–S15.

2 Tengland PA. Empowerment: a goal or a means for health promotion? *Med Health Care Philos* 2007; **10:** 197–207.

3 Tafarodi RW, Milne AB. Decomposing global self-esteem. *J Pers* 2002; **70:** 443–483.

4 Mar RA, DeYoung CG, Higgins DM, Peterson JB. Self-liking and self-competence separate self-evaluation from self-deception: associations with personality, ability, and achievement. *J Pers* 2006; **74:** 1047–1078.

5 Schüz B, Sniehotta FF, Wiedemann A, Seemann R. Adherence to a daily flossing regimen in university students: effects of planning when, where, how and what to do in the face of barriers. *J Clin Periodontol* 2006; **33:** 612–619.

6 Stewart JE, Wolfe GR, Maeder L, Hartz GW. Changes in dental knowledge and self-efficacy scores following interventions to change oral hygiene behavior. *Patient Educ Couns* 1996; **27:** 269–277.

7 Syrjälä AM, Kneckt MC, Knuuttila ML. Dental self-efficacy as a determinant to oral health behaviour, oral hygiene and HbA1c level among diabetic patients. *J Clin Periodontol* 1999; **26:** 616–621.

8 Kneckt MC, Syrjälä A-MH, Laukkanen P, Knuuttila MLE. Self-efficacy as a common variable in oral health behavior and diabetes adherence. *Eur J Oral Sci* 1999; **107:** 89–96.

9 Buglar ME, White KM, Robinson NG. The role of self-efficacy in dental patients' brushing and flossing: testing an extended Health Belief Model. *Patient Educ Couns* 2010; **78:** 269–272.

10 The National Academy of Sciences. *Learning, Remembering, Believing: Enhancing Human Performance*. Washington, DC, The National Academies Press, 1994. Available at: http://www.nap.edu/catalog.php?record_id=2303 (accessed 1 November 2009).

11 Kalaian HA, Freeman DJ. Gender differences in self-confidence and educational beliefs among secondary teacher candidates. *Teaching & Teacher Education* 1994; **10:** 647–658.

12 Cheng H, Furnham A. Personality, peer relations, and self-confidence as predictors of happiness and loneliness. *J Adolesc* 2002; **25:** 327–339.

13 Hildingh C, Luepker RV, Baigi A, Lidell E. Stress, health complaints and self-confidence: a comparison between young adult women in Sweden and USA. *Scand J Caring Sci* 2006; **20:** 202–208.

14 Armstrong M. People with impaired memory often lack self-confidence and have high anxiety levels. *Nurs Times* 1999; **95:** 41.

15 Koivula N, Hassmén P, Fallby J. Self-esteem and perfectionism in elite athletes: effects on competitive anxiety and self-confidence. *Pers Individ Dif* 2002; **32:** 865–875.

16 Zvolensky MJ, Bonn-Miller MO, Feldner MT, Leen-Feldner E, McLeish AC, Gregor K. Anxiety sensitivity: concurrent associations with negative affect smoking motives and abstinence self-confidence among young adult smokers. *Addict Behav* 2006; **31:** 429–439.

17 Miller PG. Scapegoating, self-confidence and risk comparison: the functionality of risk neutralization and lay epidemiology by injecting drug users. *Int J Drug Policy* 2005; **16:** 246–253.
18 Sassaroli S, Ruggiero GM. The role of stress in the association between low self-esteem, perfectionism, and worry, and eating disorders. *Int J Eat Disord* 2005; **37:** 135–141.
19 Bardone-Cone AM, Wonderlich SA, Frost RO *et al.* Perfectionism and eating disorders current status and future directions. *Clin Psychol Rev* 2007; **27:** 384–405.
20 Shafran R, Mansell W. Perfectionism and psychopathology a review of research and treatment. *Clin Psychol Rev* 2001; **21:** 879–906.
21 Blatt SJ. The destructiveness of perfectionism. Implications for the treatment of depression. *Am Psychol* 1995; **50:** 1003–1020.
22 Flett GL, Besser A, Hewitt PL. Perfectionism ego defense styles and depression a comparison of self-reports versus informant ratings. *J Pers* 2005; **73:** 1355–1396.
23 Huprich SK, Porcerelli J, Keaschuk R, Binienda J, Engle B. Depressive personality disorder, dysthymia, and their relationship to perfectionism. *Depress Anxiety* 2008; **25:** 207–217.
24 Purdon C, Antony MM, Swinson RP. Psychometric properties of the frost multidimensional perfectionism scale in a clinical anxiety disorders sample. *J Clin Psychol* 1999; **55:** 1271–1286.
25 Rothenberg A. Adolescence and eating disorder the obsessive-compulsive syndrome. *Psychiatr Clin North Am* 1990; **13:** 469–488.
26 Hewitt PL, Flett GL, Turnbull-Donovan W. Perfectionism and suicide potential. *Br J Clin Psychol* 1992; **31:** 181–190.
27 Kirkcaldy BD, Siefen GR, Urkin J, Merrick J. Risk factors for suicidal behavior in adolescents. *Minerva Pediatr* 2006; **58:** 443–450.
28 Ashbaugh A, Antony MM, Liss A, Summerfeldt LJ, McCabe RE, Swinson RP. Changes in perfectionism following cognitive-behavioral treatment for social phobia. *Depress Anxiety* 2007; **24:** 169–177.
29 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.
30 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.
31 Ståhlnacke K, Söderfeldt B, Unell L, Halling A, Axtelius B. Perceived oral health: changes over 5 years in one Swedish age-cohort. *Community Dent Oral Epidemiol* 2003; **31:** 292–299.
32 Chabrol H, Rousseau A, Callahan S. Results of a scale assessing instability of self-esteem. *Can J Behav Sci* 2006; **38:** 136–141.
33 Jones G, Swain A. Intensity and direction as dimensions of competitive state anxiety and relationships with competitiveness. *Percept Mot Skills* 1992; **74:** 467–472.
34 Tafarodi RW, Swann WB Jr. Self-linking and self-competence as dimensions of global self-esteem: initial validation of a measure. *J Pers Assess* 1995; **65:** 322–342.
35 Tangney JP, Baumeister RF, Boone AL. High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *J Pers* 2004; **72:** 271–322.
36 Gosselin JT, Boone AL, Sinek D, Tangney JP. *The Brief Perfectionism Scale*. Fairfax, VA: George Mason University; 2001.
37 Dumitrescu AL, Dogaru CB, Dogaru CD. Instability of self-esteem and affective lability as determinants of self-reported oral health status and oral health-related behaviors. *J Contemp Dent Pract* 2008; **9:** 38–45.
38 Dumitrescu AL, Toma C, Lascu V. Self-liking, self-competence, body investment and perfectionism: associations with oral health status and oral-health-related behaviours. *Oral Health Prev Dent* 2009; **7:** 191–200.
39 Dumitrescu AL, Dogaru BC, Dogaru CD. Self-control and self-confidence: their relationship to self-rated oral health status and behaviours. *Oral Health Prev Dent* 2009; **7:** 155–162.
40 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.
41 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.
42 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.
43 Blicher B, Joshipura K, Eke P. Validation of self-reported periodontal disease: a systematic review. *J Dent Res* 2005; **84:** 881–890.
44 Klinge B. Self-reporting measures for periodontal disease. *Evid Based Dent* 2006; **7:** 71.
45 Gilbert AD, Nuttall NM. Self-reporting of periodontal health status. *Br Dent J* 1999; **186:** 241–244.
46 Ankkuriniemi O, Ainamo J. Dental health and dental treatment needs among recruits of the Finnish Defence Forces, 1919–91. *Acta Odontol Scand* 1997; **55:** 192–197.
47 Joshipura KJ, Douglass CW, Garcia RI, Valachovic R, Willett WC. Validity of a self-reported periodontal disease measure. *J Public Health Dent* 1996; **56:** 205–212.
48 Eke PI, Dye B. Assessment of self-report measures for predicting population prevalence of periodontitis. *J Periodontol* 2009; **80:** 1371–1379.
49 Newton JT. Psychological models of behaviour change and oral hygiene behaviour in individuals with periodontitis: a call for more and better trials of interventions. *J Clin Peridontol* 2010; **37:** 910–911.