

# The Relationship between Self-Reported Oral Health, Self-Regulation, Proactive Coping, Procrastination and Proactive Attitude

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**Objectives:** This cross-sectional study investigated the relationship between self-regulation, proactive coping, procrastination and proactive attitude, perceived oral health and self-reported oral-health behaviours. **Methods:** The study sample consisted of 198 first year medical students. The questionnaire included information about socio-demographic factors, behavioural variables, self-reported oral health status, proactive coping (proactive coping subscale of the Proactive Coping Inventory), procrastination (Procrastination Scale) and proactive attitude (Proactive Attitude Scale). **Results:** Significant differences were found on self-regulation, proactive coping, procrastination and proactive attitude scales between participants who rated their gingival condition as very good/excellent and those who evaluated it as being poor, very poor or normal ( $p < 0.05$ ). Results revealed significant differences in procrastination level among individuals who never visit their dentist and those who visit their dentist for check-up or for tooth cleaning and scaling ( $p = 0.001$ ) or when treatment is needed or when in pain ( $p < 0.05$ ). In multiple linear regression analyses, proactive coping was associated with toothbrushing frequency and reason for dental visiting. **Conclusions:** The result suggested that procrastination and proactive coping are important determinants of perceived oral health and self-reported oral-health behaviours.

*Key words:* self-regulation, proactive coping, procrastination, proactive attitude, oral health, oral health behaviours

## Introduction

For several decades, studies have been conducted to examine the possible association between personality traits and periodontal diseases (LeResche and Dworkin, 2002). Previous studies associated toothbrushing frequency with various psychological traits, including self-esteem, self-efficacy, life satisfaction, optimism, sense of coherence, anxiety, depression, locus of control, stress and cynical hostility (Dumitrescu, 2006). Self-regulation is the ability to control inner states or responses with respect to thoughts, emotions, attention, and performance. As such, it is a critical aspect of development and fundamental to personality and behavioural adjustment. There is general agreement that self-regulation operates at the physiological, attentional, emotional, cognitive, and behavioural levels (Bell and Deater-Deckard, 2007). The development of early self-regulatory skills has implications for adjustment in many areas of functioning, such as school adjustment and achievement (Bell and Deater-Deckard, 2007). *Proactive coping* consists of efforts undertaken in advance of a potentially stressful event to prevent it or to modify its form before it occurs. As such, proactive coping differs from coping with stressful events and from anticipatory coping in important ways. In the stress and coping literature, *coping* is defined as activities undertaken to master, tolerate, reduce, or minimize environmental or intrapsychic demands perceived to represent potential threats, existing harm, or losses. *Anticipatory coping* involves preparation for the stressful consequences of an upcoming event whose occurrence is

likely or certain. Proactive coping may be distinguished from coping and anticipatory coping on three grounds. First, proactive coping is temporally prior to coping and anticipatory coping. It involves the accumulation of resources and the acquisition of skills that are not designed to address any particular stressor but to prepare in general, given the recognition that stressors do occur and that to be forearmed is to be well prepared. Second, proactive coping requires different skills than does coping with extant stressors. For example, because the activities of proactive coping are not directed to a particular stressor, skills relating to the ability to identify potential sources of stress before they occur assume importance in the activities of proactive coping. Third, as compared with coping with extant stressors, different skills and activities are likely to be successful for proactive coping (Aspinwall and Taylor, 1997).

*Procrastination* is a prevalent and pernicious form of self-regulatory failure. Procrastination has been associated with numerous negative outcomes including neuroticism, depression, anxiety, impulsivity, aversiveness, task delay, self-efficacy, and impulsiveness, as well as conscientiousness and its facets of self-control, distractibility, organization, and achievement motivation and poor academic achievement (e.g., Steel, 2007; Vodanovich, 2008). Estimates indicate that 80%–95% of college students engage in procrastination, approximately 75% consider themselves procrastinators, and almost 50% procrastinate consistently and problematically (Steel, 2007). It was also demonstrated that among students, high procrastination was associated with lack of self-determined motivation

and low incidence of flow state. Also in the medical field it was reported that procrastination on the part of patients is a major problem (Bogg and Roberts, 2004; Steel, 2007). Many reasons have been offered as to why people procrastinate. Either situational or temporary factors are related to procrastination such as task aversiveness, evaluation concerns and poor time management skills, either procrastination has been conceptualized as an aspect of personality and has been linked to low self-confidence, self-esteem, and self-efficacy, as well as perfectionism and fear of failure (Vodanovich, 2008).

*Proactive Attitude* is a personality characteristic which has implications for *motivation* and *action*. It is a belief in the rich potential of changes that can be made to improve oneself and one's environment. This includes various facets such as *resourcefulness*, *responsibility*, *values*, and *vision*. Locus of control, self-determination, optimism, hope, and self-efficacy are strongly positively associated with proactive attitude (Schmitz and Schwarzer, 1999).

It was hypothesized that self-regulation, proactive coping and proactive attitude will influence the oral health status and oral health behaviour positively, while procrastination will have the opposite effect.

## Methods

The subjects of the study were first year medical students at the University of Medicine and Pharmacy "Carol Davila" who were consecutively invited to this survey using the two anonymous questionnaires, at the end of the 2007/2008 academic year. All students selected for the survey consented to participation and answered the questionnaire. A total score was calculated based on the response to each statement.

Data were collected through a Romanian structured, anonymous self-administered questionnaire, specifically developed for this study and addressed the following: (1) socio-demographic factors (age, gender, smoking), (2) perceived oral health status (dental health, untreated caries, extracted teeth, satisfaction by appearance of own teeth, dental pain, gingival condition, gum bleeding), (3) oral health habits (toothbrushing, flossing, mouthrinse frequency, dental visiting) (Christensen *et al.*, 2003; Honkala and Al-Ansari 2005; Ståhlacke *et al.* 2003). The questionnaire also contained three questions assessing anxiety, stress, and depression, namely "do you feel anxious (stressed, depressed) in your everyday life" with the response alternatives "no, never" (1), "yes, sometimes" (2), and "yes, often" (3).

The *Self-Regulation Scale* (SRS; Schwarzer *et al.*, 1999) assesses a person's ability to maintain focus of attention when pursuing a goal and facing difficulties in achieving the goal. Schwarzer *et al.* (1999) stated that such a maintenance situation requires an individual to focus attention on the task at hand and to keep a favourable emotional balance. Thus, the items of the SRS were designed to reflect dispositional attention control and regulation. Each item is rated on a 4-point scale ranging from 1 (not at all true) to 4 (completely true), and responses are summed into a total score, with higher scores indicating greater ability to control and maintain one's attention.

*Proactive coping* was assessed using the proactive coping subscale of the Proactive Coping Inventory (PCI; Greenglass *et al.*, 1999) consisting of 14 items ( $\alpha=0.79$ ). Examples of the items are 'I am a "take charge" person' and 'I turn obstacles into positive experiences.' The response choices for this scale are: (1) not at all true, (2) barely true, (3) somewhat true and (4) completely true.

Schwarzer's *et al.* (2000) *Procrastination Scale* (PS) was used. This 10-item scale, keyed in the direction of high procrastination, included such items as "It is often days before I get around to doing things that I wanted to do right away" and "I often take on things which I then end up not doing". Five items are reversed keyed. Response format was: (1) not at all true, (2) barely true, (3) moderately true, (4) exactly true.

The *Proactive Attitude Scale* (PAS) (Schwarzer, 1999) has been used to assess proactive attitudes among German adults (Schmitz and Schwarzer, 1999). This construct is similar to psychological measures of optimism and has implications for coping among people living with HIV. Examples of the items are "I spend time identifying long-range goals for myself" and "I feel in charge of making things happen". Response format was (1) not at all true, (2) barely true, (3) moderately true, (4) exactly true. The scales were translated into Romanian by two bilingual psychologists using back translation methods. The mean, standard deviations, Cronbach's  $\alpha$  and inter-scale correlations are presented in Table 1.

Statistical analyses were performed with computerized statistical package (SPSS 13.0, Inc., Chicago, USA) software. The internal consistency of the SRS, PC, PS, and PAS were examined using Cronbach's  $\alpha$ . Differences between groups were analysed with Student's *t*-test and analysis of variance (ANOVA). We assessed bivariate associations among Self-regulation, Proactive Coping, Procrastination, Proactive Attitude scales and perceived

**Table 1.** Means, standard deviations, Cronbach's Alpha and interscale correlations (n=198)

Scales	Properties of scales				Scale Correlations			
	Mean	Standard Deviation	Cronbach's alpha	Number of items	Self-regulation	Proactive Coping	Procrastination	Proactive Attitude
Self-regulation	28.19	4.55	0.758	10	-			
Proactive Coping	43.34	6.05	0.835	14	0.562***	-		
Procrastination	23.94	3.99	0.613	10	-0.579***	-0.576***	-	
Proactive Attitude	25.84	3.71	0.810	8	0.462***	0.672***	-0.466***	-

Note: \*\*\*p<0.001

oral health and self-reported oral-health behaviours with Person correlations. Multiple linear regression analyses were performed using as independent variables age, gender, smoking, anxiety, stress, depression, self-regulation, proactive coping, procrastination and proactive attitude.

## Results

The mean age of the 198 respondents was 19.75 (SD 1.35) years with 72.2% being female, similar to the distribution in the university. Significant differences were found in self-regulation, proactive coping, procrastination and proactive attitude according to several variables: anxiety, stress and depression (Table 2). Seventy percent of the students felt that their dental health was good/very good/excellent, despite the fact that half reported having current untreated caries, a fifth presented extracted permanent teeth, two-fifths were not satisfied by the appearance

of own teeth and almost a third had also experienced toothache during the last six months.

Significant differences were found in proactive coping, procrastination and proactive attitude scores between participants who rated their gingival condition as very good/excellent and those rating it lower ( $p=0.004$ ,  $p=0.028$ ,  $p=0.047$  respectively). Results revealed significant differences in procrastination level among individuals who never visit their dentist and those who visit their dentist for check-up or for tooth cleaning and scaling ( $p=0.001$ ) or when treatment is needed or when pain ( $p<0.05$ ).

In order to examine whether age, gender and psychological determinants independently accounted for variance in self-reported oral health status and behaviours a multiple regression analysis was carried out. Statistical analysis showed that co-linearity was not significant between variables. As one scale was adjusted for other scales, all scales were included in same model. Proactive

**Table 2.** Means and standard deviations of self-regulation, proactive coping, procrastination and proactive attitude scales in relation to background variables

		Self-regulation		Proactive coping		Procrastination		Proactive attitude	
<i>Gender</i>									
Male	27.6%	28.24	SD 5.04	43.10	SD 5.72	23.71	SD 4.23	25.27	SD 3.66
Female	72.4%	28.16	SD 4.37	43.43	SD 6.18	24.02	SD 3.91	26.03	SD 3.72
<i>p value</i>		0.915		0.746		0.642		0.233	
<i>Anxiety in everyday life</i>									
No	28.2%	29.91	SD 4.44	45.74	SD 5.16	22.88	SD 3.34	26.67	SD 3.44
Yes, sometimes	61.5%	27.90	SD 4.11	42.97	SD 5.61	23.95	SD 3.61	25.57	SD 3.63
Yes, often	10.3%	25.00	SD 5.48	38.31	SD 7.98	27.71	SD 5.32	24.64	SD 4.47
<i>p value</i>		<0.0001		<0.0001		<0.0001		0.081	
<i>Stress in everyday life</i>									
No	2.0%	31.00	SD 2.94	50.75	SD 4.34	19.75	SD 5.61	29.25	SD 2.06
Yes, sometimes	54.6%	28.61	SD 4.56	43.79	SD 5.60	23.47	SD 3.56	25.75	SD 3.68
Yes, often	43.4%	27.51	SD 4.52	42.36	SD 6.40	24.79	SD 4.24	25.77	SD 3.77
<i>p value</i>		0.120		0.013		0.009		0.180	

**Table 3.** Summary of regression analyses predicting oral health habits from self-regulation, proactive coping, procrastination and proactive attitude scales

Measure	Oral Health Behaviours						
	Oral Health Status	Gingival condition	Toothbrushing frequency	Flossing frequency	Mouthrinse frequency	Dental visiting	Reason for dental visiting
Age	0.054	-0.039	0.028	-0.049	0.114	-0.072	0.043
Gender	<b>-0.212***</b>	-0.070	0.132	<b>0.194*</b>	0.054	0.063	-0.030
Anxiety in everyday life	<b>-0.229*</b>	<b>-0.247**</b>	0.006	0.117	-0.043	-0.141	-0.095
Stress in everyday life	-0.010	-0.073	0.154	0.012	-0.042	0.107	-0.059
Depression in everyday life	-0.104	-0.038	0.005	-0.090	-0.007	-0.121	-0.035
Self-regulation	0.068	-0.064	-0.112	-0.043	0.050	-0.089	-0.026
Proactive coping	-0.171	0.208	<b>0.298*</b>	-0.026	-0.146	-0.040	<b>-0.258*</b>
Procrastination	0.062	0.030	0.021	-0.190	-0.020	-0.094	-0.149
Proactive attitude	0.143	0.046	-0.117	-0.091	0.204	0.038	0.043
$R^2$	0.150	0.172	0.075	0.060	0.053	0.055	0.053
$F$	3.148	3.676	1.412	1.115	0.970	1.017	0.988
$p$	0.002	<0.0001	0.378	0.351	0.427	0.271	0.488

Note: \* $p<0.05$ ; \*\* $p<0.01$ ; \*\*\* $p<0.001$

coping emerged as significant predictor for toothbrushing frequency ( $\beta = 0.298$ ,  $p < 0.05$ ) and reason for dental visiting ( $\beta = -0.258$ ,  $p < 0.05$ ) (Table 3).

## Discussion

To our knowledge, this is the first study to examine the influence of self-regulation, proactive coping, procrastination and proactive attitude as determinants of self-reported oral health status and behaviour.

Various studies provide evidence of an association between oral health behaviours, periodontal disease and depression, anxiety and stress (Boyapati & Wang, 2007; LeResche & Dworkin, 2002). The multivariable models which included anxiety, stress, depression, self-regulation, proactive coping, procrastination and proactive attitude explained oral health status and gingival condition better than health behaviour ( $p = 0.002$  and  $p < 0.0001$ ). This study's participants rating their gingival condition as very good/excellent presented significantly higher levels of self-regulation, proactive coping, proactive attitude and lower level of procrastination scales than those rating their gingival condition as poor, very poor or normal. Our findings are consistent with previous studies in showing the impact of psychosocial stressors on the health of the periodontium and on periodontal therapy outcome. More important than the stressful agents is how a person copes with stress. Subjects using emotion-focused coping strategies had more periodontal disease. It has been also observed that an individual's ability to cope with stressful stimuli (coping behaviour), as measured by the beliefs of locus of control of reinforcements may play a role in the progression of periodontal disease (for review see Dumitrescu and Wright 2009).

In line with the present findings, previous studies have shown individuals with high stress tend to adopt habits which are harmful to periodontal health such as negligent oral hygiene, intensification of smoking or changes in eating habits. Individual stress coping strategies appear also to influence oral health behaviours, non-surgical periodontal therapy and on the course of periodontal disease (Dumitrescu 2006).

One limitation in our study was the exclusive use of undergraduate students, fact that decreases the practical applicability of the results. Dental health behaviours were self-reported and subjects can over- or underestimate their behaviour. The cognitive testing of self-report questionnaires demonstrated that respondents who used mouthwash regularly were able to recall the number of times with accuracy. Those who used mouthwash intermittently were more inclined to estimate; few respondents could recall with accuracy so reported the number of times used in the past week (Miller *et al.*, 2007).

The present study provides evidence that procrastination is a negatively associated reason for dental visits, while proactive coping is associated with toothbrushing frequency and reason for dental visiting in a sample of first year undergraduate students. Therefore, considering ways to increase proactive coping and a proactive attitude and to reduce the procrastination in patients should be part of the treatment considerations, as we can enhance dental health and the quality of life.

## References

- Aspinwall, L.G. and Taylor, S.E. (1997) A stitch in time: self-regulation and proactive coping. *Psychological Bulletin* **121**, 417-36.
- Bell, M.A. and Deater-Deckard, K. (2007) Biological systems and the development of self-regulation: integrating behavior, genetics, and psychophysiology. *Journal of Developmental and Behavioral Pediatrics* **28**, 409-420.
- Bogg, T. and Roberts, B.W. (2004) Conscientiousness and health-related behaviors: a meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin* **130**, 887-919.
- Boyapati, L. and Wang, H.L. (2007) The role of stress in periodontal disease and wound healing. *Periodontology* **2000** **44**, 195-210.
- Christensen, L.B., Jeppe-Jensen, D. and Petersen, P.E. (2003) Self-reported gingival conditions and self-care in the oral health of Danish women during pregnancy. *Journal of Clinical Periodontology* **30**, 949-53.
- Dumitrescu, A.L. (2006) Psychological perspectives on the pathogenesis of periodontal disease. *Romanian Jjournal of Internal Medicine* **44**, 241-260.
- Dumitrescu, A.L. and Wright, C. (2009) Psychological pathways in the pathogenesis of periodontal disease. In: *Etiology and Pathogenesis of Periodontal Disease*, 1<sup>st</sup> edn; pp245-265. Springer-Verlag: Heidelberg.
- Greenglass, E.R., Schwarzer, R. and Taubert, S. (1999) The Proactive Coping Inventory (PCI): a multidimensional research instrument. <http://www.psych.yorku.ca/greenglass/>.
- Honkala, S. and Al-Ansari, J. (2005) Self-reported oral health oral hygiene habits and dental attendance of pregnant women in Kuwait. *Journal of Clinical Periodontology* **32**, 809-814.
- LeResche L. and Dworkin SF. (2002) The role of stress in inflammatory disease including periodontal disease: review of concepts and current findings. *Periodontology* **2000** **30**, 91-103.
- Miller, K., Eke, P.I. and Schoua-Glusberg, A. (2007) Cognitive evaluation of self-report questions for surveillance of periodontitis. *Journal of Periodontology* **78**, 1462-1455.
- Rayant, G.A. and Sheiham, A. (1980) An analysis of factors affecting compliance with tooth-cleaning recommendations. *Journal of Clinical Periodontology* **7**, 289-299.
- Schmitz, G.S. and Schwarzer, R. (1999) Proaktive Einstellung von Lehrern, Konstruktbeschreibung und psychometrische Analysen [Teachers' Proactive Attitude: Construct description and psychometric analyses]. *Zeitschrift für Empirische Pädagogik* **13**, 3-27.
- Schwarzer, R., Diehl, M. and Schmitz, G.S. (1999) Self-Regulation Scale. <http://www.fu-berlin.de/gesund/skalen>.
- Schwarzer, R., Schmitz, G.S. and Diehl, M. (2000) The Procastination Scale. <http://www.fu-berlin.de/gesund/skalen>.
- Stahlnacke, K., Soderfeldt, B., Unell, L., Halling, A. and Axelius, B. (2003) Perceived oral health changes over 5 years in one Swedish age-cohort. *Community Dentistry and Oral Epidemiology* **31**, 292-299.
- Steel, P. (2007) The nature of procrastination: a meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin* **133**, 65-94.
- Vodanovich, S.J. (2008) Are procrastinators prone to boredom?. *Social Behavior and Personality*. [http://findarticles.com/p/articles/mi\\_qa3852/is\\_199901/ai\\_n8842703](http://findarticles.com/p/articles/mi_qa3852/is_199901/ai_n8842703).