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Treating highly anxious dental patients in a dental fear clinic

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Chapter 5

RELIABILITY AND VALIDITY OF THE DUTCH VERSION OF THE SOCIAL ATTRIBUTES OF DENTAL ANXIETY SCALE¹

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Introduction

The Social Attributes of Dental Anxiety Scale (SADAS) was developed in order to determine the extent to which severe levels of dental anxiety affect patients' social well-being outside the dental setting (Kent, Rubin, Getz, & Humphris, 1996); that is, how much does the anxiety interfere with normal social routines and activities of highly anxious dental patients. A factor analysis by Kent et al. (1996) revealed that the twelve SADAS items represent two separate scales. The first eight items involve unwanted psychological upsets when patients encounter dental care directly, and the four remaining items are about social inhibitions or restrictions due to the perceived state of oral health. The results furthermore indicated that the questionnaire and its two subscales are able to differentiate between a group of routine or urgent dental attendees (PTU group) and a phobic group. Moreover, the first scale had a much higher correlation with the DAS ($r_s = 0.72$; $p < 0.001$) than the social inhibition scale ($r_s = 0.45$; $p < 0.001$). It was concluded by Kent et al. (1996) that the SADAS is a valid measurement instrument of the psychological and social difficulties that highly anxious dental patients encounter.

Inclusion of the SADAS in the assessment procedure used in dental fear clinics implicates that clinicians are able to determine the extent of interference with social routines and psychological effects of dental anxiety. In addition, this instrument could be of help in determining or predicting treatment targets and effects. Various measures of treatment outcome have been used in the past, such as reduction in dental anxiety level (e.g., Berggren & Carlsson, 1985; Makkes, Schuurs, Thoden van Velzen, Duivenvoorden, & Verhage, 1987) and missed or cancelled appointments (e.g., Moore & Brødsgaard, 1994). The present instrument seems a useful addition. However, before we are able to use the SADAS in a Dutch setting, the psychometric properties of this new instrument have to be assessed for the Dutch version. The study by Kent et al. (1996) already indicated that even among American and British patients, the scale resulted in different scores. Therefore, an assessment of the psychometric properties and factorial structure of this questionnaire seems essential in each population it will be used. Thus, the aim of the present study was to assess the reliability and validity of the Dutch version of the SADAS. In addition, results are compared with those found in the study of Kent et al. (1996).

Material and methods

Subjects

Data were collected in two different samples. The first sample consisted of 170 highly anxious dental patients (99 women, 71 men) of a dental fear clinic in Amsterdam, The Netherlands. These patients filled out several questionnaires, including the SADAS, the Dental Anxiety Scale (DAS), the Short version of the Dental Anxiety Inventory (S-DAI), and the Symptom Checklist 90 (SCL-90) when they applied for treatment at the dental fear clinic. Their age ranged from 17 to 76 yr (mean=36.0, SD=11.17).

The second sample consisted of 210 first-year psychology students (140 women, 69 men, 1 not recorded) with a mean age of 20.9 yr (SD=3.72, range 17-38). The psychology students filled out the SADAS as a part of their study requirements.

Instruments

The SADAS consists of twelve questions to be answered on a 5-point scale ranging from 1 (does not apply to me at all) to 5 (completely applies to me). Total scores on the SADAS can thus range from 12 to 60. An example of an item of the psychological reactions subscale is "I feel upset when I walk or drive by a dentist's office"; an example of the social inhibition subscale is "I refuse social invitations because of the state of my teeth". The full version is displayed in Table 1. The translation in Dutch was done as literally as possible by the first author. The second author checked the translation.

The DAS (Corah, 1969) and S-DAI (Aartman, 1998) are used as measures of dental anxiety. The total DAS score ranges from 4-20; the total S-DAI score ranges from 9-45. Both are answered on a 5-point scale. The Dutch version of the Revised Symptom Checklist (SCL-90) (Arrindell & Ettema, 1986) was used to assess the severity of general psychopathology. This questionnaire consists of 90 items, which provide an indication of psychological dysfunctioning on eight dimensions, such as anxiety, somatization, and depression. Patients indicate on a 5-point scale, ranging from 1 (not at all) to 5 (a lot), the psychological and physical complaints they experienced during the previous week. The total score can vary between 90 and 450. The measurement method in its Dutch version differs from Derogatis' (1977) original report on the SCL-90 in that the 5-point scale varied from 0 to 4, as did the total score, because scores were divided by the number of items.

Procedure

First, the factorial structure of the Dutch version of the SADAS was evaluated using confirmative (CFA) and explorative factor analysis (PCA). The CFA was carried out using LISREL 8.12a for Windows (Jöreskog & Sörbom, 1993). As overall model fit indices, χ^2 -statistics, adjusted goodness-of-fit indices (AGFI) and root mean square residuals (RMSR) were computed. With the χ^2 -statistic the hypothesis is tested that the model fits the data. If the null hypothesis is rejected, the model does not fit. The AGFI represents the overall amount of covariation among the observed variables that can be accounted for by the hypothesized model adjusted for degrees of freedom. A model with an AGFI > 0.90 is generally considered to have a good fit (Stevens, 1996). The final overall fit index used, the RMSR, is based on the difference between the elements of the sample covariance matrix and the hypothesized covariance matrix, and should thus be as small as possible.

Then, reliability was estimated with Cronbach's α for the scale(s), and item-rest correlations for the separate items. In order to assess further the validity, correlation coefficients with the DAS, S-DAI, and SCL-90 were computed. In addition, the mean scores were compared with those of the student sample using t-tests, and, finally, the results of the Dutch samples were compared with the scores from Kent et al. (1996).

Results

Table 1 shows summary statistics for the separate items of the SADAS for both Dutch samples. The first item "The need to see a dentist is constantly on my mind" had the highest mean score in both samples. The order of the other items was not the same in the two groups of subjects.

Structure of the SADAS

The structure of the SADAS was determined for the sample of highly anxious dental patients only. CFA revealed that the 2-factor model showed a better fit than the null-model, in which no underlying factor was suggested, and than a 1-factor model, in which one general underlying factor was hypothesized (Table 2). However, the fit could not be considered very good (i.e., AGFI < 0.90). Therefore, an explorative factor

Table 1 Means and standard deviation per item for each sample, and corrected item-total correlations

Item	Highly anxious dental patients			Psychology students		
	Mean	SD	corrected item-total correlation	Mean	SD	Mean
1	3.91	1.29	0.41	1.63	0.95	1.63
2	2.53	1.58	0.39	1.44	0.96	1.44
3	2.84	1.45	0.38	1.16	0.67	1.16
4	1.80	1.16	0.44	1.10	0.61	1.10
5	2.87	1.61	0.48	1.22	0.74	1.22
6	2.69	1.50	0.53	1.24	0.76	1.24
7	3.24	1.47	0.54	1.16	0.67	1.16
8	3.15	1.51	0.53	1.12	0.64	1.12
9	2.91	1.67	0.60	1.21	0.70	1.21
10	2.14	1.48	0.69	1.10	0.61	1.10
11	1.74	1.31	0.55	1.09	0.57	1.09
12	1.71	1.25	0.63	1.10	0.61	1.10

analysis (PCA) with varimax rotation was conducted. This analysis revealed four factors with an eigenvalue higher than 1 explaining 72.8% of the variance (Table 3). In this solution half of the scales consisted of only two items. Since this might be too few for a stable factor pattern, a PCA was conducted in which two factors were forcedly extracted. These two factors explained 53.4% of the variance. All items had a factor loading higher than 0.30 in accordance with the structure found by Kent et al. (1996) (Table 3).

Cronbach's α was 0.78 for the psychological reactions scale, 0.90 for the social inhibition scale, and 0.85 for the total scale. The corrected item-total correlations varied for the total scale between 0.38 and 0.69 (Table 1). For the psychological reactions scale, the corrected item-total correlations varied between 0.36 and 0.60; for the social inhibition scale between 0.69 and 0.86.

Table 2 Results CFA

Model	Chi-square ^a	df	AGFI	RMSR
Null-model	1758.65	78	0.29	0.83
1-factor model	399.90	54	0.55	0.31
2-factor model	230.81	53	0.73	0.18

^a For all chi-squares: $p < 0.001$.

Validity of the SADAS

Correlations were computed for the sample of highly anxious dental patients. The correlation coefficient (Spearman rank) between the psychological reactions and social inhibition scales was 0.46 ($p < 0.001$). Correlation coefficients with the DAS, S-DAI, and SCL-90 are displayed in Table 4. In general, correlation coefficients were low. However, with the psychological reactions scale they were higher, and more often statistically significant, than with the social inhibition scale. Social inhibition correlated most strongly with the SCL-90 subscale interpersonal sensitivity and paranoid ideation.

Table 3 Factor loadings PCA for highly anxious dental patients present study and Kent et al.'s (1996) samples

item	Present study				Kent et al.'s (1996) study		
	4-factor PCA				2-factor PCA		
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	
1	0.11	0.05	0.78	0.20	0.47	0.21	0.70
2	0.19	0.07	0.73	0.06	0.39	0.28	0.51
3	0.03	0.11	0.27	0.84	0.62	0.02	0.72
4	0.17	0.21	0.05	0.84	0.60	0.14	0.50
5	0.16	0.85	0.07-	0.08	0.65	0.15	0.63
6	0.15	0.86	0.06	0.16	0.72	0.14	0.62
7	0.10	0.58	0.50	0.13	0.71	0.16	0.80
8	0.17	0.63	0.33	0.11	0.66	0.21	0.83
9	0.74	0.23	0.28	0.04-	0.25	0.77	0.74
10	0.88	0.19	0.21	0.10	0.26	0.89	0.89
11	0.90	0.07	0.02	0.12	0.10	0.88	0.87
12	0.91	0.14	0.08	0.11	0.17	0.90	0.83

Table 4 Correlation coefficients (Spearman rank) with the DAS, S-DAI, and SCL-90

	SADAS	Psychological reactions	Social inhibition
DAS	0.36***	0.41***	0.16*
S-DAI	0.22*	0.31***	0.00
SCL-Tot ^b	0.22**	0.27**	0.13
SCL-Ago	0.23**	0.29***	0.11
SCL-Anx	0.17*	0.23**	0.07
SCL-Dep	0.23**	0.27**	0.18*
SCL-Som	0.12	0.19*	0.02
SCL-CPD	0.11	0.13	0.14
SCL-ISPI	0.27**	0.28**	0.22**
SCL-AH	0.17*	0.22**	0.09
SCL-Sle	0.22**	0.26**	0.09

*: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$

^b Tot=SCL-Total psychoneuroticism score; Ago=SCL-agoraphobia; Anx=SCL-anxiety; Dep=SCL-depression; Som=SCL-somatization; CPD=SCL-cognitive-performance difficulty; ISPI=SCL-interpersonal sensitivity and paranoid ideation; AH=SCL-anger-hostility; Sle=SCL-sleep disturbance.

With respect to mean SADAS scores, there were no statistically significant differences between men and women on the total scale and both subscales ($t_{158}=0.75$, $p > 0.05$ for the total scale). Means and standard deviations for the patients of the dental fear clinic, the students, and the two groups from the study of Kent et al. (1996) respectively, are shown in Table 5. T-tests for independent sample means (using an unequal variance estimate) indicated that the highly anxious patients scored higher than the first-year university students on all scales ($t_{266.5}=16.98$, $p < 0.001$; $t_{272.6}=19.26$, $p < 0.001$; $t_{224.07}=9.14$, $p < 0.001$, respectively). Furthermore, one sample t-tests showed that the highly anxious patients scored higher than the phobic patients from Kent et al. (1996) on the total scale ($t_{159}=3.51$, $p=0.001$) and the psychological reactions scale ($t_{163}=4.95$, $p < 0.001$), but not on the social inhibition scale ($t_{164}=0.64$, $p=0.526$). Finally, the first-year students from the present study had statistically significant lower mean scores on all scales than the group of routine or urgent dental attendees (PTU group) from Kent et al. (1996) ($t_{209}=3.29$, $p=0.001$; $t_{209}=3.64$, $p < 0.001$; $t_{209}=2.41$, $p=0.017$, respectively).

Table 5 SADAS mean scores and standard deviations per sample

Scale	Highly anxious dental patients		Psychology students		PTU group ^c		Phobic group ^c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total SADAS scale	31.0	10.5	14.6	7.2	16.2	6.2	28.1	10.3
Psychological reactions	22.8	7.3	10.1	4.9	11.3	4.8	20.0	7.1
Social inhibition	8.3	5.0	4.5	2.4	4.9	1.8	8.1	4.8

^c These samples are from a study by Kent et al. (1996).

Discussion

The instruments used to assess dental anxiety thus far were all developed in order to be able to identify individuals with high levels of dental anxiety. This means that it is now possible to differentiate very well between those who are anxious and those who are not using these questionnaires (Schuurs & Hoogstraten, 1993). However, people who eventually visit a dental fear clinic for dental treatment all have high levels of dental anxiety. What was needed, was an instrument that could differentiate highly anxious dental patients with regard to issues related to dental anxiety (Kent, 1997). The SADAS seems to be such an instrument.

The results of the present study indicated that the factor structure found by Kent et al. (1996) could not be replicated satisfactorily. Both explorative and confirmative factor analyses did show the presence of the social inhibition scale that consists of the last four items. However, the psychological reactions scale seems to consist of several subgroups of items, resulting in a moderate fit of the 2-factor model. Although a factorial structure in which two scales consist of only two items may be somewhat unstable, PCA showed that with the two additional factors substantially more variance in the items could be explained. Moreover, the three separate psychological reactions scales seemed interpretable. Two items (items 1 and 2) specifically deal with dental matters being constantly in an individual's mind and pertain to the thoughts of the patient only. Two items (items 3 and 4) deal with the difficulty that is connected with encountering a dental practice and thus pertain to practical consequences, and four items (items 5, 6, 7, and 8) deal with feelings of pressure as psychological side effect of high levels of dental anxiety and pertain to the impact dental anxiety can have on the

feelings of the patient in relation to other people. To explore the factor structure further, the questionnaire might be expanded to four scales with four items each. The questionnaire would still have the advantage of being relatively short, but it would probably have a more stable factor pattern. Overall, it can be concluded that future studies are needed with highly anxious dental patients in other countries to assess the factorial validity of the first eight items of the SADAS more thoroughly. Until then it seems justified to use the two original scales.

Internal consistency, as a measure of the reliability of the SADAS, was good, especially for the four-item social inhibition scale. In addition, it was found that the two scales were moderately correlated. Correlation coefficients between, on the one hand, the total and psychological reactions scale and, on the other, the DAS and S-DAI were statistically significant, though not very high. In addition, the correlations between the social inhibition scale and the dental anxiety measures were negligible. The same pattern was found by Kent et al. (1996), indicating that the first eight items of the SADAS have a stronger relation with dental anxiety. Furthermore, the correlation coefficients with the SCL-90 and its subscales indicated that these scales relate more to the psychological reactions than to the social inhibition scale. More specifically, when using a significance level of 0.01, only one of the SCL scales, interpersonal sensitivity and paranoid ideation, is related to the social inhibition. The two scales obviously measure two different constructs. Social inhibition may be more associated to the actual dental health.

In addition, the Dutch SADAS was able to discriminate between a group of non-anxious individuals and a group of patients seeking help for their extremely high levels of dental anxiety. The students from the present study scored also lower than the patients attending for routine or urgent treatment in Kent et al.'s study (1996). Together, these results indicate a good construct validity of the SADAS, that is, the questionnaire is able to distinguish between individuals that are known to differ. Moreover, the correlation coefficients with the DAS and S-DAI indicate that the SADAS measures a different concept than dental anxiety (good discriminant validity).

In general, since the SADAS was constructed for a highly anxious population, all results were analyzed with the data from the highly anxious sample, except for the comparison of mean scores. In fact, the results for the student sample indicated that this group was too homogeneous to give reliable results, that is, the frequency

distributions of the items were very skew because almost all students used the first answer alternative for all items. To further validate the Dutch SADAS, a future study could compare the scores of highly anxious dental patients to those of dental school patients, emergency clinic patients, or the general population.

In conclusion, the SADAS is a promising new questionnaire with moderate factorial validity, but with more than sufficient reliability, as well as construct and discriminant validity. This questionnaire was specifically developed to determine the psychological and social effects of high levels of dental anxiety outside the dental setting. Considering this, the SADAS will be particularly suited to distinguish among highly anxious dental patients, though not any other population. Questionnaires such as the SCL-90 (Aartman, De Jongh, & Van der Meulen, 1997) and (some form of) the FSS (Berggren & Carlsson, 1985; Hakeberg, Gustafsson, Berggren, & Carlsson, 1995) also distinguish groups of highly anxious dental patients, but they are not distinctively related to the dental situation.

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