



Brazilian Version of the Dental Environment Stress Questionnaire

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To perform cross-cultural adaptation of the Dental Environment Stress Questionnaire (DES) for use in Portuguese-speaking populations, evaluate its psychometric properties, and determine the effects of gender and educational level in the perception of stress sources in dental students.

Methodology: An observational cross-sectional study design was implemented to examine face and content validity. 466 Brazilian students participated in the study in 2015 (UNESP students response rate=79.2%; UNIARA students response rate=82.4%). Construct validity was assessed via the determination of factorial, convergent, and discriminant validity. Reliability was estimated using Cronbach's α , and composite reliability. A model was designed using structural equation modeling, to verify the effects of gender and educational level on the perception of stress sources.

Results: The complete model purposed was not a good fit to the sample ($\lambda_s=0.358-0.955$,

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$\chi^2/df=3.36$, CFI=0.881, TLI=0.870, RMSEA=0.071, $r=0.426-0.664$, AVE=0.366–0.856). After the removal of item 12 and insertion of a correlation between the errors for items 1 and 2 (LM=399.154) and Items 14 and 16 (LM=146.216) the model fitted the sample ($\lambda s=0.411-0.955$, $\chi^2/df=2.54$, CFI=0.926, TLI=0.919, RMSEA=0.058, AVE=0.363–0.850). Adequate content validity ratios were observed for 23 items. Gender affected all DES factors, and educational level influenced four factors.

Conclusion: Cross-cultural adaptation process provided an instrument that was easy to understand, with adequate idiomatic and cultural equivalence. The Portuguese version of the DES showed good psychometric properties and reliability in the study sample. Gender and educational level exerted significant effects on seven and four factors, respectively.

Keywords: Stress; psychological; students; dental; validation studies.

1. INTRODUCTION

Undergraduate dentistry courses require high levels of academic achievement, which can lead to stress and problems related to students' academic performance and physical and mental health [1-4]. There are several reasons for the development of stress in the dentistry school: exams and grades, inadequate time for academic work and for rest, fear of failing the course, difficulty in acquiring clinical skills, criticism from supervisors, lack of patients and financial problems [1-10]. Thus, identification of potential sources of student stress is an educational strategy that facilitates the implementation of educational measures to monitor and prevent the development of stress [5-7].

The Dental Environment Stress Questionnaire (DES), developed by Garbee [8] is the most widely used instrument in the evaluation of stress sources in the academic environment in dentistry. The original English version contains 38 items divided between seven factors. Several modified versions of the DES, with various numbers of items and factors, have been developed and implemented [1-7,9]. However, Kumar et al., [5] Elani et al. [10] and Divaris et al. [11] were the only researchers to perform exploratory factor analysis after modifying the scale.

Despite being widely used in different countries, the DES has been cross-culturally adapted for use in only Arabic- [1], Spanish- [12], Japanese- [13], Malaysian- [14] and Turkish-speaking [4] populations. There is no cross-culturally adapted version for use in Portuguese-speaking populations, which limits its use with Brazilian dental students.

Cross-cultural adaptation allows the use of not only translated but also culturally suitable scales

in the native languages of study populations. Furthermore, the use of psychometric scales for particular samples requires prior validation to guarantee the validity and reliability of collected data because the validity is not a property of the instrument, but is instead related to the sample [15]. However, the literature indicated that few studies involving use of the DES have met all of these requirements.

In addition, considering the cognitive and physical damage that stress can bring to students, the identification of groups with greater susceptibility to different sources of stress will favor the implementation of specific preventive measures to control it [16,17]. Thus, the relationship between the perception of stress sources in the university environment with gender and educational level are important variables to be studied.

Therefore, the aims of this study were to I) perform cross-cultural adaptation of the DES for use in Portuguese-speaking populations, II) evaluate its psychometric properties, and III) determine the effects of gender and educational level on the perception of stress sources.

2. MATERIALS AND METHODS

The study was approved by the Ethics Committee for Research with Human Subjects at the São Paulo State University (UNESP), School of Dentistry, Araraquara, Brazil (CAAE Registry Number 31053214.4.0000.5416).

2.1 Sample and Study Design

An observational, cross-sectional study design was implemented. Undergraduate students enrolled at the Araraquara School of Dentistry, UNESP (n=375), and the University of Araraquara, UNIARA (n=205), in Brazil in 2015 were invited to participate in the study.

A minimum sample size of 60 was estimated according to Kim's [18] recommendations, whereby a 5% significance level, 80% power, and 644 degrees of freedom (df) are assumed. It should be emphasized that the aim of the study was to examine the psychometric qualities of the DES for use with dental students; therefore, the participation of a large sample that represented variation in the population was important.

2.2 Study Variables

Gender and educational level were included as participant characteristics. Kumar et al. [5] adapted version of the DES was used to identify sources of stress for the students. The instrument consists of 38 items divided between 7 factors: self-efficacy beliefs (Items 1–9, e.g. Lack of confidence to be a successful dental student; CR=0.843; α =0.806), faculty and administration (Items 10–19, e.g. Receiving criticism from supervisors about academic or clinical work; CR=0.835; α =0.798), workload (Items 20–24, e.g. Lack of time for relaxation; CR=0.922; α =0.879), patient treatment (Items 25–28, e.g. Lack of cooperation by patient in their home care; CR=0.825; α =0.776), preclinical and clinical training (Items 29–30, e.g. Difficulty in learning precision manual skills required for preclinical and laboratory work; CR=0.923; α =0.456), performance pressure (Items 31–32, e.g. Examination and grades; CR=0.679; α =0.376), and personal factors (Items 33–38, e.g. Fear of unemployment after graduation; CR=0.786; α =0.705). Responses are provided using a 4-point Likert-type scale (1 = not stressful, 2 = slightly stressful, 3 = moderately stressful, and 4 = severely stressful).

2.3 Face Validity

Translation of the DES into Portuguese was performed in consideration of spelling conventions in Brazil and Portugal. The translation was performed independently by three bilingual translators (two from Brazil and one from Portugal), who were native Portuguese speakers and had knowledge of the language and cultural contexts of English-speaking countries. A single (intermediate) Portuguese version of the scale was produced once the researchers had reached consensus. This version was back translated by a bilingual professional, whose native language was English. The translator did not have access to the original English version of the instrument and was not informed that the process involved back translation [19,20].

The idiomatic, semantic, cultural, and conceptual equivalence of the instruments were then analyzed. A multidisciplinary team consisting of psychology, dentistry, and Portuguese language professionals evaluated the intermediate version of the scale [19,20]. This version was then pretested in a group of 30 dental students, to determine the incomprehension index (II) for each item. Items with II values of <20% were considered to demonstrate adequate comprehension. The final version was produced following necessary revision.

2.4 Content Validity

Content validity was analyzed using the content validity ratio (CVR) proposed by Lawshe [21]. Ten dentistry experts and ten Psychology experts analyzed the items and classified them as "essential", "useful, but not essential", or "not necessary". For decision-making regarding the significance of CVR, considering α =5% and 20 experts, it was used the cut-off point proposed by Wilson et al. [22] (CVR=0.44).

2.5 Procedure and Ethical Considerations

Once the final version of the DES was produced, it was applied to undergraduate dental students in a classroom, at a time previously scheduled with their professors. The students were informed that their participation was voluntary, and only those who provided informed consent participated in the study.

2.6 Factorial, Convergent and Discriminant Validity

Construct validity was evaluated via determination of factorial, convergent, and discriminant validity. Factorial validity was assessed via confirmatory factor analysis using a polychoric correlation matrix with weighted least squares mean and variance adjusted (WLSMV) estimation. Chi-square ratio by df (χ^2/df), comparative fit index (CFI), Tucker Lewis index (TLI), root mean square error of approximation (RMSEA) and weighted root mean square residual (WRMR) values were determined as indices of goodness of fit [23,24]. Global adjustment was considered appropriate with a χ^2/df value of ≤ 2.0 , CFI and TLI values of $\geq .90$, and an RMSEA value of ≤ 0.10 , and local adjustment was considered appropriate with a λ value of ≥ 0.40 [23,24]. Furthermore, WRMR values of < 0.08 were considered to indicate good adjustment [24]. When the model did not fit the

sample, it was refined in consideration of λ values and modification indices. The latter, estimated from the Lagrange multipliers (LM) method, were used to verify the existence of a correlation between the errors of the items. A correlation was considered present when $LM > 11$. [14,25]. Convergent validity was evaluated using average variance extracted (AVE), as proposed by Fornell and Larcker [26] and considered adequate with an AVEj value of ≥ 0.50 [24,27]. Discriminant validity was estimated via analysis of the correlations between the factors and considered adequate with AVEi and AVEj values of $\geq r_{ij}^2$.

2.7 Reliability

Reliability was assessed via composite reliability (CR) and Standardized Cronbach's α , which was calculated using a polychoric correlation matrix created via R® software (Core Team, 2016), and considered adequate with α and CR values of ≥ 0.70 . [25,26]

2.8 Structural Model

A model was developed using structural equation modeling to determine the effects of gender and educational level on dental students' perception of stress sources. The model was assessed in two steps using the MPLUS 7.2 software program (Muthén & Muthén, Los Angeles, USA). In the first step, the quality of the model adjustment was evaluated using χ^2/df , CFI, TLI, and RMSEA values. The model adjustment was considered appropriate within the parameters described for the validation process [24]. In the second step, the contribution and significance (β) of the trajectories were evaluated via z test. The significance level was set at 5%. Statistical Package for the Social Sciences (SPSS) software, version 22.0, MPlus software, version 7.2 (Muthén & Muthén, Los Angeles, USA), and the R® program (Core Team, 2016) were used to perform the analyses.

3. RESULTS AND DISCUSSION

3.1 Results

3.1.1 Sample and study design

Two hundred and ninety-seven UNESP students (response rate = 79.2%), with an average age of 21,6 ($\pm 3,0$) years old, and 169 UNIARA students (response rate = 82.4%), with an average age of 24,3 ($\pm 1,5$) years old, agreed to participate in the study.

3.1.2 Study variables

Most of the students were women (75.7%). With respect to educational levels, 22.75%, 22.75%, 23.17%, 19.10%, and 12.23% of the students were enrolled in the first, second, third, fourth, and fifth years, respectively.

3.1.3 Face validity

The cross-cultural adaptation process revealed that only Item 8 (barriers of language) was considered difficult to understand by the participants ($II = 16.66\%$). Although the II value was $< 20\%$, we reformulated the item according to the participants' suggestions, to facilitate understanding. Therefore, "barriers of language" was replaced by "speech difficulty regarding the language".

The experts made some suggestions regarding the title and completion instructions for the intermediate version of the scale, which were incorporated into the instrument. The final version of the cross-culturally adapted DES for use in Portuguese-speaking populations is shown in Table 1.

3.1.4 Content validity

Table 2 shows the distribution of the answers to the DES items and (CVR).

The items for which higher numbers of responses were classified as severely stressful were related to fear of failure, workload, tests and grades, and personal issues such as fear of being unable to secure a good job after graduation, and financial difficulties. Twenty-three items demonstrated adequate CVR values.

3.1.5 Factorial, convergent, and discriminant validity and Reliability

The results of the construct validity analysis and reliability can be seen in Table 3.

The complete model was not a good fit to the sample. Therefore, it was necessary to remove Item 12 and include a correlation between the errors for items 1 and 2 ($LM=399.154$) and items 14 and 16 ($LM=146.216$). Thus, a refined model that fit the sample was obtained (Table 3).

DES reliability was measured by composite reliability and Cronbach's alpha. It is observed that the lowest Composite reliability value was for

the performance pressure factor (0.679) and the lowest Cronbach's alpha value was for performance pressure (0.376) and preclinical and clinical training factors (0.456).

3.1.6 Structural Model

Table 4 shows the effects of gender and educational level on the DES factors.

Women's levels of perceived stress were higher, relative to those observed for men, for all DES factors. Educational level was related only to the faculty and administration, workload, preclinical and clinical training, and performance pressure factors, with a higher level of perceived stress observed in participants with lower educational levels, relative to that observed for participants with higher educational levels.

Table 1. Version of the Dental Environment Stress Questionnaire (DES) proposed by Kumar et al. [5] and cross-culturally adapted version to Portuguese

	Version proposed by Kumar et al. [5]	Versão portuguesa
Title/Título	Dental Environment Stress Questionnaire	Questionário de Estresse no Ambiente Universitário Odontológico
Filling instructions	This list describes things at dental students' environment that could contribute to your stress. Please indicate, on a scale of 1 to 4, how much of the aspects (if any) each item is for you by making a X the appropriate number, considering: 1=not stressful, 2=slightly stressful, 3=moderately stressful, 4=severely stressful	Esta lista descreve situações no seu ambiente universitário como estudante de Odontologia que podem contribuir para seu estresse. Indique, por favor, em uma escala de 1 a 4, o quão estressante cada item é para você, assinalando com um X no número apropriado, considerando: 1=não estressante; 2=ligeiramente estressante; 3=moderadamente estressante; 4=severamente estressante.
Items/Itens		
1	Lack of confidence to be a successful dental student	Falta de confiança para ser um estudante de Odontologia de sucesso
2	Lack a confidence to be a successful dentist	Falta de confiança para ser um dentista de sucesso
3	Completing clinical requirements	Concluir (completar, cumprir) requisitos clínicos
4	Fear of not having possibility to pursue a post-graduate dental education program	Medo de não ter a possibilidade de cursar um programa de pós-graduação
5	Lack of confidence in own decision making	Falta de confiança em tomar suas próprias decisões
6	Fear of failing a course or a year	Medo de ser reprovado em uma disciplina ou em uma série
7	Difficulty in understanding lecture materials	Dificuldade de compreender a matéria da aula
8	Language barrier	Dificuldade de linguagem em relação ao idioma
9	Fear of unable to catch up if getting behind the work	Receio de não conseguir recuperar o atraso caso fique atrás no trabalho
10	Atmosphere created by clinical supervisors	Ambiente criado pelos supervisores clínicos
11	Receiving criticism from supervisors about academic or clinical work	Receber críticas de supervisores sobre trabalho clínico ou acadêmico
12	Amount of cheating in dental faculty	Quantidade de "cola" na prova na faculdade de Odontologia
13	Rules and regulations of the faculty	Regras e regulamentos da faculdade
14	Approachability of teaching staff	Acessibilidade aos supervisores
15	Expectation of dental faculty and what in reality it is like	Expectativas sobre a faculdade de Odontologia e como ela é realmente

16	Availability of supervisors in clinic	Disponibilidade dos supervisores em clínica
17	Attitudes of faculty towards women dental students	Atitudes dos professores em relação às estudantes mulheres
18	Shortage of allocated clinical time	Escassez de tempo clínico
19	Differences in opinion between clinical staff concerning patient treatment	Diferenças de opinião entre os membros da equipe clínica com relação ao tratamento do paciente
20	Amount of work assigned	Quantidade de trabalho atribuída
21	Full working day	Dia repleto de trabalho
22	Lack of time for relaxation	Falta de tempo para relaxar
23	Lack of time to do assigned college work	Falta de tempo para fazer trabalhos atribuídos pela faculdade
24	Late ending time	Atividades terminando muito tarde
25	Lack of cooperation by patient in their home care	Falta de colaboração do paciente nos cuidados a serem realizados em casa
26	Responsibilities for comprehensive patient care	Responsabilidades com o atendimento integral do paciente
27	Patients being late or not showing for their appointments	Pacientes atrasados ou não comparecendo nos horários agendados
28	Working on patients with dirty mouths	Trabalhar em pacientes com má higiene bucal
29	Difficulty in learning clinical procedures	Dificuldade no aprendizado de procedimentos clínicos
30	Difficulty in learning precision manual skills required for preclinical and laboratory work	Dificuldade no aprendizado de habilidades manuais necessárias para trabalho pré-clínico e laboratorial
31	Competition with peers for grades	Competição entre os colegas por notas
32	Examination and grades	Provas e notas
33	Relation with members of the opposite sex	Relação com membros do sexo oposto
34	Difficulty home/hostel environment in which to study	Dificuldades para estudar em casa/alojamento
35	Fear of unemployment after graduation	Medo de desemprego após a graduação
36	Financial resources	Recursos financeiros
37	Personal physical health	Saúde física pessoal
38	Availability of laboratory technicians	Disponibilidade de técnicos de laboratório

3.2 Discussion

The present study involved the development of a cross-culturally adapted Portuguese version of the DES, with consideration of the spelling conventions in Brazil and Portugal. This facilitated the use of the instrument in Brazil and other Portuguese-speaking countries. Subsequent to refinement, the DES with seven factors proposed by Kumar et al. [5] demonstrated adequate psychometric properties in the Brazilian sample.

Seventeen items were considered non-essential during the content validity process, as they demonstrated inadequate CVR values [22]. After analyzing the factorial validity, it was observed that item 12 had a low factorial weight ($\lambda=0.358$) and therefore only this item was removed. Thus,

with the removal of Item 12 and inclusion of correlations between the errors for items 1 and 2, and items 14 and 16, we obtained an adequate local and global fit to the sample. Other items for which removal was indicated in the content validity process were maintained, as they presented factor weights established as appropriate in the study ($\lambda \geq 0.40$).

The DES validation process demonstrated the effects of the variables of interest (gender and educational level) on students' perception of stress sources. Gender exerted a significant effect on all sources of stress assessed in DES ($p < 0.001$), and women showed higher levels of perceived stress than for men in all factors (Table 4). Other studies have also reported higher levels of perceived stress in women [2-4,6]. In contrast with the results of this study,

Sofola and Jeboda [9] did not observe differences in perception according to gender.

According to Fonseca et al. [28] and Basudan et al. [29] men and women may differ in how they perceive and deal with the educational environment and this difference in perception may be related to intrinsic psychological differences. According to Babar et al. [2] relative to men, women are exposed to greater stress in the university environment, and their response patterns to stressful events differ from those of men. In addition to personal and social demands, women need to deal with biological and hormonal demands. Cyclic fluctuations of estrogen and progesterone may increase their response to stress, since estrogens play an important role in the organization of development and maintenance of brain activity [30].

It is also noteworthy that patterns of psychological morbidity differed between men and women, and men were less expressive of their concerns, relative to women [2,6]. According to Abu-Ghazaleh et al. [31] men culturally demonstrate strength when they resist stress. Naidu et al. [7] and Al Saleh et al. [32] emphasize that in recent years the masculinity construct has been observed, in which men are less expressive about stress and therefore, more vulnerable to health risks.

Educational level exerted a significant effect on the faculty and administration, workload, preclinical and clinical training, and performance pressure factors, with higher levels of perceived stress observed in participants with lower educational levels, relative to those observed in participants with higher educational levels. Polychronopopou and Divaris [3] also reported lower scores for seniors. In contrast, most studies [5-7] reported an increase in perceived stress as courses progressed, which peaked during the third year, in the transition between preclinical and clinical phases. However, Sugiura et al. [13] reported no difference in perceived stress between study years.

The evaluated Brazilian students are part of dentistry courses that present a traditional curriculum. In the first two years the theoretical workload of basic subjects is high and in the second year the students still perform pre-clinical training in the Restorative Dentistry laboratory. Effective patient care begins only from the third year. In the subsequent years, the fourth and fifth year, the workload directed to the patient care is high, since these years concentrate clinical

subjects. Although in the first years of the course the evaluated students do not present as a source of stress the relationship with the patients, it is during this period that a life-changing process occurs, in which many of them leave their cities, their friends and family [33]. The challenge of becoming independent adults in an unknown environment with unfamiliar demands arises when they still have not fully recovered from the stress of admission process in the university environment. On the other hand, for older students, the issues that afflict the youngest students (university environment, workload, pre-clinical training, and performance pressure) have been overcome over the years and therefore, are perceived as less stressful.

Separate analysis of each item showed that mean scores ranged from 1.26 (± 0.635), which reflected nonstressful situations, to 3.10 (± 1.011), which reflected moderately stressful situations. In addition, the finding that none of the items provided mean scores that reflected extremely stressful situations is noteworthy. Items 17 (attitudes of faculty towards women dental students) and 33 (relation with members of the opposite sex) showed the lowest mean scores for perceived stress. In contrast, items 6 (fear of failing a course or year), 21 (full working day), 22 (lack of time for relaxation), 23 (lack of time to do assigned college work), 24 (late ending time), and 32 (examination and grades) showed high mean scores for perceived stress, which reflected moderately stressful situations.

Items with higher mean scores were related to the Workload factor. This could be explained by the fact that the undergraduate courses at both universities were full-time programs, and students had little time to study, reinforce what they had learned in class, and complete homework activities, necessitating study at night and on weekends. Therefore, work with small groups and student-centered methodologies could modify the curricular structure/educational environment [1,3], providing sufficient time for study and the accomplishment of homework activities. These strategies should allow the teaching/learning process to ensure that students have time for reflection and assimilation of the learned content. In addition, the implementation of individual counseling programs involving faculty training, incentives to practice sports, balanced diets, and regular sleep is required to control stress in students [3].

Although this was a cross-sectional study, and this limited its external validity, the literature did not include studies that had validated the DES comprehensively, as in the present study. The cross-cultural adaptation and validation process performed in the study provides previously unpublished information regarding Brazilian dental students, based on reliable and valid data.

Table 2. Distribution of answers to the DES items and content validity ratio (CVR)

Item	n (%)		Slightly stressful	Moderately stressful	Severely stressful	CVR ^a			
	Not stressful								
1	116	24.9	142	30.5	126	27.0	82	17.6	0.5
2	90	19.3	143	30.7	133	28.5	100	21.5	0.3
3	106	22.7	172	36.9	132	28.3	56	12.0	0.6
4	196	41.2	130	27.9	83	17.8	57	12.2	-0.4
5	159	34.1	152	32.6	105	22.5	50	10.7	0.7
6	53	11.4	112	24.0	96	20.6	205	44.0	0.2
7	89	19.1	196	42.1	124	26.6	57	12.2	0.3
8	216	46.4	152	32.6	76	16.3	22	4.7	-0.2
9	103	22.1	169	36.3	123	26.4	71	15.2	0.3
10	127	27.3	151	32.4	135	29.0	53	11.4	0.7
11	88	18.9	163	35.0	144	30.9	71	15.2	0.5
12	280	60.1	86	18.5	55	11.8	45	9.7	-0.7
13	222	47.6	140	30.0	63	13.5	41	8.8	-0.2
14	180	38.6	157	33.7	91	19.5	38	8.2	0.5
15	165	35.4	143	30.7	110	23.6	48	10.3	0.2
16	129	27.7	159	34.1	115	24.7	63	13.5	0.7
17	283	60.7	95	20.4	60	12.9	28	6.0	-0.7
18	133	28.5	143	30.7	131	28.1	59	12.7	0.7
19	125	26.8	136	29.2	111	23.8	94	20.2	0.1
20	90	19.3	149	32.0	140	30.0	87	18.7	0.7
21	81	17.4	93	20.0	151	32.4	141	30.3	0.6
22	47	10.1	75	16.1	127	27.3	217	46.6	0.7
23	46	9.9	99	21.2	151	32.4	170	36.5	0.7
24	55	9.9	94	21.2	147	32.4	170	36.5	0.4
25	70	15.0	155	33.3	146	31.3	95	20.4	0.4
26	127	27.3	192	41.2	106	22.7	41	8.8	0.8
27	76	16.3	158	33.9	133	28.5	99	21.2	0
28	128	27.5	156	33.5	102	21.9	80	17.2	-0.2
29	129	27.7	185	39.7	103	22.1	49	10.5	0.9
30	133	28.5	162	34.8	112	24.0	59	12.7	0.9
31	223	47.9	75	16.1	69	14.8	99	21.2	-0.3
32	52	11.2	80	17.2	132	28.3	202	43.3	0.6
33	384	82.4	53	11.4	19	4.1	10	2.1	-0.7
34	224	48.1	127	27.3	79	17.0	36	7.7	0.1
35	98	21.0	106	22.7	111	23.8	151	32.4	0.8
36	97	20.8	134	28.8	115	24.7	120	25.8	0.7
37	158	33.9	141	30.3	102	21.9	65	13.9	0.7
38	194	41.6	159	34.1	74	15.9	39	8.4	0.3

^aCVR_{20,0.05}=0.44

Table 3. Goodness-of-fit indices (local and global) and reliability of DES questionnaire

CFA	Factorial Model	
	Complete	Refined
Excluded items	-	12
Correlation between the items	-	1 e 2 (0.767), 14 and 16 (0.602)
λ	0.358–0.955	0.411-0.955
χ^2/df	3.36	2.54
CFI	0.881	0.926
GFI	0.870	0.912
RMSEA	0.071	0.058
R	0.426–0.664	0.464-0.710
AVE	0.366–0.856	0.363-0.856
CR	0.678–0.923	0.679-0.923
A	0.376–0.879	0.376-0.879

Table 4. Contribution of gender and academic level in the DES factors

Factor	Gender				Academic level			
	β	Standardized β	Standard error	p	β	Standardized β	Standard error	p
Self-efficacy beliefs	0.286	0.219	0.067	<0.001	-0.032	-0.027	0.060	0.486
Faculty and administration	0.362	0.234	0.079	<0.001	-0.329	-0.235	0.070	<0.001
Workload	0.462	0.242	0.089	<0.001	-0.509	-0.295	0.080	<0.001
Patient treatment	0.440	0.253	0.091	<0.001	0.121	0.077	0.078	0.122
Preclinical and clinical training	0.408	0.193	0.106	<0.001	-0.195	-0.102	0.094	0.036
Performance pressure	0.295	0.226	0.079	<0.001	-0.240	-0.203	0.069	<0.001
Personal factors	0.266	0.271	0.063	<0.001	-0.007	-0.008	0.042	0.876

4. CONCLUSION

Based on the results presented herein, it can be concluded that the cross-cultural adaptation process produced an easily understood instrument for use in the evaluation of stress sources in dental students, with adequate linguistic and cultural equivalence for use in Portuguese-speaking populations. Moreover, the refined DES demonstrated good psychometric qualities and reliability in the samples from both Brazilian universities. Gender exerted a significant effect on the instrument's seven factors, and educational level affected only the faculty and administration, workload, preclinical and clinical training, and performance pressure factors.

CONSENT

All authors declare that 'written informed consent was obtained from the participants for publication of this paper.

ETHICAL APPROVAL

All authors hereby declare that all data collection have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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