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Psychological Variables for Identifying Susceptibility to Mental Disorders in Medical Students at the University of Barcelona

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Abstract **Introduction:** This study analyses some psychological variables related to susceptibility to mental disorders in medical students.
Methods: A sample of 209 first- and second-year medical students was evaluated using the State and Trait Anxiety Inventory (STAI), and three questionnaires: Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ), General Health Questionnaire (GHQ-28) and UNCAHS scale of STRAIN.
Results: Thirty percent of the students suffered from emotional distress as measured by de GHQ-28, and showed significantly higher scores on trait anxiety, sensitivity to punishment and reward scales, and had higher levels of strain both in the academic environment and their personal life. Women scored significantly higher than men on trait anxiety and sensitivity to reward. Logistical regression found that trait anxiety and strain in non-academic life were the best predictors of the development of a mental disorder.
Conclusions: The study confirms the usefulness of the STAI for detecting psychological distress and the validity of the SPSRQ for identifying subjects likely to present emotional distress when facing high environmental demands. Subjects most likely to present with mental illness are those who evaluate their personal (non-academic) lives as more stressful.

The first years at university represent a major challenge for medical students. At this point in their lives they must perform according to the standards of their chosen professional career and, simultaneously, initiate the process of emancipation from parental control. This process of emotional detachment and change of social roles generates psychological distress, mainly because both the family and academic environment are underpinned by the model of social competition that predominates in professional activity. As this adaptive process evolves, some students show signs of physical or psychological suffering. Every year, the Psychological Attention Program (PAP) at our School of Medicine attends to 50 new cases of students with adaptive problems deriving from their academic studies.[1] The detection and treatment of mental difficulties (both adaptive problems and well-defined psychiatric disorders) before these future doctors embark on their professional careers is likely to help them achieve greater self-control and cope more successfully with the demands of their profession.

Several studies [2,3,4] have discussed and analysed the risks to which members of the medical profession are exposed. Three years ago, the Medical Association of Barcelona created the Integral Care Program for Sick Physicians (PAIMM) to treat drug dependence and mental disorders in doctors. This program is now broadening its functions by promoting various types of preventive measures.[2] In our view, mental disorders are related to susceptibility factors. If this is so, longitudinal studies are necessary to try to detect at-risk medical students at an early stage. We also believe that preventive measures aimed at this group will be more efficient if they are implemented in the context of professional training.

The present study aims to investigate the psychological variables that may be related to emotional distress and mental disorders in first and second-year medical students. We also examine gender related differences. The epidemiological evidence suggests that the prevalence of pathologies differs between genders, and previous studies on coping with stress have reported the existence of gender-specific responses.[5] This is of particular relevance to our study, since the majority of medical students in our environment are women.

Table 1
Scores of Psychological Variables for the Whole Sample and Differences between Males and Females

	Total (N=196)		Males (N=48)		Females (N=148		t	p
Variable	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**		
Strain work	15.9	2.4	16.5	2.6	15.8	2.3	1.90	.059
Strain no work	12.5	2.8	12.7	3.2	12.3	2.8	0.76	.450
GHQ	3.9	5.3	3.0	4.4	4.1	5.5	1.16	.248
STAI-R	21.3	10.4	18.6	10.2	21.9	10.5	1.9	.058
SP	10.5	5.7	9.8	5.8	10.7	5.6	1.0	.338
SR	8.4	4.2	9.9	4.3	8.0	4.2	2.7	.007

Methods

Subjects - All the first- and second-year medical students were invited to participate in the research. The questionnaires were administered in the time devoted to practical training. Information was obtained from 208 subjects (92.8% of the students enrolled). Gender and age distribution of the sample was representative of the population (24.5% males and 75.5% females, with ages ranging from 19 to 21 years). The identity of the students was protected by a secret code, and participation was voluntary.

Questionnaires - State and Trait Anxiety Inventory (STAI)[6,] which assesses anxiety states (STAI-S) and anxiety proneness (STAI-T).
-Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ) , developed by Torrubia et al[7], which assesses two temperamental dimensions derived from the Gray´s personality theory[8]. The first, sensitivity to punishment (SP), identifies subjects selectively responsive to anxiety and fear stimuli, and the second, sensitivity to reward (SR), identifies subjects selectively responsive to stimuli suggesting emotional well-being, reward and consummatory behaviour.
-General Health Questionnaire (GHQ-28)[9], the most used self-report instrument for assessing mental health in epidemiological studies, scored dichotomously. In the Spanish version the cut-off point of 4 offered the best predictive value[10]
-The UNCASHS-STRAIN questionnaire[11,12], comprising two subscales to assess the perception of tension and emotional burden both in personal life and in the academic environment.

Statistical analysis - Differences between groups were analysed using the Student´s t test for independent samples, and the interrelationship between quantitative variables was determined by the Pearson correlation coefficient. A regression analysis was performed to identify the variables involved in the presence of mental illness. All analysis were performed with the SPSS v.10.0, and statistical signification was established at $p < 0.05$

Results

Table 1 shows scores corresponding to all psychological variables for both sexes. Only susceptibility to reward was significantly higher in males. Sixty-three

Table 2
Differences in all Psychological Variables Among Groups Established from GHQ-28 Scores (with and without psychological dysfunction)

	GHQ- (N=145)		GHG+ (N=63)		t	p
Variable	**Mean**	**SD**	**Mean**	**SD**		
Strain work	15.5	2.2	17.0	2.3	4.659	<.001**
Strain no work	12.0	2.3	13.7	3.5	4.226	<.001**
STAI-R	17.1	7.9	30.9	9.0	11.169	<.001**
SP	8.7	5.1	14.4	4.8	7.580	.008*
SR	7.9	4.1	9.6	4.4	2.599	.011*

* $p<0.05$ ** $p<0.01$

Table 3
Correlation Matrix of all Psychological variables in Males (N=48)

	Strain work	Strain no work	GHQ 28	STAI-R	SP
Strain no work	.43**				
GHQ	.40**	.17			
STAI-R	.39**	.26	.85**		
SP	.33*	.16	.65**	.73**	
SR	.18	.36	.07	.16	15

*p< 0.05. ** p< 0.01

Table 4
Correlation Matrix of all Psychological Variables in Females (N=148)

	Strain work	Strain no work	GHQ-28	STAI-R	SP
Strain no work	.22**				
GHQ	.31**	.27**			
STAI-R	.31**	.20**	.69**		
SC	.20*	.13	.50**	.64**	
SR	.18*	.01	.30**	.39**	.22**

*p< 0.05. ** p< 0.01

subjects (30%) showed symptoms and psychological dysfunction (scores above 4 in the GHQ-28) and this group (22.9% and 31.1% females) scored significantly higher in all psychological variables (
(Table 2). In males (n = 48), GHQ-28 scores were significantly correlated with the scores for strain in the academic environment and personal life, anxiety, and susceptibility to punishment, but not with scores for susceptibility to reward. In females (n = 148), GHQ-28 scores were significantly correlated with all psychological variables (Tables 3 and 4).

A stepwise logistic regression analysis was performed including psychological scores as predictive variables of mental status (GHQ scores). Only anxiety trait and strain in personal life were predictive of the presence of symptoms and psychological dysfunction ($GHQ\text{-}28_{(+/-)}$:0.29 Strain No Work + 0.20 STAI.T – 8.23).

Discussion

The mean scores on anxiety and sensitivity to punishment and reward were lower than those found in the university sample used by Torrubia et al. to validate the SPSRQ[7] . Perceived stress in the academic context was slightly lower than in a group of 134 students of Psychology and Nutrition evaluated with the same instruments (mean = 16.2, SD = 2.9) but not in other areas (mean = 12.4, SD = 2.8). In the study by Aktekin et al [13] with samples of students studying different subjects, only medical students had higher GHQ-28 and STAI-T scores in the second evaluation, suggestive of a psychological impairment between the first and second year. As Firth-Cozens states[14], it is not clear whether the rising scores on stress as medical training progresses are due to a progressive increase in academic pressure demand or to the impairment of previous social support.

Nearly 30% of subjects scored above 4 in the GHQ-28. These subjects show psychological distress associated with high levels of trait anxiety and excessive worrying about the consequences (both positive and negative) of their behaviour. This worrying implies increased arousal and attention to environmental signals, and a perception of high contextual demand that contributes to maintaining the state of anxiety. The rate of psychological discomfort found here is slightly lower than that reported in another Spanish study on primary care physicians (36,7%)[15] which used 5 as the cut-off point. In that study, a large percentage of par-

ticipants perceived work-related pressures as the main factor of psychological stress, and stated that these environmental pressures increased with time.

Trait anxiety scores were higher in women (but lower than those reported in two previous studies[7,13]) , and the most significant gender difference was found in sensitivity to reward, which correlated with anxiety and psychological distress in females. Men appeared to be more disposed to engage in behaviours that they considered gratifying. On the other hand, sensitivity to punishment scores correlated strongly with psychological dysfunction and anxiety scores in both genders; the most avoidant and fearful subjects had poorer health.

In males, perception of academic stress was significantly associated with perception of stress in general, anxiety and psychological distress, and also with sensitivity to punishment. In contrast, perception of non-academic stress appeared more related to sensitivity to reward, suggesting that the more active and impulsive subjects tended to perceive more demands outside the academic environment. The same type of relation was found among females, but in their case, perception of academic stress was also significantly related to sensitivity to reward. In terms of the conceptual model of Gray´s personality theory[16], it seems that the use of consummatory and gratifying behaviours to cope with stress is less frequent among these women that in their male counterparts.

The combination of psychological distress (high scores on GHQ-28 and trait anxiety) and fear and anxiety proneness (sensitivity to punishment) seems to reflect the core of the negative emotional cluster suggested by Caseras et al [17] to explain the psychobiological bases of some personality disorders (cluster C). The prevalent type of psychological disorders observed in our Psychological Attention Program (obsessive-compulsive psychopathology and tendency to addictive behaviours) confirms the usefulness of this approach[1]. In a recent study conducted in these population[18], students with fear of examinations were more sensitive to punishment and less sensitive to reward, and also showed more depressive and obsessive symptoms than controls.

Logistic regression analysis underlined the importance of non-academic stress in the appearance of psychological dysfunction in both men and women, even though the women were not yet rearing children at home. In fact, using the same instrument for measuring stress, Luecken et al[11] found that professional women with children at home showed greater vulnerability to psychopathology than males and women colleagues without children. Prospective studies are necessary to ascertain which subgroup of these women would be more prone to present mental disorders after maternity.

It may be that perception of "non-academic" stress is excessively broad as a category. Stressful stimuli in personal life can range from socio-economic disadvantage or health problems to lack of social support or sentimental frustrations. Although more studies are necessary to assess the weight of these different factors in the perception of stress in personal life, there is evidence that socio-economic factors have a well-defined influence on emotional status, behaviour and health.[14,19-20]

Taken together, our data confirm that certain psychological variables such as anxiety trait and sensitivity to punishment may be related to the risk of general psychological dysfunction in medical students, and also provide information on sex differences in coping with stress. The detection of this "risk" variables when students begin their medical training is very important since there is evidence that the GHQ-28 score in the first academic year is the best predictor of the health of subjects in their last year of studies.[21]

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