



Academic stress as a predictor of chronic stress in university students

Blanca Elizabeth Pozos-Radillo^{a*}, María de Lourdes Preciado-Serrano^a, Martín Acosta-Fernández^a, María de los Ángeles Aguilera-Velasco^a, and Diemen Darwin Delgado-García^b

^aUniversity of Guadalajara, México

^bClínica Río Blanco, Los Andes, Chile

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ABSTRACT

The aim of this study was to examine the correlation and predictive value between the Academic Stress Inventory (ASI) and the Stress Symptom Inventory (SSI) in university students and its association with age and gender in both inventories. We evaluated a representative and random sample of 527 students at a public university in 2012. A multiple regression analysis was carried out. The results showed that IEA situations that correspond to classroom intervention, mandatory work, and doing an exam predict high-level chronic stress; being a female and 18, 23, and 25 years old were associated mostly to stress. We conclude that accurate identification of stressors could help understand stress and its harmful effects on college students.

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El estrés académico como predictor del estrés crónico en estudiantes universitarios

RESUMEN

El objetivo de este estudio fue examinar la correlación y el valor predictivo entre el Inventario de Estrés Académico (IEA) y el Inventario de Síntomas de Estrés (ISE) en estudiantes universitarios, así como su asociación con la edad y género en ambos inventarios. Se evaluó una muestra representativa y aleatoria de 527 estudiantes de una universidad pública en el año 2012. Se usó análisis de regresión múltiple. Los resultados mostraron que las situaciones del IEA que corresponden a intervención en clase, trabajos obligatorios y la realización de un examen predicen un nivel elevado de estrés crónico; el género femenino y las edades de 18, 23 y 25 años se asociaron mayormente con el estrés. Se concluye que la identificación exacta de estresores podría ayudar a entender el estrés y sus efectos dañinos en estudiantes universitarios.

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Stress is considered to be a physiological reaction of an organism where diverse defense mechanisms come into play in order to confront a situation which is perceived as threatening or of increased demand. Under the “cognitive-transactional model”, psychological stress according to Lazarus and Folkman (1986, p. 63) is defined as “a particular relationship between the individual and his surroundings which is judged by him to be threatening or to overwhelm his resources and which puts his well being at risk”. Specifically, facing the typical problems which may be present for students in their academic environment, stress may be a natural and necessary reaction for survival in these areas, where different factors are involved including academic overload, group projects,

competitiveness, lack of technological resources, lack of supervision, or insufficient organization of time which produces what is called chronic stress. (Tapia, Guajardo, & Quintanilla, 2008)

The symptoms of academic stress result in a particularly worrisome health concern. Not only adults are at risk for stress, the demands of modern life, even during grade school, have caused the appearance of this malady more and more frequently in children and teens, in which both endogenous and exogenous demands interact to negatively influence the academic performance and achievement of the students. (e.g., Caldera, Pulido, & Martínez, 2007; Segredo, Veloso, & Rodríguez, 2004). Specialized literature indicates that academic stress has been studied in diverse university circles (Aselton, 2012; Berrío & Mazo, 2011), developing different focuses and models. One study analyzed the potential explanatory-predictive effect of daily stress on somatic symptomology of neuroticism (Santed, Sandín, Chorón, & Olmedo 2000). Another study performed in Mexico by Preciado-Serrano and Vázquez-Goñi in 2010 explores

*Correspondence concerning this article should be addressed to Dra. Blanca Elizabeth Pozos Radillo. Paseo de los Virreyes 706 A-19. Virreyes Residencial. Zapopan, Jalisco, México. C. P. 45110. E-mail: litaemx@yahoo.com.mx

the relationship between the *stress profile* and *burnout* in Mexican university students, using a statistical regression model in which the existence of a significant correlation is reported. Other studies are directly related to perception, life events and school activities (e.g., Díaz, 2010; Matheny, Roque-Tovar, & Curlette, 2008; Pulido et al., 2011; Román, Ortiz, & Hernández, 2008), as well as academic strategies and school performance (e.g., Broc & Gil, 2008; Caldera, et al., 2007; Díaz, 2010; Martínez, 2010; Sohail, 2013). These studies conclude that timely evaluations favor the application of efficient interventions in order to lower the stress levels, lower the associated worrisome thoughts and prevent the deterioration of performance of the students (Caldera, et al., 2007).

Based on these conclusions, the objective of this study was to examine the correlation predictive value of the Academic Stress Inventory (ASI) over the Stress Symptoms Inventory (SSI) in university students, as well as their association with age and gender in both inventories.

It is appropriate to mention on one hand that in the bibliographic research no predictive studies reporting the relationship between ASI and SSI were discovered, and particularly studies related to university students. Therefore, this study is considered groundbreaking in the exploration of this relationship.

On the other hand, because the symptoms associated with stress are present in a high percentage of the population of Mexico, this study is important in order to support evidence for the transactional theory of stress and its negative manifestations in academic fields. We hope that in the near future models can be constructed to explain the role of the situations and components of academic stress in order to be able to predict the presence of chronic stress.

The present study has as its purpose to prove the following hypothesis: the ASI situations (test taking, oral presentations, classroom participation, seeking help from tutors, academic overload, overly large class size, lack of time, obligatory assignments, homework, group projects, and competition among students) are predictive of a high level of chronic stress (SSI) and are associated to age and gender of university students.

Method

Sample and Procedure

A cross-sectional and analytical study was performed during the 2012 school year with university students with physical education and sports majors from a public university in Guadalajara, Mexico. Total enrollment was 976 students (63% men and 37% women) from which a simple random selection with an expected prevalence of 64.5% (Marty, Lavín, Figueroa, Larraín, & Cruz, 2005), a 70% accepted minimum frequency and with 99% precision (Lwanga & Lameshow, 1991), which produced 527 individual interviews of university students.

The selection of this university population was carried out by random and proportional numbers, taking into consideration gender and scholastic cycles. The list of students registered for the 2012 school year was used to select those who would voluntarily answer the surveys under an informed consent status. The investigative protocol and informed consent form were reviewed and approved with reference number IISO/CI/11/2012-2013 in adherence to the Helsinki Declaration of 2008 in terms of the ethics of investigation of human beings.

Measures

The *Academic Stress Inventory* was used (ASI; Polo, Hernández, & Pozo, 1999) validated by the Spanish Society of Anxiety and Stress. This is a questionnaire with eleven situations which were considered potential stress generators in students in the academic arena. Each

one of the situations offers a scaled answer of 5 points (1 no stress, 5 high stress) where each participant gives a value according to his or her perception of whether or not it produces stress.

The eleven situations considered to be potential stress generators are: test taking (EA1), oral presentations (EA2), class participation (EA3), seeking help from tutors (EA4), academic overload (EA5), overly large class size (EA6), lack of time (EA7), obligatory assignment (EA8), homework (EA9), group projects (EA10), and competition among classmates (EA11). The reliability in terms of internal consistency corresponds to an alpha coefficient by Cronbach of .90, which is considered satisfactory. In order to establish association, the score is converted from ordinal values into a cardinal level of academic stress in the following way: if the value was 1-2 it was considered low level; a value of 3, moderate level; and between 4-5, high level.

The *Stress Symptom Inventory* (SSI), a questionnaire which was developed and approved by Lipp and Guevara (1994), contains a list of 42 psycho-physiological symptoms characteristic of chronic stress which is based on a three phase model developed by Selye (alarm, resistance, and exhaustion). In 1988, Dominguez adapted it for use in Mexico by means of a content validation and reported an alpha internal consistency rating by Cronbach of .94, which indicates an acceptable degree of reliability. The classification of high, moderate, and low levels of chronic stress was carried out by mean and standard deviation (SD). Furthermore, high level is considered two and three SD above mean, medium level ± 1 SD and low level stress 2 and 3 SD below mean (Pozos-Radillo, Torres, Aguilera, Acosta, & González, 2008). Variables gender and age (in five year increments) are also presented.

Data Analysis

Pearson's analysis of correlation was used to pinpoint the information about the predictive value and, in order to determine the validity of the measurements obtained, we carried out an analysis of regression *by steps* for the ASI and SSI by simultaneously introducing the equation of measurement to the level of significance ($p < .05$). In these analyses, the variables appear in order in the equation according to the percentage of the explained variance.

Afterwards, a hierarchical analysis of multiple regression was applied to determine the predictive value of the situations of the ASI in which the *Introduce* method was used with the ASI situations. With this procedure, an incremental value of prediction of the variable included in third place (ASI) was obtained, once the effect of the second and the first was controlled.

In order to explore the statistically significant difference of gender and age in chronic stress (SSI), as it relates to academic stress situations (ASI), the bi-variant associations were tracked through an analysis of the contingency charts. In these contingency charts the categories of the ASI and SSI (high, moderate and low) were evaluated and were transformed into dichotomies, with values of "0" or "1"; a high level rating was considered as risk. In order to carry out the association of risk calculation the Odds Ratio (OR) was estimated with a CI of 95% and a level of significance of $p < .05$. The data was tabulated and processed using SPSS (Statistical Package for Social Sciences), Version 15 for Windows XP, with university license.

Results

Descriptive Statistics and Correlations

In order to carry out this study, 527 students from a public university were interviewed, of whom 311 (59%) were women and 216 (41%) men; the age range was 18-33 years with an average age of 21.07 (± 1.80) years. The descriptive analysis of the SSI, according to the levels present, showed that 35.3% (186) of the students showed a

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