

Estrategias de afrontamiento al estrés y síntomas patológicos en universitarios ante un desastre siconatural de aluvión de barro

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Resumen

En la presente investigación se analiza la asociación entre sintomatología psicopatológica, estrategias de afrontamiento al estrés y variables sociodemográficas relacionadas con la vivencia de un desastre siconatural. En total, participaron 399 universitarios que completaron las escalas de los síntomas psicológicos (SCL-90-R), estrategias de afrontamientos (CSI) y una encuesta sociodemográfica. Se utilizó una estrategia asociativa-comparativa transversal y un diseño de grupos naturales. Los resultados indicaron la existencia de diferencias debidas al sexo en los síntomas psicopatológicos de somatización, depresión, y ansiedad, siendo las mujeres quienes puntuaron más alto. Se presentan diferencias con respecto a la valoración global del impacto producido por un aluvión en todas las dimensiones psicopatológicas, excepto en sensibilidad interpersonal; y los análisis de regresión múltiple mostraron que las dimensiones psicopatológicas son explicadas por alta retirada social y pensamiento desiderativo. Estos resultados sugieren que tanto las estrategias de afrontamiento al estrés como la presencia de niños en el núcleo familiar, la exposición a la violencia, el deterioro de la vivienda y la valoración de impacto, son potentes predictores de la sintomatología de la depresión, el índice sintomático general, la ansiedad, la somatización, la obsesión-compulsión y el total de síntomas positivos.

Palabras clave: Síntomas patológicos, estrategias de afrontamiento, psicología de la emergencia, desastres siconaturales.

Coping strategies for stress and pathological symptoms in university students in the face of a mudslide disaster

Abstract

This paper aimed to analyze the association between psychopathological symptomatology, stress coping strategies and sociodemographic variables related to the experience of social disaster. 399 undergraduates completed the Psychological Symptom Scales (SCL-90-R), the Coping Strategies Inventory (CSI) and a sociodemographic survey. A cross-sectional associative-comparative strategy and a natural group design were used. The results indicated the existence of differences due to sex in the psychopathological symptoms of Somatization, Depression, and Anxiety, where women scored higher. There are differences regarding the global assessment of the impact caused by the flood in all psychopathological dimensions, except for Interpersonal Sensitivity. Multiple regression analyzes showed that the psychopathological dimensions are explained by high Social Withdrawal and Desiderative Thinking. These results suggest that not only stress coping strategies, but the presence of children in the family nucleus, exposure to violence, housing deterioration and impact assessment are potent predictors of symptoms of Depression, General Symptomatic Index, Anxiety, Somatization, Obsession-Compulsion, and Total Positive Symptoms.

Key words: Pathological symptoms, coping strategies, emergency psychology, socio-natural disasters.

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Estratégias de enfrentamento do estresse e sintomas patológicos em universitários ante um desastre siconatural de deslizamento de terra

Resumo

Na presente pesquisa, analisa-se a associação entre sintomatologia psicopatológica, estratégias de enfrentamento do estresse e variáveis sociodemográficas relacionadas com a vivência de um desastre siconatural. Em total, participaram 399 universitários que completaram as escalas dos sintomas psicológicos (SCL-90-R), estratégias de enfrentamentos (CSI) e um questionário sociodemográfico. Utilizou-se estratégia associativa-comparativa transversal e desenho de grupos naturais. Os resultados indicaram a existência de diferenças devido ao sexo nos sintomas psicopatológicos de somatização, depressão e ansiedade, sendo as mulheres as que pontuaram mais alto. Apresentam-se diferenças a respeito da valoração global do impacto produzido por um deslizamento de terra em todas as dimensões psicopatológicas, exceto em sensibilidade interpessoal; as análises de regressão múltipla mostraram que as dimensões psicopatológicas são explicadas por alta retirada social e pensamento desiderativo. Esses resultados sugerem que tanto as estratégias de enfrentamento do estresse quanto a presença de crianças no núcleo familiar, a exposição à violência, a deterioração da moradia e a valoração de impacto são potentes preditores da sintomatologia da depressão, do índice sintomático geral, da ansiedade, da somatização, da obsessão-compulsão e do total de sintomas positivos.

Palavras-chave: Desastres siconaturais, estratégias de enfrentamento, psicologia da emergência, sintomas patológicos.

INTRODUCTION

The adaptive quality of the individual's psychological response to a situation of natural disaster is modulated by his/her ability to cope with it. Coping skills (hereinafter referred to as CSs), are defined as those cognitive, emotional, and behavioral efforts to handle specific external and/or internal demands that are assessed as surplus or overflowing the subject's resources (Lazarus & Folkman, 1986); they constitute a psychosocial strategy in the face of stress, in both occupational and situational contexts (Loo et al., 2016). The current evidence categorizes these strategies as: focused on the problem v/s focused on the management of emotion; primary (assimilative) v/s secondary (accommodative) and/or of avoidance v/s approach (Pfefferbaum et al., 2016).

Theoretically, the conditions that lead the cognitive apparatus to construct successful CSs are related to the presence of environments with a low degree of uncertainty, which allow the subject to anticipate successful solutions to current problems. However, unexpected and/or extreme situations generate maladaptive responses, which increase in the case of socio-natural disasters (Leiva-Bianchi, 2011). Faced with such conditions, the subject tends to see his/her abilities weakened along with a global impact on several of their psychological functions, which results in a cognitive deterioration and inclination to the development of depressive and anxious disorders, identity disorders, and in some cases, psychiatric disorders such as post-traumatic stress disorder –PTSD (Leach, 2016). Psychosocial research in disasters has addressed the study of adaptive behavior in the face

of disastrous events, in which people are overwhelmed in the usual coping mechanisms (López, Christodoulou, Maj, Sartorius & Okasha, 2005). At present, there is a significant proliferation of studies regarding some associated concepts such as vulnerability, risk management and CSs (Aledi & Sulaiman, 2014).

The empirical evidence confirms the differences in CSs to stress according to diverse constitutive and circumstantial variables of the person, for example, his/her life cycle (Novais, Monteiro, Roque, Correia-Neves & Sousa, 2017). Meta-analytic studies conclude the most used CSs by the young population (adolescents and young adults), are grouped into the following areas: 1) sociocultural, 2) school, 3) family and friends, 4) the self. In terms of functionality they emphasize: a) the CSs of a positive character, like: elaboration of a plan, optimism, religion and spirituality, seeking social support and mood, and b) the CSs of a negative character, such as: avoidance/withdrawal, mental rumination, rage, perfectionism, substance abuse, negative thinking, and avoidance through religious reflections (Montgomery et al., 2014). Other studies show that the CSs preferred by the child population are confined to the use of emotions (Mestre, Samper, Tur-Porca, de Minzi & Mesurado, 2012); and in the school population, the active solution, search for information, emotion and social support, concealment of the problem and passivity (Morales, Trianes, Miranda & English, 2016).

Children and adolescents are among the most vulnerable populations when facing the impact of catastrophes (Powel & Bui, 2016). Considering this vulnerability, an important neurophysiological correlate, high levels of cortisol secretion

are manifested in subjects between the ages of 15 and 17 due to the functional increase of the hypothalamic-pituitary-adrenal axis (HPA) and the hypothalamic-pituitary-gonadal axis (HPG), even higher than in late infancy and/or early puberty (Gunnar, Wewerka, Frenn, Long & Griggs, 2009; Ortiz, Wendy, Silverman, Jaccard & La Greca, 2011), considering that the exposure to intense stress could induce structural changes in the hormonal expression of encephalic receptors - and therefore - in the behavioral response to future stress situations (Blaustein & Ismail, 2013). The prevalence of symptomatology associated with exposure to a socio-natural disaster is in an extremely variable range, from 4% to an exorbitant 70%; in Chile, from 4.4% to 36% (Pérez et al., 2009). In the case of young people who directly experienced a post-traumatic reaction to a disaster, the evidence suggests that 27% maintain their symptomatology three months after the event (Neria, Nandi & Galea, 2008), and even after two years of it (Roberts, Witman, Mitchell & Taffaro, 2010), together with symptomatology of victimization, depression, anxiety and aggressive behavior (Becker, Turner & Finkelhor, 2010), and/or guilt (Salloum & Overstreet, 2012).

Contemporary studies have emphasized the worsening of CSs in the face of disasters in the adolescent population (Daxing, Huifang, Shujing & Ying, 2011), reporting that there are signs such as lack of control and loss of confidence (Pineda & López, 2010) and/or as avoidance, denial and desiderative thinking, which have little effect or even exacerbate the symptoms of PTSD over time (Wadsworth, Raviv, Compas & Connor-Smith, 2005). On the contrary, there are CSs that have a protective factor and give the individual a greater self-efficacy in the solution of problems related to the stress situation, including: intelligence, self-regulatory strategies, hope and transcendent meanings of life, self-efficacy, relationships of social support, religious beliefs and practice and community support (Powell & Bui, 2016), social independence, interpersonal initiative, social responsibility and social openness (Ling-Xiang & Cody, 2011), perceived emotional stability (Hussain, Weisæth & Heir, 2013), and physical condition (Momma et al., 2014). In line with these findings, CS of resilience account for 70% of the modulatory response for the onset of PTSD and suicidal ideation, acting as a shock absorber in front of stressors (Stratta et al., 2015).

There is a special concern about the high prevalence of PTSD in young adult victims of flood, with a prevalence of 25.8% and a high presence of irruptive and intrusive anxious symptomatology in cognitive development (Pinchen et al., 2011). Depression and generalized anxiety have been highlighted (Lima, Santacruz, Lozano, Luna & Pai, 1988), autonomic hyperactivation, intrusive thoughts, psychological

overactivity and avoidance (Craparo, Faraci, Rotondo & Gori, 2013). A preliminary study in the geographical area of occurrence of the disaster that inspires this study, shows a 2% of PTSD symptoms in undergraduate students and 85% present symptoms of medium intensity of impact to the event, suggesting the existence of a low prevalence of PTSD and - nonetheless - a high presence of subjective stress (Lería & Salgado, 2016).

On March 25, 2015, a pluviometric disaster that overflowed rivers and landslides from mining tailings precipitated in the Chilean regions of Antofagasta, Atacama and Coquimbo (27° 21'59" S, 70° 19'59" W). The government decreed a zone of catastrophe and then a constitutional exception, which is why the military took over the protection of public order. The population was exposed to a series of stressful events after the catastrophe due to air pollution, street and pedestrian damage, litter and mounds of stacked mud, among other effects and residues of the flood. The official data count more than 28,000 victims, 31 people deceased, and 16 missing (Interior Ministry's National Emergency Office [ONEMI], 2015). In addition, the existence of 43% of homes with reparable damages was established; 23% slight damage; 13% moderate damage; 7% higher damages; and 6% with non-reparable damages (Ministry of Housing and Urban Development [MINVU], 2015).

Considering the aforementioned, the need to carry out studies that show the modulating strategies of the symptomatological response to such situations is evident. For that, the questions that guide this study are: 1) Are there differences in psychopathological symptoms and CSs to stress as a function of socio-demographic variables and related to the experience of the flood? 2) What is the relationship between psychopathological symptoms and stress CSs? And 3) What variables significantly explain the variability of the psychopathological symptomatology? Thus, the objective of the study is to identify the association between psychopathological symptomatology, CSs, and sociodemographic variables related to the experience of soil mud flood in a medium-sized city.

METHOD

Design

The study adopts a non-experimental ex post-facto transectional design with a descriptive purpose. Variables are not manipulated and the relationships between them are analyzed, investigating the differences between two or more groups of individuals from the contrasts generated by nature and society (Ato, López & Benavente, 2013).

Participants

The sampling was stratified random type, calculated with a margin of error of 5% and a confidence level of 99%, obtaining a sample of 408 students out of a total of 1157 students from a public university, belonging to four academic Faculties (Engineering, Humanities and Education, Legal and Social Sciences, and Health Sciences), which constituted the strata from which the university students were randomly selected (Amón, 1995). Nine participants were excluded from the analysis because they did not complete their responding to all the instruments, so that the population was reduced to 399 students (275 women and 124 men), aged between 18 and 64 years ($M = 20.9$, $SD = 4.26$), of which 53.6% were students of the first level, 28.6% of the second level, 5.8% of the third level, and 8.3% of the fourth level. Regarding marital status, 94% of students were single and 2% were married. In addition, 64.4% reported the presence of children in their family nucleus, and 35.3% of non-presence of these.

Instruments

In consideration of Balaban's (2006) suggestions, regarding the research on victims of socio-natural disasters, participants completed the following questionnaires lasting approximately 60 minutes:

Revised Psychopathological Symptoms Questionnaire (SCL-90-R; Derogatis, 2002, Spanish adaptation by González, De las Cuevas, Rodríguez & Rodríguez, 2002). It is a self-administered questionnaire that allows to evaluate nine psychological dimensions (somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism), from 90 reagents with Likert scale of five categories, from 0 (nothing at all) to 4 (much or extremely). In addition, it allows obtaining three general scales, which are the Global Severity Index (GSI), Total Positive Symptoms (PST) and Positive Symptoms Distress Index (PSDI) (Rosa-Alcázar, Parada-Navas & Rosa-Alcázar, 2014). It is an instrument that can be used in patients who are in psychological or psychiatric treatment and in the general population (Sánchez & Ledezma, 2009). The values of the reliability coefficients as well as those of temporary stability are between .78 and .90, with a test-retest interval of one week, and show score stability over time (Derogatis, 2002). In the present study, Cronbach's alpha reliability coefficients ranged from .71 to .89, with the exception of Paranoid Ideation ($\alpha = .687$).

Coping Strategies Inventory (CSI, Tobin, Holroyd, Reynolds & Kigal, 1989) Spanish version by Cano, Rodríguez and García (2007). It is a scale used to determine the CSs, composed of 40 reagents with a Likert scale of five points, from 0 (*absolutely*) to 4 (*totally*), and at the end of the test there is an additional item about the perceived coping self-efficacy. It allows evaluating eight primary scales (problem solving, self-criticism, emotional expression, desiderative thinking, social support, cognitive restructuring, problem avoidance and social withdrawal). It presents high Cronbach alpha reliability coefficients (between .78 and .89), except for problem avoidance ($\alpha = .63$) and social withdrawal ($\alpha = .65$) (Cano et al., 2007), similar to the ones obtained in the present study (between .74 and .82), except for self-criticism ($\alpha = .65$), problem avoidance ($\alpha = .68$), and social withdrawal ($\alpha = .68$).

Socio-demographic survey. It was elaborated *ad hoc* to collect information regarding quantitative and qualitative variables of sociodemographic type and related to the perception about the life experience during and after the mudflow, such as: address at the time of the flood, assessment of the global impact of the flood, the existence of children, the elderly and/or persons with disabilities in the family nucleus, deterioration, loss or destruction of housing, exposure to robbery or violence, alteration of the work situation and/or loss of income, among others.

Procedure

Conducting this work was authorized by the authorities of the participating institution, and the procedure used was as follows: (a) Communication to the Deans of the different Academic Faculties and the Directors of academic degree courses about the objectives of the study; (b) selection of a representative sample by race, level and sex; (c) coordination with the Directors to determine the place of application of the instruments, (d) information to participants about the research purpose and the confidentiality of the information, as well as about the voluntary nature of participation and the possibility of interrupting it during the process. (e) reading of the informed consent followed by anonymous application of the instruments, which was done in a group modality according to academic degree and level of study.

Data analysis

In order to describe the psychological dimensions and the general scales of SCL-90-R and CSs, their means and standard deviations, as well as Pearson's (r) linear correlations were calculated between the direct scores obtained with both instruments, previously corroborating compliance

of the normality assumptions using the Kolmogorov-Smirnov (KS) test with the Lilliefors correction, and the homoscedasticity test using the Levene test, to determine the use of parametric tests (Amón, 1996). Subsequently, the psychopathological symptoms and the coping dimensions were analyzed in terms of sociodemographic variables and those related to the perception of life experience during and after the mudslides. For the differences by sex, Student's *t*-test was used for independent samples. In the absence of homogeneity, the Welch's test was applied (Armitaje, Berry & Matthews, 1994). For the rest of the variables, an analysis of single-variance ANOVA was performed. *Post-hoc* comparisons were performed using the *Scheffé* test and Cohen's *d* and the Partial Eta Squared (η^2) were calculated to determine the Effect Size (ES) (Cohen, 1988). Finally, a multiple linear regression model was used, with the *stepwise* method, to examine the predictive capacity of the perceived experience of the socio-natural disaster and

the CSs to stress on the psychopathological dimensions. SPSS 22.0 software was used for data processing.

Ethical Considerations

It should be noted that this study was reviewed and approved by a Committee of Scientific Ethics of the institution the authors were working for. Students were not given any incentive to participate and all guards were taken to ensure compliance with the ethical aspects of human research proposed in the guidelines of the American Psychological Association.

RESULTS

In the following section the results of the data analysis are presented, beginning with the comparative examination of the pathological symptoms and the CSs in relation to the independent variables of the study. Then, the correlations of

Table 1
Differences in the SCL-90-R dimensions and CSs according to sex

Scale/Dimension	Mean (SD)		t(397)	p	Cohen's (d)
	Male	Female			
SCL-90-R					
Total positive responses	35.81(21.350)	39.04(2.928)	-1.409	.160	
General symptomatic index	.794(.636)	.933(.666)	-1.949	.052	
SymptomaticiIntensity	1.885(.568)	2.016(.652)	-1.863	.063	
Somatization	.83(.747)	1.15(.856)	-3.805(269.274)*	.000	
Obsession-compulsion	1.13(.803)	1.26(.831)	-1.460	.145	
Interpersonal sensitivity	.75(.680)	.85(.736)	-1.380	.168	.398
Depression	.86(.767)	1.08(.823)	-2.603(253.449)*	.010	
Anxiety	.73(.775)	.91(.820)	-2.136	.033	
Hostility	.80(.848)	.83(.786)	-.363	.717	.276
Phobic anxiety	.47(.640)	.61(.655)	-1.957	.051	.225
Paranoid ideation	.76(.740)	.76(.691)	.056	.956	
Psychoticism	.58(.639)	.61(.626)	-.409	.683	
CSI					
Problem resolution	10.37(5.662)	11.04(5.825)	-1.065	.288	
Self-criticism	2.37(3.339)	2.16(3.046)	.632	.528	
Emotional expression	5.60(4.950)	6.98(5.240)	-2.464	.014	.270
Desiderative thinking	11.05(5.072)	12.84(5.490)	-3.088	.002	.338
Social support	9.47(5.187)	9.11(5.429)	.625	.532	
Cognitive restructuring	9.93(5.093)	9.26(5.265)	1.187	.236	
Problem avoidance	7.26(4.761)	6.07(4.570)	2.374	.018	.255
Social withdrawal	5.98(4.551)	5.14(4.515)	1.727	.085	

*Note** The variances are unequal so the Welch test is applied

the direct scores obtained from the applied instruments are shown, and finally the stepwise regression model is shown in the psychopathological symptomatology.

Differences in psychopathological symptoms and stress CSs as a function of sociodemographic variables and those related to the experience of the flood

Table 1 shows the existence of differences according to sex in the psychopathological symptoms of Somatization ($p = .001$), Depression ($p = .010$), and Anxiety ($p = .033$). Women's mean values were higher than men's. Considering the ES it is possible to indicate that the differences are small according to Cohen's interpretation (1988). The scores obtained indicate that the sample is between the 55th and the 90th percentiles, with the mean values in both sexes in terms of obsession-compulsion and depression.

Regarding stress CSs differences were found according to sex in Emotional Expression ($p = .014$), Desiderative Thinking ($p = .002$), and Problem Avoidance ($p = .018$). In the first two scales, the means reached by women were higher, and in the last one, it was higher in men. The ES was small. It should be noted that the participants of both sexes presented high means in Desiderative Thinking, Cognitive Restructuring, Problem avoidance and Social Withdrawal.

Correlations were made between age and psychopathological symptomatology, finding no significant relationships. On the other hand, between age and stress CSs, meaningful and direct correlations in the variables were found: Self-criticism, $r_{(389)} = .101$, $p = .047$, Emotional expression, $r_{(389)} = .123$, $p = .016$, and Cognitive restructuring, $r_{(389)} = .108$, $p = .034$.

Regarding the place where the participants lived, classified according to the degree of affectation in three zones (Yellow = Not affected, Green = Moderately affected and Red = Very affected) [MINVU, 2015], significant differences of averages were found in all the psychopathological symptoms, including overall rates, with the exception of Phobic Anxiety, $F_{(2,374)} = 2.202$, $p = .112$. In relation to stress CSs, unequal averages are presented in Problem solving, $F_{(3,373)} = 3.439$, $p < .05$, and Desiderative thinking, $F_{(3,374)} = 3.135$, $p < .05$. It should be noted that the highest average scores, in all cases, correspond to the participants who live in the most affected area.

Regarding the student's course level, no significant differences were found in the psychopathological symptoms. The opposite happened in stress CSs, especially in: Self-criticism, $F_{(3,380)} = 2.683$, $p < .05$, $\eta^2 = .024$; Emotional expression, $F_{(3,380)} = 4.631$, $p < .01$, $\eta^2 = .033$; Social support, $F_{(3,380)} = 6.018$, $p < .045$, $\eta^2 = .045$; Cognitive

restructuring, $F_{(3,380)} = 5.015$, $p < .01$, $\eta^2 = .032$; Problem Avoidance $F_{(3,380)} = 2.702$, $p < .05$, $\eta^2 = .019$. It should be noted that the highest means were presented in the upper levels (third and fourth year). The ES was small according to the Cohen classification (1988).

Regarding the marital status of the participants, there were no significant differences in the Psychopathological symptomatology or the stress CSs.

The type of course studied showed differences in symptoms. Significant ones are as follows: Somatization, $F_{(14,371)} = 3.583$, $p < .001$, $\eta^2 = .135$; Obsession-compulsion, $F_{(14,371)} = 4.083$, $p < .001$, $\eta^2 = .159$; Interpersonal sensitivity, $F_{(14,371)} = 2.055$, $p < .05$, $\eta^2 = .087$; Depression, $F_{(14,371)} = 2.561$, $p < .01$, $\eta^2 = .102$; Anxiety, $F_{(14,371)} = 2.395$, $p < .05$, $\eta^2 = .092$; Phobic anxiety, $F_{(14,371)} = 3.492$, $p < .001$, $\eta^2 = .127$; Psychoticism, $F_{(14,371)} = 1.991$, $p < .05$, $\eta^2 = .079$; PTSD, $F_{(14,371)} = 2.661$, $p < .01$, $\eta^2 = .122$; GSI, $F_{(14,371)} = 3.097$, $p < .001$, $\eta^2 = .124$; And PSDI, $F_{(14,371)} = 2.765$, $p < .05$, $\eta^2 = .097$. Thus, in the following CSs: Emotional expression, $F_{(14,371)} = 2.129$, $p < .01$, $\eta^2 = .076$; Desiderative thinking, $F_{(14,371)} = 1.886$, $p < .05$, $\eta^2 = .074$; Social support, $F_{(14,371)} = 2.955$, $p < .001$, $\eta^2 = .107$; Cognitive restructuring, $F_{(14,371)} = 2.134$, $p < .05$, $\eta^2 = .079$. It should be noted that the participants from studies in the fields of Health Sciences and Humanities have higher means in the Total positive responses and in the General symptomatic index, and, on the other hand, the sample belonging to the area of the Legal and Social Sciences, and Health Sciences presented higher means in Symptomatic Intensity. Regarding the ES, it was moderate to large, both in the psychopathological symptomatology and in the stress CSs, highlighting the symptoms of Somatization and Obsession-compulsion.

As for the global assessment of the impact caused by the flood on the participants (from 0 = no impact / minimum impact to 3 = major or severe impact), there are significant differences of averages in all dimensions of the SCL-90-R, except for Interpersonal sensitivity, $F_{(2,371)} = 2.948$, $p = .054$. The ES was small. On the other hand, unequal averages are presented in the following CSs: Problem solving, $F_{(2,371)} = 11.886$, $p < .001$, $\eta^2 = .061$; Emotional expression, $F_{(2,371)} = 3.825$, $p < .05$, $\eta^2 = .018$; and Desiderative thinking, $F_{(2,361)} = 6.939$, $p < .01$, $\eta^2 = .037$. The mean values reached by those who value the impact as greater or severe are higher.

Regarding the presence of an elderly person or elderly family member, there are no significant differences in the psychopathological symptomatology. However, there are unequal means in stress CS about Problem solving, $t_{(395)} = 2.786$, $p = .006$, 95% CI [0.473, 2.741]. The highest mean is presented in those participants who had an elderly

in their family nucleus. Thus also in Avoidance of problems, $t_{(396)} = -2,052, p = .041, 95\% \text{ CI } [-1.875, -.040]$, where higher scores are obtained by undergraduate students who do not have an older adult in their family, ES was small.

In relation to the presence of children in the family, there are significant differences in averages in the following symptomatology: Somatization, $t_{(396)} = -2.369, p = .018, 95\% \text{ CI } [-.378, -.035]$; Depression, $t_{(396)} = -2.485, p = .018, 95\% \text{ CI } [-.377, -.044]$; Anxiety, $t_{(396)} = -3.014, p = .003, 95\% \text{ CI } [-.419, -.088]$; Phobic anxiety, $t_{(396)} = -2.695, p = .007, 95\% \text{ CI } [-.317, -.050]$; Psychoticism, $t_{(396)} = -2.311, p = .021, 95\% \text{ CI } [-.281, -.023]$; and GSI, $t_{(396)} = -2.418, p = .016, 95\% \text{ CI } [-.301, -.0310]$. It should be noted that the highest averages are presented in those who belong to a family nucleus without children. In relation to EF, there were no differences of averages regarding the presence of children in the family, except for Social withdrawal, $t_{(396)} = -2.445, p = .015, 95\% \text{ CI } [-2.086, -.226]$, where higher mean scores are observed in people living with families with children. ES was small.

As for the presence of people with disabilities in the family nucleus, there were no significant differences in the psychopathological symptomatology or in the stress CSs.

There are significant differences in all psychopathological symptoms and overall rates, with the exception of the PSDI, $t_{(389)} = 1.154, p = .249, 95\% \text{ CI } [-.056, .217]$, which

is an indicator of the mean symptomatic intensity. It should be noted that the high mean scores are presented in those people who were exposed to situations of violence. On the other hand, there are no unequal means in CSs to stress. ES was small to moderate.

Regarding the perception of the participants about housing deterioration, there are significant differences of means in the psychopathological symptoms (small ES), except for the overall symptomatic intensity rate, $F_{(2,388)} = 1,040, p = .073$. The highest means of the scores are in those participants who perceive a "moderate impact" of housing damage. As for Coping Strategies, unequal means are presented in: Problem solving, $F_{(2,395)} = 8.993, p < .001, \eta^2 = .041$; Self-criticism, $F_{(2,396)} = 4.498, p < .05, \eta^2 = .023$; Desiderative thinking, $F_{(2,396)} = 8.848, p < .001, \eta^2 = .038$; and Cognitive restructuring, $F_{(2,396)} = 4.015, p < .05, \eta^2 = 0.017$, the highest mean scores occur in those who perceive a "greater or severe impact" on home deterioration.

Regarding the access to basic services after the flood, there are differences of means in the category of absence of "drinking water" (0 = No absence until 4 = More than 15 days), the most significant ones are the following according to psychopathological symptoms: Somatization, $F_{(4,333)} = 4.694, p < .001$; Obsession-compulsion, $F_{(4,383)} = 3.7242, p < .01$; Depression, $F_{(4,383)} = 3.268, p < .01$; Anxiety, $F_{(4,333)}$

Table 2
Pearson Correlations Matrix between stress CSs and psychopathological symptomatology

SCL-90-R	Stress Coping Skills (CSs)							
	PRS	SFC	EEX	DTH	SSP	CRE	PAV	SWH
Positive symptoms Total (PST)	.120*	.194**	.111*	.328**	-.004	-.015	.058	.0361**
Global severity Index (GSI)	.145**	.194**	.132**	.320**	-.035	.001	.066	.438**
Positive Symptom distress index (PSDI)	.172**	.100*	.114**	.193**	-.032	.088	.096	.332**
Somatization	.179*	.187**	.092	.309**	-.053	-.003	.000	.353**
Obsession-compulsion	.204**	.162**	.176**	.335**	.082	.096	.008	.368**
Interpersonal sensitivity	.075	.147**	.144**	.269**	.003	-.029	.067	.319**
Depression	.130*	.167**	.160**	.311**	-.036	-.022	.008	.436**
Anxiety	.087	.208**	.097	.281**	-.096	-.052	.085	.415**
Hostility	.081	.094	.040	.248**	-.065	-.048	.067	.332**
Phobic anxiety	.053	.160**	.114*	.228**	-.062	.035	.051	.338**
Paranoid ideation	.164**	.206**	.112*	.245**	.009	.048	.155**	.395**
Psychoticism	.050	.175**	.079	.198**	-.037	-.013	.140**	.379**

* $p < .05, **p < .01$.

Note. PRS: Problem solving, SFC: Self-criticism, EEX: Emotional expresion, DTH: Desiderative thinking, SST: Social support, CRE: Cognitive restructuring, PAV: Problem avoidance, SWH: Social withdrawal

Table 3
Final Summary of the regression model by steps in the psychopathological symptomatology

SCL-90-R Dimensions	Independent variables	Beta	t	F	Corrected R2
Global Severity Index (GSI)	Social Withdrawal	.365	7.872***	28.892***	.286
	Desiderative thinking	.224	4.762***		
	Exposure to violence	-.127	-2.780**		
	Assessment of impact	.128	2.767**		
	Sex	.121	2.623**		
Total Positive Symptoms (PST)	Social withdrawal	.255	5.158***	2.229***	.248
	Desiderative thinking	.311	6.246***		
	Housing deterioration	.106	2.140**		
	Cognitive Restructuring	-.134	-2.765**		
	Self-criticism	.118	2.362**		
	Exposure to violence	-.104	-2.173**		
Positive Symptoms distress index (PSDI)	Social withdrawal	.282	5.412***	14.109***	.133
	Sex	.148	2.927**		
	Assessment of impact	.133	2.622**		
	Labor status	-.103	-1.997*		
Somatization	Social withdrawal	.225	4.487***	19.099***	.266
	Desiderative thinking	.268	5.207***		
	Sex	.159	3.380**		
	Assessment of impact	.151	3.208**		
	Exposure to violence	-.158	-3.401**		
	Social support	-.127	-2.509*		
	Self-criticism	.112	2.251*		
Obsession-compulsion	Social withdrawal	.290	6.171***	31.567***	.259
	Desiderative thinking	.269	5.680***		
	Exposure to violence	-.190	-4.092***		
	Assessment of impact	.112	2.383*		
Interpersonal sensitivity	Social withdrawal	.237	4.793***	13.314***	.175
	Desiderative thinking	.193	3.432**		
	Exposure to violence	-.084	-1.652*		
	Cognitive Restructuring	-.145	-2.813**		
	Emotional expression	.143	2.591*		
	Housing deterioration	.105	2.049*		
Depression	Social withdrawal	.395	8.625***	25.180***	.294
	Desiderative thinking	.198	3.782***		
	Sex	.141	3.062**		
	Cognitive restructuring	.119	2.568*		
	Housing deterioration	-.134	-2.805**		
	Emotional expression	.122	2.393*		
Anxiety	Social withdrawal	.272	5.428***	16.886***	.267
	Desiderative thinking	.255	4.940***		
	Sex	.124	2.638**		
	Assessment of impact	.111	2.367*		
	Presence of children	.106	2.297*		
	Self-criticism	.127	2.547*		
	Exposure to violence	-.108	-2.313*		
	Social support	-.143	-2.832**		

Continuation table 3

Hostility	Social withdrawal	.256	5.071***	13.014***	.171
	Desiderative thinking	.205	3.942***		
	Cognitive restructuring	-.141	-2.774**		
	Housing deterioration	.147	2.756**		
	Absence of electricity	-.123	-2.371*		
	Labor status	-.108	-2.067*		
Phobic anxiety	Social withdrawal	.280	5.643***	16.410***	.181
	Desiderative thinking	.177	3.563***		
	Sex	.145	2.944**		
	Exposure to violence	-.119	-2.423*		
	Presence of Children	.107	2.187*		
Paranoid ideation	Social Withdrawal	.339	6.637***	28.587***	.192
	Desiderative thinking	.185	3.786***		
	Self-criticism	.106	2.108*		
Psychoticism	Social withdrawal	.334	6.749***	19.301***	.173
	Housing deterioration	.131	2.632**		
	Desiderative thinking	.112	2.224*		
	Presence of children	.098	1.996*		

*** $p < .001$, ** $p < .01$, * $p < .05$

= 2.277, $p < .01$; Phobic anxiety, $F_{(4,383)} = 4.412$, $p < .01$; Psychoticism, $F_{(4,383)} = 2.946$, $p < .05$; and the overall rates, GSI, $F_{(4,383)} = 3.499$, $p < .01$, and PSDI, $F_{(4,377)} = 3.320$, $p < .01$. The highest mean scores correspond to the "More than 15 days" category in the absence of drinking water. With respect to CSs to stress, the differences are presented in: Self-criticism, $F_{(4,382)} = 2.595$, $p < .05$; Emotional expression, $F_{(4,383)} = 2.996$, $p < .05$; Desiderative thinking, $F_{(4,383)} = 2.557$, $p < .05$; Social withdrawal, $F_{(4,383)} = 4.818$, $p < .001$. The highest averages are presented in participants who were more than seven days without the service. The ES was small.

In terms of labor status and/or loss of income, unequal means are presented in almost all psychopathological symptoms, except for Interpersonal Sensitivity, $t_{(387)} = 1.371$, $p = .171$; Paranoid Ideation, $t_{(387)} = 1.912$, $p = .057$; and Psychoticism, $t_{(387)} = 1.875$, $p = .062$. Regarding stress CSs, significant differences of means were observed in: Self-criticism, $t_{(387)} = 3.226$, $p < .01$, 95% CI [.439, 1.767]; Desiderative thinking, $t_{(387)} = 3.154$, $p < .01$, 95% CI [.689, 2.988]; Problem avoidance, $t_{(387)} = 3.666$, $p < .001$, 95% CI [.852, 2.788]; and Social Withdrawal, $t_{(387)} = 4.498$, $p < .001$, 95% CI [1,214, 3,100]. The highest means in the scores obtained in both SCL-90-R and CSs correspond to people inserted in a family nucleus affected both economically and in terms of work.

Correlations between psychopathological symptoms and CSs. stress

In order to explore the relationship between the psychopathological Symptoms of undergraduate students and the stress CSs, correlations between each of the dimensions were made. It is observed in Table 2 that the correlation between the dimensions of SCL-90-R and CSs are low and in some cases moderate. The strategies of Social support and Cognitive restructuring do not correlate with the psychopathological symptoms or with the overall rates, and Problem avoidance presents only significant correlations with Paranoid ideation and Psychoticism. On the other hand, Social withdrawal correlates significantly with all psychopathological symptoms and overall rates, highlighting the following: with Depression, $r_{(398)} = .436$, $p = .001$, with Anxiety, $r_{(398)} = .415$, $p = .001$, and with GSI, $r_{(398)} = .438$, $p = .001$. Thus, the strategy of Desiderative thinking correlates significantly with all psychopathological dimensions and overall rates, with correlations with: Obsession-compulsion, $r_{(398)} = .335$, $p = .001$, Depression, $r_{(398)} = .311$, $P = .001$, Somatization, $r_{(398)} = .309$, $p = .001$, GSI, $r_{(398)} = .320$, $p = .001$, and PST, $r_{(398)} = .328$, $p = .001$. It should be noted that although there were significant correlations ($p < .05$, $p < .01$), these were moderate with coefficients lower than .4 (Aron & Aron, 2002).

Predictive variables of the Psychopathological dimensions and Overall rates

To explore the predictive power of stress CSs, sex, age, and variables related to perception of the life experience during and after flooding on the criteria variables of Psychopathological symptoms and Overall rates, a multiple linear regression analysis with the stepwise method was performed.

Table 3 shows the predictors that entered the last step in the regression equation for each psychopathological dimension and the overall rates. GSI and PST were mainly predicted by Social withdrawal and Desiderative thinking, $F_{(5,344)} = 28.892, p < .001$, $F_{(6,344)} = 20.229, p < .001$, respectively. For PSDI, Social withdrawal was a significant predictor along with Sex and Impact assessment, $F_{(4,339)} = 14.109, p < .001$. In relation to the psychopathological symptomatology in the case of Somatization, the main predictors were Social withdrawal and Desiderative thinking, $F_{(7,342)} = 19.099, p < .001$. For Obsession-compulsion, Social withdrawal along with Desiderative thinking and Exposure to violence were meaningful predictors, $F_{(4,345)} = 31.567, p < .001$. Regarding Interpersonal sensitivity, Depression, Anxiety, Hostility, Phobia anxiety and Paranoid ideation, were mainly predicted by Social withdrawal and Desiderative thinking, $F_{(6,343)} = 13.314, p < .001$, $F_{(6,343)} = 25.810, p < .001$, $F_{(8,341)} = 16.886, p < .001$, $F_{(6,343)} = 13.014, p < .001$, $F_{(5,344)} = 28.892, p < .001$, $F_{(5,344)} = 16,410, p < .001$, $y F_{(3,346)} = 28.587, p < .001$ respectively. For Psychoticism, Social withdrawal was a good predictor together with Housing Impairment, $F_{(4,345)} = 19,301, p < .001$.

The most explained psychopathological dimensions by the predictive variables were Depression (29.4%), General Symptomatic Index (28.6%), Anxiety (26.7%), Somatization (26.6%), Obsession (25.9%) and Total Positive Symptoms (24.8%).

DISCUSSION

The aim of this study was to identify the association between psychopathological symptomatology, CSs, and socio-demographic variables related to the socio-demographic disaster of mudslides in a medium-sized city.

The existence of sex differences in the psychopathological symptoms of Somatization, Depression and Anxiety, and stress CSs, is shown according to what Kelly, Tyrka, Price and Carpenter (2008) stated, following the tendency seen in women to experience greater anxiety and the use of emotions as CS. Likewise, the results obtained are congruent with the evidence provided by Novais et al. (2017), which indicates that the female sex is more prone

to the development of anxiety-depressive symptomatology caused by a greater neurophysiological and immunological activation. However, there is evidence that in situations of chronic and/or intense stress this difference does not occur (Matud, 2004; Baker et al., 2006). Similarly, differences were found between stress CSs and sex, where women rated higher in Emotional Expression and Desiderative Thinking; and men in Problem Avoidance, in agreement with the conclusions of metaanalytical studies (Meléndez, Butordomo, Sancho & Tomas, 2012).

With respect to the CSs before extreme stressors, in contrast to Coiro, Bettis and Compas (2017) and the non-mediation of CSs to stressful situations of a more usual character such as academic stress, in the present study differences between CSs and symptomatology are observed. This confirms evidence regarding the behavioral response to perceived stressors as more controllable, as opposed to stressors perceived as less controllable, like the ones appearing in the face of social and natural disasters, which together lead to explicit symptoms and deterioration of social competence (Clarke & Chenoweth, 2006).

The results show the predictive potential of socio-demographic variables related to experience of social disaster, highlighting: (a) the presence of children, elderly and/or persons with disabilities in the family nucleus; (b) exposure to violence; (c) the deterioration of housing and; (d) assessment of impact on basic services and/or loss of work on psychopathological symptoms (Depression, General Symptomatic Index, Anxiety, Somatization, Obsession-Compulsion and Total Positive Symptoms), and CSs. stress.

Considering the role of the family in the modulation of the stress response to disaster situations, future research topics are opened for the study of CSs, considering that families do not present a unique coping style, but different strategies depending on the demands that arise throughout the process of adaptation to an extreme stress experience, becoming a factor of vulnerability and protector at the same time, because of its capacity to mobilize resources (Macias, Madariaga, Valle & Zambrano, 2013).

On the other hand, differences regarding the global evaluation of the impact caused by the flood in all the psychopathological dimensions, except for Interpersonal Sensitivity, confirm the multiplicity of effects that the experience of stress has. Previous studies have found that in university population affected by mudslides, a high percentage of young people exposed to a catastrophe situation presents a high subjective impact (Leria & Salgado, 2016).

This study provides empirical evidence for the analysis of adaptive behaviors to socio-natural disasters in the adult-youth population of undergraduate students, constituting a contribution to therapeutic interventions for the

development of CSs in a preventive sense. Its limitations mainly point to the transectional character of the design, which does not allow visualizing the progression in the appearance of the psychopathological symptomatology and the association with the CSs, which could have been visualized with a longitudinal design. Nevertheless, their projections are shaped by the research of other sectors of the population that were directly and indirectly affected by the flood, individually and in groups, integrating other variables such as subjective well-being and life satisfaction.

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