

# Symptoms of post-traumatic stress in children and adolescents exposed to a natural disaster in Chile

## *Síntomas de estrés postraumático en niños y adolescentes expuestos a un desastre natural en Chile*

---

Fecha recepción: 1 de septiembre de 2020 / fecha aceptación: 21 de octubre de 2020

Mariela Andrades<sup>1</sup>

Shelene G. Gentz<sup>2</sup>

### Abstract

Post-traumatic stress disorder (PTSD) is one of the most common consequences of exposure to natural disasters. The aim of the study is to describe the post-traumatic symptoms in children and adolescents exposed to an earthquake in 2015 in the city of Los Vilos, Chile (Coquimbo Region). The Childhood Post Traumatic Stress Disorder Symptom Scale (CPSS), a questionnaire of severity of exposure to a traumatic event, and a sociodemographic questionnaire were applied to 105 participants aged 12 to 16 years, 12 months after the event occurred. The total probable rate of PTSD was 29.5% with a higher incidence in women and younger children. Exposure to disaster and the perception of significant threats to their integrity, increases levels of PTSD. The results show the importance of implementing preventive programs and designing intervention strategies that contribute to face the consequences of a natural disaster in children and adolescents.

**Keywords:** PTSD, natural disaster, severity of exposure, trauma, children, adolescents

---

1 Universidad Central, Santiago, Chile, Email: mariela.andrades@ucentral.cl  
ORCID iD: <https://orcid.org/0000-0001-6203-3586>

2 University of Namibia (UNAM), Windhoek, Namibia.  
ORCID iD: <https://orcid.org/0000-0002-3394-0897>

## Resumen

El trastorno por estrés postraumático (TEPT) es una de las consecuencias más frecuentes de la exposición a desastres naturales. El objetivo del estudio es describir la sintomatología postraumática en niños, niñas y adolescentes expuestos a un terremoto el año 2015 en la ciudad de los Vilos, Chile (Región de Coquimbo). Se aplicó la Escala Infantil de Síntomas de Trastorno de Estrés Postraumático (CPSS), un cuestionario de severidad a exposición a un evento traumático y un cuestionario sociodemográfico a 105 participantes de 12 a 16 años, 12 meses después de ocurrido el evento. La tasa total probable de TEPT fue de 29,5% con mayor incidencia en mujeres y niños (as) de menor edad. La exposición al desastre y la percepción de amenazas importantes a su integridad aumenta los niveles de TEPT. Los resultados dan cuenta de la importancia de implementar programas preventivos y diseñar estrategias de intervención que contribuyan a enfrentar las consecuencias de un desastre natural en niños, niñas y adolescentes.

**Palabras clave:** Trastorno por estrés postraumático, desastre natural, severidad del evento, trauma, niños, adolescentes.

## Introduction

**O**n September 16 2015, an earthquake with a grade 8.4 on the Richter scale took place in Coquimbo, Chile. This catastrophe killed 13 people, left a further 30 000 people affected and destroyed or severely damaged 1 100 homes (United States Geological Survey, 2015). Earthquakes are intense, uncontrollable and surprising events, and endanger the physical and psychological integrity of those who experience them (Leiva, 2011). A natural disaster like this tests the ability of an individual to adapt and can alter the mental health of people, including adults, children and adolescents (Kun, et al., 2009), both in the short and long term (Rochanakorn, 2007). The emotional responses of children and adolescents to these disasters can be very varied, from fulfilling an initially adaptive function, to minimal and short-term alterations (Cohen & Gadassi, 2009). However, psychopathological responses may also arise, including posttraumatic stress (Alisic & Kleber, 2010; Fu, et al., 2017), either in the form of a disorder (PTSD) or symptomatology.

Posttraumatic stress disorder (PTSD) is a psychiatric disorder that can occur after living or having witnessed or been exposed to events that threaten one's life or that of others, as well as extreme exposure to details of the traumatic event (DSM-5, 2013). The emotional reaction experienced

involves a response of intense fear, hopelessness or horror expressed in children through unstructured or agitated behaviour. The groups of symptoms described include a re-experiencing of the traumatic event, an avoidance of stimuli associated with the trauma, hyperactivity and persistent negative alterations in cognitions and mood. The symptoms of re-experiencing have been described as the most disabling, associated with greater severity in PTSD symptomatology (Zahradnik, et al., 2010). However, this is under discussion (Blom & Oberink, 2012). Furthermore, occurrence of PTSD in populations affected by a disaster has a high correlation with the emergence of other psychiatric pathologies, such as major depressive disorder, substance use, and the increase in suicide risk (Echeburúa, et al., 2016). There is also a high correlation between PTSD and the decrease in the quality of life of people exposed to the disaster (Zhao, et al., 2012).

Reviews of psychopathological disorders indicate that PTSD would be the most observed pathology after an earthquake, with prevalence rates estimated between 10% and 34.3% (Zhao et al, 2012). In children and adolescents exposed to disasters, the reported prevalence of PTSD symptoms has varied with figures ranging from 4.5% to 74.5% (La Greca, et al., 2008). These differences are owing to differences in methodologies used, different exposure levels to disasters, individual characteristics and the environment, among others (Kleim & Ehlers, 2009). The development of PTSD in children and adolescents is influenced by various factors. Level of exposure to the disaster, for example, has been one of the most studied factors. Level of exposure increases the sensation of vulnerability and thus, the fear of possible subsequent events would intensify, generating posttraumatic symptoms (Ben-Ezra, 2014). Another factor is the degree of destructiveness and loss generated by the disaster, that is, the presence of or perception of a threat to life, both of themselves and of loved ones (La Greca & Prinstein, 2002). Research has shown that disasters that cause disruptions to daily life, such as changing homes, schools and communities, distance from friends, altered leisure activities, among others, also contribute to PTSD symptoms. However, disasters that lead to the death of a loved one, in particular, are more closely related to the development of PTSD (Agustini, et al., 2011; Dell’Osso et al., 2011). The sex of the child is another important factor, with a higher prevalence of PTSD symptoms in women (Agustini et al., 2011; Usami, et al., 2014). With regards to age, there are variations in findings with most studies suggest that being younger is a factor associated with greater PTSD (López-García & López-Soler, 2014). However, few

other studies show a higher prevalence of probable PTSD in older children (Baddam, et al., 2007).

Considering the frequency of natural disasters in Chile and the sparsity of research on their effects on child and adolescent mental health, the objective of the current study is to describe posttraumatic symptoms in children and adolescents exposed to the earthquake of 2015 in the city of Coquimbo, Chile. In addition, we consider the particular effect of differing levels of exposure to the event, including disruptions in daily life and the threat of the life of a loved one.

## Materials and Method

### Participants

A total of 105 children and adolescents (49% female), aged between 12 and 16 years (Mean age = 14.35; SD = 1.32), were evaluated 12 months after the earthquake that occurred in the city of Los Vilos (Coquimbo Region, Chile).

### Instruments

The Childhood Scale of Posttraumatic Stress Disorder Symptoms (CPSS) by Foa, et al. (2001) was used to assess PTSD symptoms. This instrument assesses the presence and severity of PTSD symptoms in children, adolescents, from eight to 18 years of age with a known history of trauma. The scale is based on the diagnostic criteria of the DSM-IV for PTSD and is composed of 17 items referring to the frequency of manifestation of symptoms of the disorder ranging from 0 (never) to 4 (9 times or more). The total score ranges from 0 to 68 points, with a cut-off point of 24 to distinguish between the presence and absence of PTSD. Psychometric properties indicate adequate internal consistency ( $\alpha = 0.89$ ) and temporal stability ( $r = 0.84$ ). The scale was validated in Chile by Bustos, et al. (2009), obtaining appropriate internal consistency values, similar to those of the original instrument ( $\alpha = 0.91$ ) and a capacity of 90.7% to discriminate the presence / absence of PTSD according to established clinical criteria.

To assess the level of exposure to the earthquake, we used Exposure to Traumatic Events Questionnaire, developed by Vernberg, et al. (1996). The scale was originally developed to assess exposure to Hurricane Katrina; but was translated and adapted for use in earthquakes by Andrades et al. (2018). The scale consists of 17 dichotomous items (yes / no), with one item referring to the direct perception of threat to the child's own life, six items related to a specific threatening events that could be observed in the earthquake (for example, door and window breakage) and ten items related to disruptive experiences and post-disaster losses (for example, moving home). In the present study, an appropriate Cronbach's alpha was obtained ( $\alpha = 0.80$ ).

Finally, a socio-demographic questionnaire assessed factors such as age, sex, city of residence at the time of the earthquake and city of current residence.

## Analysis of data

Statistical analysis was conducted with the Statistical Package for the Social Sciences (SPSS) version 22.0. For categorical or discrete variables, contingency tables and the Chi-square test were conducted. For independent samples, the Student's t test was used to compare groups of women and men and compare children who felt they could die with those who did not think otherwise. Pearson's product-moment correlation coefficient was used to analyze the relationship between PTSD and age and PTSD and the sub-scales of the Traumatic Events Questionnaire.

## Procedure

Data was collected twelve months after the earthquake occurred. In order to select participants, data on educational establishments in the affected area were obtained from social organizations working in the area. From this data, two educational establishments were selected randomly. Within these educational establishments, classes corresponding to a predetermined age range were randomly selected. Informed consent was obtained from all parents in the selected classes. Furthermore, once parental consent was obtained, the study was also explained to each child and their assent was

requested. Children were informed that participation was voluntary, that no negative consequences would follow non-participation and that their identities would be confidential. There were no refusals. Questionnaires were anonymized and data was analyzed as a whole. Participants completed the questionnaires in their respective classrooms, assisted by trained undergraduate students. Approval for the study was obtained by the ethics commission of the School of Psychology of the Central University of Chile.

## Results

Participants obtained a mean score of 17.60 (SD=13.66) on the CPSS with scores ranging from 0 to 56 points. From Table 1, we can see that females reported significantly more posttraumatic symptomatology than males for the total CPSS score, and the sub-scales of re-experiencing and arousal, but not for the avoidance subscale. A significant and negative correlation was found between age and the total CPSS score, avoidance and arousal. Younger children had significantly higher posttraumatic symptomatology compared to older children (Table 2).

**Table 1.**

*Differences between groups of symptoms according to sex*

Sex (n)	CPSS total	Re-exp.	Avoidance	Arousal
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Males (54)	14.69 (12.31)	4.52 (3.61)	5.96 (6.57)	4.20 (4.09)
Females (51)	20.69 (14.43)	6.57 (4.41)	7.12 (6.36)	7.00 (5.25)
Significance	p=.24 <sup>a</sup>	p=.011 <sup>b</sup>	p=.35 <sup>c</sup>	p=.003 <sup>d</sup>

a  $t(103)=-2.30$  , b  $t(96)=-2.60$  , c  $t(103)=-.94$  , d  $t(94)=-3.03$

**Table 2.**  
*Correlation between CPSS scores and participant age*

	<b>CPSS total</b>	<b>Re-exp.</b>	<b>Avoidance</b>	<b>Arousal</b>
<b>Age</b>	-.228	-.079	-.239	-.255
<b>Significance</b>	p=.021	p=.421	p=.014	p=.009

Overall 29.5% of the participants scored above the cut-off score, suggesting that they are at risk for a diagnosis of PTSD. Significantly more females (39.2%) than males (20.4%) scored above the cut-off score for PTSD (Table 3).

**Table 3.**  
*PTSD level by sex*

	<b>CPSS score</b>	
	<b>&lt; 24</b>	<b>≥ 24</b>
<b>Males</b>	43 (79.6%)	11 (20.4%)
<b>Females</b>	31 (60.8%)	20 (39.2%)
<b>TOTAL</b>	<b>74 (70.5%)</b>	<b>31 (29.5%)</b>

Note: Test  $\chi^2(1, N=105)=4.477, p<.05$ .

### ***Exposure to traumatic events***

The findings on Exposure to Traumatic Events Questionnaire are presented in Table 4. This includes perceived life threat, life threatening experiences and losses and disruptions. Almost half (44.8%) of participants thought that they would die during the earthquake, with significantly more females than males thinking that they would die (66.7% vs. 33.3%,  $p < .001, \chi^2[1, N=105] = 19.2$ ). Participants reported an average of 0.7 (SD = 1.0) life threatening experiences (ranging from 0 to a maximum of 6 events) and an average of 0.8 (SD = 1.4) numbers of disruptions and losses (ranging from 0 to a maximum of ten). There were no significant differences between girls and

boys for number of life threatening experiences or number of disruptions and losses.

**Table 4.**

*Frequency (%) who thought they could die, number of life threatening events (Mean, SD) and number of losses and disruptions (Mean, SD)*

	Frequency (%) of participants who thought they would die		<i>n</i> life threatening events	<i>n</i> losses and disruptions
	No	Yes	M (SD)	M (SD)
Male	41 (75.9%)	13 (24.1%)	0.6 (1.1)	0.7 (1.7)
Female	17 (33.3%)	34 (66.7%)	0.8 (0.9)	0.9 (1.1)
<b>TOTAL</b>	<b>58 (55.2%)</b>	<b>47 (44.8%)</b>	<b>0.7 (1.0)</b>	<b>0.8 (1.4)</b>

### **Exposure to traumatic events and PTSD symptomatology**

The relationship between the severity of exposure to the event and posttraumatic symptomatology was evaluated. Children and adolescents who thought they could die presented more symptoms in the total CPSS scale ( $p < .001$ ), as well as in all the subscales (Table 5).

**Table 5.**

*PTSD symptoms in participants who thought they could die (yes or no)*

Did you think you could die?	CPSS total Mean(SD)	Re-experiencing Mean(SD)	Avoidance Mean(SD)	Arousal Mean(SD))
No	13.10 (1.40)	4.09 (3.16)	5.36 (5.71)	3.66 (3.50)
Yes	23.15 (14.96)	7.28 (4.52)	7.96 (6.77)	7.92 (5.32)
<b>Significance</b>	t(81)=-3.87, $p < .001$	t(80)=-4.10, $p < .001$	t(103)=-2.13, $p < .05$	t(76)=-4.72, $p < .001$



Similarly, as seen from Table 6, the number of life threatening events had a significant and positive relationship with the scores in the total CPSS ( $r = .256$ ), and the subscales of re-experiencing ( $r = .224$ ) and arousal ( $r = .290$ ). The number of disruptions and losses experienced by participants had a significant and positive relationship with the scores in the total CPSS ( $r = .331$ ), and the subscale of re-experiencing ( $r = .276$ ), avoidance ( $r = .298$ ) and arousal ( $r = .308$ ). In other words, a higher number of reported traumatic experiences were related to more symptoms of PTSD. When children and adolescents feel important threats to their integrity, the level of PTSD symptoms is increased.

**Table 6.**

*Bivariate correlations between the sub-scales of exposure to traumatic events and PTSD symptomatology (n = 105)*

	CPSS total	Re-experiencing	Avoidance	Arousal
Life threatening events	.256**	.224*	.183	.290**
Losses and disruptions	.331**	.276**	.298**	.308**

*Note: \* $p < .05$ , \*\* $p < .01$*

## Discussion

Studies show a considerable psychological impact on people who have experienced a natural disaster. PTSD as one of the most serious pathologies and can significantly interfere in the daily activities of those affected. For this reason, the present study aimed to describe posttraumatic symptoms in children and adolescents affected by the 2015 earthquake in the city of Los Vilos, Chile. In addition, we explored the extent of posttraumatic symptomatology according to socio-demographics factors and levels of exposure to the traumatic event.

In the current sample, 29.5% scored above the cut-off score on the CPSS, an indicator of a probable fulfilment of the criteria for PTSD. This shows the extent of the impact on the mental health of the children and youth exposed to this earthquake, twelve months after the event. The prevalence

found in the current study is similar to that found in other studies with populations of the same age, in locations affected exclusively by earthquake and carried out at equivalent times after the event, (Dell'Osso et al., 2011). The current prevalence is lower compared to studies conducted with children after the earthquake and tsunami in Chile, in February 2010 (Briceño et al., 2013; Piyasil et al. 2007; Usami et al., 2014). The differences in the type of disasters, in the populations considered and in the evaluation methods used, make it difficult to compare these results with data obtained in previous research. However, one can surmise that areas affected by both earthquakes and tsunamis would result in a greater threat and destructibility, which would account for higher levels of PTSD symptomology.

In accordance with previous research (Briceño et al., 2013; Díaz, et al., 2012; Cova et al., 2013) the prevalence of probable PTSD was higher in females compared to males. With respect to age, children with younger age presented greater posttraumatic symptoms. Although it is under discussion that younger children are a population at risk, the results of this research is similar to what has been found in other studies (Briceño et al., 2013; López-García & López-Soler, 2014).

One of the notable results observed in the current study is related to the perception of threat manifested by the participants during the earthquake. This is reflected in the high percentage (45%) of participants that responded positively to the item: “sometime during the earthquake, you thought that you could die”, an item that surpasses the other items of exposure. The perception of threat is an important factor in the development of traumatic symptomatology (La Greca & Prinstein, 2002). It is relevant to mention that significant differences were found in this item with respect to sex, with females endorsing this item with “yes” more frequently. This may explain the higher levels of posttraumatic symptoms found in females. Furthermore, this may be related to differences in rumination styles and coping strategies used by women and men.

According to the literature, there is a greater tendency for women to present ruminant responses, compared to men (Rocha-Sánchez & Cruz del Castillo, 2013). These types of responses have been defined as having recurring, repetitive, intrusive, passive and unwanted ideas about sadness itself, its origin, its possible causes and consequences (Watkins, 2008). These patterns would be highly linked to social conditioning and gender role expectations, affecting the ways in which women and men learn to respond

to their mood (Rocha-Sánchez, 2013). On the contrary, the socialization of “masculine” gender tends to be characterized by the search for risks and emotional “restriction” that demands a lower expression of their emotions (Rocha-Sánchez, 2010).

The results obtained in relation to the items that account for specific threatening events and those related to disruptive experiences and post-disaster losses, show that they generate greater traumatic posttraumatic symptoms for all the subscales of the CPSS. Therefore, exposure to the disaster and the perception of significant threats to integrity would increase PTSD levels. The relationship with the experience of intense fear and danger is consistent with the research that indicates that the experience of terror is fundamental in the development of subsequent posttraumatic symptoms (La Greca & Prinstein, 2002).

This study has some limitations. The selection of the participants was purposeful and the sample size is small, factors to consider when generalizing these findings. Finally, to explain PTSD in this population important variables, such as exposure and threat perception, were incorporated according to the literature. There may be other relevant factors that could contribute to a better understanding of mechanisms that act on the mental health of children and adolescents, such as social support (Schroevers, et al., 2010) or the emotional state of their parents (Kilmer et al., 2009).

The results show the importance of implementing preventive programs and designing intervention strategies that contribute to face the consequences of a natural disaster in children and adolescents. Understanding the level of threat and exposure that children perceive are valuable factors to consider when designing interventions. Finally, it would be fruitful to also consider the possible positive effects that may result from exposure to a trauma, with a construct called Post-Traumatic Growth, conceptualized as the experience of positive changes that a person experiences as a result of the process of struggle that someone undertakes from the experience of a traumatic event (Calhoun & Tedeschi, 1999), particularly as findings show that higher levels of threat can lead to increased levels of posttraumatic growth. This concept is increasingly being studied in child populations (Andrades, et al., 2018; Meyerson, et al., 2011).

## Acknowledgments

The authors wish to thank all the students and educational institutions that participated in this research.

## References

- Ahmad, N., Bukhari, T.A. & Munir, N. (2011). The Prevalence of Post traumatic Stress Disorder (PTSD) among Flood Affected School Children in Pakistan. *Journal of Contemporary research in business*, 3(2), 445-452.
- Agustini, I., Asniar, I. & Matsuo, H. (2011). The prevalence of long-term post-traumatic stress symptoms among adolescents after the tsunami in Aceh. *Journal of Psychiatric and Mental Health Nursing*, 18, 543-549. <https://doi.org/10.1111/j.1365-2850.2011.01702.x>
- Alisic, E. & Kleber, R. J. (2010). Measuring posttraumatic stress reactions in children: Preliminary validation of the Children's Responses to Trauma Inventory. *Journal of Child and Adolescent Trauma*, 3, 192-204. <https://doi.org/10.1080/19361521.2010.500979>
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). American Psychiatric Association.
- Andrades, M., García, F., Calonge, I. & Martínez-Arias, R. (2018). Posttraumatic Growth in Children and Adolescents Exposed to the 2010 Earthquake in Chile and its Relationship with Rumination and Posttraumatic Stress symptoms. *Journal of Happiness Studies*, 19(5), 1505-1517. <https://doi.org/10.1007/s10902-017-9885-7>
- Baddam, P., Russel, S. & Swamidhas, P. (2007). The prevalence of posttraumatic stress disorder among children and adolescents affected by tsunami disaster in Tamil Nadu. *Disaster Management & Response*, 5(1), 3-7. <https://doi.org/10.1016/j.dmr.2006.11.001>
- Ben-Ezra, M. (2014). Subjective fear of future events in the after-math of single source versus multiple sources disasters. In K., Kaniasty, K., Moore, S. Howard, & P. Buchwald (Eds.). *Stress and anxiety: applications to social and environmental threats, psychological well-being, occupational challenges, and developmental psychology* (pp. 25-30). Logos Berlag Berlin GmbH.

- Blom M. & Oberink, R. The validity of the DSM-IV PTSD criteria in children and adolescents: A Review (2012). *Clinical Child Psychology And Psychiatry*, 17(4) 571-601. <https://doi.org/10.1177/1359104511426408>
- Briceño A. M., Abufhele, M.M., Dávila D.A., Barreau, V., Sommer, K., Castro, S., Ebel, C., Oltra, S., Aravena, M., Melo, C. y Correa, A. (2013). Estrés postraumático en escolares a 8 meses del 27F. *Revista chilena de pediatría*, 84(1), 42-50. <http://dx.doi.org/10.4067/S0370-41062013000100005>
- Bonanno G. A., Brewin C. R., Kaniasty K. & La Greca A. M. (2010). Weighing the Costs of Disaster: Consequences, Risks, and Resilience in Individuals, Families, and Communities. *Psychological Science in the Public Interest*, 11(1), 1-49. <https://doi.org/10.1177/1529100610387086>
- Bustos, P., Rincón, P. y Aedo, J. (2009). Validación preliminar de la Escala Infantil de Síntomas del Trastorno de Estrés Postraumático (Child PTSD Symptom Scale, CPSS) en niños/as y adolescentes víctimas de violencia sexual. *Psykhé*, 18(2), 113-126. <https://doi.org/10.4067/S0718-22282009000200008>
- Calhoun, L. G. & Tedeschi, R. G. (1999). *Facilitating posttraumatic growth: A clinician's guide*. Lawrence Erlbaum.
- Cohen, J.A. & Gadassi, R. (2009). Posttraumatic stress disorder in young children exposed to terrorism: Validation of the alternative diagnostic criteria. *Journal of the Child & Adolescent Trauma*, 2(4), 229-241. <https://doi.org/10.1080/19361520903317295>
- Cova F., Valdivia M, Rincón P., Haquin, C., Sanhueza, F., Melipillán, R., Medel, M., Martínez, J. y Alarcón, G. (2013). Estrés postraumático en población infantojuvenil post 27F. *Revista Chilena Pediatría*, 84 (1) 22-31. <http://dx.doi.org/10.4067/S0370-41062013000100004>
- Dell'Osso L, Carmassi C, Massimetti G, Conversano, C., Daneluzzo, E., Riccardi, I., Stralla, P. & Rossi, A. (2011). Full and partial PTSD among Young adult survivors 10 months after the L'Aquila 2009 earthquake: gender differences. *Journal Affect Disord*, 131(1-3), 79-83. <https://doi.org/10.1016/j.jad.2010.11.023>
- Díaz C., A, Quintana G.R. & Vogel, E. H. (2012). Síntomas de depresión, ansiedad y Estrés post-traumático en adolescentes siete meses después

- del terremoto del 27 de febrero de 2010 en Chile. *Terapia Psicológica*, 30(1), 37-43. <https://doi.org/10.4067/S0718-48082012000100004>
- Echeburúa, E., Amor, P., Sarasua, B., Zubizarreta, I., Holgado-Tello, F. & Muñoz, J. (2016). Posttraumatic Stress Disorder Symptom Severity Scale-Revised (EGS-R) according to DSM-5 criteria: Psychometric properties. *Terapia Psicológica*, 34(2), 111-128. <https://doi.org/10.4067/S0718-48082016000200004>
- Foa, E.B., Johnson, K., Feeny, N. & Treadwell, K. (2001). The Child PTSD Symptom Scale: A preliminary examination of its psychometric properties. *Journal Of Clinical Child & Adolescent Psychology*, 30(3), 376-384. [https://doi.org/10.1207/S15374424JCCP3003\\_9](https://doi.org/10.1207/S15374424JCCP3003_9)
- Lin, F. U., Cheng, J. & Liu, Z. (2017). Cross-lagged analysis of acute stress disorder, posttraumatic stress disorder and depressive symptoms among children after Lushan Earthquake. *Chinese Mental Health Journal*, 31(7), 548-553.
- Johnson, D. P. & Whisman, M. A. (2013). Gender differences in rumination: A meta-analysis. *Personality and Individual Differences*, 55(4), 367-374. <https://doi.org/10.1016/j.paid.2013.03.019>
- Kilmer, R. P., Gil-Rivas, V., Tedeschi, R. G., Cann, A., Calhoun, L. G., Buchanan, T. & Taku, K. (2009). Use of the revised posttraumatic growth inventory for children. *Journal of Traumatic Stress*, 22(3), 248-253. <https://doi.org/10.1002/jts.20410>
- Kleim, B., & Ehlers, A. (2009). Evidence for a curvilinear relationship between posttraumatic growth and posttrauma depression and PTSD in assault survivors. *Journal of Traumatic Stress*, 22(1), 45-52. <https://doi.org/10.1002/jts.20378>
- Kun, P., Han, S. C., Chen, X. C. & Yao, L (2009). Prevalence and risk factors for posttraumatic stress disorder: A cross-sectional study among survivors of the Wenchuan 2008 earthquake in China. *Depression and Anxiety*, 26(12), 1134-1140. <https://doi.org/10.1002/da.20612>
- La Greca, A. M. (2007). Understanding the psychological impact of terrorism on youth: Moving beyond posttraumatic stress disorder. *Clinical Psychology: Science and Practice*, 14(3), 219-223. <https://doi.org/10.1111/j.1468-2850.2007.00080.x>

- La Greca, A. M. & Prinstein, M. J. (2002). Hurricanes and Earthquakes. In *Helping children cope with disasters and terrorism* (pp. 107-138). American Psychological Association.
- Leiva, M. (2011). Impacto psicosocial de terremotos y tsunamis. Reflexiones basadas en investigaciones posteriores al 27-F chileno. *Revista Sociedad, Ciudad y Territorio*, 2, 1-12.  
<http://oumpuebla.com.mx/documents/Leiva.pdf>
- López-García, J. & López -Soler. C. (2014). Trastorno de estrés postraumático en Escolares tras el terremoto de Lorca (España) en 2011. *Gaceta sanitaria*, 28(3), 230-233.  
<https://doi.org/10.1016/j.gaceta.2013.10.009>
- Meyerson, D. A., Grant, K. E., Carter, J. S. & Kilmer, R. P. (2011). Posttraumatic growth among children and adolescents: A systematic review. *Clinical Psychology Review*, 31(6), 949-964.  
<https://doi.org/10.1016/j.cpr.2011.06.003>
- Rocha-Sánchez, T. E. (2010). Identidad de género y estado anímico en hombres y mujeres. En Rivera Aragón, S., Díaz-Loving, Sánchez Aragón R. & Reyes Lagunes, I. (Eds.). *La psicología social en México XII* (pp. 663- 670). Asociación Mexicana de Psicología Social.
- Rocha-Sánchez, T. E. & Cruz del Castillo, C. (2013). Barreras estructurales y subjetivas en la transición de roles de mujeres mexicanas y su malestar emocional. *Acta Colombiana de Psicología*, 16(1), 123-135.
- Rochanakorn, K. (2007). IASC guidelines on mental health and psychosocial support in emergency settings. Geneva: IASC
- Salcioglu E. & Basoglu M. (2008). Psychological effects of earthquakes in children: prospects for brief behavioral treatment. *World Journal of Pediatrics*, 4, 165-172. <https://doi.org/10.1007/s12519-008-0032-8>
- Schroevers M., Helgeson V., Sanderman, R. & Ranchor A. (2010). Type of social support matters for prediction of posttraumatic growth among cancer survivors. *Psychooncology*. 19(1), 46-53.  
<https://doi.org/10.1002/pon.1501>
- United States Geological Survey's: Historic World Earthquakes. Última actualización Septiembre 2015.  
[http://earthquake.usgs.gov/earthquakes/world/historical\\_mag.php](http://earthquake.usgs.gov/earthquakes/world/historical_mag.php)

- Usami, M., Iwadare, Y. Watanabe, K., Kodaira, M. Ushijima, H., Tanaka, T., Harada, M., Tanaka, H., Sasaki, Y. & Saito, K. (2014). Analysis of Changes in Traumatic Symptoms and Daily Life Activity of Children Affected by the 2011 Japan Earthquake and Tsunami over Time. *PLoS ONE* 9(2), e88885. <https://doi.org/10.1371/journal.pone.0088885>
- Vernberg, E.M., Silverman, W.K., La Greca A.M. & Prinstein, M (1996). Prediction of posttraumatic stress symptoms in children after hurricane Andrew. *Journal of Abnormal Psychology*, 105(2), 237-248.
- Watkins, E. R. (2008). Constructive and unconstructive repetitive thoughts. *Psychological Bulletin*, 134(2), 163-206. <https://doi.org/10.1037/0033-2909.134.2.163>
- Zahradnik, M., Stewart, S. H., O'Connor, R. M., Stevens, D., Ungar, M. & Wekerle, C. (2010). Resilience moderates the relationship between exposure to violence and posttraumatic reexperiencing in Mi'kmaq youth. *International Journal of Mental Health and Addiction*, 8(2), 408-420. <https://doi.org/10.1007/s11469-009-9228-y>
- Zhao, C., Wu, Z. & Xu, J. (2012). The association between post-traumatic stress disorder symptoms and the quality of life among Wenchuan earthquake survivors: the role of social support as a moderator. *Quality of Life Research*, 22(4), 733-743. <https://doi.org/10.1007/s11136-012-0197-4>