Coping, rumination and posttraumatic growth in people affected by an earthquake

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Abstract

Background: In this article, the evaluation of a structural model that seeks to identify predictors and mediators of posttraumatic growth (PTG) of people affected by a natural disaster is presented. **Method:** The sample was composed of 349 adult men and women who experienced the earthquake and tsunami on February 27, 2010 in Chile. A modeling with structural equations was used, contrasting two predictive models of PTG. The latent variables assessed were subjective severity, social sharing of emotion, intrusive rumination, deliberate rumination, problem-focused coping and posttraumatic growth. **Results:** The best fit was obtained with the model that shows a direct influence of the subjective severity, problem-focused coping, and deliberate rumination in the presence of PTG. Problem-focused coping mediated the relation between subjective severity and social sharing with PTG. In turn, deliberate rumination mediated the relation of problem-focused coping and intrusive rumination with PTG. **Conclusions:** The results show the relevant role of cognitive processes such as deliberate rumination and behavioral processes such as problem-focused coping in the presence of PTG.

Keywords: subjective severity, social sharing, problem-focused coping, rumination, natural disaster.

Resumen

Afrontamiento, rumiación y crecimiento postraumático en personas afectadas por un terremoto. **Antecedentes:** este artículo presenta la evaluación de un modelo estructural que busca identificar predictores y mediadores de crecimiento postraumático (CPT) en personas afectadas por un desastre natural. **Método:** la muestra estuvo conformada por 349 hombres y mujeres adultos que vivieron el terremoto y tsunami del 27/F del 2010 en Chile. Se empleó modelamiento con ecuaciones estructurales contrastando 2 modelos predictivos de CPT. Las variables latentes fueron la subjetive severity, social sharing, rumiación intrusiva, rumiación deliberada, afrontamiento centrado en el problema y CPT. **Resultados:** el mejor ajuste se obtuvo con el modelo que muestra una influencia directa de la severidad subjetiva, el afrontamiento centrado en el problema y la rumiación deliberada en la presencia de CPT. El afrontamiento centrado en el problema medió la relación de la severidad subjetiva y compartir social con el CPT; a su vez, la rumiación deliberada medió la relación del afrontamiento centrado en el problema y la rumiación intrusiva con el CPT. **Conclusiones:** los resultados muestran el rol relevante de procesos cognitivos como la rumiación deliberada y procesos conductuales como el afrontamiento centrado en el problema en la presencia de CPT.

Palabras clave: afrontamiento centrado en el problema, compartir social, desastre natural, rumiación, severidad subjetiva.

Natural disasters have significant psychological impacts (Gaborit, 2006; García, 2011). In addition to the acute and chronic stress derived from disaster, loss experiences can generate damage in major groups of people, and trigger emotional disorders (Cova & Rincón, 2010; Norris et al., 2002).

However, a significant group of people also describe experiencing positive changes and learning processes after traumatic events. The concept of posttraumatic growth (PTG) proposed by Tedeschi and Calhoun (2006) attempts to capture these aspects. These authors suggest that what characterizes PTG is not the absence of suffering or psychological distress, but the experience of positive change in interpersonal relationships,

philosophy of life and in oneself after experiences of intense suffering and discomfort.

Among the various factors that have been proposed as potential contributors to the development of PTG, problem-focused coping strategies have been consistently associated with this issue (Stanton, Bower, & Low, 2006; Wolchik, Coxe, Tein, Sandler, & Ayers, 2008). These refer to actions whose objective is to actively confront the stressor factor in order to reduce or eliminate its impact (Carver, 2011). The use of these strategies enables individuals to obtain new social resources through stronger relationships with their loved ones and wider social networks (Schaefer & Moss, 1998). Coping by positive reappraisal and acceptance have shown clear relations with PTG as well (Prati & Pietrantoni, 2009). Rumination could also be related to growth, though not linearly, hence different forms of rumination and the times they occur must be differentiated (Prati & Pietrantoni, 2009). Taku, Cann, Tedeschi, and Calhoun (2009) suggest that after a traumatic event, people tend to experience intrusive rumination that can be progressively substituted by a more deliberate and reflexive style of rumination.

In this way, the reconstruction of the fundamental assumptions about the world, that in some cases are shattered, can begin.

As anguish in the first stages of trauma tends to be incapacitating (Tedeschi & Calhoun, 2004), it is likely that the cognitive processing is intrusive and negative. Thus, the development of PTG could be importantly mediated by the later development of deliberate rumination about the event. This voluntary rumination could help the reevaluation to find positive aspects and benefits.

Another variable with possible influence on the development of PTG is the social sharing of emotions, an interpersonal strategy that involves translating an emotional experience into a socially shared language (Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998). This involves seeking and obtaining emotional social support. A meta-analysis has confirmed that both support-seeking coping and social support are related to PTG (Prati & Pietrantoni, 2009). This emotional exchange based on social support allows the restoration of beliefs affected by trauma, as well as the search of an acceptable meaning for the event (Páez et al., 2011).

This study will test a model that evaluates the role of several variables in the development of PTG in people who were displaced from their homes due to the earthquake and tsunami in the Biobío Region in Chile on February 27, 2010. This population was chosen because displacement incorporates additional stress to the one from the disaster itself (Fullilove, 1996) and, furthermore, being accommodated in shelters may increase the negative impact of the natural disaster (Pérez-Sales, Cervellón, Vázquez, Vidales, & Gaborit, 2005; Nolen-Hoeksema & Morrow, 1991).

In Figure 1, a hypothesized model is proposed. Here, deliberate rumination mediates the relation between the subjective severity of the event, intrusive rumination, and the development of PTG. This model is based on posttraumatic growth theory (Tedeschi, & Calhoun; 2004; Calhoun, Cann, & Tedeschi, 2011), which has proposed that deliberate rumination is a mediating variable in the development of PTG. Furthermore, the model also takes into account further research that has shown the role of severity of trauma, social sharing, and problem-focused coping strategies in PTG (García, Jaramillo, Martínez, Valenzuela, & Cova, 2014; Morris & Shakespeare-Finch, 2011; Stockton, Hunt, & Joseph, 2011). Because the direction between social sharing and problem-focused coping strategies is not clear, an alternative model that reverses that relation was proposed (Figure 2).

Method

Participants

The sample consisted of 351 individuals (63.2% female and 36.8% male) who lost their homes (their dwelling collapsed, 15.7%; displaced due to the tsunami, 27.1%, and their dwelling suffered irreparable damage, 53.6%) as a result of the earthquake and tsunami that affected Chile on February 27, 2010. The age range was 18 to 84 years ($M = 40.4$, $SD = 15.29$).

Instruments

Posttraumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996). The instrument consists of 21 items that are answered on a six-point Likert scale, ranging from 0 (*no change*) to 5 points (*a very important change*). In its original version, the authors obtained five factors. García, Cova and Melipillán (2013) conducted a study

of its psychometric properties in the Chilean population exposed to the earthquake on February 27, 2010. They obtained three first-order factors: changes in self-perception, changes in interpersonal relationships, and changes in philosophy of life. They also obtained a second-order factor of general PTG. In this study, three items of the Self-perception subscale were selected (items 11, 12 and 13), as well as four items of the Relation to others subscale (items 9, 16, 20 and 21), and two items in the Life philosophy subscale (items 5 and 18) as indicators of each factor, based on the highest factorial loads found in a previous study with people affected by the February 2 earthquake (García et al., 2014). Using subscales as indicators of a latent variable has been previously used in other PTG studies that have analysed PTG as a single latent construct (Cadell, Regehr, & Hemsworth, 2003; Taku, Calhoun, Cann, & Tedeschi, 2008; Updegraff & Marshall, 2005).

Brief COPE (Carver, 1997). The subscales of Active Coping and Planning of this instrument were used to measure problem-focused coping, according to the factorial structure found by Morán, Landero, and González (2010). This subscale of problem-focused coping contains four items that are rated in a 4-point Likert scale ranging from 0 (*almost never*) to 3 (*almost always*). A Cronbach's alpha of .80 was considered.

Event Related Rumination Inventory (ERRI; Cann et al., 2011). This 20-item questionnaire is composed of two factors; Intrusive rumination and Deliberate rumination, with 10 items each. In this instrument, the frequency with which certain repetitive thoughts occur is rated (e.g. "Thoughts about what happened come to my mind and I can't stop thinking about them") on a 4-point Likert scale ranging from 0 (*almost never*) to 3 (*almost always*). García et al. (2014) applied the scale to a population of students exposed to the same earthquake. After exploratory factorial analyses, the scales were reduced to 6 items in Intrusive rumination (items 2, 4, 5, 6, 7 and 10) and 4 items in Deliberate rumination (items 12, 14, 15 and 16). The remaining items were discarded because they loaded on both factors, they loaded on none, or they showed cross
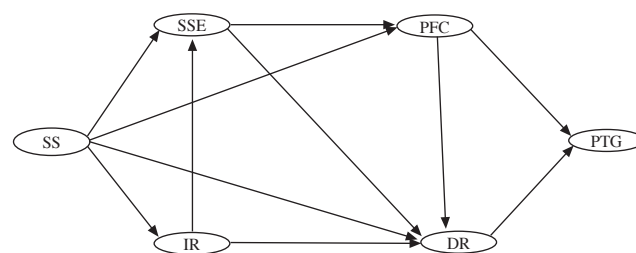

Figure 1. *Hypothetical model 1. SS: subjective severity; SSE: social sharing of emotion; IR: intrusive rumination; DR: deliberate rumination; PFC: problem-focused coping; PTG: posttraumatic growth*

Figure 2. *Alternative model 2. SS: subjective severity; SSE: social sharing of emotion; IR: intrusive rumination; DR: deliberate rumination; PFC: problem-focused coping; PTG: posttraumatic growth*
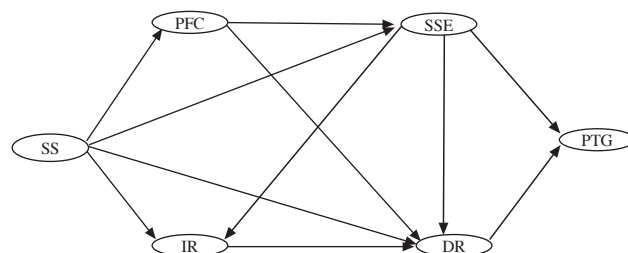
loads. They obtained a Cronbach's alpha of .80 in each subscale. In this study those 10 items were used as indicators, obtaining a high internal consistency in each subscale (Intrusive rumination, α = .94; Deliberate rumination, α = .88).

In addition, a questionnaire was constructed in order to assess socio-demographic aspects related to loss of homes, where questions to measure subjective severity and social sharing were included. Questions to assess the subjective severity were: "To what extent do you feel that your life was disrupted by the earthquake and/or tsunami?" and "To what extent do you qualify the earthquake and/or tsunami as a traumatic experience for your life?" Each item is answered on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*severe*). Between both items, a moderate correlation was obtained (r = .64). The questions to evaluate social sharing were based on those used by Rimé et al. (2010): "During the first six months after the earthquake, did you tell anybody a story about what you lived through and/or felt that day?"; "During the first six months after the earthquake, did anybody tell you a story about what they lived through and/or felt that day?"; "To what extent did you talk and reflect in your group about what happened in that period?" This questionnaire consists of three questions on a 7-point Likert scale ranging from 1 (*never*) to 7 (*always*). Cronbach's alpha was .79.

Procedure

Participants were selected through the snowball method, using people who lost their homes in the Biobío Region, which was the epicenter of the earthquake, as the selection criterion. Participants were contacted directly, without intermediation of state institutions or NGOs. Participants signed a written informed consent before answering the survey. The questionnaires were applied between September and November, 2012.

Data analyses

For data analysis, structural equation modeling (SEM) was used, following the two-step procedure suggested by Anderson and Gerbing (1988). (a) Confirmatory Factorial Analysis aimed to assess the measuring model, and (b) Evaluation of the structural model. The hypothesized model was compared with an alternative model and the degrees of adjustment were contrasted (Martens, 2005).

Individual items were used for the following latent variables: subjective severity (2 items), social sharing (3 items), problem-focused coping (4 items), intrusive rumination (6 items) and deliberate rumination (4 items). In the case of PTG, each one of the factors was considered as an indicator.

In order to evaluate the fit of the model, the maximum likelihood estimation method was used. Although χ^2 was used as the first fit index, additional indices were also used that are less sensitive to sample size. Thus, the following fit indices and criteria were used (Hu & Bentler, 1999; Yu, 2002): (a) χ^2: non-significant values indicate good fit. (b) χ^2/df: a good fit is indicated by values less than 2. (c) Comparative fit index (CFI) and Tucker-Lewis index (TLI): an acceptable fit is indicated by values ≥ .90, and a good fit is determined by values ≥ .95. (d) Root mean square error of approximation (RMSEA): an acceptable fit is determined by values ≤ .08 (90% CI ≤ 0.10), and a good fit is indicated by values ≤ .05 (90% CI ≤ 0.08). (e) Akaike information criterion (AIC): is a comparative indicator, where lower values favor the choice of

model. For analyses, SPSS 20.0 and Amos v18 software by IBM were used.

Results

As shown in Table 1, the kurtosis and symmetry values of the variables were located in the range from +1 to -1, indicating normality in its distribution, in accordance with the analysis performed from its graphical representation.

Measurement model

Mardia's coefficient obtained a value of 18.8. Despite falling outside of the ±5 range suggested by Bentler (2005) to assume

Table 1
Descriptive statistics, skewness and kurtosis of the study instruments (N = 351)

	Minimum	Maximum	M	DE	Skewness	Kurtosis
Subjective severity	0	8	5.58	1.99	-0.51	-0.52
Social sharing	3	21	15.44	4.04	-0.43	-0.28
Problem-focused coping	0	12	7.44	3.00	-0.35	-0.46
Intrusive rumination	0	18	6.22	5.18	0.54	-0.86
Deliberate rumination	0	12	6.21	3.19	0.30	-0.74
Posttraumatic growth	0	45	29.22	11.19	-0.73	-0.26

Table 2
Indicators, standard error (S.E.), z-scores and standardized factorial loads for latent variables in the model

Latent variable	Indicator	E.E.	Z	Factorial loads
Subjective severity	SS1			0.94
	SS2	0.068	9.51	0.68
Social sharing	SSE1			0.72
	SSE2	0.083	11.50	0.75
	SSE3	0.109	11.63	0.80
Problem-focused coping	PFC1			0.62
	PFC 2	0.109	10.20	0.71
	PFC 3	0.110	10.92	0.82
	PFC 4	0.118	10.16	0.71
Intrusive rumination	IR1			0.81
	IR2	0.056	10.59	0.85
	IR3	0.055	18.40	0.85
	IR4	0.055	16.96	0.80
	IR5	0.054	17.29	0.81
	IR6	0.060	15.38	0.74
Deliberate rumination	DR1			0.81
	DR2	0.065	13.56	0.85
	DR3	0.060	13.40	0.84
	DR4	0.067	11.63	0.80
Posttraumatic growth	PTG-SP			0.87
	PTG-IR	0.078	17.47	0.89
	PTG-PL	0.047	13.11	0.66

All estimated parameters are significant for p<0.001

multivariate normality, it is below the critical value of ±70 recommended to use the ML estimation method, preferable to others by allowing the contrast of hypothesis of the estimates (Rodríguez & Ruiz, 2008).

The measurement model presented satisfactory fit indices: χ^2 (194) = 332.593, p<0.001, χ^2/df = 1.714, CFI = 0.96, NFI = 0.92, TLI = 0.9, PNFI = 0.77, RMSEA = 0.045 (90% CI = 0.037-0.053).

Structural model

The hypothesized model 1 and alternative model 2 mentioned above were evaluated (Figures 1 and 2), showing an acceptable fit in both cases. Model 1 obtained higher fit indices to the alternative model (Figure 3). Subsequently, regression coefficients were set to zero in those paths with regression loads that were nonsignificant (IR-SSE; SSE-DR; SS-DR). The SS-PTG path was included, which had been suggested by the modification indices and is coherent with some theoretical proposals (Calhoun & Tedeschi, 1988). A respecified model that slightly improved some fit indices was obtained, as observed in Table 3. The final model is shown in Figure 4.

Then, a corrected-bias bootsrap estimation was performed (10,000 samples) with a 95%confidence interval to determine whether the indirect effects were significant (MacKinnon, Lockwood, & Williams, 2004). In this case, there is mediation if zero is not included in the confidence interval. The result of the analysis indicated that all the indirect effects observed were significant. These results can be observed in Table 4.

Discussion

The proposed structural model obtained adequate of goodness-of-fit indices with better comparative indices than the alternative

model. In particular, the mediating role of deliberate rumination for the development of posttraumatic growth was confirmed. Specifically, deliberate rumination appears to completely mediate the relation between intrusive rumination and PTG and partially, the relation among problem-focused coping strategies, subjective severity, and PTG.

Some of the relationships proposed in the initial model did not show the hypothesized behavior: subjective severity and social sharing showed no direct effect on deliberate rumination. This is coherent with the issues raised by Rimé (22007), who suggests that social sharing only influences deliberate rumination and PTG through its relation with direct coping. Also, the relationship between social sharing and PTG appears mediated in this study by problem-focused coping.

It was initially hypothesized that subjective severity could have an indirect effect on PTG, completely mediated by other variables. However, the study showed a significant though low magnitude direct effect between subjective severity and PTG. The meta-analysis by Prati and Petrantoni (2009) indicates an association of a similar size between subjective severity and PTG. These results suggest that the effect of subjective severity on PTG probably depends also on other variables not included in this study, but with relevance as predictors of PTG such as social support and religiosity among coping strategies (García, Páez, Cartes, Neira, & Reyes, 2014), and optimism among interpersonal variables (Helgeson, Reynolds, & Tomich, 2006; Prati & Pietrantoni, 2009; Rajandram, Jenewein, McGrath, & Kwahlen, 2011; García, Cova, & Reyes, 2014).

Finally, it was hypothesized that intrusive rumination could influence people to share their emotions more (Calhoun et al., 2011). In this study, no association between these variables was found. This outcome could be attributed to the low specification of the social sharing measure by not controlling variables that could
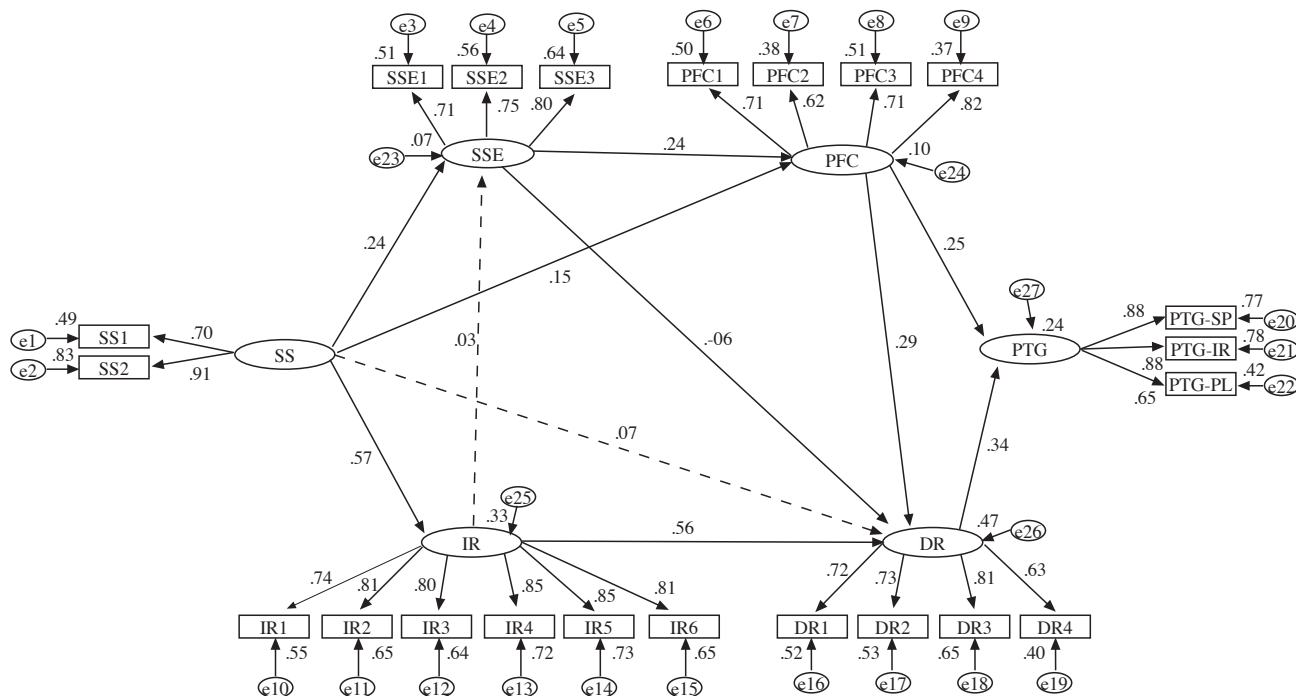

Figure 3. *Hypothesized model 1. Values are standardized. Dotted lines indicate non-significant relations. SS: subjective severity; SSE: social sharing of emotion; IR: intrusive rumination; DR: deliberate rumination; PFC: problem-focused coping; PTG: posttraumatic growth*

Figure 4. *Respecified model. Values are standardized. SS: subjective severity; SSE: social sharing of emotion; IR: intrusive rumination; DR: deliberate rumination; PFC: problem-focused coping; PTG: posttraumatic growth*
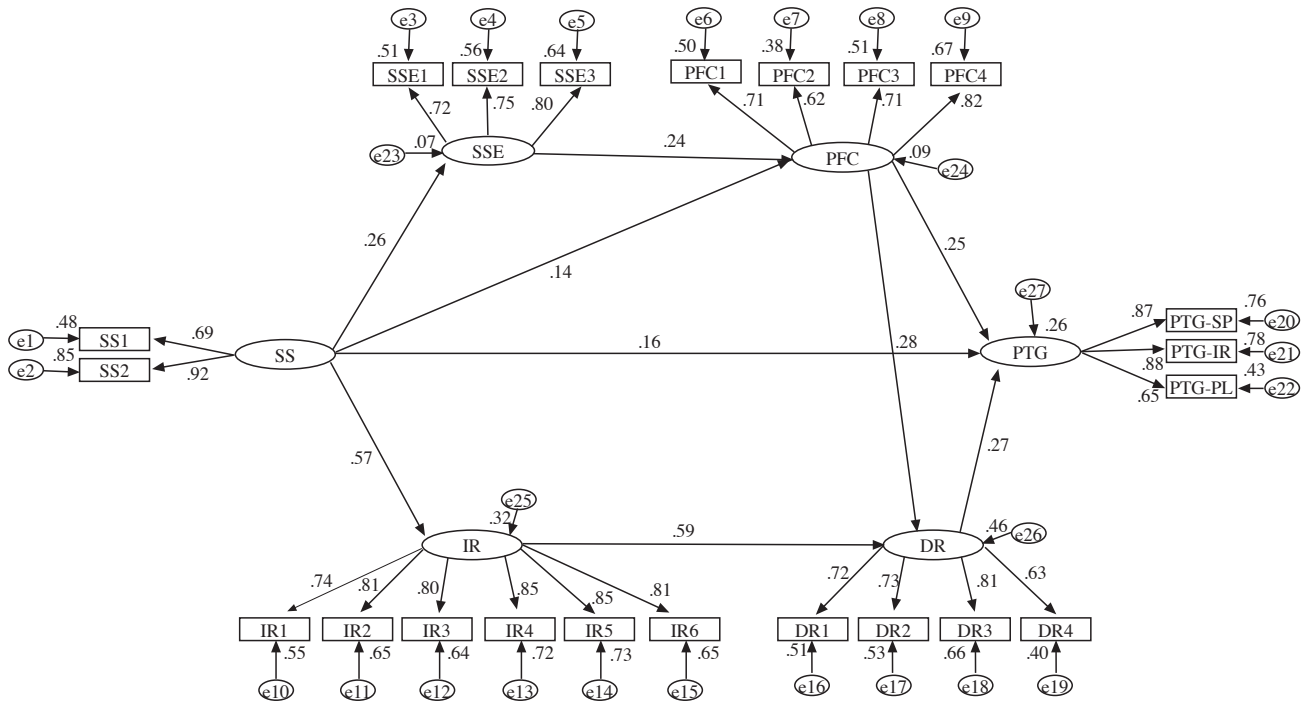
	χ^2	gl	χ2/gl	TLI	CFI	PNFI	AIC	RMSEA	IC 90%
				Table 3 Indices of fit for the hypothesized model					
MODEL 1	343.5***	198	1.74	0.96	0.96	0.78	497.51	0.046	0.038-0.054
MODEL 2	350.8***	198	1.77	0.95	0.96	0.78	504.76	0.047	0.039-0.055
MOD. 1 RESP	339.1***	200	1.70	0.96	0.96	0.79	489.14	0.045	0.036-0.053

*** p<0.001

Table 4
Direct, indirect and standardized total effects, and confidence intervals (CI) of the effect according to corrected-bias bootstrap

		SSE	PFC	IR	DR	PTG
SS	Direct effects	0.26	0.14	0.57	0.00	0.16
	Indirect effects	0.00	0.06 (IC = 0.02-0.14)	0.00	0.39 (CI = 0.30-0.48)	0.16 (CI = 0.09-0.23)
	Total effects	0.26	0.21	0.57	0.39	0.32
SSE	Direct effects		0.24	0.00	0.00	0.00
	Indirect effects		0.00	0.00	0.07 (IC = 0.03-0.13)	0.08 (IC = 0.03-0.15)
	Total effects		0.24	0.00	0.07	0.08
PFC	Direct effects			0.00	0.28	0.25
	Indirect effects			0.00	0.00	0.08 (IC = 0.04-0.14)
	Total effects			0.00	0.28	0.32
IR	Direct effects				0.59	0.00
	Indirect effects				0.00	0.16 (IC = 0.07-0.25)
	Total effects				0.59	0.16
DR	Direct effects					0.27
	Indirect effects					0.00
	Total effects					0.27

SS = Subjective severity; SSE = Social sharing of emotion; PFC = Problem-focused coping; IR = Intrusive rumination; DR = Deliberate rumination; PTG = Posttraumatic growth

interfere with its effect on PTG, such as positive or negative shared emotional content (Brans, 2013), as well as the characteristics of cognitive or emotional support of the one who listens to the story (Brans, Van Mechelen, Rimé, & Verduyn, 2013).

The final model assumes that an early psychological response after a disaster is the perception of severity of what has been lived. It is observed that such subjective severity could activate the following coping mechanisms: a) emotional, such as sharing the experience emotionally with other people; b) behavioral such as problem-focused coping; and c) cognitive, such as intrusive and deliberate ruminations. In addition, intrusive rumination was found to be more associated with negative consequences, like depression and TEPT (García et al., 2014; Kane, 2009). To the extent that leads to a more deliberate rumination, it is related to PTG. In the studies in which rumination has played an adaptive role, it has been associated with reevaluation or cognitive appraisal by distancing and emphasis on the positive (García et al., 2014; Kane, 2009).

Like other studies (Benetato, 2011; Calhoun et al., 201A), this study supports the hypothesis of the central role of deliberate rumination in processing the traumatic experience, which finally leads to the identification of positive changes after the event. Considering the Janoff-Bulman Shattered Assumptions theory (2006) and the need to reconstruct such assumptions as a condition to overcome the negative consequences trauma, it is possible to propose that deliberate rumination mediates, partially or totally, other psychological processes involved. This is observed in this study. Thus, the notion that deliberate rumination promotes PTG by allowing the reconstruction of shattered assumptions at the time of the trauma (Rajandram et al., 2011; Stockton et al., 2011) is supported by our data. Cann et al. (2010) and Taku et al. (2009) suggest that this kind of rumination, focused on the search for meaning and positive aspects derived from the experience, contributes to the change of narrative regarding trauma and PTG.

This study presents several constraints. First, data collection in this study was performed two years after the earthquake. Thus, some variables that require recall could be affected by recall bias. Although this study hypothesizes causal and temporary relations through a SEM, its design was cross-sectional and correlational, so the final model should be corroborated by further experimental or longitudinal studies. Likewise, the proposed respecifications should be considered exploratory.

These limitations open space for future research, such as implementing experimental designs capable to test some of the relationships found in this study. For instance, creating experimental conditions that encourage social sharing of emotion (Brans, 2013; Nils & Rimé, 2012), or conditions where ruminative processes are produced (Watkins, 2004; Watkins & Brown, 2002), and assessing their effects on PTG. Longitudinal studies that evaluate some psychological variables and observe their evolution over time could also be implemented soon after a traumatic event. With this, the conditions that predict the development of PTG and their influence on psychological adaptation measures in the future could be assessed, in line with what has been carried out by other researchers (Frazier, Conlon, & Glaser, 2001; McMillen, Smith, & Fisher, 1997). It is also necessary to identify factors that affect the transformation of intrusive rumination or problem-focused coping into deliberate rumination. An important aspect to be explored in this transformation is the mediation of variables that, according to meta-analyses, influence PTG, such as optimism, reevaluation and religiosity (Helgeson et al., 2006; Prati & Pietrantoni, 2009).

Discovering which means and psychological processes lead to PTG in people seriously affected by a natural disaster might be relevant at the time of determining protective processes and risk processes. This could allow promoting effective coping strategies for people suffering from similar events in the future, and preventing their discomfort.

References

American Psychological Association (2010). *Ethical principles of psychologists and code of conduct*. Washington DC, USA: APA.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411-423.

Benetato, B. (2011). Posttraumatic growth among operation enduring freedom and operation Iraqi freedom amputees. *Journal of Nursing Scholarship, 43*, 412-420.

Bentler, P. (2005). *EQS Structural equations program manual*. Encino, CA: Multivariate Software.

Brans, K. (2013). *Social sharing and the dynamics of emotions* (Dissertation of Doctor). University of Leuven, Belgium.

Cadell, S., Regehr, C., & Hemsworth, D. (2003). Factors contributing to posttramatic Growth: A proposed structural equation model. *American Journal of Orthopsychiatry, 73*, 279-287.

Calhoun, L.G., Cann, A., & Tedeschi, R.G. (2011). The posttraumatic growth model: Sociocultural considerations. In T. Weiss & R. Berger (Eds.), *Posttraumatic growth and culturally competent practice* (pp. 1-14). New York, NY: Wiley & Sons.

Calhoun, L.G., & Tedeschi, R.G. (1998). Beyond recovery from trauma: Implications for clinical practice and research. *Journal of Social Issues, 54*, 357-371.

Cann, A., Calhoun, L.G., Tedeschi, R.G, Triplett, K., Vishnevsky, T., & Lindstrom, C. (2011). Assessing posttraumatic cognitive processes: The Event Related Rumination Inventory. *Anxiety, Stress & Coping, 24*, 137-156.

Carver, C. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine, 4*, 92-100.

Carver, C. (2011). Coping. En R. Contrada & A. Baum (Eds.), *The handbook of stress science* (pp. 221-229). New York, NY: Springer.

Cova, F., & Rincón, P. (2010). El terremoto y tsunami del 27-F y sus efectos en la salud mental [The earthquake and tsunami on 27/F and its effects on mental health]. *Terapia Psicológica, 28*, 179-185.

Fullilove, M. (1996). Psychiatric implications of displacement: Contributions from the psychology of place. *The American Journal of Psychiatry, 153*, 1516-1523.

Gaborit, M. (2006). Desastres y trauma psicológico [Disasters and psychological trauma]. *Pensamiento Psicológico, 2*, 15-39.

García, F. (2011). Prevention of psychopathological consequences in survivor of tsunamis. In M. Mokhtari (Ed.), *Tsunami: A growing disaster* (pp. 211-232). Rijeka, Croatia: InTech.

García, F. (2013). Bajo los escombros: estrategias de sobrevivencia en una mujer afectada por un terremoto [Under the rubbles: Surviving strategies in a woman hit by an earthquake]. *Procesos Psicológicos y Sociales, 9*, 1-22.

García, F., Cova, F., & Melipillán, R. (2013). Propiedades psicométricas del Inventario de Crecimiento Postraumático en población chilena afectada por un desastre natural [Psychometrical properties of the Posttraumatic Growth Inventory in Chilean population affected by a natural disaster]. *Revista Mexicana de Psicología, 30*(2), 145-153.

García, F., Cova, F., & Reyes, A. (2014). Severidad del trauma, optimismo, crecimiento postraumático y bienestar en sobrevivientes de un desastre natural [Severity of trauma, optimism, posttraumatic growth and welfare in survivors of a natural disaster]. *Universitas Psychologica*, *13*(2), 15-24.

García, F., Jaramillo, C., Martínez, A.M., Valenzuela, I., & Cova, F. (2014). Respuestas psicológicas ante un desastre natural: estrés y crecimiento postraumático [Psychological responses to a natural disaster: Posttraumatic stress and growth]. *Liberabit*, *20*, 121-130.

García, F., Páez, D., Cartes, G., Neira, H., & Reyes, A. (2014). Religious coping, social support and subjective severity as predictors of posttraumatic growth in people affected by the earthquake in Chile on 27/F 2010. *Religions, 5*, 1132-1145.

Helgeson, V., Reynolds, K., & Tomich, P. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology, 74,* 797-816.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55.

Janoff-Bulman, R. (2006). Schema-change perspectives on posttraumatic growth. In L. G. Calhoun & R. G. Tedeschi (Eds.), *Handbook of posttraumatic growth: Research and practice* (pp. 81-99). Mahwah, NJ: Erlbaum.

Frazier, P., Conlon, A., & Glaser, T. (2001). Positive and negative life changes following sexual assault. *Journal of Consulting and Clinical Psychology, 69*, 1048-1055.

Kane, J. (2009). *An examination of a two-factor model of rumination and its impact on the relationship between posttraumatic growth and posttraumatic stress disorder (PTSD)* (Dissertation of Doctor). George Mason University, USA.

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*, 99-128.

McMillen, C., Smith, E., & Fisher, R. (1997). Perceived benefit and mental health after three types of disaster. *Journal of Consulting and Clinical Psychology, 65*, 733-739.

Martens, M. (2005). The use of structural equation modeling in counseling psychology research. *The Counseling Psychologist, 33*, 269-298.

Morán C., Landero R., & González M. (2010). COPE-28: un análisis psicométrico de la versión en español del Brief COPE [COPE-28: A Psychometric Analysis of the Spanish Version of the Brief COPE]. *Universitas Psychologica*, *9*(2), 543-552.

Morris, B., & Shakespeare-Finch, J. (2011). Rumination, post-traumatic growth, and distress: Structural equation modeling with cancer survivors. *Psycho-Oncology*, *20*, 1176-1183.

Nils, F., & Rimé, B. (2012). Beyond the myth of venting: Social sharing modes determine the benefits of emotional disclosure. *European Journal of Social Psychology, 42*, 672-681.

Nolen-Hoeksema & Morrow (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology, 61*, 115-121.

Norris, F., Friedman, M., Watson, P., Byrne, C., Díaz, E., & Kaniasty, K. (2002). 60,000 Disaster victims speak: Part I, an empirical review of the empirical literature, 1981-2001. *Psychiatry, 65*, 207-239.

Páez, D, Vázquez, C., Bosco, S., Gasparre, A., Iraurgi, I., & Sezibera, V. (2011). Crecimiento post estrés y post trauma: posibles aspectos positivos y beneficiosos de la respuesta a los hechos traumáticos [Post stress and posttraumatic growth: Possible positive and beneficial aspects of the response to traumatic events]. In Páez, C. Martín Beristain, J. L. González, N. Basabe & J. De Rivera (Eds.), *Superando la violencia colectiva y construyendo cultura de paz* (pp. 311-339). Madrid: Fundamentos.

Pérez-Sales, P., Cervellón, P., Vázquez, C., Vidales, D., & Gaborit, M. (2005). Post-traumatic factors and resilience: The role of shelter management and survivours' attitudes after the earthquakes in El Salvador (2001). *Journal of Community & Applied Social Psychology, 15*, 368-382.

Prati, G., & Pietrantoni, L. (2009). Optimism, social support, and coping strategies as factors contributing to posttraumatic growth: A meta-analysis. *Journal of Loss and Trauma, 14*, 364-388.

Rajandram, R. K., Jenewein, J., McGrath, C., & Kwahlen, A. (2011). Coping processes relevant to posttraumatic growth: An evidence-based review. *Support Care Cancer, 19*, 583-589.

Rimé, B. (2007). The social sharing of emotion as an interface between individual and collective processes in the construction of emotional climates. *Journal of Social Issues*, *63*(2), 307-322.

Rimé, B., Finkenauer, C., Luminet, O., Zech, E., & Philippot, P. (1998). Social sharing of emotion: New evidence and new questions. *European Review of Social Psychology, 9*, 145-189.

Rodríguez, M., & Ruiz, M. (2008). Atenuación de la asimetría y de la curtosis de las puntuaciones observadas mediante transformaciones de variables: incidencia sobre la estructura factorial [Attenuation of skewness and kurtosis of scores observed by means of transformations of variables: Incidence on factorial structure]. *Psicológica*, *29*(2), 205-227.

Schaefer, J. A., & Moos, R. H. (1998). The context for posttraumatic growth: Life crises, individual and social resources, and coping. In R. Tedeschi, C. L. Park, & L. Calhoun (Eds.), *Posttraumatic growth: Positive changes in the aftermath of crisis* (pp. 99-126). Mahwah, NJ: Lawrence Erlbaum.

Stanton, A., Bower J., & Low, C. (2006). Posttraumatic growth after cancer. In L. Calhoun & R. Tedeschi (Eds.), *Handbook of Posttraumatic Growth: Research and Practice* (pp. 138-175). New York, NY: Lawrence Erlbaum Associates.

Stockton, H., Hunt, N., & Joseph, S. (2011). Cognitive processing, rumination, and posttraumatic growth. *Journal of Traumatic Stress, 24*, 85-92.

Taku, K., Calhoun, L., Cann, A., & Tedeschi, R. (2008). The role of rumination in the coexistence of distress and posttraumatic growth among bereaved Japanese university students. *Death Studies, 32*, 428-444.

Taku, K., Cann, A., Tedeschi, R. G., & Calhoun, L. G. (2009). Intrusive versus deliberate rumination in posttraumatic growth across U.S. and Japanese samples. *Anxiety, Stress, & Coping*, *22*, 129-136.

Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*, 455-471.

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry, 15*, 1-18.

Updegraff, J. A., & Marshall, G. N. (2005). Predictors of perceived growth following direct exposure to community violence. *Journal of Social and Clinical Psychology, 24*, 538-560.

Watkins, E. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin*, *134*, 163-206.

Watkins, E., & Brown, R. (2002). Rumination and executive function in depression: An experimental study. *Journal of Neurology, Neurosurgery, and Psychiatry, 72*, 400-402.

Wolchik, S. A., Coxe, S., Tein, J. Y., Sandler, I. N., & Ayers, T. S. (2008). Six-year longitudinal predictors of posttraumatic growth in parentally bereaved adolescents and young adults. *Omega: Journal of Death and Dying, 58*, 107-128.

Yu, C. Y. (2002). *Evaluating cutoff criteria of model fit Indices for latent variable models with binary and continuous outcomes* (Dissertation of Doctor). University of California, Los Angeles, USA.