



Universitat Ramon Llull



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TESIS DOCTORAL

**Reacciones psicológicas en situaciones de desastre y emergencia:
estudio de la vivencia del suceso traumático**

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ABREVIACIONES

- APA:** American Psychiatric Association
- CPT:** Crecimiento postraumático
- CRED:** Centre for Research on the Epidemiology of Disasters
- CIE:** Clasificación Internacional de las Enfermedades
- DSM:** Diagnostic and Statistical Manual of Mental Disorders
- MAS:** Modelo del Apego Social en los Desastres
- TEPT:** Trastorno por estrés postraumático
- TIS:** Teoría de la Identidad Social de la Respuesta a los Desastres
- TNE:** Teoría de la Norma Emergente
- WHO:** World Health Organization

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INTRODUCCIÓN

ORGANIZACIÓN DE LOS CONTENIDOS DE LA TESIS

Esta tesis ha sido realizada por compendio de publicaciones y está compuesta por tres estudios que han dado lugar a tres artículos publicados en revistas con factor de impacto. Además, cumple los requisitos para la mención de Doctorado Europeo. La introducción, la justificación de la unidad temática, los apartados relativos al método, discusión y conclusiones están escritos en castellano; las tres publicaciones están escritas en inglés y se presentan en el apartado de los resultados, cada una introducida por un resumen en castellano. El resumen de la tesis ha sido escrito en italiano y se encuentra en el apartado apéndice.

En el apartado introducción se define el tema de la tesis y los constructos analizados presentando el marco teórico sobre el que se sustenta la investigación. En el apartado justificación de la unidad temática se describe la coherencia teórica entre los tres estudios y se definen los objetivos y las hipótesis. El apartado método describe los aspectos metodológicos de los estudios, mientras que en la sección de los resultados se presentan las tres publicaciones que componen la tesis. Finalmente, en la sección correspondiente a la discusión de los resultados y conclusiones se presentarán las principales aportaciones de este trabajo de investigación, las limitaciones y las vías de investigación que se abren con esta tesis.

Listado de las publicaciones que componen la tesis:

Saccinto, E., Prati, G., Pietrantonì, L., & Pérez-Testor, C. (2013). **Posttraumatic stress symptoms and Posttraumatic growth among Italian survivors of emergency situations.** *Journal of Loss and Trauma*, 18:210-226. doi: 10.1080/15325024.2012.68732

Saccinto, E., Vallès, L., Hilterman, E., Roiha, M., Pietrantonì, L., & Pérez-Testor, C. (2013). **Perceived self-efficacy during an emergency situation reduces posttraumatic stress symptoms.** *Spanish Journal of Psychology*, 16, e56, 1-9. doi: 10.1017/sjp.2013.56

Prati, G., Saccinto, E., Pietrantonì, L., & Pérez-Testor, C. (2013). **The 2012 Northern Italy earthquakes: modelling human behaviour.** *Natural Hazards*, 69:99-113. doi: 10.1007/s11069-013-0688-9

DEFINICIÓN DEL TEMA

En los últimos años la investigación en situaciones de desastre y emergencia de pequeña escala está recibiendo más atención debido a las consecuencias psico-físicas padecidas por parte de los afectados y a los daños económicos causados por estos acontecimientos. Sin embargo, la mayoría de los estudios han sido desarrollados en los Estados Unidos y otros países anglosajones con características socio-contextuales diferentes (geográficas, culturales, etc.) a las de los países europeos. De hecho, la cultura parece tener una influencia en las reacciones emocionales y cognitivas durante y después del suceso (Steger, Frazier, & Zacchanini, 2008). En este sentido, cabe señalar la importancia de determinar si los resultados encontrados en estudios precedentes son válidos también para los sobrevivientes de situaciones de desastre y emergencia ocurridos en Europa (Schmidt, Knuth, & Kehl, 2011), debido al hecho que las creencias, las actitudes, los comportamientos y la experiencia previa, así como la cultura de la emergencia propia de cada país, pueden presentar diferencias significativas con respecto a la legislación en materia de emergencia, las iniciativas de preparación de los ciudadanos y la manera de gestionar las situaciones de desastre y emergencia.

En la actualidad no existe un consenso entre los expertos sobre la definición de desastre (Grimm, Hulse, Preiss, & Schmidt, 2012), aunque la tendencia general ha sido categorizar estos sucesos entre naturales y los debidos a la acción humana o tecnológicos (Galea, Nandi, & Vlahov, 2005). Sin embargo, como subraya Alexander (2005), esta estricta diferenciación entre desastres naturales y los debidos a la acción humana es crítica. De hecho, aunque la causa del desastre es “natural”, como en el caso de un terremoto, el impacto del suceso (derrumbamiento o resistencia de los edificios a los temblores, etc.) depende también de las características de los edificios, que reflejan el resultado de la acción humana. El Centre for Research on the Epidemiology of Disasters (CRED) ha establecido unos criterios guía según los cuales un desastre es un suceso que cumple por lo menos uno de los siguientes criterios, es decir donde hay: a) diez (10) o más fallecidos, b) cien (100) o más afectados, c) declaración de un estado de emergencia, d) necesidad de intervención internacional.

Sin embargo, las situaciones de emergencia son acontecimientos que ocurren de manera impredecible e inesperada, donde hay peligro, riesgo de muerte u otras amenazas para la integridad física de los seres humanos (Van de Walle & Turoff, 2008). Esta expresión define entonces una categoría más amplia de acontecimientos en comparación con aquellos definidos por el término desastre, incluyendo sucesos de diferente gravedad y tipología (como por ejemplo accidente de coche, incendio o violencia personal).

En la presente tesis nos centramos en situaciones de desastre y emergencia, tales como terremotos, inundaciones, incendios ocurridos en el hogar o edificios públicos y ataques de terrorismo, y, de acuerdo con algunos autores (Perry, 2007) ponemos la atención no tanto en el tipo de causa, es decir natural o debida a la acción humana, sino en las consecuencias de estos sucesos en las personas afectadas.

En el 2012 el CRED registró en el mundo 357 desastres naturales, que causaron más de 9655 fallecidos y afectaron más de 122,9 millones de personas con costes económicos de 157,3 billones de dólares (Guha-Sapir, Hoyois, & Below, 2013). En Europa se observó una tendencia general creciente en el número de desastres registrados en el año 2012 en comparación con el promedio de la década 2002-2011, aunque con diferencias con respecto al tipo de desastre considerado. Dos terremotos ocurridos en la región Emilia-Romagna (en el Norte de Italia) hicieron 14367 y 11057 víctimas, respectivamente, y fueron considerados en tercer lugar entre los acontecimientos con mayor impacto económico del año 2012, causando daños económicos de 16 billones de dólares (Guha-Sapir et al., 2013).

Además, los países europeos tuvieron que hacer frente a otros desastres, tales como las inundaciones del 2002 y 2010 en la República Checa, Alemania y Polonia, los terremotos ocurridos en Turquía en 1999 y en 2010, los ataques de terrorismo de Madrid en 2004 y de Londres en 2005 (Knuth et al., 2013). Sin embargo, también las emergencias de pequeña escala, como los incendios, constituyen situaciones de riesgo para la salud psico-física de los individuos afectados y en Europa se registran cada año 2.0 - 2.5 millones de incendios que causan 20,000 - 25,000 fallecidos (el 80% de los fallecimientos se producen durante incendios ocurridos en viviendas privadas) y 250,000 - 500,000 heridos (Kobes & Groenewegen, 2009).

Los estudios destacan que la exposición a desastres y situaciones de emergencia es un evento común y que un tercio o más de las personas afectadas de manera severa pueden desarrollar un trastorno por estrés postraumático (TEPT) u otros trastornos mentales (North & Pfefferbaum, 2013). Con respecto a esto las consecuencias psicopatológicas más frecuentes son el *distress*, es decir, un conjunto de síntomas que causan desajuste, sufrimiento y angustia sin presentar las características de un trastorno mental específico, los trastornos psicopatológicos y los comportamientos de riesgo para la salud (Benedek, Fullerton, & Ursano, 2007). Entre estas posibles consecuencias negativas el TEPT ha recibido más atención, conjuntamente con el estudio de los factores de riesgo y protección que pueden favorecer o reducir la probabilidad de su desarrollo.

Por otro lado, la investigación en el área del trauma ha evidenciado que las personas afectadas por situaciones potencialmente traumáticas experimentan algunos cambios percibidos

como positivos (Zoellner & Maercker, 2006). Con respecto a esto, el constructo de crecimiento postraumático (CPT) describe la experiencia subjetiva de un cambio psicológico positivo experimentado por una persona como resultado de la lucha con el trauma (Tedeschi, Park, & Calhoun, 1998).

Diversos estudios han investigado los diferentes factores de riesgo y de protección asociados al desarrollo del TEPT (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003) y del CPT (Helgeson, Reynolds, & Tomich, 2006). La identificación de estos factores puede reducir el impacto de un suceso traumático y promover un proceso de cambio beneficioso en los sobrevivientes. Estos estudios han evidenciado que los factores peri-traumáticos y aquellos que actúan después del suceso tienen un impacto más fuerte con respecto al desarrollo del TEPT. En este sentido, parece necesario y de gran relevancia investigar las reacciones emocionales y comportamentales en situaciones de peligro, porque estas pueden reducir el impacto de los sucesos potencialmente traumáticos y garantizar la integridad psicofísica y la salud mental de las personas afectadas.

DIAGNÓSTICO Y CLASIFICACIÓN DEL TRASTORNO POR ESTRÉS POSTRAUMÁTICO

En el año 1980 el trastorno por estrés postraumático (TEPT) fue reconocido por primera vez en el DSM-III como una entidad diagnóstica diferenciada (APA, 1980), aunque este trastorno hunde conceptualmente sus raíces en la psiquiatría de finales del XIX y principios del XX (Báguena-Puigcerver, 2001). Una notable aportación en la comprensión del desarrollo del trastorno fue la obra de Kardiner (1941) sobre los síntomas experimentados por los soldados que combatieron en la Primera y Segunda Guerra Mundial, en la que se destacaba la importancia de los elementos de activación fisiológica extrema presentes en los afectados. Trabajos más recientes que contribuyeron a completar el acta formal de nacimiento del trastorno son los de Horowitz (1975, 1979) y de Figley (1978), sobre los veteranos de la guerra del Vietnam que presentaban un síndrome de estrés característico, semejante al descrito en algunos soldados de la Segunda Guerra Mundial.

El TEPT según los diferentes sistemas diagnósticos

La identificación de un suceso estresante grave al que la persona se ha visto expuesta es una condición necesaria para diagnosticar el TEPT (Hetrick, Purcell, Garner, & Parslow, 2010) tanto en el Manual Diagnóstico y Estadístico de los Trastornos Mentales (DSM-V) (APA, 2013), como en la Clasificación Internacional de las Enfermedades (CIE-10) (WHO, 1992). En general, ambos sistemas de clasificación indican grupos de síntomas comunes, aunque existan algunas diferencias en el momento de formular el diagnóstico. Por ejemplo, la presencia de los síntomas de reexperienciación es una condición esencial para el diagnóstico del trastorno en ambos sistemas. Sin embargo, no sucede lo mismo con gran parte del perfil sintomatológico restante. De hecho, en el DSM-V se proporcionan reglas explícitas para abordar el diagnóstico de TEPT, mientras en la CIE-10 las reacciones de la persona se equiparan con una pauta sintomatológica general, en la que algunos de los síntomas no son necesarios para diagnosticar el trastorno (WHO, 1992). También, existen diferencias en los referentes temporales. De hecho en la CIE-10 la consideración temporal se aplica al tiempo de latencia en la aparición de los síntomas (plazo de 6 meses después del suceso), mientras que en el DSM-V la consideración temporal se aplica particularmente a la duración de los síntomas, que deben estar presentes más de un mes. Finalmente, la probabilidad de comorbilidad es una característica del DSM-V frente a la CIE-10, cuya preferencia en el proceso diagnóstico se orienta a la asignación de un diagnóstico único.

Controversias acerca del TEPT

A pesar del aumento de los conocimientos sobre el trauma psicológico en los últimos 30 años, el diagnóstico del TEPT continúa generando controversias (Brewin, Lanius, Novac, Schnyder, & Galea, 2009; Elhai, Grubaugh, Kashdan, & Frueh, 2008; McNally, 2003). En primer lugar, el TEPT supone admitir el papel central de un estresor reconocible en la generación de los síntomas de malestar subjetivo. El DSM-III (APA, 1980) exigía que el estresor fuese lo suficientemente grave como para “generar síntomas significativos de malestar en la mayor parte de las personas y que se encontrase fuera de la experiencia humana normal” (p. 249). En el DSM-IV (APA, 1994) se acentuaba el criterio subjetivo, en el sentido de que debe producirse una respuesta emocional intensa del individuo al suceso traumático, mientras que la CIE-10, de la misma manera que en el DSM-III-R (1987), pone el énfasis en el suceso traumático, que sería de naturaleza tal que resultaría perturbador para casi cualquier individuo. Cabe destacar que el énfasis del criterio subjetivo en el DSM-IV se reflejaba en la ampliación de los estresores y en los colectivos vulnerables a desarrollar sintomatología postraumática y a recibir tratamientos psicoterápicos. En segundo lugar, entre las controversias acerca del TEPT existen las preocupaciones por su uso excesivo en las poblaciones expuestas a desastres naturales o debidos a la acción humana (Kessler & Üstün, 2008), como por ejemplo, diagnosticar TEPT cuando las poblaciones están siendo expuestas activamente a los factores de estrés extremo, lo que hace difícil la diferenciación entre el TEPT, las reacciones adaptativas de miedo y duelo, y otros trastornos mentales comunes que pueden emerger en estas circunstancias (Steel, Chey, Silove, Marnane, Bryant, & Van Ommeren, 2009). También, se ha destacado que se ha trasladado al campo de la salud mental la comprensión de las respuestas emocionales naturales a la exposición a un suceso traumático (McHugh & Treisman, 2007). Finalmente, otro tema de debate es la validez diagnóstica transcultural del TEPT (Maercker et al., 2013). De hecho, en estudios transculturales se destaca que los profesionales de la salud mental perciben la presencia de *bias* culturales en los sistemas de clasificación más utilizados y la falta de idoneidad en el propio contexto cultural de pertenencia (Evans et al., 2013).

Principales cambios en el diagnóstico del TEPT

Con el fin de mejorar la precisión diagnóstica y de acuerdo con los resultados de estudios precedentes (Friedman, Resick, Bryant, & Brewin, 2011), el DSM-V ha eliminado el criterio A2 del DSM-IV, es decir, la experiencia de sentimientos de miedo, impotencia u horror que ocurren justo después del trauma, porque no aumentaba la precisión diagnóstica del trastorno.

Por lo que concierne a otros cambios que recoge el DSM-V (APA, 2013), conviene señalar que el TEPT, así como el trastorno por estrés agudo, se desplaza de la clase de los trastornos de ansiedad a una nueva clase de “Trauma y Trastornos relacionados con el estrés.” Todas las condiciones incluidas en esta categoría requieren la exposición a un suceso traumático o estresante como criterio diagnóstico. La razón fundamental para la creación de esta nueva categoría se basa en el reconocimiento clínico de expresiones variables de angustia como resultado de la experiencia traumática, que representa el enlace entre todas las condiciones incluidas en esta clase.

A pesar de estos cambios, los síntomas necesarios para diagnosticar el TEPT son básicamente los mismos de aquellos indicados en el DSM-IV, aunque existen algunas diferencias que cabe destacar. La primera, hace referencia a los tres grupos de síntomas del DSM-IV que se dividen en cuatro grupos en el DSM-V, en concreto en: (a) intrusión, (b) evitación, (c) alteraciones negativas en las cogniciones y del estado de ánimo, y, finalmente, (d) alteraciones en la excitación y reactividad. La segunda diferencia se refiere a la división en dos del criterio C del DSM-IV (presencia de síntomas de evitación y embotamiento), que en la versión actual se presentan como síntomas de evitación y alteraciones negativas en las cogniciones y el estado de ánimo. Este cambio implica que en la actualidad se requiere, al menos, un síntoma de evitación para el diagnóstico de TEPT (a diferencia del DSM-IV con el que se podía diagnosticar el TEPT sin síntomas de evitación). La tercera, hace referencia a la adición de nuevos síntomas de alteraciones negativas en las cogniciones y del estado de ánimo, tales como la presencia de culpa persistente y distorsionada hacia uno mismo o hacia los demás y el estado emocional negativo persistente. Finalmente, el criterio correspondiente a las alteraciones en el arousal y la reactividad exige una conducta imprudente o destructiva.

Otros cambios realizados en la última versión del DSM conciernen, por ejemplo, el desarrollo de criterios diferenciadores para el diagnóstico del TEPT en niños hasta los seis años de edad (Scheeringa, Zeanah, & Cohen, 2011), y la inclusión de la especificación “con síntomas disociativos” para los individuos que experimentan también síntomas de despersonalización y desrealización (Lanius, Brand, Vermetten, Freewin, & Spiegel, 2011). Los estudios preliminares evidencian que la prevalencia de diagnósticos de TEPT son levemente más bajas en comparación con las basadas sobre los criterios del DSM-IV (Kilpatrick, Resnick, Milanak, Miller, Keyes, & Friedman, 2013), como consecuencia de los cambios aportados en la revisión de los criterios. Por ejemplo, el hecho de haber limitado la descripción de los eventos traumáticos a un número menor de situaciones, hace que se excluyan, por ejemplo, los casos de fallecimientos inesperados

y debidos a causas naturales de familiares o amigos, y, en consecuencia, que se delimiten mayormente los casos elegibles para un posible diagnóstico.

Los aspectos críticos relacionados con el diagnóstico de TEPT ponen de manifiesto, por un lado, la importancia de la correcta identificación de este trastorno mental y, por otro lado, la necesidad de mejorar los criterios de referencia establecidos en los sistemas diagnósticos actuales. Con respecto a esto, así como la nueva versión del DSM-V ha aportado algunos cambios con el objetivo de mejorar la fiabilidad diagnóstica, también el Grupo de Trabajo del CIE-11 ha propuesto para la próxima versión del manual (que será editada en el 2015) centrar el diagnóstico del TEPT en tres elementos básicos y ha recomendado la eliminación de los síntomas no específicos y comunes a otros trastornos (Brewin et al., 2009).

Las pautas propuestas en el CIE-11 para el diagnóstico requerirán (Forbes, Lockwood, Elhai, Creamer, O'Donnell, Bryant, & Silove, 2011): (a) la re-experimentación del evento traumático, donde el acontecimiento no sólo es recordado sino experimentado como si vuelva a ocurrir de nuevo; (b) la evitación de los recuerdos que pueden producir la re-experimentación del acontecimiento traumático; (c) la percepción de amenaza actual aumentada, como se indica mediante varias formas de *hyperarousal*. El diagnóstico se basará principalmente en la aparición de los síntomas que tienen que manifestarse después de la exposición a un acontecimiento de carácter extremadamente amenazante u horrible, en lugar de la determinación de si el acontecimiento constituye un factor de estrés traumático. Además, a diferencia del CIE-10, se propondrá el deterioro funcional (así como también la duración de los síntomas) como criterio para diferenciar el TEPT de las reacciones normales ante un acontecimiento extremadamente estresante con el fin de simplificar el diagnóstico y orientar la atención de los clínicos hacia las características centrales del trastorno y el deterioro funcional (Maercker et al., 2013).

En el CIE-11 se propondrá también una nueva categoría diagnóstica, el TEPT *complejo*, es decir, un trastorno originado por reacciones traumáticas extensas, que se manifiestan como consecuencia de la exposición a factores de estrés severos y prolongados y que, generalmente, incluyen varios o repetidos eventos adversos (Maercker et al., 2013). El diagnóstico propuesto comprende los tres elementos centrales de este trastorno, acompañados por alteraciones duraderas en el área de la afectividad, del sí mismo y de las relaciones interpersonales. Este constructo se inspira en los estudios de las poblaciones sobrevivientes, donde se identifican síntomas que reflejan perturbaciones sostenidas y generalizadas en la regulación de la emoción, en la experiencia de una sensación disminuida y derrotada del sí mismo y en las dificultades para mantener las relaciones (Morina & Ford, 2008; Cloitre, Courtois, Charuvastra, Carapezza, Stolbach, & Green, 2011; Cloitre, Garvet, Brewin, Bryant, & Maercker, 2013).

En el CIE-11 se halla un cambio significativo con respecto a la descripción de las reacciones agudas de estrés tras un acontecimiento traumático. Si bien en el CIE-10 el estrés agudo se presenta como un conjunto de manifestaciones a nivel emocional, cognitivo y conductual, consideradas como patológicas e incluidas en el capítulo de los trastornos mentales, en el CIE-11, este tipo de reacciones se considerarán como respuestas propias que forman parte del rango considerado normal, a pesar de que puedan ser de interés clínico. Además, se propone que la reacción de estrés agudo pueda desplazarse al capítulo del CIE-11 que establece las categorías que representan motivos de interés clínico pero que no son trastornos o enfermedades. De hecho, a pesar de que el trastorno por estrés agudo es un predictor de TEPT, sin embargo no es capaz de identificar la mayoría de las personas que desarrollan TEPT (Bryant, 2011). La presente propuesta tiene por objeto facilitar el apoyo a corto plazo sin patologizar, de esta manera, las organizaciones humanitarias y otras instituciones podrían usar esta categoría para asignar la asistencia psicológica inmediata a las personas necesitadas después de eventos traumáticos.

CRECIMIENTO POSTRAUMÁTICO

Las situaciones de desastre y emergencia son sucesos estresantes que pueden asociarse a síntomas y desajuste psicológico, afectando el bienestar psicológico y alterando el funcionamiento psicosocial de los afectados. Aunque la mayoría de las personas no desarrollan trastornos psiquiátricos, la exposición a estos acontecimientos aumenta el riesgo de desarrollar problemas psicopatológicos (Rubonis & Bickman, 1991). Sin embargo, es importante reconocer que los procesos psicológicos implicados en la gestión de las reacciones negativas son los mismos procesos que también pueden producir cambios positivos (Tedeschi & Calhoun, 2004a). En este sentido, el crecimiento postraumático se produce concomitantemente con los intentos de adaptarse a las consecuencias negativas de las circunstancias difíciles que pueden generar altos niveles de angustia psicológica.

La idea general del poder transformador del sufrimiento, es decir, que el dolor y el desajuste puedan ser posibles fuentes de cambio positivo, es muy antigua y ha sido un tema central de los escritos religiosos, de la investigación filosófica y de la obra de novelistas, dramaturgos y poetas (Tedeschi & Calhoun, 1995). En el siglo XX varios médicos y científicos (por ejemplo, Caplan, 1964 y Dohrenwend, 1978) del campo general de la psicología se dirigieron a estudiar en que manera las crisis vitales ofrecen posibilidades para el cambio personal positivo. A pesar de que hay varias maneras de describir y llamar estos cambios percibidos como positivos tras una vivencia traumática, Tedeschi y Calhoun (1996) etiquetaron el conjunto de estas modificaciones con la expresión “crecimiento postraumático” (CPT) y lo diferenciaron de los conceptos de resiliencia, *hardiness*, optimismo y sentido de coherencia, aunque todos estos constructos describen ciertas características que permiten a las personas de manejar bien las adversidades (Tedeschi & Calhoun, 2004a). El proceso de crecimiento postraumático se pone en marcha por la ocurrencia de una crisis de vida que la desafía gravemente y tal vez rompa la comprensión que el individuo tiene del mundo y de su lugar en él. Tedeschi y Calhoun (1996) identificaron cinco dimensiones que constituyen el constructo del CPT: una sensación de aumento de la cercanía en las relaciones con los demás, nuevas posibilidades para la propia vida, un sentido de mayor fuerza personal, un cambio en la espiritualidad y una mayor apreciación de la vida.

Tedeschi y Calhoun (2004a, p. 4) argumentan que el “crecimiento postraumático se refiere a un cambio en las personas que no sólo es entendido como la capacidad de resistir y no ser dañado por circunstancias altamente estresantes, sino que implica un movimiento más allá de los niveles pre-traumáticos de adaptación”. Además, subrayan que este constructo “tiene una

calidad de transformación o un cambio cualitativo en el funcionamiento”. En este sentido, el individuo no sólo ha sobrevivido, sino que ha experimentado cambios que se consideran importantes y que son percibidos más allá de lo que fue el *status quo* anterior. En consecuencia, esto no es simplemente una vuelta al estado originario, sino que es una experiencia de mejoría que, para algunas personas, puede ser muy profunda. En este proceso de cambio los individuos pueden modificar algunas creencias que constituyen el sistema de asunciones relativas a la visión de sí mismo, los demás y el mundo. Estas creencias dirigen las acciones, ayudan a entender las causas de los acontecimientos, a darles un sentido y una finalidad (Janoff-Bulman, 1992). La experiencia de una situación crítica, como puede ser un desastre, puede modificar estos esquemas mentales, que se reconstruyen y redefinen también incluyendo el trauma y la posibilidad de que ocurra de nuevo en el futuro.

El optimismo, el apoyo social, ser religioso, las estrategias de enfrentamiento (*coping*) orientadas a la reformulación de la situación, la aceptación y el uso de la espiritualidad como recurso para gestionar la situación de crisis se asocian al CPT (Prati & Pietrantonio, 2009). Cabe destacar que este proceso no es únicamente cognitivo, sino que el nivel de participación emotiva es fundamental para que se desarrolle un proceso de cambio. Inicialmente, el individuo debe emplear las estrategias de *coping* necesarias para manejar las emociones abrumadoras, pero ocurre también un intenso proceso cognitivo acerca del acontecimiento traumático. El grado en que la persona se involucra cognitivamente por la crisis, parece ser un elemento central en el proceso de CPT, que se relaciona con el desarrollo de una sabiduría en general acerca de la vida y una modificación de las narrativas de vida del individuo.

Los estudios que han analizado la relación entre CPT e índices de salud mental presentan resultados no unívocos. Algunas investigaciones evidenciaron una asociación negativa entre el CPT y el *distress* (Frazier, Conlon, & Glaser, 2001; Park; Cohen, & Murch, 1996). Sin embargo, otras investigaciones no encontraron ninguna relación fiable entre el CPT y el *distress* (Cordova, Cunningham, Carlson, & Andrykowski, 2001; Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003). Finalmente, algunos estudios indicaron una relación positiva entre el CPT y los pensamientos intrusivos, que frecuentemente son causas de malestar (Calhoun, Cann, Tedeschi, & McMillan, 2000). Por lo que concierne a la relación entre CPT y síntomas de estrés postraumático algunos estudios han encontrado una relación positiva (Hobfoll, Canetti-Nisim, & Johnson, 2006; Morris, Shakespeare-Finch, Rieck, & Newbery, 2005), mientras que otros, presentan resultados mixtos (Grubaugh & Resick, 2007; Salsman, Segerstrom, Brechting, Carlson, & Andrykowski, 2009). Los estudios que han encontrado una relación negativa sustentan la idea central por la cual el desajuste y el CPT son los extremos de un único

constructo bipolar. Por lo contrario las investigaciones que han encontrado una relación positiva consideran el CPT y el desajuste como dos constructos independientes que pueden coexistir (Linley & Joseph, 2004; Laufer & Solomon, 2006). De acuerdo con esta idea, las personas que experimentan unos cambios en positivo no están libres de los síntomas psicopatológicos, sugiriendo que para poner en marcha el proceso de crecimiento, no sólo es necesario un cierto grado de malestar psicológico o sufrimiento, sino también, un malestar persistente que puede acompañar el proceso de mejora y el mantenimiento del CPT (Tedeschi & Calhoun, 2004a).

Considerando la falta de homogeneidad de los resultados de los estudios que han investigado la relación entre CPT y estrés postraumático, se destaca la necesidad de seguir investigando sobre este tema en virtud de las implicaciones teóricas y prácticas que se derivan de ella.

MODELOS Y TEORÍAS SOBRE EL ESTRÉS POSTRAMÁTICO

Modelos y teorías cognitivas conductuales

Existen muchas teorías que tratan de explicar el desarrollo del TEPT. Como ha señalado Brewin y Holmes (2003) entre las primeras se encuentran: las teorías socio-cognitivas, las teorías del condicionamiento y las teorías del procesamiento de la información.

Las teorías socio-cognitivas se centran principalmente en la forma en que el trauma rompe las estructuras mentales existentes y sobre los mecanismos innatos para incluir la información incompatible con las creencias anteriores. Horowitz (1975) fue un pionero en el estudio del TEPT y sus teorías fueron definidas como socio-cognitivas (Brewin, Dalgleish & Joseph, 1996). Las teorías socio-cognitivas proporcionan explicaciones válidas de la gama de las emociones y las creencias originadas por el trauma y el proceso de adaptación a largo plazo, sin diferenciar claramente entre el TEPT y otros tipos de reacciones, como la depresión; y tampoco sin tener en cuenta la naturaleza de las respuestas al recuerdo del trauma.

Las teorías del condicionamiento (Mowrer, 1960; Keane, Zimering, & Caddell, 1985) consideran como factores centrales para el desarrollo del TEPT las asociaciones y la conducta de evitación, proporcionando una buena explicación de cómo los estímulos del trauma pueden provocar miedo y destacando el papel fundamental desempeñado por la evitación. Las mayores limitaciones residen en el hecho de que no consiguen explicar gran parte de los síntomas cognitivos que se manifiestan en el trastorno, como por ejemplo, las creencias y la percepción de amenaza.

Con respecto a las teorías del procesamiento de la información (Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1988; Creamer, Burgess, & Pattison, 1992; Foa, Steketee, & Rothbaum, 1989), éstas se centran en la codificación, el almacenamiento y la recuperación de los acontecimientos inductores de miedo y los estímulos y las respuestas asociadas. Las teorías del procesamiento de la información ofrecen descripciones más claras de la arquitectura cognitiva en la que el suceso traumático puede ser representado, de los efectos de la atención, y de cómo los pensamientos intrusivos aumentan el número de los potenciales recordatorios del trauma. Sin embargo, estas teorías son menos capaces de dar cuenta de la importancia de emociones distintas del miedo y de las creencias que se extienden más allá del peligro y que se refieren al contexto social.

Aunque todas estas primeras teorías estaban limitadas por la escasa investigación disponible sobre el trauma, la memoria y el TEPT en ese momento, cabe destacar que, dentro de su marco de referencia, cada una ha contribuido a proporcionar conocimientos fundamentales para entender el proceso a través del cual se desarrolla el TEPT. Además, los resultados de los estudios realizados a partir de éstas han contribuido al desarrollo de nuevas teorías, entre las cuales cabe mencionar la teoría del procesamiento de las emociones (Foa et al., 1989; Foa & Riggs, 1993), la teoría de la representación dual (Brewin et al., 1996) y el modelo cognitivo de Ehlers y Clark (2000).

La teoría del procesamiento de las emociones tiene un gran poder explicativo sobre el desarrollo del TEPT y ofrece valiosas sugerencias a los profesionales que abordan este trastorno en la práctica clínica. Un aspecto importante de la teoría es el poner en relación el TEPT y los esquemas cognitivos presentes antes del trauma con otros factores, como por ejemplo la rigidez de las creencias sobre sí mismo, el mundo y los demás. De hecho, se propone que los individuos con creencias propias (pre-trauma) más rígidas, tanto en positivo como en negativo, serían más vulnerables al TEPT. Por ejemplo, un individuo que se ve a sí mismo como extremadamente competente y el mundo como muy seguro, o que tenga unas creencias negativas y rígidas sobre el yo (por ejemplo, percibir el yo como extremadamente incompetente y el mundo como extremadamente peligroso), tiene más probabilidad de desarrollar el TEPT, tras un suceso que contradice estas percepciones. Según Foa y Rothbaum (2001) la exposición a un trauma facilita una reacción de ruptura de los esquemas cognitivos de la persona, en que los recuerdos, los pensamientos, las imágenes no pueden asimilarse en los esquemas cognitivos preexistentes. Además, los autores afirman que los síntomas de intrusión y evitación son parte del proceso de asimilación e integración de viejos esquemas persistentes con las nuevas informaciones aportadas por el suceso negativo. En segundo lugar, según este modelo, los eventos peligrosos son representados en la memoria de una manera cualitativamente diferente en comparación con los eventos ordinarios. Con la expresión de *fear network* (Foa et al., 1989) se describe el conjunto de asociaciones que constituyen a la representación del suceso traumático, en el que existe una interconexión de varios nodos que contienen informaciones diferentes: las informaciones del estímulo acerca del suceso traumático (por ejemplo, olores, luces, sonidos), las informaciones relativas a las reacciones cognitivas, emotivas, comportamentales; y la información acerca del significado asociado al suceso (por ejemplo, la percepción de amenaza). La elaboración cognitiva puede llevarse a cabo solamente si la información presente en el *fear network* puede integrarse con las estructuras mnemónicas preexistentes a través de una reducción de la fuerza de las asociaciones. Un tercer factor que influye en el desarrollo del TEPT son las

reacciones propias y la de los demás. En este sentido, la elaboración cognitiva es más difícil si la persona experimenta reacciones negativas en su entorno, tales como reacciones que refuerzan la idea de peligrosidad del mundo, o que tienden a interpretar los síntomas de estrés experimentados durante y después del trauma como signos de escaso valor personal.

La teoría de la representación doble (Brewin et al., 1996) es una de las más significativas para explicar el desarrollo del TEPT. Según los autores existe un doble sistema de memoria: la memoria verbal accesible y la memoria situacional accesible. La memoria verbal accesible concierne la memoria autobiográfica y contiene informaciones que pueden ser recordadas intencionalmente, siendo aquellas a las que se ha dado atención durante del suceso. El segundo nivel de memoria contiene todas las informaciones a las cuales se accede sin intencionalidad. Estas informaciones emergen cuando estímulos externos o internos desencadenan algunos recuerdos del suceso traumático. Los recuerdos disociativos y los *flashback*, por ejemplo, resultan de la activación de las representaciones de la memoria situacional accesible. Brewin y Holmes (2003) afirman que una de las implicaciones de la teoría es que la resolución del TEPT depende de dos procesos distintos: el primero, se refiere a la necesidad de reducir las emociones y creencias negativas a través de una reafirmación de la percepción de control personal sobre la propia vida, la atribución de correctas responsabilidades y la integración de nuevas informaciones con las preexistentes. Sin embargo, es también necesario reducir la reactivación automática de las memorias situacionales asociadas con el trauma. Para lograr este objetivo es necesario desarrollar nuevas memorias constituidas por imágenes del trauma, pero asociadas a un estado de activación psicofisiológica (arousal) más bajo.

Finalmente, otro modelo explicativo es el propuesto por Ehlers y Clark (2000), en el que destacan la paradoja del TEPT, es decir la preocupación por el futuro, a pesar de que el trauma ha ocurrido en el pasado. Los autores proponen que las reacciones patológicas al trauma surgen cuando los individuos procesan la información traumática de una manera que ésta produce una sensación de amenaza actual a la integridad psicofísica propia o de los demás. Los dos mecanismos principales que producen este efecto implican unas evaluaciones negativas del trauma o sus secuelas y de las características en la memoria traumática. Ehlers y Clark identifican una amplia gama de evaluaciones negativas pertinentes. Algunas de ellas se centran en el suceso traumático y la sobre-generalización de los señales de peligro (ej. “Los otros pueden ver que soy una víctima”) o la valoración negativa de las acciones propias (ej. “Me merezco que las cosas malas me suceden”). Otras evaluaciones se centran en las secuelas, como en los síntomas de embotamiento del TEPT (“Nunca voy a ser capaz de relacionarme de nuevo con la

gente”), las reacciones de otras personas (“Creer que soy demasiado débil para hacer frente a las situaciones”), y las perspectivas de vida (“Mi cuerpo está en ruinas”). Entre los factores que aumentan la probabilidad de desarrollar evaluaciones negativas hallamos los procesos de pensamiento que se originan durante el suceso y las creencias y experiencias anteriores al trauma. El modelo sugiere también, que la memoria del suceso está elaborada de manera deficiente y mal integrada en el sistema de memoria autobiográfica. Esto da cuenta de la dificultad de recordar de manera intencional algunos aspectos del trauma (la ausencia de vías de recuperación claramente especificadas), de volver a experimentar en el presente aspectos del pasado (la ausencia de un marco temporal), la falta de conexión con otra información relevante y la fácil activación por estímulos físicos similares. También, cabe señalar que la recuperación de la memoria asociativa es *cue-driven* y no intencional, por lo que la persona puede no ser consciente de los factores desencadenantes que conducen a revivir el suceso traumático. El modelo de Ehlers y Clark (2000) representa actualmente la referencia más detallada del mantenimiento de los síntomas de TEPT y de su tratamiento, porque ha contribuido a ampliar significativamente la comprensión de la gama de evaluaciones negativas relevantes e identificar una variedad de factores de afrontamiento cognitivo que influyen en el curso del trastorno.

Modelos y teorías psicosociales

Las teorías cognitivas conductuales presentadas anteriormente, describen la génesis de los síntomas del estrés postraumáticos, sin embargo se desarrollan en el marco del paradigma *stress-distress* y no tienen en debida consideración la contribución de los factores psicosociales en el desarrollo del TEPT (Pietrantonio & Prati, 2009). Entre los modelos con un enfoque psicosocial, se destacan, por ejemplo, el modelo del estrés psicosocial de Dohrenwend (1978), el modelo transaccional de Lazarus y Folkman (1984) y el modelo de las crisis de vida de Schaefer y Moos (1992).

Según el modelo de Dohrenwend (1978) se asume que la situación ambiental y las características personales crean las condiciones para incurrir en acontecimientos estresantes, que pueden generar reacciones transitorias de estrés. El modelo plantea diferentes posibles resultados, como psicopatología, ausencia de cambio en el funcionamiento de vida y crecimiento, que dependen de la mediación de factores situacionales, como el apoyo social, los recursos económicos y los psicológicos, como los valores y las habilidades de *coping* (es decir, las estrategias de afrontamiento de situaciones críticas).

El modelo transaccional (Lazarus & Folkman, 1984) se enfoca en el papel de las estrategias de *coping* y las evaluaciones cognitivas del sujeto. Un primer nivel de evaluación

determina el grado de daño, pérdida, amenaza o reto; el segundo nivel consiste en la elección de las estrategias de *coping* que se deben adoptar en relación con los recursos sociales y personales disponibles, mientras que la tercera evaluación, concierne a la valoración de la eficacia de las estrategias adoptadas.

Finalmente, el modelo de las crisis de vida o transacciones (Schaefer & Moos, 1992) asume que el sistema ambiental (relaciones de la persona, apoyo de la familia, colegas, amigos, pareja, recursos económicos, condiciones de la propia vivienda y de la comunidad) y el sistema personal (características socio-demográficas, auto-estima, auto-eficacia, optimismo, confianza en sí mismo, motivación, estado de salud y experiencias precedentes) influyen las crisis de vida o transacciones. Estas crisis pueden desencadenar consecuencias negativas o positivas en función de las estrategias de *coping* adoptadas y de la evaluación psicológica del suceso. El modelo considera también el papel de los factores relativos al suceso crítico como la gravedad, la duración, si es un suceso que afecta a un único individuo o a una comunidad, etc., mientras el rol de la evaluación influye, sobretodo, a la percepción de daño, pérdida, amenaza o reto que los sujetos atribuyen al suceso. De acuerdo con este modelo, las crisis de vida pueden ofrecer oportunidades de cambio y aprendizaje de nuevas habilidades, que, si son resueltas con éxito, pueden aumentar la confianza en las propias capacidades.

Existen también algunas teorías que han enfatizado el papel de los factores de protección, como el apoyo social o las emociones positivas con respecto a la posibilidad de favorecer y facilitar la adaptación después de un desastre (Norris & Kaniasty, 1996). En esta línea, la teoría de la ampliación y construcción de las emociones positivas (Fredrickson, 2001) asume que éstas tienen un papel crucial con respecto al proceso de adaptación porque pueden ampliar el repertorio cognitivo y conductual de las personas construyen los propios recursos para enfrentarse a una situación desafiante. Las emociones negativas, gracias a la interacción con el Sistema Nervioso Autónomo, favorecen la tendencia a la acción y a los comportamientos adaptivos de “*flight and fight*” (es decir, escapar y atacar) durante situaciones de peligro. Sin embargo, las emociones positivas permiten alcanzar beneficios a largo plazo y a niveles fisiológico, cognitivo, socio-relacional y de calidad de vida. Esto se refleja en percepciones de adaptación a los acontecimientos negativos (Fredrickson, 2001), y en asociaciones positivas con percepciones de bienestar también en contextos caracterizados por altos niveles de violencia (Veronese, Natour, & Said, 2012), sugiriendo un papel de protección hacia el desarrollo de síntomas psicopatológicos.

Finalmente, entre las teorías psicosociales cabe mencionar la teoría social-cognitiva de Benight y Bandura (2004) que se centra en los conceptos autoeficacia y en la idea de las

personas como agentes activos en el proceso de enfrentamiento y adaptación al trauma. Esto implica que una respuesta adaptativa está asociada a la presencia de creencias de autoeficacia de las propias estrategias de enfrentamiento (*coping*). Es decir, las personas que se perciben como capaces de gestionar o ejercer un cierto nivel de control sobre el suceso y sus consecuencias son aquellas que presentan una mejor adaptación y menores secuelas negativas.

La riqueza aportada sobre el TEPT tanto por los modelos cognitivo-conductuales como por los psicosociales ha contribuido a identificar una amplia variedad de factores de riesgo y protección que tienen un papel en el desarrollo los síntomas postraumáticos. Los modelos cognitivos conductuales han permitido comprender el mecanismo de desarrollo de los síntomas, mientras que los modelos psicosociales se han enfocado en el proceso y en los cambios psicológicos, que ocurren tras una situación potencialmente traumática, y en los factores que, interactuando, pueden reducir el impacto del suceso.

MODELOS Y TEORÍAS SOBRE LAS REACCIONES PSICOLÓGICAS Y COMPORTAMENTALES EN SITUACIONES DE PELIGRO

El estudio del comportamiento humano en situaciones de peligro radica en la importancia que tiene con respecto a la probabilidad de aumentar la sobrevivencia a un suceso adverso y al impacto de las consecuencias psicofísicas de los afectados. A pesar de su importancia, esta área de investigación genera problemas concretos debido a las escasas oportunidades para investigar el comportamiento humano en situaciones de peligro, puesto que se ven limitadas por las restricciones físicas y éticas que suponen.

La teorización más antigua y conocida de las reacciones psicológicas y comportamentales en el tema que nos ocupa, es la teoría del pánico, que está asociada con la influyente obra de Gustave Le Bon (Le Bon, 2004), conocida por primera vez a finales del siglo XIX y recuperada por autores como Park y Blumer que fundan la *group mind tradition* (Zeitz, Tan, Grief, Couns, & Zeitz, 2009). Esta corriente postula que las reacciones a las amenazas colectivas se caracterizan por emociones negativas, como el miedo, la histeria y la ira, la pérdida del pensamiento racional y del orden social y por comportamientos violentos y antisociales. Todas estas manifestaciones son ocasionadas y exacerbadas por la influencia de la multitud que crea una condición de despersonalización.

Las teorías del pánico continúan ejerciendo una poderosa influencia en las representaciones populares de la conducta humana en los desastres y emergencias, en la planificación de las políticas, en la toma de decisiones, así como en el ámbito científico (Quarantelli, 2002). Sin embargo, en los estudios empíricos sobre el comportamiento de emergencia se han encontrado pruebas que falsifican las predicciones hechas por los teóricos de pánico (Quarantelli & Dynes, 1977; Alexander, 2007). Algunos autores han criticado estas teorías, sugiriendo que la amenaza del pánico masivo y la desintegración social también sirve para justificar políticas sociales de control y desconfianza, en lugar de promover las políticas sociales que puedan fomentar la independencia y participación pública de los ciudadanos (Dynes, 2003; Drury, Cocking, & Reicher, 2009a).

La teoría de la norma emergente (TNE) (Turner, 1964; Turner & Killian, 1987) ha sido una de las primeras tentativas para superar las teorizaciones sobre el pánico y las conductas irracionales de la multitud en situaciones de peligro (Drury, Cocking, & Reicher, 2009b). Para la TNE, todo el comportamiento social y colectivo es una función de las normas sociales. Los desastres y otras emergencias son acontecimientos "extraordinarios", donde las normas cotidianas de comportamiento no necesariamente se aplican, y donde surge la necesidad de

desarrollar nuevas normas, que se originan a través de un proceso de interacción interpersonal. Bajo estas nuevas condiciones, las personas deben hacer un esfuerzo concertado para dar sentido a situaciones nuevas y desconocidas, a menudo bajo la presión del tiempo (Kuligowski, 2013). La TNE explica el proceso de construcción de significado en condiciones de incertidumbre (Turner & Killian, 1987), donde la situación de peligro crea una crisis normativa en consecuencia de la cual las normas establecidas ya no se aplican. En consecuencia, durante un incendio, por ejemplo, las personas interactúan colectivamente para crear conjuntamente unas normas que guíen sus comportamientos. En otras palabras, las personas deben trabajar juntas para redefinir la situación y proponer un nuevo conjunto de acciones, que son el producto de los procesos de *milling* y *keynoting*. El *milling* es un proceso de comunicación mediante el cual las personas se unen en un intento común para definir la situación, proponer y adoptar nuevas normas de comportamiento apropiadas para gestionar la nueva situación y elegir una acción coordinada para encontrar una solución al problema compartido (Aguirre, Wenger, & Vigo, 1998). El *keynoting* es aquel proceso a través del cual se identifican los líderes, que son representados por las personas que avanzan interpretaciones del suceso o sugerencias sobre cómo actuar. Las consecuencias de estos procesos se reflejan en una minimización de la ambigüedad inicial y en el desarrollo de un sentido de destino común que conducen a una definición colectiva de la situación y a la elección de unos comportamientos comunes (Turner & Killian, 1987). La contribución más importante de esta teoría es su énfasis en la construcción social de la respuesta a situaciones de peligro. Esto significa que las respuestas a los desastres son principalmente decisiones del grupo formado por las dinámicas sociales, en lugar de reacciones emocionales y de comportamientos primitivos a estresores ambientales. Estas respuestas reflejan las deliberaciones racionales del grupo y están influenciadas por las limitaciones contextuales (tiempo, lugar, habilidades, conocimiento, etc.) y maximizan las posibilidades de supervivencia y preservación del mundo social (Solberg, Joffe, & Rossetto, 2008).

La TNE está, en gran parte, relacionada con el comportamiento en situaciones colectivas y no es apropiada para explicar el comportamiento humano cuando una persona, por ejemplo, está sola durante un terremoto o incendio que ocurre en el hogar. Sin embargo, el modelo del Apego Social (MAS) del comportamiento humano en situaciones de desastre (Mawson, 2005; 2007) puede proporcionar explicaciones a los comportamientos de los individuos, cuando éstos se enfrentan a situaciones de peligro en solitario o en pequeños grupos. La hipótesis central del modelo es que la respuesta más frecuente en casos de emergencia no es el pánico o el escapar, sino el mantenimiento (o la búsqueda) de la proximidad a personas, objetos y lugares familiares.

Según este modelo, escapar se considera como una respuesta general en que las personas se mueven tanto hacia personas, objetos y lugar de apego familiar, como lejos de las situaciones de peligro.

Mawson (2005) propone un modelo predictivo de respuesta a los desastres, que combina la percepción del nivel de peligro (leve/grave) y los niveles de apoyo social disponibles en la situación (presente/ausente). En general, al aumentar del apoyo social se amortiguan las tendencias de escapar, mientras que en situaciones de peligro percibido como grave, es más probable que las personas escapen del lugar en que se encuentran. Sólo en los casos en que el apoyo social es muy bajo y el peligro es muy elevado podrían manifestarse los comportamientos clásicos de pánico. Los casos en que las personas tienen altos niveles de apoyo social y perciben altos niveles de peligro prevén una evacuación ordenada y relativamente tranquila.

La teoría de la identidad social (TIS), tal como se aplica a los comportamientos en los desastres (Drury & Cocking, 2007; Drury, Cocking, & Reicher, 2009a; 2009b), opera desde la premisa de que la identidad social compartida determina el comportamiento social. La identidad social es aquella parte de la identidad de los individuos que se forma cuando una persona se clasifica a sí mismo como perteneciente a un grupo específico. La pertenencia a un grupo puede ir desde los grupos fijos, como aquellos basados en el género y la clase socio-económica; hasta los grupos creados por circunstancias ocasionales, tales como los que se forman cuando las personas se encuentran atrapadas con desconocidos en una situación de peligro. La aplicación de la TIS al comportamiento en desastres tiene principalmente la finalidad de explicar las observaciones persistentes que no pueden ser explicadas satisfactoriamente por la TNE y el MAS (Solberg, Joffe & Rossetto, 2008). En primer lugar, esta teoría consigue dar explicaciones del comportamiento altruista entre desconocidos y de la ausencia de comportamientos de pánico en la mayoría de los desastres. Además, la TIS distingue entre una masa psicológica, que está unida por redes de identidades compartidas y motivaciones, y simples agregados de personas que carecen de identidades compartidas. Una de las predicciones es que las masas psicológicas, a diferencia de simples agregados de personas, tales como las personas que se enfrentan a una amenaza común, mostrarán más preocupación hacia los demás (tanto familiares como desconocidos), mayor coordinación y comportamientos altruistas y expectativas de recibir recíproco apoyo. Este proceso depende del hecho que el desastre en sí crea un vínculo o destino común entre quienes lo experimentan. Los estudios realizados con diferentes métodos de investigación han encontrado que niveles más altos de percepciones de una identidad común favorecen tales comportamientos y cogniciones (Drury, Cocking, & Reicher, 2009a).

El Modelo de Kuligowski y Miletí sobre el comportamiento humano durante los

incendios (2009) afirma que el comportamiento individual en situaciones de peligro es el resultado de un proceso de toma de decisiones en las que el riesgo percibido juega un papel crucial. La percepción del riesgo se refiere a la cantidad de riesgo/peligro percibido como resultado del suceso y de las percepciones acerca de la gravedad de la situación. Los autores del modelo postulan que la percepción de riesgo está relacionada con el comportamiento de evacuación. Sin embargo, la percepción de riesgo no es el único factor que influye en la evacuación. La investigación sobre este tema ha demostrado que también las características de la situación de peligro y otros factores relacionados con la experiencia de la persona influyen en el tiempo de la evacuación. Estas características y factores pueden ser las señales ambientales, la proximidad a una zona segura, la obtención de información, la búsqueda de información adicional, la percepción de riesgo y las actividades realizadas antes de iniciar la evacuación. Por otra parte, aunque Sherman, Peyrot, Magda y Gershon (2011) destacan la validez del modelo, también identifican dos factores adicionales, que tienen un papel importante en el momento de predecir el proceso de evacuación de un edificio. Estos son los conocimientos que una persona tiene con respecto al edificio en que se encuentra durante la situación de emergencia (ej. número de escaleras, ubicación de las salidas de emergencia) y el nivel de preparación en emergencia (ej. conocimientos, participación en simulacros, experiencias precedentes en situaciones de peligro, etc.). La importancia de incluir estos factores en el modelo reside en el hecho que, los niveles de conocimientos y preparación pueden ser modificados con una adecuada información y a través de la experiencia, y esto tiene repercusiones importantes para la seguridad de las personas afectadas por la situación de peligro.

JUSTIFICACIÓN DE LA UNIDAD TEMÁTICA, OBJETIVOS E HIPÓTESIS

JUSTIFICACIÓN DE LA UNIDAD TEMÁTICA

El riesgo de exposición a situaciones de desastre y emergencias representa un aspecto con el cual los individuos tienen que convivir. Además, aunque la intensidad y probabilidad de algunos sucesos permanece constante, el aumento de la población, el desarrollo económico, urbano y de las infraestructuras, hace que las consecuencias de estos acontecimientos sean potencialmente de mayor envergadura (Paton & Johnston, 2006).

Para hacer frente a las amenazas de estas situaciones y reducir sus impactos, es necesario considerar los factores asociados como la vulnerabilidad, pero también, aquellos que pueden promover una respuesta adaptativa. En este sentido, el paradigma salutogénico (Antonowsky, 1990) puede ofrecer algunas respuestas tanto para la preparación de los ciudadanos a una situación de desastre o emergencia (antes de su ocurrencia) como para su gestión (durante de su ocurrencia), como para mitigar las secuelas negativas en las personas afectadas. Paton y Johnston (2006) destacan la importancia de esta integración porque tanto en el discurso común como en los estudios realizados en este ámbito de investigación se destacan mayoritariamente los aspectos de vulnerabilidad y las pérdidas (ej. de bienes materiales, fallecimientos, salud etc.). A partir de estas consideraciones, es importante analizar los factores implicados, que interrelacionándose entre ellos en las diferentes etapas de una emergencia, promueven la adaptación y el crecimiento, o bien, el *distress* y otras secuelas negativas.

Siguiendo la línea de este marco teórico, que considera tanto los aspectos de vulnerabilidad y como de crecimiento, la tesis se compone de tres estudios, los dos primeros tienen como finalidad la identificación de los factores de riesgo y protección que promueven los síntomas de estrés postraumático y el crecimiento postraumático tras la vivencia de una situación de desastre o emergencia. El tercer estudio centra la atención en la *safety*, es decir, en los comportamientos que pueden garantizar la salud y la seguridad de las personas que se encuentran en una situación de peligro (por ejemplo, el respecto de las norma de seguridad, manutención adecuada del hogar, adopción de conductas adecuadas antes y durante el suceso, preparación de un plano de evacuación, búsqueda de informaciones etc.) y en los factores socio-contextuales que pueden promoverla. La adopción de comportamientos adecuados no solamente influye en la sobrevivencia durante la ocurrencia del suceso crítico (*response*), sino también, en la etapa de

recuperación (*recovery*) (Paton & Johnston, 2006). De hecho, a pesar de que tradicionalmente los estudios de las consecuencias de los desastres sobre la salud mental y las investigaciones enfocadas en los comportamientos de *safety* han sido independientes, sin embargo necesitarían una mayor integración porque los factores peri-traumáticos, como las reacciones emocionales y comportamentales experimentadas durante el suceso, tienen un impacto considerable tanto en la salud mental (Ozer et al., 2003), como en la seguridad de las personas afectadas.

Debido al hecho de que ciertos riesgos no pueden ser eliminados completamente, la conceptualización de las consecuencias de la exposición a situaciones de riesgo, teniendo en cuenta los aspectos de vulnerabilidad, los posibles beneficios y los comportamientos de *safety* representa una posibilidad de capturar de manera más apropiada la esencia de la vivencia del suceso traumático.

OBJETIVO GENERAL

El objetivo general de este trabajo de investigación es estudiar las consecuencias de las situaciones de desastre y emergencia a nivel de salud mental y de comportamientos seguros (*safety*) a través del análisis del comportamiento humano en terremotos, inundaciones y otras situaciones de emergencia, como incendios y actos de terrorismo. En este estudio se adopta una doble perspectiva, es decir se tienen en cuenta las consecuencias negativas a nivel psicosocial de estos acontecimientos y los aspectos salutogénicos (ej. beneficios psicológicos, comportamientos adecuados) experimentados por los sobrevivientes.

Más en detalle, el trabajo se enfoca en identificar la influencia que factores socio-contextuales específicos tienen con respecto a los comportamientos adecuados e inadecuados, realizados por las víctimas de situaciones de desastre y emergencia.

Además, siempre manteniendo esta doble perspectiva, se investigan los factores de riesgo asociados al desarrollo de las consecuencias negativas, como los síntomas de estrés postraumático, y los factores que, por el contrario, favorecen una respuesta adaptativa tras la vivencia del suceso potencialmente traumático.

OBJETIVOS CONCRETOS

A continuación se presentan los objetivos concretos de este estudio.

Objetivos que exploran los síntomas de estrés postraumático, el crecimiento postraumático y los factores de riesgo y de protección asociados:

1. Estudiar la relación entre los síntomas de estrés postraumático y crecimiento postraumático.
2. Identificar los predictores de los síntomas de estrés postraumático.
3. Identificar los predictores de crecimiento postraumático.
4. Estudiar el papel de un factor de protección, es decir, la percepción de auto-eficacia personal durante la situación de desastre o emergencia con respecto a su influencia en el desarrollo de los síntomas de estrés postraumático.
5. Estudiar si los factores que reflejan la experiencia previa en emergencia de la persona tienen un papel con respecto al desarrollo de los síntomas de estrés postraumático.

Objetivos que analizan las respuestas comportamentales y emotivas durante una situación de desastre o emergencia y el papel de los factores socio-contextuales asociados:

6. Explorar los comportamientos y las reacciones emotivas de las personas afectadas por un terremoto.
7. Explorar las predicciones de algunos modelos que explican la respuesta humana a situaciones de desastre y emergencia.

HIPÓTESIS DE TRABAJO

Estudio I

En el estudio I se plantean cuatro hipótesis, basadas en resultados previos de la literatura:

- 1) Se espera una asociación positiva entre los constructos de crecimiento postraumático y síntomas de estrés postraumático.
- 2) Se espera que los predictores de más síntomas de estrés postraumáticos sean: género femenino, mayor edad, renta más baja, ninguna afiliación religiosa, experiencia previa en situaciones de desastre o emergencia, menos tiempo transcurrido desde la situación de desastre o emergencia y más síntomas de pánico peri-traumático.
- 3) Se espera que los predictores de crecimiento postraumático sean: género femenino, menor edad, renta más alta, afiliación religiosa, ninguna experiencia previa en situaciones de desastre o emergencia, más tiempo transcurrido desde la situación de desastre o emergencia y más síntomas de pánico peri-traumático. No se hace ninguna predicción con respecto al tipo de situación experimentada (es decir, si es de tipo natural o debida a la acción humana), puesto que los estudios precedentes no presentan resultados coherentes.
- 4) Finalmente, se explora si los síntomas de estrés postraumático pueden ser mediadores entre los síntomas de pánico peri-traumático y el crecimiento postraumático.

Estudio II

En el estudio II se plantean dos hipótesis, basadas en resultados de estudios precedentes:

- 1) Se analiza la contribución de la autoeficacia percibida durante una situación de desastre o emergencia en un modelo multivariante. Se plantea la hipótesis que un aumento de la autoeficacia percibida durante la situación de desastre o emergencia se asocie a menos síntomas de estrés postraumáticos.
- 2) Se espera que los predictores de niveles más altos de síntomas de estrés postraumáticos sean: escasa confianza en los servicios de emergencia, menor percepción de riesgo, menores conocimientos de prevención en emergencia, no haber actuado de manera activa

durante el acontecimiento (en comparación con haber actuado de manera activa), no haber actuado de manera consciente durante el acontecimiento (en comparación con haber actuado de manera no consciente).

Estudio III

En el estudio III se plantean tres objetivos sobre las respuestas emocionales y conductuales durante el terremoto:

- 1) Se exploran las hipótesis del Modelo Ampliado de Kuligowski y Mileti (Sherman et al., 2011) aplicado en caso de terremoto. Concretamente se analiza el efecto de la percepción de riesgo y de la preparación previa en emergencia con respecto a los comportamientos adecuados e inadecuados adoptados y con respecto a la reacción emocional.
- 2) Se exploran las hipótesis del Modelo del Apego Social (Mawson, 2005). En concreto se analiza el efecto de hallarse en un lugar familiar y con la presencia de familiares con respecto a los comportamientos adecuados e inadecuados adoptados y a la reacción emocional.

MÉTODO

POBLACIÓN DEL ESTUDIO

Estudio I

En el primero estudio participaron 173 sobrevivientes que experimentaron diferentes situaciones de desastre y emergencia. El 57.6% de los participantes fueron mujeres y el 42.4% hombres con una edad media de 32.52 años. La mayoría de los participantes (63.5%) tenía una renta inferior de 11,864 €, mientras que el 32.7% entre 11,864 € y 25,424 €. La mayoría era religiosa (76%) y el 24% no. Con respecto al tipo de evento experimentado, el 26% refirió haber sido víctima de un incendio en el hogar, el 13.3% un incendio en un edificio público, el 50.9% un terremoto y el 9.8% una inundación. Más de la mitad de los participantes (50.9%) declaró no haber tenido una experiencia previa de situación de desastre o emergencia, el 39.9% refirió una experiencia previa, el restante indica entre 2 y 3 situaciones previas.

Estudio II

En el segundo estudio participaron 214 sobrevivientes, 44.2% hombres y 55.8% mujeres. El 40.2% fueron Españoles y el 59.8% Italianos. La edad media de la muestra total fue de 36.85 años. Los participantes fueron sobrevivientes de varias situaciones de desastre o emergencia, tales como terremotos (n = 74), inundaciones (n = 7), incendios en el hogar (n = 63), incendios en edificios públicos (n = 49) y actos de terrorismo (n = 21). En el artículo donde se presentan los resultados del estudio II, se proporciona más información sobre las características socio-demográficas de los participantes en relación con la nacionalidad de pertenencia.

Estudio III

En el tercero estudio participaron 1,839 sobrevivientes del terremoto que ocurrió en la región Emilia-Romagna (Norte de Italia) en Mayo de 2012. El 63.9% fueron mujeres y el 36.1% hombres con una edad media de 27.22 años. La distancia media desde el epicentro fue de 33.7 km (DE = 18.82; rango: 0 - 152.27 km). La mayoría de los participantes vivió una experiencia previa de terremoto (88.4%), mientras que el 11.6% ninguna.

ASPECTOS ÉTICOS

Los estudios realizados que dan lugar a esta tesis se llevaron a cabo respetando las normas del Codice Etico della Ricerca e dell’Insegnamento in Psicologia della Associazione Italiana in Psicologia (AIP – www.aipass.org). Los participantes recibieron informaciones sobre los objetivos y las implicaciones de los estudios, las instituciones involucradas y el tipo de contribución pedida. Profesionales calificados y entrenados contactaron con los participantes, que recibieron informaciones sobre el responsable del proyecto (ej. formación, centro de afiliación, teléfono, correo electrónico y dirección). Los participantes pudieron hacer preguntas al profesional que suministró el cuestionario y se les ofreció contactar un referente del equipo. Además, con respecto a los estudios I y II, los participantes tuvieron que dar el consentimiento para participar y la autorización para utilizar sus datos, firmando el siguiente texto: *“Confirmando que he sido informado sobre el estudio y que he tenido la oportunidad de hacer preguntas acerca del proyecto y acerca de este estudio. Puedo retirarme del estudio en cualquier momento. La información será analizada por los investigadores y se seguirán todas las normas necesarias para la protección de datos”*. Mientras que para el estudio III, que se realizó a través de una encuesta on-line, los participantes dieron el consentimiento marcando una casilla, expresando así su voluntad y autorizando el uso de los datos para fines de la investigación.

Se aseguró a los participantes el completo anonimato en todas las etapas del estudio. En ninguna sección de los cuestionarios se pidieron informaciones que pudieran permitir la identificación del participante. Además, se subrayó la voluntariedad de la participación y la posibilidad de retirarse en cualquier momento sin dar explicación alguna. Debido a que los estudios requerían la participación de personas que habían vivido situaciones potencialmente traumáticas, se dio la posibilidad de ponerse en contacto con un profesional del ámbito de la salud mental, en caso que la participación a los estudios pudiera desencadenar emociones negativas asociadas al recuerdo de la experiencia traumática. Además, las diferentes secciones del cuestionario tenían una introducción con la finalidad de informar sobre el tipo de preguntas y rechazar la participación en caso que el participante hubiese decidido no contestar.

MATERIAL Y MÉTODO

Procedimiento

Los datos de los estudios I y II se recogieron entre Julio 2010 y Marzo 2011 como parte del proyecto europeo “BeSeCu: Behaviour, Security and Culture” (número de contrato 218324) dentro del European Union Framework 7 Security Program Initiative a través de un cuestionario suministrado personalmente por los investigadores del proyecto o de un idéntico cuestionario online. Los participantes se contactaron a través de diferentes estrategias (por más detalles consultar los artículos correspondientes). Con respecto al estudio III, los datos se recogieron a través de un cuestionario online creado en la página web del Gruppo di Ricerca Emergenza e Sicurezza dell’Università di Bologna (<http://emergenze.psice.unibo.it/>). El cuestionario fue distribuido en la red pocos días después del primer terremoto ocurrido en la región Emilia-Romagna (Italia) el 20 Mayo de 2012. En las publicaciones presentadas en las páginas siguientes se proporcionan informaciones más detalladas sobre el procedimiento de los estudios realizados.

Instrumentos utilizados

Para el estudio I y II se utilizaron algunas escalas del cuestionario BeSeCu-S (versión para sobrevivientes de situaciones de emergencia) (Knuth et al., 2013), creado por el grupo de investigación internacional, que participó en el Proyecto BeSeCu.

Para el estudio III se creó un cuestionario *ad hoc*, que fue desarrollado para detectar las primeras respuestas emocionales y comportamentales de las personas afectadas por el terremoto. En las publicaciones presentadas en las páginas siguientes se proporcionan informaciones más detalladas sobre los instrumentos realizados.

Análisis estadístico

Se utilizó el software estadístico IBM SPSS Statistics (versión 20) para realizar los análisis descriptivos, de correlación bivariada y las regresiones múltiples. En cada artículo se proporcionan los detalles de los programas específicos y extensiones de SPSS utilizadas para realizar los análisis concretos.

RESULTADOS

En este capítulo se presentan los resultados del presente trabajo de investigación. Los resultados que hacen referencias a los objetivos 1, 2 y 3 se presentan en el trabajo “Posttraumatic stress symptoms and Posttraumatic growth among Italian survivors of emergency situations”.

Los resultados que hacen referencia a los objetivos 4 y 5 se presentan en el trabajo “Perceived self-efficacy during an emergency situation reduces posttraumatic stress symptoms”.

Los resultados que hacen referencia a los objetivos 6 y 7 se presentan en el trabajo “The 2012 Northern Italy earthquakes: modelling human behaviour”.

PRIMERA PUBLICACIÓN

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Resumen

En el artículo se investiga la relación entre crecimiento postraumático y estrés postraumático en sobrevivientes de incendios, terremotos e inundaciones. Además, se estudia el papel de varios predictores que pueden promoverlos. Participaron 173 sobrevivientes de diferentes situaciones de desastre y emergencia ocurridas en Italia en la última década. Los resultados del estudio evidencian una relación positiva entre el crecimiento postraumático y los síntomas de intrusión-hyperarousal, y entre el crecimiento postraumático y los síntomas de evitación. Se utilizan regresiones múltiples para analizar los factores de riesgo y de protección asociados al desarrollo de los síntomas de estrés y de crecimiento. Los análisis revelan que los síntomas de pánico predicen tanto los síntomas de intrusión-hyperarousal como el crecimiento postraumático. Además, se destaca que los síntomas de intrusión-hyperarousal son mediadores en la relación entre los síntomas de pánico y el crecimiento postraumático. En el presente trabajo se confirman los resultados de estudios precedentes y se contribuye a la comprensión del papel de los pensamientos intrusivos en el desarrollo del crecimiento postraumático.

Posttraumatic Stress Symptoms and Posttraumatic Growth Among Italian Survivors of Emergency Situations

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We investigated the relation between posttraumatic growth and posttraumatic stress symptoms among survivors of fires, earthquakes, and floods. Furthermore, we explored the contribution of several predictors to these outcomes. Participants were 173 survivors of several events that have occurred in Italy in the last decade. Posttraumatic growth was positively related to posttraumatic avoidance and intrusion-hyperarousal symptoms. Multiple regression analyses revealed that peritraumatic panic was a predictor of posttraumatic intrusion-hyperarousal symptoms and posttraumatic

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growth. Moreover, posttraumatic intrusion-hyperarousal symptoms mediate the relationship between peritraumatic panic symptoms and posttraumatic growth. These results contribute to a better understanding of the role of intrusive thoughts in promoting posttraumatic growth.

KEYWORDS emergency situations, posttraumatic growth, posttraumatic stress, risk factors, trauma

Emergency situations are events that occur unpredictably and unexpectedly, where there is danger, risk of death, or other threats to the physical integrity of human beings (Van de Walle & Turoff, 2008). The term “emergency situation” refers to any number of events (e.g., earthquakes, personal violence) but, for the purposes of this article, we focus on emergencies such as earthquakes and floods (natural accidents) and fires in residential and public buildings (man-made accidents). These events are potentially traumatic experiences that may lead to the development of posttraumatic stress disorder (PTSD) (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). However, the struggle with highly challenging situations may also result in posttraumatic growth (PTG) (Tedeschi & Calhoun, 1996), defined as positive changes in self-perception, interpersonal relationships, and philosophy of life. PTG occurs concomitantly with the attempts to adapt to highly negative circumstances, and psychological distress may be necessary in order to initiate a cognitive process of transformation in the core beliefs system (Tedeschi & Calhoun, 2004).

Research has shown a positive relationship between PTG and PTSD symptoms (Hobfoll, Canetti-Nisim, & Johnson, 2006; Laufer & Solmon, 2006) and, although other studies have revealed mixed findings (Grubaugh & Resick, 2007), maybe due to methodological limitations (e.g., small sample size or lack of generalization), a positive relationship was also found in Helgeson, Reynolds, and Tomich’s (2006) meta-analysis. The coexistence of these two outcomes stresses the importance of identifying risk and protective factors in order to detect vulnerable groups and individuals and to tailor interventions focused not only on the treatment of symptoms but also on the promotion of personal growth.

Previous studies have shown that female gender (Chan et al., 2011) is a risk factor for PTSD but is also associated with increased PTG (Linley & Joseph, 2004). Furthermore, older age (Hall et al., 2008; Linley & Joseph, 2004), low socioeconomic status (Brewin, Andrews, & Valentine, 2000; Cordova, Cunningham, Carlson, & Andrykowski, 2001), previous traumatic events (Adams & Boscarino, 2006; Bonanno, Galea, Bucciarelli, & Vlahov, 2007), and lack of a religious affiliation (Kroo & Nagy, 2011; Pargament, Koenig, & Perez, 2000; Prati & Pietrantonio, 2009) are common risk factors for PTSD and are related to less PTG. Although some studies have revealed

higher levels of positive changes among natural accident survivors (McMillen, Smith, & Fisher, 1997), Helgeson et al.'s (2006) meta-analysis did not clarify which types of events create conditions under which beneficial outcomes are related to health. PTSD has been found to be a common outcome in earthquake (Başoğlu, Kiliç, Şalcioğlu, & Livanou, 2004), flood (Liu et al., 2006), and fire (Dorn, Yzermans, Spreeuwenberg, & Van, 2007) survivors.

Moreover, while Kessler et al. (1995) stated that PTSD decreases over time, Tedeschi and Calhoun (2004) observed that PTG increases with time because time is needed for the productive rumination or cognitive processing that is necessary to achieve PTG. Previous studies also showed that peritraumatic panic (i.e., during or in the immediate aftermath of trauma exposure) is involved in the development of posttraumatic stress symptoms (Adams & Boscarino, 2006). PTG theory suggests that potentially traumatic events must be of a great enough impact to force individuals to reconsider their basic assumptions and initiate a cognitive process (Tedeschi & Calhoun, 2004), and since more peritraumatic panic symptoms may reflect a high level of emotional engagement during an emergency situation, it is possible that they may predict PTG. Nevertheless, no previous studies have explored this hypothesis.

On the basis of the previous findings, we expect that (a) posttraumatic stress avoidance and intrusion-hyperarousal symptoms and PTG will be positively related; (b) posttraumatic stress avoidance and intrusion-hyperarousal symptoms will be predicted by female gender, older age, lower income, lack of a religious affiliation, prior experience of emergency situations, less time elapsed since the emergency situation, and more peritraumatic panic symptoms; and (c) PTG will be predicted by female gender, younger age, higher income, religious affiliation, more time elapsed since the emergency situation, no previous experience of emergency situations, and more peritraumatic panic symptoms. For both posttraumatic stress symptoms and growth, no predictions are made with respect to the kind (natural vs. man-made) of accident experienced since the literature has shown mixed findings and we included several events that diverge in their magnitude and complexity. Since more peritraumatic panic symptoms have been associated with posttraumatic stress symptoms (Marmar et al., 2006) and posttraumatic stress has been associated with PTG (Morris, Shakespeare-Finch, Rieck, & Newbery, 2005), and in order to better understand the relationship between these three variables, we also explored if posttraumatic stress symptoms may be mediators between peritraumatic panic symptoms and PTG.

METHOD

Participants

The sample consisted of 173 participants; 57.6% ($n = 99$) were women and 42.4% ($n = 74$) men. Participants' ages ranged from 18 to 83 ($M = 32.52$,

$SD = 13.68$). The annual net income was below €11,864 for 101 (63.5%) participants and between €11,864 and €25,424 for 52 (32.7%) participants. The majority ($n = 117$; 68.4%) of the participants were Christian-Catholic, and 41 (24.0%) reported no religious affiliation. Regarding the kind of event, 45 (26.0%) described a domestic fire, 23 (13.3%) a fire in a public building, 88 (50.9%) an earthquake, and 17 (9.8%) a flood. Eighty-eight (50.9%) participants experienced no prior emergency situations, 69 (39.9%) one prior emergency situation, 13 (7.5%) two prior emergency situations, and 3 (1.7%) three emergency situations.

Procedure

The recruitment of participants was carried out from July 2010 to March 2011 and included the experiences of civilians affected by fires in residential and public buildings, terrorist attacks, floods, and earthquakes. There were no instructions given to the respondents regarding which emergency situation they should report on. We asked participants to report one single event relevant to their personal life (i.e., if a participant had experienced more than one emergency situation in his or her life, he or she had to select and describe only one event). Participants were recruited by using several strategies such as online advertisements and social networks, and by personally contacting victims after a detailed search of emergency situations in print/online newspapers and Italian Firefighters and Civil Protection Web pages. The study was carried out with a convenience sample of participants who voluntarily and anonymously agreed to be involved in the survey. Participants were asked to give their written informed consent before answering the survey questions. The inclusion criteria to participate in the study were as follows: (a) Participants should be 18 years old or older; (b) the incident should have happened within the last 11 years; and (c) emergency services should have been involved.

The questionnaire was developed by the BeSeCu Research Group (for more detailed information, see <http://www.besecu.de>), and it is aimed to assess behaviors, emotions, and cognitions of people who have experienced fires in residential and public buildings, terrorist attacks, earthquakes, and floods (Schmidt, Knuth, & Kehl, 2011).

An a priori power analysis for multiple regression (10 predictors), using the general power analysis program GPOWER 3 (Faul, Erdfelder, Lang, & Buchner, 2007), revealed that a sample of 172 participants was sufficient to detect a medium effect size ($f^2 = 0.15$) and to provide a minimum of 95% statistical power.

Measures

ANNUAL NET INCOME

Participants had to report their individual annual net income by responding to a single item. Response options were “less than €11,864,” “between

€11,864 and €25,424,” and “more than €25,424.” Thresholds for the three categories were established considering the average income of the country (GfK AG, 2008). The first category represents less than 70%, the second between 70% and 150%, and the third more than 150% of the average income of the country, respectively. In order to include income in the multiple regression analyses, the variable was dichotomized (0 = <€11,864; 1 = ≥€11,864).

RELIGIOUS AFFILIATION

Participants had to report their religious affiliation. In order to include the variable in the multiple regression analyses, it was dichotomized (0 = no religious affiliation; 1 = religious affiliation).

KIND OF EMERGENCY SITUATION

Participants answered a single item referring to the kind of emergency situation they experienced among fire in a residential or public building, flood, or earthquake (only one option was possible). In order to include the variable in the multiple regressions, it was dichotomized (1 = natural accident [i.e., earthquake and flood]; 0 = man-made accident [i.e., fire in residential or public building]).

TIME SINCE THE EMERGENCY SITUATION

Participants indicated the date (day, month, year) when the emergency situation occurred by answering a single item. Time since the emergency situation represents the difference between the date when the subject completed the questionnaire and the date when the emergency situation occurred. The variable was calculated in days since the incident. Values ranged from 6 to 4,177 days (nearly 11 years) ($M = 1,165.82$, $SD = 1,122.48$; the mean score and standard deviation were calculated in days).

PRIOR EXPERIENCE OF AN EMERGENCY SITUATION

This variable was assessed with a 6-item scale. Participants indicated if they had experienced other incidents before the described event by marking all that applied in a list with the following options: fire in a residential or public building, building evacuation that turned out to be a false alarm, earthquake, flood, and terrorist attack. In order to include this variable in the multiple regression analyses, it was dichotomized (0 = no previous incidents; 1 = one previous incident or more).

PERITRAUMATIC PANIC SYMPTOMS

Participants had to indicate if they experienced panic symptoms during the emergency situation by indicating all items that applied in a list of the 13 DSM-IV-TR symptoms of panic attack (1 = presence of symptom; 0 = no presence of symptom). The sum of the number of panic symptoms experienced during the emergency situation was calculated.

POSTTRAUMATIC GROWTH

PTG was assessed by using 10 items of the Italian Posttraumatic Growth Inventory (Prati & Pietrantonio, 2006) validated by Tedeschi and Calhoun's (1996) original scale. This short scale was not validated in Italian, and we selected two items of each of the five dimensions. The reduction of this scale was necessary in order to avoid a lengthy questionnaire. The 10 items were factor analyzed using principal axis factoring followed by quartimin rotation. In order to identify the number of factors, we employed a parallel analysis (Horn, 1965; O'Connor, 2000) that indicated a one-factor solution. Examples of items used are as follows: "I changed my priorities about what is important in life" and "I am able to do better things with my life." In this article, the critical event was the emergency situation the participant decided to describe. Each item of the scale ranges between 0 (very small degree) and 5 (very great degree), with a total score between 0 and 50. In this study, internal consistency (Cronbach's alpha) for the total scale was .92.

POSTTRAUMATIC STRESS SYMPTOMS

Posttraumatic stress symptoms were assessed by using the Italian version (Giannantonio, 2003) of the Impact of Event Scale-Revised (IES-R) (Weiss & Marmar, 1997). This scale had been used previously in the Italian context (e.g., Giannantonio, 2003) but was not validated in the Italian language. The instrument is a 22-item self-reported questionnaire designed to capture PTSD symptoms, with scores ranging from 0 to 88. Each item is rated on a 5-point scale between 0 (not at all) and 4 (extremely), reflecting the extent to which the particular symptom has been a problem for the respondent during the past week with respect to the incident that the participant described. There are eight items measuring intrusion, eight measuring avoidance and numbing, and six measuring hyperarousal symptoms. Examples of items used are as follows: "I had trouble staying asleep," "I had dreams about it," and "I tried not to think about it." The items were factor analyzed using principal axis factoring followed by quartimin rotation. In order to identify the number of factors, we employed a parallel analysis (Horn, 1965; O'Connor, 2000) that indicated a two-factor solution. The first factor included 17 items measuring intrusion, hyperarousal, and avoidance symptoms (3 items: "I felt as if it hadn't

happened or wasn't real"; "I was aware that I still add a lot of feelings about it, but I didn't deal with them"; "My feelings about it were kind of numb"), and the second factor included 5 items measuring avoidance symptoms. In this study, internal consistency (Cronbach's alpha) was .94 for the intrusion-hyperarousal subscale and .76 for the avoidance subscale.

RESULTS

The mean score for panic symptoms was 2.20 ($SD = 1.91$) and ranged from 0 to 11. To reduce positively skewed data, a square root transformation was employed. One hundred thirty-two (77.2%) participants did not meet the criteria for a panic attack during the emergency situation, whereas 39 (22.8%) did.

Means of the two subscales regarding PTSD symptoms were 4.35 ($SD = 4.24$, range = 0–15) for avoidance and 16.19 ($SD = 15.08$, range = 0–66) for intrusion-hyperarousal. The skewness and kurtosis of the avoidance subscale did not exceed the value of ± 1 . However, because the values of the intrusion-hyperarousal subscale showed a substantial positive skew, a square root transformation was employed.

The mean score for PTG was 16.63 ($SD = 12.39$) and ranged from 0 to 45. A square root transformation was employed to reduce positively skewed data. Participants reported positive changes more frequently with respect to "I have a greater appreciation for the value of my own life" ($M = 2.23$, $SD = 1.71$), "I discovered that I am stronger than I thought I was" ($M = 2.04$, $SD = 1.68$), and "I know better that I can handle difficulties" ($M = 2.19$, $SD = 1.51$). Changes in spirituality were less frequently reported: "I have a stronger religious faith" ($M = .87$, $SD = 1.46$) and "I have a better understanding of spiritual matters" ($M = 1.05$, $SD = 1.51$). Participants also reported changes in their priorities and philosophy of life, that is, "I changed my priorities about what is important in life" ($M = 1.80$, $SD = 1.76$), "I established a new path for my life" ($M = 1.19$, $SD = 1.70$), and "I am able to do better things in my life" ($M = 1.67$, $SD = 1.72$). As regards interpersonal relationships, participants reported changes with respect to "I have a greater sense of closeness with others" ($M = 1.91$, $SD = 1.62$) and "I learned a great deal about how wonderful people are" ($M = 1.69$, $SD = 1.66$).

Predictors of Posttraumatic Stress and Posttraumatic Growth

Table 1 shows correlations among all of the variables. A bivariate correlation analysis showed significantly positive relationships between PTG and avoidance symptoms ($r = .38$, $p < .01$) and between PTG and intrusion-hyperarousal symptoms ($r = .48$, $p < .01$).

Moreover, to exclude multicollinearity problems, we examined the variance inflation factor (VIF) and tolerance statistics associated with the multiple

TABLE 1 Correlation of All Study Variables ($N=173$).

	1	2	3	4	5	6	7	8	9	10	11
1. Gender ^a	—										
2. Age ^b	-.14	—									
3. RA ^c	.13	.08	—								
4. Income ^d	-.15*	.42**	.08	—							
5. NA ^e	.08	-.19*	.08	-.04	—						
6. PEES ^f	-.07	.22**	-.02	.13	-.08	—					
7. TSES ^g	.08	-.08	.04	-.11	.10	-.13	—				
8. PPS ^h	.28**	-.07	.24**	-.07	.18*	-.04	-.05	—			
9. PTG ⁱ	.16*	-.10	.22**	.15	.28**	-.19*	-.03	.42**	—		
10. PTIHS ^j	.24**	-.03	.10	.00	.22**	-.04	-.13	.54**	.48**	—	
11. PTAS ^k	.23**	-.07	.17*	-.02	.16*	-.10	.02	.48**	.38**	.65**	—

Note. A point-biserial correlation coefficient (r_{pb}) was computed for correlations between two binary variables and between a binary variable and an interval variable. A Pearson's correlation coefficient (r) was computed for correlations between two interval variables.

^aGender (female = 1, male = 0).

^bLogarithm of age.

^cReligious affiliation (yes = 1, no = 0).

^dAnnual net income ($\geq \text{€}11,864 = 1$, $< \text{€}11,864 = 0$).

^eNatural accident (yes = 1, no = 0).

^fPrior experience of emergency situation (yes = 1, no = 0).

^gTime since emergency situation (days since the event), square root transformed.

^hPeritraumatic panic symptoms (number of symptoms), square root transformed.

ⁱPosttraumatic growth, square root transformed.

^jPosttraumatic intrusion-hyperarousal symptoms, square root transformed.

^kPosttraumatic avoidance symptoms.

* $p < .05$; ** $p < .01$.

regression analyses and included all of the predictors in the multiple regression analyses. First, we scanned the correlation matrix between predictors of posttraumatic stress symptoms and PTG (see Table 1). None of the significant correlation coefficients were equal to or higher than .70 (Tabachnik & Fidell, 2007). Second, we examined the VIF and tolerance statistics. There were no values of tolerance below 0.2 (Menard, 1995), and VIF values were not higher than 10 (Bowerman & O'Connell, 1990). These statistics indicated that there was no cause for concern.

Three separate hierarchical multiple regression analyses in three steps were performed to assess the contribution of the selected predictors to PTG, posttraumatic stress avoidance, and intrusion-hyperarousal symptoms. Sociodemographic variables (gender, age, income, and religious affiliation) were entered in the first step. Because the values of age showed a positive skew, a logarithmic transformation was employed. The second step included variables related to the characteristics of the emergency situation experienced (kind of emergency situation, time since the emergency situation, and prior experience of emergency situations). Because the values of time since the emergency situation showed a positive skew, a square root

transformation was employed. The third step included peritraumatic panic symptoms experienced during the emergency situation. Because this variable showed a positive skew, a square root transformation was employed. In the regression analysis for PTG, since there was a positive correlation between PTG and posttraumatic stress symptoms both in the current study and in previous research (Morris et al., 2005), we decided to include avoidance and intrusion-hyperarousal symptoms as control variables. Moreover, we controlled for the effect of avoidance and intrusion-hyperarousal symptoms in the two respective regressions.

Table 2 illustrates the results of the hierarchical linear multiple regression for PTG. The full model accounted for 33.2% of variance, $F(10, 159) = 8.89$, $p < .001$. Five variables contributed significantly to PTG in the final model: income ($\beta = .22$, $p = .003$), natural accident ($\beta = .18$, $p = .009$), prior experience of an emergency situation ($\beta = -.18$, $p = .01$), peritraumatic panic symptoms ($\beta = .25$, $p = .004$), and intrusion-hyperarousal symptoms ($\beta = .22$, $p = .023$). People with a higher income, those who had experienced a natural accident, those with more panic symptoms, and those with more posttraumatic intrusion-hyperarousal symptoms tended to report more

TABLE 2 Multiple Regression Analysis Predicting Posttraumatic Growth.

Predictor	Step 1			Step 2			Step 3		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Gender ^a	.17	.09	.15	.17	.08	.15*	.04	.08	.04
Age ^b	-.52	.29	-.15	-.21	.28	-.06	-.23	.25	-.07
Income ^c	.24	.09	.21*	.23	.09	.21*	.24	.08	.22**
RA ^d	.26	.10	.21**	.22	.09	.17*	.14	.09	.11
NA ^e				.31	.08	.28***	.20	.08	.18**
PEES ^f				-.20	.08	-.19*	-.19	.07	-.18*
TSES ^g				-.00	.00	-.08	-.00	.00	-.02
PPS ^h							.17	.06	.25**
PTAS ⁱ							.00	.01	.03
PTIHS ^j							.06	.03	.22*

Note. Step 1: $R^2 = .112^{**}$, adjusted $R^2 = .089^{**}$; Step 2: $R^2 = .220^{***}$, adjusted $R^2 = .184^{***}$; Step 3: $R^2 = .374^{***}$, adjusted $R^2 = .332^{***}$.

^aGender (female = 1, male = 0).

^bLogarithm of age.

^cAnnual net income ($\geq \text{€}11,864 = 1$, $< \text{€}11,864 = 0$).

^dReligious affiliation (yes = 1, no = 0).

^eNatural accident (yes = 1, no = 0).

^fPrior experience of emergency situation (yes = 1, no = 0).

^gTime since emergency situation (days since the event), square root transformed.

^hPeritraumatic panic symptoms (number of symptoms), square root transformed.

ⁱPosttraumatic avoidance symptoms.

^jPosttraumatic intrusion-hyperarousal symptoms, square root transformed.

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

PTG, whereas people with a previous experience of emergency situations tended to report less PTG.

Table 3 illustrates the results of the hierarchical linear multiple regression for posttraumatic stress avoidance symptoms. The full model accounted for 42.6% of variance, $F(9, 159) = 14.13, p < .001$. Posttraumatic intrusion-hyperarousal symptoms only contributed significantly to posttraumatic avoidance symptoms ($\beta = .56, p = .000$) in the final model.

Table 4 illustrates the results of the hierarchical linear multiple regression for posttraumatic stress intrusion-hyperarousal symptoms. The full model accounted for 50.4% of variance, $F(9, 159) = 18.93, p < .001$. Two variables contributed significantly to the final model: peritraumatic panic symptoms ($\beta = .30, p = .000$) and posttraumatic avoidance symptoms ($\beta = .49, p = .000$).

To test whether posttraumatic stress may be a mediator in the relationship between peritraumatic panic and PTG, we employed resampling methods (MacKinnon, Fairchild, & Fritz, 2007). Following Shrout and Bolger's (2002) recommendation, point estimates and bias-corrected and accelerated bootstrap confidence intervals (BCa CIs) for indirect effects were derived by formulating 5,000 bootstrapped resamples. The indirect effect is statistically

TABLE 3 Multiple Regression Analysis Predicting Posttraumatic Avoidance Symptoms.

Predictor	Step 1			Step 2			Step 3		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Gender ^a	1.62	.68	.19*	1.62	.68	.19*	.10	.55	.01
Age ^b	-1.53	2.27	-.06	-.40	2.33	-.01	-1.01	1.81	-.04
Income ^c	.06	.74	.01	.05	.75	.01	.04	.58	.00
RA ^d	1.36	.77	.14	1.20	.78	.12	.63	.62	.06
NA ^e				1.21	.69	.14	-.11	.55	-.01
PEES ^f				-.71	.68	-.08	-.58	.52	-.07
TSES ^g				-.00	.02	-.02	.02	.02	.08
PPS ^h							.81	.41	.15
PTIHS ⁱ							1.22	.16	.56***

Note. Step 1: $R^2 = .066^*$, adjusted $R^2 = .042^*$; Step 2: $R^2 = .092^*$, adjusted $R^2 = .050^*$; Step 3: $R^2 = .459^{***}$, adjusted $R^2 = .426^{***}$.

^aGender (female = 1, male = 0).

^bLogarithm of age.

^cAnnual net income ($\geq \text{€}11,864 = 1, < \text{€}11,864 = 0$).

^dReligious affiliation (yes = 1, no = 0).

^eNatural accident (yes = 1, no = 0).

^fPrior experience of emergency situation (yes = 1, no = 0).

^gTime since emergency situation (days since the event), square root transformed.

^hPeritraumatic panic symptoms (number of symptoms), square root transformed.

ⁱPosttraumatic intrusion-hyperarousal symptoms, square root transformed.

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

TABLE 4 Multiple Regression Analysis Predicting Posttraumatic Intrusion-Hyperarousal Symptoms.

Predictor	Step 1			Step 2			Step 3		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Gender ^a	0.96	.31	.24**	.99	.31	.25**	.34	.23	.09
Age ^b	.00	1.04	.00	.56	1.04	.05	.71	.77	.06
Income ^c	.13	.34	.03	.06	.33	.02	.12	.25	.03
RA ^d	.30	.35	.07	.23	.35	.05	-.31	.26	-.07
NA ^e				.88	.31	.22**	.39	.23	.10
PEES ^f				-.11	.30	-.03	.05	.22	.01
TSES ^g				-.02	.01	-.15*	-.01	.01	-.11
PPS ^h							.75	.17	.30***
PTAS ⁱ							.22	.03	.49***

Note. Step 1: $R^2 = .067^*$, adjusted $R^2 = .043^*$; Step 2: $R^2 = .130^{**}$, adjusted $R^2 = .090^{**}$; Step 3: $R^2 = .532^{***}$, adjusted $R^2 = .504^{***}$.

^aGender (female = 1, male = 0).

^bLogarithm of age.

^cAnnual net income ($\geq \text{€}11,864 = 1$, $< \text{€}11,864 = 0$).

^dReligious affiliation (yes = 1, no = 0).

^eNatural accident (yes = 1, no = 0).

^fPrior experience of emergency situation (yes = 1, no = 0).

^gTime since emergency situation (days since the event), square root transformed.

^hPeritraumatic panic symptoms (number of symptoms), square root transformed.

ⁱPosttraumatic avoidance symptoms.

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

significant at the .05 level if the bias-corrected and accelerated bootstrap confidence intervals for the estimates do not include zero.

A multiple mediator model was tested (Preacher & Hayes, 2008) in which the relationship between peritraumatic panic and PTG was mediated by the intrusion-hyperarousal and avoidance subscales. In the context of this model, the indirect effect of the intrusion-hyperarousal subscale was significant (bootstrap estimate = 0.119, BCa 95% CI = 0.037, 0.202), whereas the indirect effect of the avoidance subscale was not significant (bootstrap estimate = 0.024, BCa 95% CI = -0.035, 0.089). Therefore, the development of intrusion-hyperarousal symptoms, but not avoidance symptoms, mediated the relationship between peritraumatic panic and PTG.

DISCUSSION

In accordance with previous studies (Helgeson et al., 2006), the findings evidenced a moderate positive association between posttraumatic stress avoidance and intrusion-hyperarousal symptoms and posttraumatic growth. This result offers support to Joseph and Linley's (2006) organismic valuing theory of growth through adversity and to Tedeschi and Calhoun's (2004) model of

PTG, in which positive adjustment requires a struggle with meanings in order to give meaning to a traumatic experience. PTG has also the strongest association with the intrusion-hyperarousal subscale of the IES-R. This indicates that survivors with more intrusive thoughts and productive ruminations regarding the events are more likely to cognitively process the traumatic experience and to give positive meanings to the experience (Tedeschi, Park, & Calhoun, 1998).

Consistent with Galea et al. (2002), the peritraumatic panic reaction was a strong predictor of posttraumatic intrusion-hyperarousal symptoms, and this also suggests the role of panic symptoms as a mediating variable in the process of development and consolidation of PTSD (Pitman, Shalev, & Orr, 2000). In fact, greater panic reaction during the exposure is associated with greater adrenergic activation, greater fear conditioning, memory consolidation, and persistence of hyperarousal symptoms (Marmar et al., 2006). Peritraumatic panic symptoms did not predict posttraumatic avoidance symptoms, which were only predicted by intrusion-hyperarousal symptoms.

To our knowledge, this is the first study that investigated the role of peritraumatic panic as a predictor of PTG. In this study, the more peritraumatic panic symptoms were experienced during the traumatic event, the more the survivor was stricken in the aftermath of the emergency situation and the more likely the survivor was to experience PTG. This supports Januff-Bulman's (1992) notion, according to which an event has to severely challenge the individual's way of understanding the world to activate a cognitive process directed towards rebuilding personal schemas, which have to be more resistant to being shattered and incorporate the trauma experience and other possible future events (Tedeschi & Calhoun, 2004). Moreover, only posttraumatic intrusion-hyperarousal symptoms, and not posttraumatic avoidance symptoms, mediated the relationship between peritraumatic panic and PTG. Peritraumatic panic symptoms may be associated with a higher perception of threat, may favor the process of memory consolidation of the event, and may promote automatic and intrusive ruminations that lead to disengagement from previous goals and assumptions and to changes in personal life schemas. Furthermore, since posttraumatic avoidance symptoms were not predictors of PTG and did not mediate the relationship between peritraumatic panic and PTG, this suggests that they are not crucial in the development of PTG.

A further argument is that survivors with more peritraumatic panic symptoms were also the more affected individuals and those who sought formal (e.g., psychotherapy) and informal (e.g., help from partner, family) social support. Indeed, self-disclosure in supportive social environments aids the cognitive processing of trauma into growth (Cordova et al., 2001).

In accordance with previous research (Tolin & Foa, 2006), women were more at risk for PTSD symptoms, and this may reflect the higher prevalence of anxiety disorders in women. Although this result has not been shown cross-culturally (Foa, Stein, & McFarlane, 2006), the current investigation

highlights a higher prevalence in PTSD symptoms in Italian women. Nevertheless, female gender was not a risk factor in the final model, and this supports findings (Brewin et al., 2000) showing a smaller effect of pre-trauma variables on the development of PTSD.

Regarding predictors of PTG in the final model, survivors of natural accidents reported more PTG than those affected by man-made accidents. A possible explanation is that natural accidents considered in this study were collective events that may have promoted social networks and supportive behaviors among survivors and favored processes based on shared experiences, which may have contributed to the positive elaboration of the event. Rimé (2007) emphasized that a characteristic of natural disaster survivors is the widespread use of collective rituals designed to remember the victims, and suggested that this can foster social cohesion and perception of positive changes following a trauma. It also emerged that survivors who had experienced other emergencies in their life reported less PTG, suggesting that life stressors act counterproductively with respect to survivors' beliefs and diminish their perception of being able to gain benefits. It is possible that, when people have a history of prior traumas, their capacity to deal with the new traumatic event may be affected and they may feel overwhelmed, hopeless, and unable to rebuild a new and positive reframe of the event. Among the sociodemographic variables, only income appeared to be a predictor of PTG. In accordance with previous studies (Hobfoll, 1989), less economically vulnerable groups may be less able to achieve increased benefits in terms of growth after a traumatic situation because they may find more obstacles in reestablishing what they lost in the traumatic event.

This study has some limitations such as the cross-sectional design, which suggests caution in interpreting the observed associations, and the characteristics of the small and nonrepresentative sample, which do not allow us to generalize the results. Furthermore, given the voluntary participation in the research, it is possible that there are unidentifiable biases regarding the decision to participate. Another limitation concerns the use of the IES-R, which does not allow us to know how many participants met the criteria for PTSD. Nevertheless, the study highlights that the peritraumatic panic reaction has an important role in predicting PTG and posttraumatic intrusion-hyperarousal symptoms. Moreover, it appears that the relationship between PTG and peritraumatic panic is mediated by posttraumatic intrusion-hyperarousal symptoms. This result has important implications for the development of interventions directed to survivors of emergency situations. Psychological interventions focusing on intrusive thoughts may be particularly useful for promoting PTG and reducing avoidance symptoms. Further studies should explore the use of different instruments to assess posttraumatic stress symptomatology in order to better understand when intrusive thoughts reflect the symptoms of a PTSD diagnosis or the attempt to process the traumatic event.

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Resumen

En este estudio se analiza si la autoeficacia percibida durante una situación de emergencia es un factor de protección frente al desarrollo de síntomas de estrés postraumático en sobrevivientes de varias situaciones de desastre y emergencia, utilizando un modelo multivariante de regresión múltiple, donde se han incluido otros predictores de síntomas de estrés postraumático, como algunos factores que reflejan la experiencia previa en emergencia de la persona. Participaron 214 sobrevivientes de varias situaciones de emergencia ocurridas en España e Italia durante la última década. Los resultados del estudio evidencian que los participantes que se perciben como más autoeficaces durante el suceso traumático presentan menos síntomas de estrés postraumático. Al contrario, el género femenino, mayor percepción de amenaza personal y más gravedad con respecto a la situación, se asocian a más síntomas de estrés postraumáticos. Estos resultados contribuyen a un mejor entendimiento del comportamiento humano en situaciones de peligro y evidencian el papel de protección de la autoeficacia percibida en los sobrevivientes de situaciones de desastre y emergencia.

Perceived Self-efficacy during an Emergency Situation Reduces Posttraumatic Stress Symptoms

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Abstract. This study investigates if perceived self-efficacy during an emergency situation has a protective role in the development of posttraumatic stress symptoms among Italian and Spanish survivors of several emergency situations. We explored the impact of self-efficacy in a multiple regression model including other predictors of posttraumatic stress symptoms, such as emergency prevention knowledge; trust in emergency services; risk perception of becoming a victim of an emergency situation; and conscious and active behaviors in comparison with no conscious and no active behavior during the emergency. We carried out a retrospective study recruiting 214 participants who reported their experience as victims of one specific emergency event. Results showed that survivors who perceived themselves as more self-efficacious during the traumatic event had less posttraumatic stress symptoms. In contrast, female gender, more self-threat perception and higher trauma severity were associated with more symptoms. Findings contribute to better understand human behavior in emergency situations and evidence the protective role of perceived self-efficacy beliefs among survivors of emergency situations.

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In the last decades, research has increased attention on human behavior in emergency situations such as natural and man-made disasters, though the majority of studies have been carried out in the United States. This stresses the importance of determining the validity of

US findings in European survivors (Schmidt, Knuth, & Kehl, 2011). Europe showed an increased number of natural disasters rising from 59 on average per year during 2000-2009 to 70 disasters in 2010 (Guha-Sapir, Vos, Below, & Ponserrre, 2011), and European citizens have also been affected by man-made incidents such as the bombings in Madrid 2004 and London 2005, or the Torino ThyssenKrupp fire of 2007.

Posttraumatic stress disorder (PTSD) is a common outcome to these traumatic events and it could appear in the aftermath of the incident (Foa, Stein, & MacFarlane, 2006). PTSD symptoms include repeated and unwanted re-experiencing of the event, hyperarousal, emotional numbing, and avoidance of stimuli perceived as reminders of the event (Ehlers & Clark, 2000). Previous studies identified many risk and protective factors involved in the development of PTSD (Brewin, Andrews, & Valentine, 2000). Self-efficacy beliefs have been found to be the most proximal predictor of mental health outcomes during posttraumatic recovery (Benight & Bandura, 2004). Social cognitive theory (Bandura, 1997) defines self-efficacy as the perceived capacity of managing one's personal functioning and environmental demands occasioned by stressful and traumatic events. Both cross-sectional studies and longitudinal studies have shown that self-efficacy is protective in respect of the development of PTSD (Benight, Cieslak, Molton, & Johnson, 2008; Luszczynska,

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Benight, & Cieslak, 2009). However, most studies have investigated the influence of self-efficacy on the recovery process in the aftermath of a traumatic event (Cieslak, Benight, Luszczynska, & Laudenslager, 2011), but none has focused on survivor's perception of self-efficacy during the emergency situation as protective factor. This knowledge will bring new insights in the understanding of behavior in emergency situations, in which perceived self-efficacy may promote action-oriented strategies (i.e. activating pro-social behaviors, seeking for shelter, evacuating from the location) and predict adaptation. An active behavior during an emergency situation could represent the survivor's effort of managing a threatening situation and reflect an action-oriented coping strategy (Luszczynska et al., 2009). In fact, prior studies have found a negative association between the use of active coping strategies and distress symptoms among people affected by emergency situations (Benight & Harper, 2002; McPherson, Hale, Richardson, & Obholzer, 2003).

The public discourse concerning the human behavior in emergencies emphasizes the occurrence of panic and irrational behaviors among victims of emergency situations, despite the fact that this notion has not been supported by empirical findings (Drury, Cocking, & Reicher, 2009). In fact, most people react in a conscious and adaptive way, while irrational and maladaptive behaviors are rare (Blake, Galea, Westeng, & Dixon, 2004). No previous research has explored whether active and conscious behaviors during an emergency situation reduce the occurrence of posttraumatic stress symptoms, therefore in this study we consider this association.

The variables acting during and after the traumatic event are stronger predictors of posttraumatic stress symptoms in comparison with pre-event factors (Ozer, Best, Lipsey, & Weiss, 2003). However, few studies have explored if pre-trauma variables reflecting the survivors' emergency culture, such as risk perception, emergency prevention knowledge, and trust in the capacity of emergency services, have a role in the development of PTSD symptoms. Proulx (2001) hypothesized that previous knowledge and training in emergency situations influence behavior during fires. Research has confirmed that if people are trained, they start earlier with evacuation (Proulx & Pineau, 1996). Emergency drills and exercises could increase emergency prevention knowledge, producing benefits among first responders and citizens (Peterson & Perry, 1999). Another hypothesis is that exercises favor the attribution of credibility to emergency services and increase the likelihood that victims will comply with recommended measures (Perry, 2004). An implication is that increased emergency prevention knowledge raises the perception of being able to deal with the situation, resulting in less posttraumatic stress symptoms.

Regarding risk perception, studies among survivors and firefighters have shown that higher risk perception increases the perception of threat resulting in greater stress symptoms (López-Vázquez & Marvan, 2003; Prati et al., 2013).

Survivors' trust in emergency personnel is another variable that has received little attention in previous studies on posttraumatic stress predictors. Basolo et al. (2009) found a positive association between disaster preparedness and citizens' reliance on authorities in respect of their capacity to manage it. If individuals believe that control can be achieved through the managing agency, they will likely engage in more action-oriented strategies aimed at modifying the situation (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Consistently, survivors who perceived an accident as predictable by experts showed less levels of stress than those who considered the accident as unpredictable (Evans, Wener, & Phillips, 2002; Lange, Toussaint, & Fleming, 2004). These results stress the importance of exploring the influence that survivor's reliance in emergency services has on the development of posttraumatic stress.

This study focuses on survivors of natural and man-made disasters and not on interpersonal violence such as rape or domestic violence. We analyzed the contribution of self-efficacy in explaining the variance of posttraumatic stress symptoms in a multivariate model. We expected that an increase in perceived self-efficacy in the emergency situation predicted less posttraumatic stress symptoms. We also expected that predictors of higher levels of posttraumatic stress symptoms could be: less trust in emergency services; less risk perception; less emergency prevention knowledge; no active behavior in comparison to active behavior; and no conscious behavior in comparison to conscious behavior in the emergency situation. Trauma severity (Galea et al., 2002), perceived threat (Vázquez, Pérez-Sales, & Matt, 2006), female gender (Başoğlu, Kiliç, Şalcioğlu, & Livanou, 2004), and older age (Johnson et al., 2009), are risk factors for PTSD symptoms, thus we included them in the regression model as control variables. The time since the emergency situation and the country were also included as control variables because the time frame of the events was wide (11 years) and because we recruited Italian and Spanish survivors who differ in some study variables.

Method

Procedure

Data were collected from July 2010 to March 2011 as part of a funded research project called BeSeCu, which means Behavior, Security and Culture, (contract 218324) under the European Union Framework 7 Security

Program initiative¹. BeSeCu Research Group developed the questionnaire (Knuth et al., in press), which was aimed to assess behaviors, emotions and cognitions of people affected by emergency situations such as domestic fire, fire in a public building, terrorist attack, flood and earthquake.

Participants had to refer to their experience by answering questions in respect of only one specific emergency situation. At the beginning of the questionnaire, the participant had to indicate to which incident he/she would report. Moreover, in order to avoid misunderstanding, a short title introduced each section of the questionnaire and explained the content of the related questions (e.g. *Now some questions about emergency in general; Now some questions about the specific incident you experienced*). Several strategies to recruit participants were used: recruitment via online advertisement and via social networks; personal contact with victims after a detailed search of emergency situations in print/online newspapers and web pages related to fire-fighters and civil protection. As for the victims of terrorist attacks, participants were recruited mainly through victims' associations.

The inclusion criteria for participation were: (a) Participants should be 18 years old or older; (b) The incident should have happened in the last 11 years; (c) Emergency services should have been involved.

Participation was completely voluntary and anonymity was granted. A written informed consent was distributed and signed before the involvement in the study.

The Besecu-S questionnaire was translated from English into Italian and Spanish. A forward-back-translation technique was used in order to achieve best possible cross-cultural harmonization. The questionnaire was available in paper-pencil format and online, for both languages. For both formats participants could obtain more information about the project and the questionnaire by contacting a reference person (we provided name, institution affiliation, address, telephone number, email). A third format used was the "support-mode", in which the participant completed the questionnaire with the help of a BeSeCu staff member or in the case of the terrorist attack victims, accompanied by a psychologist affiliated to the victims' association.

Participants

In the present study, data from Italy and Spain have been used and the sample consisted of 214 participants who had experienced an emergency situation. Sixty-three participants reported a domestic fire ($n_{\text{Spanish}} = 32$;

$n_{\text{Italian}} = 31$), 21 a terrorist attack ($n_{\text{Spanish}} = 21$), 7 a flood ($n_{\text{Spanish}} = 1$; $n_{\text{Italian}} = 6$), 49 a fire in a public building ($n_{\text{Spanish}} = 32$; $n_{\text{Italian}} = 17$), and 74 an earthquake ($n_{\text{Italian}} = 74$). The average length of time since the emergency situation, which the participant reported, was 1173.21 days (i.e. nearly 3 years) ($SD = 977.23$).

The majority of participants were from Italy ($n = 128$; 59.8%) and 86 (40.2%) from Spain ($\chi^2 = 8.24$; $df = 1$; $p < .01$). The mean age for the total sample was 36.85 ($SD = 14.28$; range: 18-83), 31.63 ($SD = 12.80$; range: 18-83) for the Italian participants and 44.55 ($SD = 12.85$; range: 19-82) for the Spanish participants. Table 1 shows the sample characteristics.

Measures

The Italian and Spanish versions of the questionnaire were composed of the same scales and each scale has the same number of items in the two language versions. Each scale was assessed on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*) with the exception of the Impact of Event Scale Revised (assessing posttraumatic stress symptoms) and Trauma Severity Scale, which presented different ranges (see below). Internal consistency was calculated as Cronbach's alpha for each subscale. For the purposes of the current study, we selected the following measures from the BeSeCu-S questionnaire (Schmidt et al., 2011).

Table 1. Sample characteristics and country differences ($n = 214$)

Variable	Italian N (%)	Spanish N (%)
Gender		
Male	53 (24.9)	41 (19.3)
Female	74 (34.7)	45 (21.1)
Relationship status		
No relation	34 (16.0)	23 (10.8)
Relation	93 (43.6)	63 (29.6)
Qualification ^a		
No-Lowest	3 (1.4)	16 (7.5)
Intermediary	8 (3.8)	10 (4.7)
Higher secondary	56 (26.3)	21 (9.9)
University degree	60 (28.1)	39 (18.3)
Employment ^b		
Unemployed	7 (3.3)	15 (7.0)
Employed	120 (56.3)	71 (33.4)
Income ^{c,d}		
< 70%	70 (35.1)	11 (5.5)
70% \geq x \leq 150%	43 (21.6)	40 (20.1)
> 150%	4 (2.1)	31 (15.6)

Note: ^a $\chi^2 = 22.42$, $df = 3$, $p < .001$, Cramer's $V = .32$; ^b $\chi^2 = 7.88$, $df = 1$; $p < .01$, $\phi = .19$; ^c $\chi^2 = 59.6$, $df = 2$, $p < .001$, Cramer's $V = .55$. ^dThresholds for the three categories were established considering the average income of the country (GfK Group, 2008).

¹For more detailed information: http://www.besecu.de/html/besecu_aims.html

Emergency Services Trust Scale

Three items from the Emergency Service Trust Scale were selected to assess to what extent participants relied on Medical Service, Police and Firefighters with a total score ranging from 3 to 15 (e.g. *Before the incident occurred, to what extent did you believe you could rely on the Medical Service to assist you in an emergency?*). Internal consistency for the total sample was .80 (.87 for the Italian sample and .75 for the Spanish sample).

Emergency Prevention Knowledge Scale

Seven items constituted this scale with a total score ranging from 7 to 35. It explored the participant's emergency prevention knowledge received by professional activity, first aid course, fire safety knowledge, fire drills at school and work, etc. Examples of items were: *I had taken part in fire drills at work; I had read safety notices/evacuation plans in public places, such as in hotel rooms, train carriages, etc.* Internal consistency was .75 for the total sample (.64 for the Italian sample and .88 for the Spanish sample).

Risk Perception Scale

Participants were asked to rate (percentage from 0 to 100; total score from 0 to 600) the perceived likelihood of becoming a victim in the future in respect of six emergency situations: domestic fire, fire in a public building, terrorist attack, earthquake, flood and traffic accident. Internal consistency for the total sample was .80 (.78 for the Italian sample and .89 for the Spanish sample).

Self-efficacy in emergency situation

Three items assessed participants' perception of having been able to deal with the emergency situation throughout the stages of the incident such as in the realization stage, during the evacuation and upon exiting the location (e.g. *When you realized you were in an emergency situation, did you think you were able to deal with the situation?; During evacuation/rescue, did you think you were able to deal with the situation?; Upon exiting the location, did you think you were able to deal with the situation?*). The total score ranged from 3 to 15. Internal consistency was .88 for the total sample (.89 for the Italian sample and .84 for the Spanish sample).

Automatic Behavior

Participants had to answer a single item (i.e. *How would you describe your behavior when you understood something was happening?*) by choosing one option between "automatic/instinctive" (0) and "conscious/rational" (1).

Active Behavior

Participants had to indicate their first action during the emergency situation (i.e. *What was the first thing you did when you understood something was happening?*) by choosing one option in a list of 10 possible actions. The variable was dichotomized in active (1) and passive behaviors (0). Examples of items reflecting an active behavior are *I sought help from the emergency services; I tried to alert, comfort or save others who might be threatened by the situation*, and examples of passive behaviors are *I did nothing for a while; I gave up and let happen whatever was about to happen*.

Trauma severity

Four dichotomized items assessed trauma severity (ranging from 0 to 4). Participants had to indicate: if they were admitted to hospital for injuries (yes = 1; no = 0); if they had family/friends seriously injured (yes = 1; no = 0); if family/friends suffered fatal injuries (yes = 1; no = 0) and if their property/belongings incurred any serious damage in the incident (yes = 1; no = 0).

Perceived Personal Threat

Three-items assessed participants' perception of personal threat throughout the stages of the incident such as in the realization stage, during the evacuation and upon exiting the location (e.g. *During evacuation/rescue, did you think your own life was in danger?; Upon exiting the location, did you think your own life was in danger?*). The total score ranged from 3 to 15. Internal consistency for the total sample was .85 (.86 for the Italian sample and .85 for the Spanish sample).

Posttraumatic stress symptoms

Posttraumatic stress symptoms were assessed by using the Italian (Giannantonio, 2003; Saccinto, Prati, Pietrantonio, & Pérez-Testor, 2013) and Spanish (Gargurevich, Luyten, Fils, & Corveleyn, 2009) versions of the Impact of Event Scale-Revised (IES-R) (Weiss & Marmar, 1997). Participants referred to symptoms related to the emergency situation they described. The instrument is a 22-item self-reported questionnaire designed to capture intrusive, hyperarousal, avoidance and numbing posttraumatic stress symptoms. The total score ranges from 0 to 88, and each item is rated on a 5-point scale (from 0 = not at all and 4 = extremely), reflecting to what extent the particular symptom has been a problem for the respondent during the past week with respect to the described incident. In this study, internal consistency for the total scale was .94, .90 for the intrusion, .87 for the hyperarousal, and .80 for the avoidance-numbing subscales. For the Italian group, internal consistency for the total scale was .94,

for the intrusion .90, for the avoidance-numbing .79 and .88 for the hyperarousal subscale. For the Spanish group, internal consistency for the total scale was .97, for the intrusion .95, for the avoidance-numbing .88 and .94 for the hyperarousal subscale. Since the three subscales presented high positive correlations between each other (intrusion and avoidance-numbing: $r = .74$, $p < .01$; intrusion and hyperarousal: $r = .78$, $p < .01$; hyperarousal and avoidance-numbing: $r = .72$, $p < .01$), we decided to use the total score instead of the scores of the three subscales in the following analyses.

Statistical analysis

In order to perform parametric tests, we checked if all variables presented a normal distribution. Age and posttraumatic stress symptoms lacked a normal distribution and were transformed logarithmically. The time since the emergency situation did not have a normal distribution either, and the square root transformed variable was used. Independent t-tests and Pearson Chi-squares were used to determine differences between the Italian and Spanish participants regarding the dependent and independent variables.

A multiple hierarchical regression analysis was used to assess the contribution of the selected predictors to posttraumatic stress symptoms.

To perform regression analysis, multi-collinearity was checked. Correlations between predictor variables and posttraumatic stress symptoms did not exceed the value of .70 (Tabachnik & Fidell, 2007). Also the Variance Inflation Factor (VIF) and Tolerance statistics, of multiple regression analysis, did not reach significant values below .2 (Menard, 1995) and > 10 (Bowerman & O'Connell, 1990), respectively.

Results

Differences between the Italian and the Spanish participants

Regarding the Italian group, more participants reacted in an automatic/instinctive way than in a conscious/rational way ($\chi^2 = 10.78$; $df = 1$; $p < .01$); Italian participants also presented more active than passive behaviors ($\chi^2 = 28.78$; $df = 1$; $p < .001$). The Spanish group presented more conscious/rational behaviors than automatic/instinctive behaviors ($\chi^2 = 4.76$; $df = 1$; $p < .05$) and more active than passive behaviors ($\chi^2 = 28.10$; $df = 1$; $p < .001$). Each group did not present significant gender differences.

We found that the Spanish participants were significantly older ($t = 7.97$, $df = 211$, $p < .001$) than the Italian participants. Moreover, the average time since the occurrence of the emergency situation was higher for Spanish than Italian participants ($t = 3.34$, $df = 186$,

$p < .01$). Furthermore, other differences between the two groups were that Spanish participants presented more conscious behavior during the emergency situation ($\chi^2 = 14.26$; $df = 1$; $p < .001$), perceived themselves as more self-efficacious ($t = -2.97$, $df = 211$, $p < .01$), and presented less posttraumatic stress symptoms ($t = -2.86$, $df = 203$, $p < .01$) than Italian participants. The two groups did not significantly differ regarding gender, trust in emergency services, emergency prevention knowledge, risk perception, active vs passive behavior, trauma severity and perceived personal threat.

Bivariate correlation analyses between the study variables are presented in table 2.

Multiple regression analysis

A multiple hierarchical regression analysis was used to assess the contribution of the selected predictors to posttraumatic stress symptoms. The two groups differed regarding the dependent and some independent variables, thus we included the country as control variable. Table 3 shows results of the multiple hierarchical regression analysis.

As a first step, country, gender, age, emergency prevention knowledge, trust in emergency service, risk perception, time since the emergency situation, active behavior, conscious behavior, trauma severity and self-threat perception were entered in the regression analysis. The model accounted for 32% of the variance in posttraumatic stress symptoms, $F(11, 160) = 7.85$, $p < .001$. Three variables, such as gender ($\beta = .21$, $p = .004$), trauma severity ($\beta = .26$, $p = .001$) and self-threat perception ($\beta = .24$, $p = .002$) significantly predicted the variance in posttraumatic stress symptoms. These results evidenced that women, participants with a higher self-threat perception and those who experienced a more severe traumatic event presented more posttraumatic stress symptoms.

As a second step, the variable perceived self-efficacy during the emergency situation was entered and increased the explained variance of the model ($\Delta R = .07$). The final model accounted for 39.1% of the variance, $F(12, 160) = 9.55$, $p < .001$ ($\Delta F = 18.30$). Four variables were significant predictors of posttraumatic stress symptoms: perceived self-efficacy during the emergency situation ($\beta = -.33$, $p < .001$), gender ($\beta = .17$, $p = .015$), trauma severity ($\beta = .25$, $p < .001$) and self-threat perception ($\beta = .21$, $p = .006$). These results mean that participants, who perceived themselves as more self-efficacious during the emergency situation, presented less posttraumatic stress symptoms. In contrast women, participants with a higher self-threat perception and those who experienced a more severe traumatic event presented more posttraumatic stress symptoms.

Table 2. Correlation matrix of all study variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Country ¹	–											
2. Gender ²	.06	–										
3. Age ³	-.48**	-.08	–									
4. ESTS ⁴	-.10	.08	-.06	–								
5. EPKS ⁵	-.08	-.19**	-.01	.08	–							
6. RPS ⁶	.09	.22**	-.13	.06	.11	–						
7. SE ⁷	-.20**	-.29***	.01	.03	.29***	-.10	–					
8. CB ⁸	-.26**	-.15*	.27***	-.03	.18*	-.09	.35***	–				
9. AB ⁹	-.06	-.15*	.03	-.02	.12	-.13	.30***	.12	–			
10. TS ¹⁰	-.08	-.09	.21**	-.17*	-.08	.01	-.17*	-.04	-.12	–		
11. ST ¹¹	.12	.24***	-.05	-.06	-.14*	.16*	-.39***	-.21**	-.23**	.38***	–	
12. PTS ¹²	.21**	.20**	.01	-.05	-.09	.10	-.51***	-.31***	-.24**	.40***	.50***	–
13. TES ¹³	-.24**	-.02	.05	.13	-.14	-.08	-.05	-.12	-.09	.06	-.04	.08

Note: * $p < .05$; ** $p < .01$; *** $p < .001$. A point-biserial correlation coefficient (r_{pb}) was computed for correlations between two binary variables, and a binary variable and an interval variable. A Pearson's correlation coefficient (r) was computed for correlations between two interval variables.¹Country (Spanish = 4; Italian = 8); ²Gender (m = 1; f = 2); ³Logarithm of age; ⁴Emergency Services Trust Scale; ⁵Emergency Prevention Knowledge Scale; ⁶Risk Perception Scale; ⁷Self-efficacy in emergency situation; ⁸Conscious Behavior (conscious behavior = 1; no conscious behavior = 0); ⁹Active Behavior (active behavior = 1; no active behavior = 0); ¹⁰Trauma severity; ¹¹Self-threat perception; ¹²Logarithm of Posttraumatic stress symptoms; ¹³Time since the emergency situation (square root transformed).

Discussion

As hypothesized, people who perceived themselves more self-efficacious during the emergency situation presented less posttraumatic stress symptoms in the aftermath of the event, even when controlling for country, gender, age, time since the occurrence of the emergency situation, trauma severity and self-threat perception. In line with previous research, results show

that self-efficacy is a protective factor that reduces PTSD symptoms, and predicts recovery among victims of man-made and natural accidents (Benight et al., 2000; Benight & Harper, 2002). On the contrary and in accordance with previous research (Ozer et al., 2003), female gender, trauma severity and self-threat perception contributed to explain the increase in posttraumatic stress symptoms.

Table 3. Hierarchical Multiple Regression analysis predicting Posttraumatic Stress Symptoms

Variable	Step 1			Step 2		
	B	(SE B)	β	B	(SE B)	β
Country ¹	.04	.02	.14	.03	.02	.10
Gender ²	.20	.07	.21**	.16	.07	.17*
Age ³	.17	.24	.05	.14	.23	.04
EPKS ⁴	.03	.04	.05	.07	.04	.11
ESTS ⁵	.00	.01	.01	.00	.01	-.01
RPS ⁶	.00	.00	-.06	.00	.00	-.06
TES ⁷	.00	.00	.10	.00	.00	.10
Conscious behavior ⁸	-.13	.07	-.13	-.04	.07	-.04
Active behavior ⁹	-.15	.08	-.13	-.06	.08	-.05
Trauma severity	.15	.04	.26***	.14	.04	.25***
Self-threat perception	.03	.01	.24**	.03	.01	.21**
Self-efficacy ¹⁰				-.05	.01	-.33***

Note: * $p < .05$; ** $p < .01$; *** $p < .001$. Step 1: $R^2 = .367$ ***, $Adj.R^2 = .320$ ***. Step 2: $R^2 = .436$ ***, $Adj.R^2 = .391$ ***. ¹Country (Italian = 8; Spanish = 4); ²Gender (m = 1; f = 2); ³Logarithm of age; ⁴Emergency Prevention Knowledge Scale; ⁵Emergency Services Trust Scale; ⁶Risk Perception Scale; ⁷Time elapsed since the emergency situation; ⁸Conscious Behavior (conscious behavior = 1; no conscious behavior = 0); ⁹Active Behavior (active behavior = 1; no active behavior = 0); ¹⁰Self-efficacy in emergency situation.

Differently from previous studies, our findings focused on the survivor's perceived ability to deal with the situation during its occurrence. To our knowledge, this is the first study that links perceived self-efficacy in the emergency situation and posttraumatic stress. Since more self-efficacious individuals can present more adaptive response in the aftermath of the event, our results have some possible implications. First of all, it stresses the importance of increasing people's self-efficacy and their perception of being able to manage a stressful event. This goal may be achieved, for instance, by developing adequate training programs, which focuses on citizens' knowledge of how to behave during natural and man-made accidents. The programs should explore if people are prepared to adopt protective actions during a danger situation and include simulations of evacuation. Training programs may be conducted with a participatory approach in order to promote proactive attitudes among participants and encourage people to better know environmental risks and adopt preventive cautionary actions. They also should target different groups with a particular attention to more vulnerable ones, such as migrants, children and women. In our study, we found a significant positive association between survivors' emergency prevention knowledge and self-efficacy in the bivariate analysis. It is not unreasonable to hypothesize that more emergency prevention knowledge increases self-efficacy in emergency situation, which in turn reduces posttraumatic stress symptoms. Further research should test this hypothesis, which may support the need for the development of preventive plans and educational programs directed towards individuals and communities at risk. Furthermore, future studies could assess perceived peritraumatic self-efficacy in the immediate aftermath of the trauma and evaluate whether it is a predictor in a longitudinal design. To better understand the role of peritraumatic self-efficacy further studies should control for other control variables such as self-esteem and survivors' level of self-efficacy.

In accordance with Benight and Harper (2002), we consider that our findings underline the need to support affected survivors to identify perceptions regarding their behaviors during the emergency situation. This will allow the professional to offer support to more vulnerable individuals and, when possible, to value positively survivors' efforts directed to manage the stressful situation. This may contribute to promote a positive cognitive appraisal of the event and prevent the development of a negative memory concerning the traumatic situation, which may lead to distress and psychopathology (Ehlers & Clarks, 2000).

Finally, the current study concerns the experience of survivors who were victims of several emergency situations that occurred in Italy and Spain in the last

decade. This is worth mentioning because future disasters may be multinational events and there is a need to extent results regarding behavior in emergency situation to survivors affected by different types of events and/or with different cultural backgrounds. Briere and Elliot (2000) pointed out that previous research has focused on participants who experienced a specific category of event (e.g. all participants were victims of earthquakes or traffic accident) and this limited the generalization of results. They also found that the stressor characteristics (i.e. capacity to injure or damage, fear of death) were stronger predictors of distress symptoms than the specific type of event. Our findings have shown that survivors of fires, terrorist attacks, earthquakes and floods with more self-efficacy beliefs have developed less posttraumatic symptoms, even when controlling for the severity of the trauma.

Regarding the pre-event variables, such as emergency prevention knowledge, trust in emergency services and risk perception of becoming a victim of an emergency situation, it emerged that they were not associated to a reduction in posttraumatic stress symptomatology. Although the findings do not support our hypotheses, they are in accordance with previous studies (Ozer et al., 2003) showing that posttraumatic stress symptoms are more strongly related to factors operating during and after the traumatic event. It is also possible that the lack of association lies on the fact that we assessed these pre-event variables by collecting survivors' perceptions and beliefs.

This study has several limitations. First, the sample size was small and not randomly selected. The study has been developed with a convenience sample of survivors who voluntarily participated in the research. It is possible that there are latent biases linked to the decision of participating in the study, or that the difficulty of reaching some population groups limited their recruitment. For instance, in spite of our efforts to recruit a representative sample of survivors of emergency situations, we found difficulties especially in recruiting participants of non-collective events, such as domestic fires. These difficulties may depend on the type of event, which is associated to self-blame for its occurrence (Greenberg & Keane, 2001) and favors reluctance to participate. Second, the emergency situation reported by the participant could have occurred up to 11 years ago, and it is possible that this long time affected the retrospective recall of the event and the results. Finally, a further issue is the cross-sectional design of the study, which impedes to identify causal relationships between the studied variables and suggests caution in interpreting and generalizing the observed findings.

Despite these limitations, the study gives a contribution in understanding the role of perceived self-efficacy during the emergency situations in culturally different

populations of survivors, which experienced several types of emergency situation such as earthquake, flood, terrorist attack and fires.

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Resumen

El objetivo del estudio es analizar las reacciones emotivas y comportamentales de sobrevivientes afectados por un terremoto, utilizando como marco teórico dos modelos que intentan explicar la reacción humana en situaciones de peligro, es decir el Modelo del Apego Social de Mawson (2005) y el modelo ampliado de Kuligowski y Mileti (2009). Participaron 1893 sobrevivientes del primer terremoto ocurrido en Mayo 2012 en la región Emilia-Romagna en el Norte de Italia. Los resultados evidencian que algunas reacciones comportamentales son más frecuentes que otras, como pasar de una habitación a otra, escapar y esperar en la propia cama. Además, en el presente estudio se confirma la hipótesis del Modelo ampliado de Kuligowski y Mileti (2009), es decir, que más percepción de riesgo se asocia con la evacuación, mientras que una mayor preparación en emergencia predice comportamientos más adecuados durante el terremoto. De acuerdo con el Modelo del Apego Social, los comportamientos de búsqueda de cercanía de personas significativas son más frecuentes que comportamientos que reflejan la intención de escapar de la situación de peligro. Sin embargo, el contexto social no influye en la respuesta emocional, la evacuación y la búsqueda de protección dentro del edificio.

The 2012 Northern Italy Earthquakes: modelling human behaviour

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Abstract The aim of this study was to investigate human behaviour during the 2012 Northern Italy Earthquakes. Furthermore, the current study used Kuligowski and Mileti's (Fire Saf J 44:487–496, 2009) extended model and the Social Attachment Model as a framework to explain the behavioural responses. The study included 1839 participants who were affected by the earthquake occurred in the Emilia-Romagna region (Italy) on 20 May 2012. The most frequent behavioural responses during the earthquake were moving to another room of the house, escaping from home, and waiting in bed. According to Kuligowski and Mileti's (Fire Saf J 44:487–496, 2009) extended model, perceived risk was associated with evacuation, and emergency preparedness was related to more efficient and effective responses during the earthquake. In line with the Social Attachment Model, affiliation behaviours were more frequent than flight behaviours, while, contrary to predictions, the social context did not influence emotional responses, evacuation behaviour, and search for protection.

Keywords Earthquake · Behavioural response · Perceived risk · Emotional response · Protective action

1 Introduction

Annually, since 1970, the number of earthquakes that resulted in significant human and economic loss has increased. Moreover, according to the data provided by the EM-DAT International Disaster Database, earthquakes have caused an average of 27,000 reported deaths per year since 1990 (Guha-Sapir and Vos 2011). However, few studies have focused on investigating human behaviours during and in the immediate aftermath of a disaster. Physical as well as ethical constraints limit the opportunities for studying human behaviour

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in an earthquake (Drury and Cocking 2007). Despite these limitations, different theories of human and collective behaviours in emergencies have been developed.

2 Theories of human behaviour in emergencies and disasters

Different theories of human behaviour in emergencies and disasters have been proposed (see Drury and Cocking 2007; Solberg et al. 2008). Following Le Bon's conceptualisation of crowd behaviour, panic theories posit that people in dire emergencies are overwhelmed by acute fear and tend to lose their humanity, and abandon their ties to others, as well as their socialised responses and social norms. This situation results in non-adaptive, competitive, and dangerous behaviours such as flight, pushing and trampling others to reach safety, and other violent conducts (see Mawson 2005). Despite the fact that panic theories continue to exert a significant influence on social representations of emergency behaviour (Quarantelli 2001), empirical evidence showed that panic is actually rare (see, for a review of studies, Drury and Cocking 2007). Differently, previous research revealed that fear is the most frequent emotion experienced among survivors of earthquakes, although this emotional reaction does not result in panic behaviour (Bourque et al. 1993; Prati et al. 2012). Moreover, antisocial or selfish behaviours are rare, whereas helping behaviour and cooperation are frequent (Bourque et al. 1993; Drury and Cocking 2007; Ohta and Ohashi 1985; Prati et al. 2012). These findings are in line with the predictions of three theories of collective behaviours in emergencies, such as Turner and Killian's (1987) Emergent Norm Theory of collective behaviour (see also Aguirre 2005; Aguirre et al. 1998), Johnson's (1987, 1988) Normative theory, and the Social Identity Theory applied to mass emergency and evacuation behaviour (Drury and Cocking 2007; Drury et al. 2009a, b), which emphasise the role of social identity processes, social norms, and roles. These theories are largely concerned with collective decision-making and behaviour, rather than individual-level processes. Therefore, these perspectives are useful when predicting group or crowd processes, but their predictions are less straightforward with regard to situations in which a person is alone or with few friends or family members. In these situations, the affiliation models of evacuation behaviour (e.g., Mawson 2005; Sime 1985) may be more useful. The Social Attachment Model of human behaviour in disasters (Mawson 2005) posits that affiliation is a typical response to a variety of physical threats. Affiliation behaviours in disasters refer to seeking the proximity of familiar persons or places, even though this may involve approaching or remaining in a situation of danger. For instance, a frequent expression of affiliation behaviour is to seek telephone and physical contact with loved ones (Binu et al. 2008). The Social Attachment Model (Mawson 2005) states that the search for the proximity of attachment persons or places is the most common behaviour in disasters; on the contrary, flight behaviours are more unusual. According to this model, escaping from a dangerous situation (i.e., "flight behaviour") is less likely to occur in presence of familiar persons, and the physical presence of familiar persons has a calming effect reducing the likelihood of flight-and-affiliation (Mawson 2005). Anyway, the available studies on this topic present mixed findings, showing the complexity of understanding the influence that the presence of significant others has on human behaviours in emergencies. For instance, studies focused on hurricane survivors have shown that the presence of children is associated with evacuation (Gladwin and Peacock 1997; Dash 2002). In contrast, families with elderly people were less likely to evacuate (Gladwin and Peacock 1997), although other studies have not found a significant association for families with senior people (Heath et al. 2001). Moreover, in a previous study, which focused on

human behaviour during an earthquake, evacuation was less frequent among those who were with family members or at home during the seismic event (Prati et al. 2012) in comparison with those who were not at home or not in presence of family members.

More recently, in their model, Kuligowski and Mileti (2009) stated that individual behaviour in crisis situations is the result of a decision-making process in which perceived risk plays a crucial role. Perceived risk refers to how much risk/danger people feel as a result of the event and their perceptions concerning the seriousness of the event. In this model, the authors posit that risk perception is related to evacuation behaviour. Furthermore, Sherman et al. (2011) extended Kuligowski and Mileti's (2009) model by adding emergency preparedness as an additional variable predicting appropriate responses to a crisis situation, and they found that emergency preparedness was associated with quick evacuation only when the situation demanded it.

3 The present study

The aim of this study was to investigate human behaviour during the 2012 Northern Italy Earthquakes. Specifically, we assessed human behaviour during the first of the two major earthquakes that occurred in Northern Italy in May 2012. The magnitude of the first earthquake was 5.9 on the Richter scale, and its epicentre was about 36 kilometres north of the city of Bologna in the Emilia-Romagna region. It struck on 20 May 2012 at 04:03 a.m. local time (02:03 UTC).

The current research is an attempt to extend the scant empirical literature addressing human behaviour during earthquakes. Since the earthquakes struck at night when the majority of the people were at home, in this study, we cannot investigate crowd behaviour during earthquakes. Therefore, we will focus on individual-level processes.

To contextualise the setting in which the people were when the earthquake struck, the characteristics of the physical and social context during the shock will be presented. Then, we will investigate the range of responses during the earthquake. Finally, we will test the predictions of Kuligowski and Mileti's (2009) extended model and Social Attachment Model (Mawson 2005). Despite Kuligowski and Mileti's extended model has been theorised to explain human behaviour in fires, we decided to test its predictions in case of earthquakes. It is possible that the model predicts human behaviours also in earthquake because, as in fires, people can be alone or in small groups and need to make decisions in short time and under uncertain situations. More specifically, we will investigate the role of perceived risk (perception of the shock, intensity of fear, and perceived degree of house damage) and emergency preparedness (previous experience of earthquakes, participation in drills, and civil protection membership) in response to earthquake. Further, we will examine how the familiarity of the context and the presence of family members may have an influence on the respondent's behaviours and emotional reactions. Finally, we will include age and gender because these socio-demographic characteristics may play a role in behaviour during the earthquake (Bourque et al. 1993; Peek-Asa et al. 2003). In addition, the distance from the epicentre was included as control variable.

Our dependent variables were the behavioural responses during the seismic shock. Based on the findings of Prati et al. (2012) study and the recommendations provided by the Federal Emergency Management Agency (2003), we focused on the following behaviours during the seismic shock: (1) waiting in bed; (2) seeking shelter in a doorway; (3) seeking shelter under a table; (4) seeking shelter near the supporting wall of the house; (5) escaping from home; (6) getting dressed or changing clothes; (7) moving to another room; and (8)

going down the stairs. On the basis of the Federal Emergency Management Agency recommendations (2003), the first four behaviours could be considered protective (labelled “recommended behaviours”), while the other three not recommended (labelled “inappropriate behaviours”).

4 Methods

4.1 Procedure

Data were collected through an online questionnaire, which assessed citizens' response to the earthquake occurred in the Emilia-Romagna region (Italy) on 20 May 2012. The questionnaire focused on participants' immediate reactions in respect of the first shock. The online survey was launched the day after the first shock (21st of May). Data collection was stopped nearly 10 days after, since researchers were interested in exploring the reactions to the first shocks. Participation was voluntary, and anonymity was guaranteed.

The survey was promoted through advertisements on online local press such as “Il Resto del Carlino” (portals of Bologna, Modena, Ferrara, Reggio Emilia, Rovigo), “Il Corriere della Sera”, and “La Nuova Ferrara”. These online newspapers are popular among Italian citizens and are visited by people looking for daily national and local news. Moreover, the press agency of the University of Bologna was used for the promotion of the survey, and participants were recruited also through the Web page of the Research Group Emergency and Security of the University of Bologna (<http://emergenze.psice.unibo.it/>). This website is visited by people looking for information about crisis psychology (i.e., the experience of adverse life events, preparedness to emergencies and disasters) and receives about 1,000 visitors per month. In addition, the survey was also promoted by posting advertisement on YouTube in the section dedicated to participants' comments regarding videos of the earthquakes, which were recorded by private citizens and press agencies (e.g., <http://www.youtube.com/user/Peachgoodfellow>). The study received much attention and media coverage, so that in just 10 days, 2,087 people participated in the survey, and 88.13 % were considered valid for participation. Questionnaires with more than 50 % of missing answers were excluded.

To be eligible for the study, the participants had to be 18 years old or older. Moreover, to be included in the study, participants also had to have experienced the earthquake. Before filling in the questionnaire, participants had to sign an informed consent explaining the purposes and methodology of the study, and it was made clear that participation was anonymous and voluntary. Furthermore, we specified that they had the right to withdraw from the study at any time and for any reason. After giving informed consent and providing demographic details, participants were invited to complete the questionnaire. An IP address of the respondents was collected to avoid multiple submissions from the same participant. When responses with identical IP addresses were collected, the demographic and the event-related information was analysed to identify and exclude multiple submissions by a single individual.

4.2 Participants

The study was carried out with 1,839 participants. Table 1 shows their characteristics. Six hundred and forty-two were men (36.1 %) and 1,134 (63.9 %) women. The average age of participants was 27.22 years (SD = 13.12). The majority came from the Emilia-Romagna region (90.7 %), whereas 9.3 % from other neighbouring regions of the Centre-Northern

Table 1 Characteristics of participants

	<i>n</i>	%
Gender		
Male	642	36.1
Female	1,134	63.9
Age (in years)		
18–24	802	43.6
25–34	456	24.8
35–44	410	22.3
45–54	139	7.6
55–70	32	1.7
Region		
Emilia-Romagna	1,574	90.7
Other regions of the Centre-Northern Italy	161	9.3
Loss or damages of the house		
No	1,555	85.3
Yes	267	14.7
Previous experience of earthquake		
No	214	11.6
Yes	1,625	88.4
Civil protection membership		
No	1,567	96.2
Yes	62	3.8

Italy. Participants' average distance from the epicentre was 33.70 km (SD = 18.82), ranging from zero to 152.27 km. The majority of respondents (88.4 %) had previously experienced an earthquake, whereas 11.6 % had had no previous exposure. The majority of participants (96.2 %) were not affiliated to Italian associations of Civil Protection Body.

According to the EM-DAT (<http://www.emdat.be/>) database on disasters maintained by the Centre for Research on the Epidemiology of Disasters (CRED), a total of 11,050 people were affected by the earthquake (including those displaced). Data extracted from the Italian National Institute of Statistics information system (<http://www.istat.it>) revealed that a total of 2,597,795 people live in the provinces of Modena, Ferrara, Bologna, and Reggio Emilia. According to the Italian Civil Protection and the Emilia-Romagna Region (<http://www.regione.emilia-romagna.it/terremoto>), the earthquake hit in a densely populated region (about 550,000 residents). Furthermore, the earthquake caused damages to 33,600 buildings. Since 647,863 buildings are present in the areas covered by the provinces of Modena, Ferrara, Bologna, and Reggio Emilia, this means that the earthquake damaged about 5 % of the buildings (Table 1).

4.3 Measures

Participants were asked questions about their socio-demographic characteristics, perceived risk, behaviours during the shock, and emergency preparedness. Before posing these questions, we asked the respondents to report the context in which they found themselves

during the earthquake, what they were doing, and whether they were with other people. The distance from the epicentre was computed.

4.3.1 *Perceived risk*

Three different items were used as proxy measures of perceived risk. Since perception of a risk has been conceptualised as having both cognitive and emotional components (Loewenstein et al. 2001), we measured the perceived intensity of the shock and the experienced intensity of fear during the earthquake. More specifically, perception of the intensity of the shock was measured using a single item (How would you describe the shock?). Participants were asked to rate their perception of the intensity of the shock on a 5-point Likert scale (very weak = 1; weak = 2; moderate = 3; strong = 4; very strong = 5). A single item measured the intensity of fear; respondents were asked to indicate a number between 0 and 100, which corresponded to the intensity of fear they experienced during the shock. The average of the intensity of fear during the shock was 68.85 (SD = 26.79) with a minimum of zero and a maximum of 100. Finally, we used a third item to measure the extent to which participants did not feel safe in the building in which they were located (How much were you worried about the safety of the building?). Participants were asked to rate their worry about the safety on a 4-point Likert scale (not at all = 1; a little bit = 2; quite a bit = 3; extremely = 4).

4.3.2 *Behaviours during the shock*

Research on earthquake survivors provided information about the most frequent behavioural responses, in particular, based on the findings of Prati et al. (2012), who carried out a study with Italian survivors of an earthquake. We also identified several protective actions indicated by the Federal Emergency Management Agency (2003). Participants had to indicate whether they had performed the following behaviours during the seismic shock: I escaped from home; I sought shelter in a doorway; I sheltered under a table; I sought shelter near the supporting wall of the house; I waited in my bed; I got dressed or I changed my clothes; I moved to another room; I went down the stairs. Response options were yes, no, it does not apply to me: “yes” was coded as 2 and “no” as 1. “It does not apply to me” has not been considered in the analyses (Table 2).

4.3.3 *Emergency preparedness*

Participants were asked to report whether they (a) had participated in evacuation drills (at school or work); (b) were members of the civil protection; (c) had had previous experience of an earthquake.

4.4 Data analysis

We used the SAS PROC GLM and SAS PROC LOGISTIC to estimate the general linear models and the logistic regression models, respectively. To control for potential type I error rate inflation due to multiple testing, we requested adjusted p values by using Benjamini and Hochberg's (2000) adaptive linear step-up method.

Table 2 Behaviours during the shock

	Yes		No	
	<i>n</i>	%	<i>n</i>	%
I escaped from home ^a	591	35.6	1,224	67.4
I sought shelter in a doorway ^b	255	14.1	1,550	85.9
I sheltered under a table ^c	30	1.7	1,766	98.3
I sought shelter near the supporting wall of the house ^d	254	14.1	1,546	85.9
I waited in my bed ^e	605	32.9	1,182	64.3
I got dressed or I changed my clothes ^f	334	18.6	1,461	81.4
I moved to another room ^g	756	41.9	1,048	58.1
I went down the stairs ^h	513	27.9	1,227	66.7

Values represent valid percentages

^a Missing value = 0.5 %; excluded value because “it does not apply to me” = 0.8 %

^b Missing value = 0.5 %; excluded value because “it does not apply to me” = 1.3 %

^c Missing value = 0.6 %; excluded value because “it does not apply to me” = 1.7 %

^d Missing value = 0.6 %; excluded value because “it does not apply to me” = 1.5 %

^e Missing value = 0.4 %; excluded value because “it does not apply to me” = 2.4 %

^f Missing value = 0.5 %; excluded value because “it does not apply to me” = 1.8 %

^g Missing value = 0.5 %; excluded value because “it does not apply to me” = 1.4 %

^h Missing value = 0.5 %; excluded value because “it does not apply to me” = 4.8 %

5 Results

5.1 Characteristics of the physical and social context during the shock

All the participants were in a building. The majority (98.5 %) were in a house (which was not necessarily his or her house) and only 1.5 % were in another kind of building (not in a house). No participant was outdoors. This should be expected since the earthquake struck at 04:03 a.m. local time. The majority of respondents were on the first floor (40.1 %), 22.6 % on the second floor, 14.2 % on the third floor, and 10.4 % on the basement/ground floor, whereas the remaining 12.7 % were from the fourth to eighth floors.

Regarding the kind of activity during the shock, 93.9 % were sleeping, 4.8 % were sitting, and 1.3 % were standing or moving. During the earthquake, the majority of participants were with family members (72.7 %), 17.5 % were alone, and 9.8 % were with people other than family members. Among the participants who escaped from the location ($n = 982$), 34.7 % escaped with another person, 26.1 % with three or more people, 25.5 % with two people, and 13.7 % alone.

5.2 Emotional reaction during the shock

Participants' emotional reaction during the shock was analysed with a general linear model in which the dependent variable was the intensity of fear experienced during the shock, and the predictors were gender, age, distance from epicentre, perception of the shock, perceived degree of house damage, home context, social context, previous participation in

Table 3 General linear model univariate analyses with emotional reaction during the shock as the dependent variable

Factors	<i>df</i>	<i>F</i>	<i>p</i>	Partial η^2
Gender	1.1487	53.575	<.001	.035
Age	1.1487	28.199	<.001	.019
Distance from the epicentre	1.1487	16.172	<.001	.011
Perception of the shock	1.1487	241.593	<.001	.141
Perceived degree of house damage	1.1487	308.835	<.001	.173
Home context	1.1487	1.904	.168	.001
Social context	2.1487	0.338	.713	.000
Civil protection membership	1.1487	0.857	.355	.001
Previous experience of earthquake	1.1487	1.758	.185	.001

$R^2 = .41$ ($p < .001$)

drills, civil protection membership, and previous experience of an earthquake. Results from a general linear model analysis [$F(10, 1487) = 104.19$, $p < .001$, $\eta^2 = .41$] showed that there was a significant effect of gender (female), younger age, less distance from the epicentre, more intense perception of the shock, and higher perceived degree of house damage (see Table 3).

5.3 Predictors of behavioural response during the shock

Eight separate multiple logistic regression analyses (enter method) were used to determine the associations between the covariates that were predictive of the participants' behaviours during the shock in the adjusted model. Predictor variables considered in the model were as follows: (a) gender, (b) age, (c) distance from epicentre, (d) perception of the shock, (e) intensity of fear, (f) perceived degree of house damage, (g) home context, (h) social context, (i) civil protection membership, and (j) previous experience of an earthquake. Tables 4 and 5 summarise the results and show the odd ratios and confidence intervals for the selected predictors.

We found that there were no significant predictors regarding the following behaviours: seeking shelter in a doorway, seeking shelter near the supporting wall of the house, and sheltering under a table.

Participants who waited in bed were more likely to be younger, to experience less fear, and to be alone versus in presence of family members. Respondents who escaped from the building were more likely to be male, to live less distant from the epicentre, to perceive high fear and a higher degree of house damage, and to have had no previous experience of an earthquake. Variables that were significantly associated with getting dressed or changing clothes were being male and older, experiencing more fear, and being in presence of other people versus in presence of family members/loved ones. Participants who moved to another room were more likely to be older, to live more distant from the epicentre, to experience more fear, and to be with family members/loved ones versus alone and were less likely to belong to civil protection. Participants who went down the stairs were more likely to be male, to live less distant from the epicentre, to perceive more fear and a higher degree of house damage and were less likely to be alone versus with family members and to have had previous experience of an earthquake.

Table 4 Predictors of recommended behaviours during the shock

Recommended behaviours	I waited in my bed			I sought shelter in a doorway			I sheltered under a table			I sought shelter near the supporting wall of the house						
	OR	95 % CI	p	OR	95 % CI	p	OR	95 % CI	p	OR	95 % CI	p				
Control variables																
Gender	0.98	0.77	1.25	.696	1.03	0.76	1.41	.856	1.61	0.66	3.90	.429	0.97	0.71	1.33	.886
Age	0.98	0.97	0.99	.001	0.99	0.98	1.01	.499	0.95	0.91	0.98	.053	1.00	0.99	1.01	.886
Distance from epicentre	1.01	1.00	1.01	.068	1.01	1.00	1.02	.499	0.99	0.97	1.01	.442	1.01	1.00	1.01	.348
Perceived risk																
Perception of the shock	0.99	0.81	1.22	.696	1.14	0.87	1.49	.556	1.70	0.79	3.68	.353	0.99	0.76	1.28	.886
Intensity of fear	0.98	0.98	0.99	<.001	1.01	1.00	1.01	.499	0.98	0.97	1.00	.096	1.01	1.00	1.01	.232
Perceived degree of house damage	0.92	0.79	1.07	.354	1.02	0.84	1.24	.856	1.01	0.59	1.73	.824	0.93	0.77	1.13	.881
Context																
Home context	1.14	0.44	2.97	.696	1.36	0.44	4.17	.792	0.00	0.00	0.00	.824	1.48	0.48	4.57	.881
Presence of family members	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Being alone	1.72	1.28	2.32	.001	0.78	0.51	1.19	.499	1.68	0.63	4.49	.429	0.84	0.56	1.26	.881
Presence of other people	1.29	0.88	1.89	.285	1.32	0.83	2.09	.499	1.67	0.57	4.95	.441	1.14	0.70	1.84	.886
Emergency preparedness																
Civil Protection membership	1.26	0.70	2.27	.500	0.67	0.27	1.62	.556	4.02	1.08	15.04	.096	0.83	0.37	1.85	.886
Previous experience of earthquake	0.98	0.69	1.39	.696	1.06	0.68	1.67	.856	1.64	0.47	5.77	.442	1.78	1.06	3.01	.180

p Values are adjusted by using Benjamini and Hochberg's (2000) adaptive linear step-up method. The variables are mutually adjusted in the models

Table 5 Predictors of inappropriate behaviours during the shock

Inappropriate behaviours	I escaped from the building			I got dressed/changed my clothes			I moved to another room			I went down the stairs						
	OR	95 % CI	p	OR	95 % CI	p	OR	95 % CI	p	OR	95 % CI	p				
Control variables																
Gender	0.72	0.55	0.93	.032	0.66	0.50	0.87	.015	1.04	0.83	1.30	.801	0.68	0.53	0.89	.005
Age	1.00	0.99	1.01	.728	1.02	1.00	1.03	.026	1.01	1.00	1.02	.048	0.99	0.98	1.00	.075
Distance from epicentre	0.95	0.94	0.96	<.001	0.99	0.98	1.00	.061	1.01	1.00	1.02	.038	0.97	0.96	0.98	<.001
Perceived risk																
Perception of the shock	1.09	0.86	1.37	.507	0.99	0.77	1.27	.790	0.98	0.81	1.18	.801	1.08	0.86	1.36	.179
Intensity of fear	1.02	1.01	1.02	<.001	1.01	1.00	1.02	.031	1.01	1.01	1.02	.003	1.01	1.01	1.02	.001
Perceived degree of house damage	1.22	1.04	1.43	.032	1.01	0.85	1.20	.790	0.92	0.80	1.06	.322	1.24	1.05	1.45	.010
Context																
Home context	0.45	0.13	1.50	.290	0.96	0.31	2.99	.790	1.27	0.51	3.16	.741	0.28	0.06	1.30	.052
Presence of family members	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Being alone	0.89	0.63	1.25	.507	1.14	0.79	1.65	.522	0.69	0.51	0.92	.038	0.68	0.48	0.98	.030
Presence of other people	0.90	0.58	1.37	.552	1.92	1.25	2.94	.015	0.78	0.53	1.12	.280	0.64	0.41	1.00	.031
Emergency preparedness																
Civil protection membership	1.05	0.48	2.30	.728	0.73	0.32	1.67	.522	0.31	0.15	0.62	.005	0.86	0.39	1.88	.235
Previous experience of earthquake	0.66	0.46	0.95	.043	0.71	0.48	1.05	.125	0.98	0.71	1.37	.838	0.70	0.48	1.00	.031

p Values are adjusted by using Benjamini and Hochberg's (2000) adaptive linear step-up method. The variables are mutually adjusted in the models

6 Discussion

The purposes of this study were (1) to explore citizens' response to the earthquake occurred in Emilia-Romagna (Italy) in May 2012 and (2) to test the predictions of Kuligowski and Mileti's (2009) extended model and the Social Attachment Model (Mawson 2005). The results concerning the immediate behavioural responses to the earthquake are partially in accordance with Prati et al. (2012), who reported similar percentages for evacuation and search for protection inside the building. On the contrary, compared with Prati and colleagues' research, in this study, we found more participants who did not react during the shock and remained in bed. This difference may depend on several reasons. First, the earthquake, which occurred in the Marche-Umbria Region, was nearly seven on the Richter scale, whereas the Emilia-Romagna earthquake was one point lower on the same scale: it is reasonable to hypothesise that the different magnitude may account for these inconsistencies. Moreover, the earthquake struck at night when the majority of the participants were sleeping; therefore, it was more difficult to be aware of what was happening and to react rapidly.

Together, these findings showed that the most reported behavioural responses during the shock were not adaptive, such as escaping from home, moving to another room of the house, going down the stairs, and getting dressed. The Federal Emergency Management Agency (2003) recommends that people who are indoors during the shock should not escape until the shaking has stopped. Indeed, research has shown that most injuries and deaths occur when people inside buildings attempt to move to a different location or to leave because these behaviours increase the likelihood that falling objects or debris injure people (Wagner 1996).

This study showed that the distance from the epicentre influenced response. Indeed, the more distant the respondents lived from the epicentre of the earthquake, the less likely evacuation or intention of evacuation occurred (e.g., going down the stairs). However, living more distant from the epicentre was also positively associated with moving to another room of the house. Therefore, these results seem to suggest that, regardless of the distance from the epicentre, participants reported inappropriate behaviours.

Regarding evacuation behaviour, the findings revealed that women were less likely to escape, in line with Bourque et al.'s (1993) findings. Since previous studies showed that women have a higher risk for injuries (Peek-Asa et al. 2003), we should have expected that they would have reported riskier behaviours during crisis such as escaping from home. On the contrary, our results showed that women not only were less likely to evacuate during the shocks (in line with Bourque et al. 1993), but also reported fewer inappropriate behaviours (i.e., getting dressed and going down the stairs). Concerning the protective actions, we found no gender differences. However, even if in our study women reported more fear than men according to previous research (Prati et al. 2012), they reported less inappropriate behaviours even when controlling for the intensity of fear. Further research is needed to determine whether these findings can be replicated in different earthquakes. Moreover, if these findings can be replicated, it is interesting to investigate why women experience higher rates of injuries and deaths and, at the same time, are less likely to report inappropriate behaviours during earthquakes. Besides, the finding that women experienced more fear than men is in line with previous studies on natural disasters showing that affective reactions are influenced by individual differences such as gender (Prati et al. 2012; Villegas et al. 2012).

Results showed that evacuation behaviours (i.e., escaping from home and going down the stairs) were more likely among people who experienced high fear and had a higher

perception of house damage. Evacuation can be considered as a flight response, which represents an ancestral behaviour aimed at escaping from a dangerous situation in order to look for protection (Ekman 1992). An intense fear response was also associated with behaviours such as getting dressed or moving to another room, which is probably driven by a state of psychophysical arousal. In line with this, survivors who experienced more fear were less likely to wait in bed during the shock. Results seem to suggest that psychophysical arousal elicited by the earthquake may favour responses that paradoxically put them in danger. These findings call for interventions to improve the level of earthquake preparedness and to reduce the risk of injuries and fatalities. Effective earthquake education should take into account the influence of cognitive, emotional, and societal factors on the preparedness process (Becker et al. 2012).

7 Test of the predictions of Kuligowski and Mileti's (2009) extended model and the Social Attachment Model (Mawson 2005)

These results substantially support the hypothesis derived from Kuligowski and Mileti's (2009) extended model that perceived risk (operationalised as intensity of fear and perceived degree of house damage) was associated with evacuation behaviour. Furthermore, participants who reported higher intensity of fear were less likely to remain in bed. It is interesting to note that the measure of perception of the shock had no influence on behaviour during the earthquake. To explain these results, we could refer to appraisal theories in which cognitive evaluations—in this study, perception of the shock—are thought to influence affect (Ortony et al. 1988). Still, following recent psychosocial approaches (see Kobbeltved et al. 2005; Lee and Lemyre 2009; Prati et al. 2011), the influence of cognitive factors involved in the perception of a risk is mediated by emotional responses. Therefore, we hypothesise that perception of the shock is associated with behavioural responses during the earthquake to the extent that it stimulates an emotional response. Following this explanation, the influence of perception of the shock on behaviour was not significant because its effect was completely mediated by the intensity of fear.

However, although perceived risk was associated with evacuation, it should be noted that during an earthquake, differently from fire, this behaviour (e.g., escaping from home and going down the stairs) could be defined as inappropriate. Our results also showed no significant associations between intense fear and behaviours aimed at seeking protection in the location. These results are notable given that fear is the most frequent emotional reaction during earthquakes (see Prati et al. 2012).

In line with Sherman et al.'s (2011) extension of Kuligowski and Mileti's (2009) model, this study showed that emergency preparedness was related to more efficient and effective responses during the earthquake. More specifically, participants who had previously experienced an earthquake and belonged to civil protection were less likely to perform inappropriate behaviours such as escaping from home and moving to another room. In sum, the present findings highlight that when people feel in danger during an earthquake and do not have preparation to cope with this danger, they are more likely to perform inappropriate behaviours.

However, contrary to the predictions of the Social Attachment Model (Mawson 2005), the social context did not influence emotional responses, evacuation behaviour, and search for protection. In this respect, Mawson (2005) stated that the presence of family members should be associated with less likelihood of evacuation because the

proximity of significant persons has a calming effect. In this study, we did not find any influence of the social context on fear responses. Moreover, the presence of familiar and loved people did not predict less evacuation behaviours (i.e., escaping from the building), which occurred independently of the social context. Furthermore, it emerges that the presence of family members was associated with other actions (e.g., going down the stairs), which reflect arousal and probably intention to evacuate. For instance, respondents who were alone were more likely to remain in bed and less likely to move to another room and go down the stairs in comparison with those with family members. Results also show that when other people, compared to family members, were present, respondents were more likely to get dressed. It is likely that this finding is related to the embarrassment at the thought of being without clothes on in front of other (non-familiar) people.

Taken together, these findings suggest that the Social Attachment Model should be revised to include the possibility that the presence of family members or significant others may not have a calming effect. For example, social interaction may actually exacerbate the levels of experienced arousal, through stress contagion processes (Hobfoll and London 1986).

8 Limitations and conclusions

Several limitations of the study need to be considered. First, due to the cross-sectional study design, it is not possible to infer causality in the relationships among variables. Although the model tested here was theoretically driven, there may be other unmeasured variables that could have affected our results. Second, the generalisability of the current findings is unknown given that our sample was drawn from a population of Internet users. Indeed, our sample may differ in some respects from the general population of individuals exposed to the earthquake with respect to gender, socioeconomic status, geographic location, age, and race. Although Internet samples are not representative of the population at large, they are generally more representative than traditional samples, such as undergraduates and volunteers, who characterise much research in social sciences (Gosling et al. 2004). Still, it should be noted that our results are not very different from those obtained with participants recruited through randomised sampling (see Prati et al. 2012). Nonetheless, future studies are needed to demonstrate that the present findings are reproducible in other cultural settings. Finally, the sample was over-represented by women (63.9 %). Gender differences in emotional expression may account for this difference in participation rates. Although social norms may differ across the expression of specific emotions, expressing emotions is generally “viewed as ‘unmanly’” (Brody 2000, p. 26). Anyway, in all the analyses, we controlled for gender.

Notwithstanding the limitations noted above, the results provide empirical support for Kuligowski and Mileti's (2009) extended model. Besides, the current findings indicate the need to extend and revise the Social Attachment Model (Mawson 2005). Finally, the present results provide valuable guidance for researchers and practitioners trying to understand the mechanisms through which they can improve protective behavioural responses to earthquakes.

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DISCUSIÓN DE LOS RESULTADOS

La presente tesis tiene como objetivo explorar la experiencia de las personas que han vivido situaciones de desastre y emergencia a través del análisis de las respuestas emotivas y comportamentales que están relacionadas con la salud mental y la *safety*, es decir, con los comportamientos dirigidos a garantizar la seguridad y protección de los afectados (ej. conductas adecuadas durante el suceso, autoprotección, preparación preventiva para reducir el impacto del suceso etc.). Con respecto a la salud mental, la presente tesis investiga el desarrollo de estrés postraumático y crecimiento postraumático, como índices del estado de desajuste y bienestar de las personas afectadas.

En el primer estudio se investiga la relación entre el estrés postraumático y el crecimiento postraumático, conjuntamente con los factores de riesgo y protección que favorecen sus desarrollos. Los resultados sustentan aquellos estudios que han encontrado una relación positiva entre los dos constructos (Tomich & Helgeson, 2004), demostrando que el estrés y el crecimiento pueden representar dos aspectos coexistentes de la vivencia de los sobrevivientes de situaciones de emergencia. Además, el estudio contribuye a explicar el mecanismo a través del cual los sobrevivientes llegan a percibir una experiencia de crecimiento tras el suceso traumático. En el segundo estudio se analiza el impacto de algunos factores de riesgo y protección asociados al desarrollo de los síntomas de estrés postraumático, sin embargo, el trabajo se centra principalmente en el papel que ejerce la percepción de autoeficacia durante el acontecimiento estresante e investiga la influencia de algunos factores relacionados con la experiencia en emergencia de los sobrevivientes. El estudio evidencia que la autoeficacia percibida durante la emergencia es un factor capaz de reducir los síntomas de estrés postraumáticos. Finalmente, el tercer estudio se enfoca en el tema de la *safety*, concretamente explora el papel de algunos factores sociales y contextuales, que pueden influir en la respuesta emocional y conductual de las personas afectadas por un terremoto. Los resultados evidencian que la preparación en emergencia reduce la probabilidad de conductas inadecuadas, mientras que una alta percepción de riesgo se asocia, con más frecuencia, a una evacuación del edificio, lo que representa un comportamiento inadecuado en caso de terremoto porque expone la persona diferentes tipos de riesgo.

Los resultados de los estudios I y II permiten resaltar que es posible superar situaciones potencialmente traumáticas y reducir sus impactos negativos. Las personas afectadas pueden poner en marcha un proceso de cambio que puede llegar a producir hallazgos positivos, es decir,

una experiencia de crecimiento que se refleja en varios ámbitos y dimensiones de la vida, tales como el descubrimiento de tener más fuerza personal de lo que se imaginaba, una mayor valoración de la vida y un cambio en sus prioridades, el desarrollo de una espiritualidad más profunda o el percibir más cercanía con los demás. Sin embargo, el crecimiento postraumático no representa un proceso “indoloro” y automático, al contrario, como demuestran los resultados de esta tesis, para que ocurra un cambio en los esquemas y creencias de los individuos es necesario experimentar un cierto nivel de desajuste producido por la vivencia traumática. De hecho, como ha evidenciado la meta-análisis de Helgeson et al. (2006), los individuos que experimentan más crecimiento postraumático tienen más síntomas de intrusión, que pueden representar indicadores del proceso cognitivo, que está ocurriendo en el afectado por el trauma, en lugar de indicadores de desajuste psicológico. En las víctimas de desastres y otras situaciones de emergencia, varios factores favorecen esta experiencia, sin embargo, los síntomas de pánico peri-traumáticos (es decir, experimentados durante el evento) y los de intrusión-hyperarousal son los predictores más fuertes de crecimiento postraumático. Cabe destacar que con respecto a la relación entre estas variables y al mecanismo de desarrollo del crecimiento postraumático los síntomas de pánico peri-traumático promueven el crecimiento a través de la mediación de los síntomas de intrusión-hyperarousal. Este resultado está en acuerdo con el planteamiento de Januff-Bulman (1992) y de Tedeschi y Calhoun (2004b), según los cuales para que se modifiquen las creencias de los individuos una experiencia tiene que crear un cierto conflicto y ser de alguna manera desafiante. En este sentido los pensamientos intrusivos crean las condiciones para el desarrollo de una reflexión sobre la experiencia traumática y humana. El trauma y sus consecuencias son así incluidas dentro de los esquemas mentales de los individuos y favorecen sus reestructuraciones, reflejándose en los cambios percibidos en la visión de sí mismo, de los demás y del mundo.

De acuerdo con estudios precedentes (Ozer et al., 2003), los resultados de esta tesis indican que los factores peri-traumáticos (los que actúan durante el evento) son los predictores más fuertes entre aquellos que favorecen el desarrollo de síntomas de estrés postraumático. En el estudio I el pánico peri-traumático promueve el crecimiento postraumático, mientras que en el estudio II la percepción de autoeficacia durante la situación de emergencia reduce los síntomas de estrés postraumáticos. Estos resultados tienen implicaciones importantes tanto para la terapia, como para la educación de los ciudadanos sobre cómo enfrentarse a las situaciones de desastre y emergencia. Con respecto a las implicaciones terapéuticas o de apoyo psicológico a las víctimas, los resultados evidencian el papel importante de los síntomas de intrusión-hyperarousal en el proceso de desarrollo del crecimiento postraumático. Los profesionales deberían ayudar a los

pacientes a manejar estos síntomas de estrés postraumático, sin olvidar que estos síntomas contribuyen a poner en marcha un proceso cognitivo de cambio, que puede conducir a modificar los objetivos y las creencias no compatibles tras la vivencia del trauma (ej. invulnerabilidad, seguridad del mundo, etc.) (Tedeschi & Calhoun, 2004b). Entendiendo que el crecimiento postraumático requiere un tiempo para manifestarse, las intervenciones de los profesionales deberían trabajar las narrativas de los pacientes sobre el trauma cuando la persona sea capaz de gestionar el desajuste producido por los síntomas (Tedeschi & Calhoun, 1995). Finalmente, los profesionales deberían considerar el crecimiento postraumático como uno entre los posibles resultados de la experiencia traumática. De hecho, aunque los síntomas de intrusión-hyperarousal pueden ser motores de cambio, se tiene que considerar que para algunos sobrevivientes, la experiencia traumática puede haber sido tan devastadora, que cualquier tentativa de redefinir la vivencia, incluyendo posibles beneficios, sea percibida con rechazo.

A partir de los resultados, es posible destacar otro aspecto que merece ser tenido en cuenta cuando se ofrece apoyo psicológico o psicoterapia a las víctimas de emergencias y desastre: la exploración de cómo las personas han gestionado el suceso, especialmente si se han sentido capaces y autoeficaces para hacer frente a los desafíos presentes durante el acontecimiento. Esto es un aspecto crucial porque la percepción de autoeficacia durante el evento es un factor de protección que reduce los síntomas de estrés postraumático posteriormente, y, además, es una componente sobre el cual se puede tener un margen de influencia, al margen de otras variables, como las sociodemográficas, la historia psiquiátrica de la persona o las experiencias previas en emergencia, que, aunque sean factores de riesgo importantes, pertenecen a las características inmodificables de la persona.

Los programas de prevención de las emergencias deberían incluir la educación de los ciudadanos para que estos se sientan capaces de enfrentarse con situaciones críticas, tales como accidentes naturales (ej. terremotos, inundaciones etc.) o de más pequeña escala (ej. incendios). Es difícil establecer, por la falta de datos fiables, si los ciudadanos tienen niveles adecuados de conocimientos teóricos y experiencia práctica sobre cómo gestionar estas situaciones, que les permitan adoptar las respuestas más adecuadas para garantizar la propia seguridad y aquella de las otras personas. Por ejemplo, en el caso de terremoto, Ronan y Johnston (2005) analizaron los resultados de estudios internacionales evidenciando que la preparación de los habitantes es, en general, escasa, también en las zonas geográficas de alto riesgo. En Nueva Zelanda, por ejemplo, aunque sea un país donde en la última década se han hecho muchas campañas de información sobre cómo prepararse al terremoto, más de la mitad de los habitantes declaró no haber realizado ninguna acción preventiva para reducir el impacto del terremoto en caso que ocurriera en el

futuro (Becker, Paton, Johnston, & Ronan, 2012). Estos datos están de acuerdo con los resultados del estudio III de esta tesis doctoral, que aborda la temática de la preparación y la respuesta de los ciudadanos al terremoto. Se evidencian, de hecho, unos datos preocupantes, que indican altas frecuencias de conductas inadecuadas y de riesgo. Concretamente más de un tercio de los participantes del estudio escapó del edificio durante los temblores, casi un tercio utilizó las escaleras y el 40% se trasladó a otra habitación del edificio en el cual se encontraba. Como indica la Federal Emergency Management Agency (FEMA, 2003) estas conductas son altamente desaconsejadas en caso de terremoto porque ponen a las personas en grave riesgo. Las escaleras representan, en muchas ocasiones, las partes más vulnerables de la estructura del edificio y con riesgo de colapso, escaparse o moverse a otra habitación expone a la persona al peligro de caídas (durante un terremoto es frecuente la pérdida de equilibrio), golpes y heridas por objetos o muebles o por la ruptura de los vidrios de las ventanas. Además, el estudio presenta porcentajes muy bajos (entre 7 y 14%) de personas que buscaron protección en el marco de una puerta, contra una pared maestra y debajo de una mesa o escritorio resistente. Esta última acción representa la conducta aconsejada y la primera elección (cuando es posible) en caso de terremoto, porque en las casas modernas los marcos de las puertas puedan que no sean más fuertes y seguros que cualquier parte de la casa (U.S. Geological Survey, 2011). La preparación en emergencia (es decir, pertenecer a una asociación de protección civil o tener una experiencia previa de terremoto) se asocia a menos conductas inadecuadas, aunque no promueve la búsqueda de protección *in situ*. Hablar de desarrollo de una cultura de la emergencia y preparación de los ciudadanos a los riesgos psicofísicos asociados con la exposición a estas situaciones, pone de inmediato la cuestión de la comunicación sobre los riesgos ambientales. Un reto para los profesionales que trabajan en este ámbito será mejorar la eficacia de las campañas y de los programas de educación, que en la mayoría de los casos tienden a proporcionar informaciones pasivas, a través de materiales informativos, televisión o páginas web, y no basada en mensajes eficaces. Con respecto a esto, se ha evidenciado que este tipo de información está asociado a niveles más bajos de sensibilización y conciencia sobre la importancia de la preparación en situaciones de desastre y emergencia, en comparación con la experiencia práctica (ej. conocimientos adquiridos a través de la vida personal, experiencias de otros) y las informaciones interactivas (ej. actividades en la escuela, simulacros en el trabajo) que tienen más capacidad de motivar el cambio (Becker et al., 2012).

Los resultados de la presente tesis precisan ser interpretados con cautela debido a algunas limitaciones de los estudios que la componen. En primer lugar, el diseño es correlacional y esto no permite establecer relaciones causales entre las variables analizadas. En segundo lugar, la

muestra no es representativa de la población general y no ha sido seleccionada de manera aleatoria. Debido a que los sobrevivientes participaron voluntariamente en los estudios, es posible que existan sesgos latentes vinculados a la decisión de participar; estos sesgos pueden, de hecho, caracterizar la muestra e influir en los resultados obtenidos. A pesar de esto, cabe destacar que los datos del estudio III han sido recogidos pocos días después del suceso y sugieren una cierta fiabilidad del recuerdo de los participantes.

A pesar de estas limitaciones, los resultados de estos estudios tienen implicaciones importantes para la seguridad y la salud psicofísica de los afectados. En este sentido el desarrollo de una cultura de la emergencia representa un reto para quienes se ocupan de la gestión de las situaciones de crisis y, también, para los profesionales de la salud mental. Esto es un objetivo crucial debido a la urgencia de motivar a las personas a ser más proactivas en conocer los riesgos ambientales presentes en sus contextos de vida (ej. hogar, lugar de trabajo, área geográfica etc.) y tomar medidas para hacer frente a las consecuencias negativas que pueden ser evitables. Estas medidas podrían tener implicaciones también para la salud mental porque pueden aumentar la percepción de autoeficacia relativa a la gestión de la emergencia que, como se ha presentado antes, es un factor de protección hacia el desarrollo de los síntomas de estrés postraumático. En este sentido, la seguridad y la preparación (*safety* y *preparedness*), así como la salud mental de los afectados se presentan como estrechamente interrelacionados. Será importante que futuros estudios puedan testar modelos que tengan en cuenta tanto los indicadores de salud mental como los constructos relacionados con la preparación y cultura en emergencia, porque ambos constituyen aspectos diferentes y cruciales de la vivencia de los sobrevivientes de situaciones de desastre y emergencia.

CONCLUSIONES

Esta tesis presenta los resultados de tres estudios dirigidos a la identificación de los factores de riesgo y protección implicados en el desarrollo de síntomas de estrés postraumático y crecimiento postraumático, y a aquellos asociados a la seguridad de las personas afectadas por diferentes situaciones de desastre y emergencia, como terremotos, inundaciones, ataques de terrorismo e incendios. A continuación se resumen los resultados más significativos de los estudios:

1. En las personas que se enfrentan con un suceso traumático los síntomas de estrés postraumático y el crecimiento postraumático están asociados positivamente, sugiriendo que son dos constructos posiblemente coexistentes. Se evidencia que el mecanismo a través del cual están asociados ve los síntomas de intrusión-hyperarousal como mediadores entre los síntomas de pánico peri-traumático y el crecimiento postraumático.
2. Los resultados están de acuerdo con estudios precedentes en los que se evidencian el papel de algunos factores que predicen el crecimiento y el estrés postraumático. Entre los nuevos predictores se destaca el papel de los síntomas de pánico peri-traumático que promueven el crecimiento postraumático y la percepción de autoeficacia durante la situación de emergencia, que reduce los síntomas de estrés postraumático.
3. Se confirma la validez del modelo ampliado de Kuligowski y Mileti (2009), que ha sido aplicado por primera vez como modelo para explicar la conducta humana en caso de terremoto.
4. Se sugiere la importancia de revisar el modelo del apego social en los desastres (Mawson, 2005) teniendo en cuenta que la presencia de familiares en una situación de peligro no influye en la respuesta emocional, la evacuación y los comportamientos de protección de las personas afectadas por un terremoto.
5. Se evidencian bajas tasas de comportamientos de autoprotección. Esto destaca la importancia de aumentar la consciencia sobre los riesgos ambientales, desarrollar programas de prevención, que sean específicos para diferentes tipos de amenazas y dirigidos a los ciudadanos con el fin de proporcionar herramientas para garantizar la propia seguridad y la de los familiares.

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APÉNDICE

RESUMEN DE LA TESIS (VERSIÓN EN ITALIANO)

INTRODUZIONE

Questa tesi di dottorato prende in esame la letteratura sulle reazioni postraumatiche (Benedek, Fullerton, & Ursano, 2007; Elhers & Clark, 2000; Norris & Kaniasty, 1996; Tedeschi & Clahoun, 2004) e il comportamento umano in situazioni di pericolo (Drury & Cocking, 2007; Drury, Cocking, & Reicher, 2009a; 2009b; Kuligowski & Mileti, 2009; Mawson, 2005, 2007; Turner & Killian, 1987). La ricerca su situazioni di disastri ed emergenze sta ricevendo, infatti, un'attenzione crescente a causa delle conseguenze psico-fisiche subite dalle persone colpite e dei danni economici causati da tali eventi (Guha-Sapir, Hoyois, & Below, 2013). Infatti, l'aumento della popolazione, lo sviluppo economico e urbanistico rende le conseguenze potenziali di questi eventi di maggiore entità (Paton & Johnston, 2006). Tuttavia, la validità dei modelli e degli studi realizzati per la maggior parte in paesi anglosassoni non è stata dimostrata in contesti con caratteristiche differenti (es. geografiche, culturali, sociali). Ciò è importante in quanto la cultura sembra influenzare le reazioni emotive e cognitive delle persone colpite (Steger, Frazier, & Zacchanini, 2008). Credenze, atteggiamenti, comportamenti e precedenti esperienze, che contribuiscono a costituire la “cultura dell'emergenza” propria di ogni paese, possono differire in modo significativo, anche in relazione agli aspetti legislativi, all'educazione dei cittadini e alla gestione delle situazioni di emergenza.

Uno dei rischi dell'esposizione a una situazione d'emergenza è lo sviluppo di stress postraumatico (North & Pfefferbaum, 2013), allo stesso tempo alcune persone riferiscono un vissuto di crescita personale associato all'esperienza traumatica (Tedeschi & Calhoun, 2004a). Gli studi sulla relazione tra stress e crescita postraumatica e i fattori di rischio e protezione a essi associati presentano risultati discordanti (Grubaugh & Resick, 2007; Hobfoll, Canetti-Nisim, & Johnson, 2009) e non è chiara la relazione che lega questi due costrutti.

Tra le teorie psicosociali che considerano il ruolo dei fattori protettivi troviamo la teoria socio-cognitiva di Benight e Bandura (2004), che si focalizza sul ruolo dell'*agency* e dell'auto-efficacia. Secondo gli autori gli individui sono agenti attivi nel processo che li conduce ad affrontare e adattarsi al trauma, e ciò implica che una risposta adattativa è associata alla presenza di convinzioni di auto-efficacia. Quindi, le persone che si percepiscono in grado di gestire una situazione difficile, o che sentono di poter esercitare un certo livello di controllo sull'evento e le sue conseguenze, presentano un miglior adattamento e meno conseguenze negative. Per affrontare i rischi ambientali e ridurre il loro impatto sulla salute mentale e sull'integrità psicofisica, è pertanto necessario considerare non solo i fattori associati alla vulnerabilità, ma anche quelli che possono favorire una risposta adattativa e di crescita. In questo senso, il paradigma salutogenico (Antonowsky, 1990) può aiutare a comprender le risposte psicosociali in emergenza e come potenziare gli aspetti di crescita e adattamento. L'integrazione del paradigma salutogenico con quello del distress è, infatti, importante poiché sia nel discorso comune sia negli studi precedenti si è sempre posta maggior attenzione agli aspetti di vulnerabilità e alle perdite (es. di beni materiali, decessi, salute) rispetto ai benefici ottenibili attraverso l'esperienza traumatica e alle risposte adattive (Paton & Johnston, 2006).

In linea con questo approccio che considera sia gli aspetti di vulnerabilità che quelli di crescita e adattamento, la tesi si compone di tre studi. I primi due sono volti a identificare i fattori di rischio e protezione per lo sviluppo di sintomi di stress posttraumatico e crescita post-traumatica dopo l'esperienza di un disastro o situazione di emergenza. Il terzo studio si focalizza, invece, sulla *safety*, ossia, sui comportamenti che possono garantire la sicurezza delle persone che si trovano in una situazione di pericolo (ad esempio, il rispetto delle norme di sicurezza, l'adozione di comportamenti adeguati durante l'evento, la preparazione di un piano di evacuazione, la ricerca di informazioni, ecc.) e sui fattori socio-contestuali ad essi associati. L'adozione di un comportamento appropriato durante l'emergenza non influenza solo la sopravvivenza durante il verificarsi dell'evento critico (*response*), ma anche la fase di recupero (*recovery*) (Paton & Johnston, 2006). Infatti, sebbene sia scarsa l'integrazione tra gli studi sulla *safety* e quelli sulle conseguenze per la salute mentale di disastri ed emergenze, è emerso che i fattori peri-traumatici (es. le reazioni emotive e comportamentali sperimentate durante l'evento) hanno un notevole impatto sulla salute mentale (Ozer et al. , 2003) e la sicurezza fisica delle persone colpite.

OBIETTIVI

Di seguito sono presentati gli obiettivi specifici della presente tesi.

STUDIO I

Il primo studio della ricerca ha avuto lo scopo di analizzare (a) la relazione tra crescita post-traumatica e stress post-traumatico, (b) identificare i predittori di questi due costrutti e, infine, (c) comprendere il meccanismo che lega i sintomi di panico peri-traumatico, lo stress post-traumatico e la crescita post-traumatica.

STUDIO II

Il secondo studio ha esaminato (a) il ruolo dell'auto-efficacia percepita durante la situazione d'emergenza come fattore protettivo verso lo sviluppo di sintomi di stress post-traumatico. Un secondo obiettivo (b) è stato quello di analizzare possibili predittori di stress post-traumatico includendo nel modello multivariato dei fattori che riflettono l'esperienza previa in emergenza dei partecipanti.

STUDIO III

Lo scopo del terzo studio è stato quello di analizzare le reazioni emotive e comportamentali dei sopravvissuti vittime di un terremoto, utilizzando due modelli esplicativi delle reazioni umane in situazioni di pericolo: il modello dell'attaccamento sociale nei disastri (Mawson, 2005) e il modello ampliato di Kuligowski e Mileti (2009), applicato in questo studio al caso di un terremoto.

STUDIO I

Abstract (traduzione dell'abstract originale)

Abbiamo studiato la relazione tra crescita post-traumatica e sintomi di stress post-traumatico tra sopravvissuti di incendi, terremoti e inondazioni. Inoltre, abbiamo esplorato il contributo di diversi predittori di questi due costrutti. I partecipanti sono stati 173 superstiti di diverse situazioni d'emergenza verificatesi in Italia negli ultimi dieci anni. I risultati dello studio hanno mostrato una relazione positiva tra crescita post-traumatica e sintomi di intrusione-iperarousal e tra crescita post-traumatica e sintomi di evitamento. Dall'analisi di regressione multipla è emerso che i sintomi di panico peritraumatico sono predittori di sintomi di intrusione-iperarousal e di crescita post-traumatica. Inoltre, i sintomi di intrusione-iperarousal mediano la relazione tra sintomi di panico peritraumatico e crescita post-traumatica. Questi risultati contribuiscono a una migliore comprensione del ruolo dei pensieri intrusivi nello sviluppo della crescita post-traumatica.

STUDIO II**Abstract (traduzione dell'abstract originale)**

Questo studio indaga se l'autoefficacia percepita durante una situazione di emergenza ha un ruolo protettivo nello sviluppo di sintomi da stress post-traumatico in sopravvissuti italiani e spagnoli di varie situazioni di emergenza. Abbiamo esplorato l'impatto dell'auto-efficacia in un modello di regressione multipla assieme ad altri predittori di sintomi di stress post-traumatico, come le conoscenze previe in emergenza; la fiducia nei servizi di emergenza, la percezione del rischio di diventare vittima di una situazione di emergenza e l'attuazione di un comportamento consapevole e attivo durante l'emergenza in confronto con un comportamento non consapevole e non attivo. Abbiamo condotto uno studio retrospettivo con 214 partecipanti che hanno riferito la loro esperienza come vittime di una specifica situazione d'emergenza. I risultati hanno mostrato che i sopravvissuti, che si sono percepiti come più auto-efficaci durante l'evento traumatico, hanno sperimentato meno sintomi di stress post-traumatico. Al contrario, il genere femminile, una più alta percezione di minaccia personale e una maggior gravità della situazione traumatica sono associati con più sintomi. I risultati contribuiscono a comprendere meglio il comportamento umano in situazioni di emergenza e a evidenziare il ruolo protettivo della percezione di auto-efficacia fra i sopravvissuti di situazioni di emergenza.

STUDIO III

Abstract (traduzione dell'abstract originale)

Lo scopo di questo studio è stato analizzare il comportamento umano nel corso dell'evento sismico del 2012 verificatosi nel Nord Italia. Inoltre, il presente studio ha utilizzato il modello esteso di Kuligowski e Mileti (2009) e il modello dell'attaccamento sociale nei disastri come cornici teoriche per esplorare le reazioni comportamentali. Lo studio ha incluso 1839 partecipanti che sono stati colpiti dal terremoto verificatosi in Emilia-Romagna (Italia) il 20 maggio 2012. Le reazioni comportamentali più frequenti durante il terremoto sono state muoversi verso un'altra stanza della casa, uscire di casa e rimanere a letto. In accordo con il modello esteso di Kuligowski e Mileti (2009), il rischio percepito è stato associato con l'evacuazione, mentre la preparazione in emergenza è associata a risposte più efficienti ed efficaci durante il terremoto. In linea con il modello dell'attaccamento sociale, i comportamenti di affiliazione sono stati più frequenti dei comportamenti di fuga, mentre, contrariamente alle sue predizioni, il contesto sociale non ha influenzato le risposte emotive, i comportamenti di evacuazione e la ricerca di protezione.

DISCUSSIONE DEI RISULTATI

Questa tesi si è posta due obiettivi principali. Il primo obiettivo è stato indagare i predittori di stress post-traumatico e crescita post-traumatica e la relazione tra questi due costrutti (studio I e II). Il secondo obiettivo è stato esplorare le reazioni emotive e comportamentali in emergenza analizzando i fattori socio-contestuali capaci di promuovere i comportamenti di *safety*, ossia quelli capaci di garantire la sicurezza delle persone coinvolte nella situazione di pericolo (es. rispetto delle norme di sicurezza, comportamenti di autoprotezione durante l'evento, etc.) (studio III). I risultati del primo studio supportano le ricerche che hanno trovato una relazione positiva tra i due costrutti (Park et al., 1996; Schorr & Roemer, 2002; Tomich & Helgeson, 2004), dimostrando che lo stress e la crescita possono rappresentare due aspetti possibilmente coesistenti nell'esperienza potenzialmente traumatica. Nel secondo studio è stato invece analizzato l'impatto della percezione di auto-efficacia durante l'evento stressante e l'influenza di alcuni fattori legati all'esperienza in emergenza dei sopravvissuti. In accordo con altre ricerche (Luszczynska, Benight, & Cieslak, 2009), è emerso che l'auto-efficacia percepita durante l'emergenza è un fattore in grado di ridurre i sintomi di stress post-traumatico. Infine, il terzo studio si è focalizzato sul tema della sicurezza, esplorando il ruolo di alcuni fattori sociali e contestuali che possono influenzare le reazioni emotive e comportamentali delle persone colpite da un terremoto. I risultati hanno mostrato che la preparazione in emergenza riduce la probabilità di comportamenti inadeguati, mentre un'alta percezione del rischio è associata con comportamenti di evacuazione durante il sisma.

I risultati degli studi I e II suggeriscono che i superstiti di situazioni d'emergenza possono superare eventi potenzialmente traumatici e ridurre l'impatto negativo. Nonostante la popolarità del paradigma dello stress con l'enfasi sulle conseguenze psicopatologiche dei disastri, studi precedenti hanno evidenziato che le persone colpite da situazioni potenzialmente traumatiche reagiscono nella maggior parte dei casi in maniera adattiva (Vázquez, Cervellón, Pérez-Sales, Vidales, & Gaborit, 2005). La crisi può in questo senso avviare un processo di cambiamento, che in alcuni casi si configura come un'esperienza di crescita profonda in vari aspetti del sé, delle relazioni interpersonali e della filosofia di vita. Tuttavia è bene rilevare che la crescita post-traumatica non rappresenta un processo "indolore" e automatico, al contrario, affinché avvenga un cambiamento negli schemi mentali e nelle credenze degli individui è necessario sperimentare un certo livello di sofferenza associata all'esperienza traumatica (Tedeschi & Calhoun, 2004a). A riguardo Helgeson et al. (2006) evidenziano un'associazione positiva tra benefici psicologici conseguiti in seguito all'esperienza traumatica e sintomi di intrusione, suggerendo l'ipotesi per cui le ruminazioni intrusive possano rappresentare indicatori

del processo cognitivo di rielaborazione e integrazione dell'esperienza traumatica negli schemi mentali preesistenti. In vittime di disastri ed emergenze, diversi fattori favoriscono questa esperienza di crescita, ma i sintomi di panico peri-traumatico (ossia sperimentato durante l'evento) e i sintomi di intrusione-iperarousal sono i più forti predittori di crescita post-traumatica. In particolare, per quanto riguarda il rapporto tra queste variabili è emerso che il panico peri-traumatico promuove la crescita attraverso la mediazione dei sintomi di intrusione-iperarousal. Questo risultato è in linea con l'approccio di Januff-Bulman (1992) e Tedeschi e Calhoun (2004b) secondo i quali affinché si modifichino le credenze di base è necessario che l'esperienza vissuta provochi un certo livello di conflitto e rottura con le credenze pretraumatiche. In questo senso le ruminazioni intrusive possono riflettere il processo di assimilazione e accomodamento, che può condurre a includere il trauma e le sue conseguenze all'interno degli schemi mentali dell'individuo e a promuoverne la ristrutturazione, ciò si riflette in cambiamenti percepiti nell'immagine di se stessi, degli altri e del mondo (Vázquez et al., 2005).

In accordo con studi precedenti (Brewin et al., 2000; Ozer et al., 2003), i risultati di questa tesi hanno evidenziato che i fattori peri-traumatici sono i più forti predittori di sintomi di stress post-traumatico: il panico peri-traumatico si associa a più sintomi di stress post-traumatico e la percezione di autoefficacia durante la situazione di emergenza ne riduce i sintomi. Questi risultati suggeriscono alcune implicazioni in ambito terapeutico e di educazione della comunità. Per quanto riguarda le implicazioni terapeutiche o di supporto alle vittime, si vuol porre l'accento sull'importante ruolo dei sintomi di intrusione-iperarousal nel processo di sviluppo della crescita post-traumatica. I professionisti della salute mentale dovrebbero quindi aiutare i pazienti a gestire il disagio arrecato dai sintomi, considerando, allo stesso tempo, che tali sintomi possono contribuire ad avviare un processo di cambiamento negli credenze personali (es. idea di invulnerabilità, benevolenza del mondo) e in vari ambiti di vita (Tedeschi & Calhoun, 2004b). Poiché la crescita post-traumatica richiede un certo tempo per manifestarsi, gli interventi volti a stimolare la crescita postraumatica potrebbero essere orientati ad arricchire le narrazioni dei pazienti connesse con il trauma, quando questi siano in grado di gestire il disagio e la sofferenza causati dai sintomi (Tedeschi & Calhoun, 1995). È comunque pur sempre necessario considerare che la crescita post-traumatica rappresenta uno dei molteplici e possibili esiti associati all'esperienza traumatica. Infatti, per alcuni sopravvissuti, l'esperienza traumatica potrebbe essere stata così devastante, da non consentire una ridefinizione dell'esperienza traumatica, perché troppo dolorosa o vissuta con disagio e rifiuto. I risultati suggeriscono inoltre un'altra considerazione per chi lavora con vittime di disastri ed emergenze, ossia la necessità di aiutare i pazienti a ristabilire una percezione di controllo sulla propria vita e sull'immagine di sé. In

questo senso, potrebbe essere di aiuto esplorare il comportamento durante l'evento, allo scopo di identificare quelle percezioni di controllo e autoefficacia personale esperite durante la situazione critica. Questo perché la percezione di auto-efficacia durante l'evento è un fattore protettivo che riduce i sintomi di stress post-traumatico e rappresenta, inoltre, una componente modificabile e influenzabile, diversamente da altre variabili pre-traumatiche, come quelle socio-demografiche, la storia psichiatrica o le precedenti esperienze, che, pur essendo fattori di rischio, riflettono caratteristiche immodificabili della persona.

Per quanto riguarda l'educazione dei cittadini, emerge una chiara necessità di migliorare la preparazione in emergenza per affrontare adeguatamente eventi naturali (es. terremoti, alluvioni ecc.) o di altra natura (es. incendi). Il concetto di preparazione (*preparedness*), secondo la definizione riportata da Levec, Toal-Sullivan e O'Sullivan (2012), riguarda l'identificazione di barriere e condizioni che contribuiscono alla vulnerabilità, assieme alle risorse personali e contestuali che consentono di rispondere adeguatamente a un evento avverso. Ronan e Johnston (2005) hanno analizzato i risultati di studi internazionali e dimostrato che la preparazione della popolazione in caso di terremoto è generalmente bassa, anche in aree geografiche ad alto rischio. In Nuova Zelanda, per esempio, malgrado negli ultimi dieci anni siano state svolte numerose campagne sulla preparazione verso i terremoti, più della metà dei residenti ha riferito di non aver intrapreso azioni preventive per ridurre l'impatto di un possibile evento sismico (Becker, Paton, Johnston, & Ronan, 2012). Questi risultati sono in accordo anche con quelli dello studio III della presente tesi, che affronta la questione della preparazione e la risposta dei cittadini al terremoto. Essi mostrano, infatti, alcuni dati preoccupanti indicanti alte frequenze di comportamenti inappropriati e di rischio. In particolare, più di un terzo dei partecipanti allo studio è uscito dall'edificio durante le scosse, quasi un terzo ha usato le scale e il 40% si è spostato in un'altra stanza rispetto a quella in cui si trovava. Come indicato dalla Federal Emergency Management Agency (FEMA, 2003) questi comportamenti sono inappropriati in caso di terremoto, perché espongono le persone a gravi rischi. Inoltre, lo studio mostra percentuali molto basse (tra il 7 e il 14%) di comportamenti volti a cercare protezione sul luogo. Questi risultati sembrano essere in accordo con quanto riportato da Paton (2003) rispetto ai scarsi livelli di preparazione dei cittadini. Al contrario, la preparazione in emergenza (ad esempio, far parte di un'associazione di protezione civile o avere una precedente esperienza terremoto) è associata a meno comportamenti inappropriati, ma non promuove la ricerca di protezione sul luogo.

I risultati di questa tesi suggeriscono l'urgenza di promuovere un'adeguata consapevolezza sulla percezione dei rischi ambientali. In quest'ottica, sarà importante sviluppare un'efficace comunicazione del rischio. Ciò si configura come una sfida per chi si occupa di

emergenza, data l'incerta efficacia delle attuali campagne, che si avvalgono prevalentemente di informazioni passive, diffuse attraverso materiali informativi, televisione o pagine web. A tale proposito, è stato dimostrato che questo tipo d'informazione si associa a bassi livelli di consapevolezza verso la preparazione in emergenza, in confronto con l'impatto di informazioni acquisite tramite esperienze pratiche (es. le conoscenze ottenute tramite le esperienze di vita proprie o altrui), e con quello di informazioni interattive (es. le attività scolastiche, le simulazioni sul lavoro), che sembrano essere più efficaci nel motivare al cambiamento (Becker et al. , 2012).

I risultati di questa tesi devono essere interpretati con cautela a causa di alcuni limiti metodologici presenti negli studi che la compongono. In primo luogo, il disegno è di tipo correlazionale e non consente di identificare le relazioni causali tra le variabili considerate. In secondo luogo, il campione non è rappresentativo della popolazione generale e non randomizzato. Poiché i sopravvissuti delle situazioni d'emergenza hanno partecipato volontariamente allo studio, è possibile che ci siano dei *bias* latenti associati alla decisione di partecipare che abbiamo influenzato le caratteristiche del campione e i risultati degli studi.

Nonostante questi limiti, i risultati hanno importanti implicazioni per la sicurezza e la salute psicofisica delle persone colpite da situazioni d'emergenza, suggerendo l'importanza di sviluppare una cultura dell'emergenza per far fronte alle minacce dei rischi ambientali. Questo obiettivo richiede la presa di coscienza dei rischi presenti nel contesto di vita (es., nella propria casa, sul posto di lavoro, nell'area geografica di appartenenza, ecc.) e l'adozione di misure per mitigare le conseguenze negative ad essi associate in termini di salvaguardia della sicurezza e della salute mentale. Aumentare l'autoefficacia dei cittadini sarà in questo senso fondamentale per gli effetti di questa variabile sia sulla salute mentale (Luszczynska et al., 2009) sia sulla preparazione in emergenza (Paton, 2003). A questo riguardo, la sicurezza, la preparazione e la salute mentale si configurano come aspetti strettamente correlati nell'esperienza delle persone esposte (o potenzialmente a rischio) di emergenze. Sarà importante che in studi futuri si possano testare dei modelli che tengono conto sia degli indicatori di salute mentale, come lo stress e la crescita posttraumatica, sia di costrutti quali la preparazione e la sicurezza, poiché rappresentano aspetti diversi e cruciali dell'esperienza di sopravvissuti di disastri e situazioni d'emergenza.

CONCLUSIONI

Questa tesi presenta i risultati di tre studi volti a identificare i fattori di rischio e protezione coinvolti nello sviluppo dei sintomi di stress post-traumatico e crescita post-traumatica, la relazione tra questi due costrutti e i fattori socio-contestuali connessi con la sicurezza delle persone colpite da disastri ed emergenze come terremoti, inondazioni, incendi e atti di terrorismo. I risultati più importanti sono riassunti di seguito:

1. Nelle persone vittime di disastri ed emergenze esiste un'associazione positiva tra sintomi di stress post-traumatico e crescita post-traumatica, suggerendo che i due costrutti possono coesistere. I risultati mostrano che i sintomi di intrusioni-iperarousal sono mediatori tra i sintomi di panico peri-traumatico e la crescita post-traumatica.
2. I risultati confermano studi precedenti sui predittori di crescita e stress post-traumatico. Tra i nuovi fattori predittivi emergono i sintomi di panico peri-traumatico che promuovono la crescita post-traumatica e l'auto-efficacia durante la situazione di emergenza che riduce i sintomi di stress posttraumatico.
3. I risultati confermano la validità del modello esteso di Kuligowski e Mileti (2009), che è stato applicato per la prima volta per spiegare il comportamento umano in caso di terremoto.
4. Si evidenzia la necessità di rivedere il modello dell'attaccamento sociale nei disastri (Mawson, 2005). I risultati ottenuti mostrano che la presenza di familiari durante una situazione di pericolo non influenza la risposta emotiva, l'evacuazione e i comportamenti protettivi delle persone colpite dal terremoto.
5. Emergono scarsi tassi di comportamenti auto-protettivi durante l'evento sismico. Ciò evidenzia l'importanza di aumentare la coscienza sui rischi ambientali, sviluppare programmi di prevenzione delle emergenze, che siano specifici per diversi tipi di minacce e con la finalità di fornire risorse adeguate a garantire la propria e altrui sicurezza.

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