Menschliche Reaktionen in Naturkatastrophen und technologischen Krisensituationen:

Ergebnisse der explorativen Befragung von Überlebenden zur konzeptuellen

Entwicklung eines standardisierten Instruments für das retrospektive Assessment

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1. Zusammenfassung

Einleitung

In den letzten Jahren fanden in Europa Naturkatastrophen, wie 2010 die Flut in Polen oder die Elbeflut, die 2002 Teile Polens, Tschechiens und Deutschlands überschwemmte sowie die verheerenden Erdbeben in L'Aquila (Italien) 2009 und der Marmara Region (Türkei) 1999, aber auch von Menschen verschuldete Krisensituationen, wie die Terrorattentate in London 2005, Madrid 2004, Stockholm 2010 und Oslo 2011 statt, bei denen es eine Vielzahl an Verletzten und Toten zu beklagen gab, immense Sachkosten entstanden sind und nicht zuletzt viele traumatische Erinnerungen im Gedächtnis der Menschen blieben.

Untersuchungen zu Krisensituationen, sowohl aus individueller, sozialer, geographischer oder ingenieurstechnischer Perspektive, werden unter dem Begriff Katastrophenforschung und international als *disaster research* zusammengefasst. Obwohl die Bevölkerung immer häufiger Opfer von Naturkatastrophen und technologischen Krisensituationen, wie Terrorattentaten und Großbränden wird, und auch die Anzahl der Studien und Untersuchungen dazu steigen, gibt es derzeit keine vorherrschende klassische und eindeutige Definition des in der internationalen, wissenschaftlichen Gemeinde genutzten Begriffs *disaster* (Alexander, 2005; Perry, 2005; Perry, 2007).

Innerhalb der Sozialwissenschaften werden Krisensituationen und Katastrophen als soziales Phänomen aufgefasst, gekennzeichnet durch menschliche Interaktion sowie Verankerung in sozialen Strukturen und Systemen, im Gegensatz zu dem geographisch geprägten *hazard-disaster* Ansatz, der sich auf das Gefahrenereignis (*hazard*) selbst, also Naturkatastrophen, wie Erdbeben, Fluten, Stürmen etc. konzentriert (Perry, 2007; Quarantelli, 2005). So ist der Gefahrenmoment zwar mit dem *disaster* verbunden, aber „*a hazard might have been involved but was not the most important element in the disasters that occurred (...). A disaster is not a physical happening (...) it is a social occasion*“ (Quarantelli, 2005; p. 343). „*If there are no*

negative social consequences, there is no disaster" (Quarantelli, 2005; p. 347). Die Gemeinsamkeiten zwischen unterschiedlichen sozialwissenschaftlichen Definitionen von *disaster* beziehen sich außerdem zum einen auf den Ablauf von Stabilität – Unterbrechung – Anpassung (*stability-disruption-adjustment*), zum anderen werden häufig deren Bedeutung, Gründe und Konsequenzen für eine Definition herangezogen (Perry, 2007). Buckle (2005) bezieht sich zur Bestimmung des Begriffs auf die Charakteristiken von *disasters*, wie Verluste (Tod, Verletzungen und Trauma) und einem Betroffenenkreis, der von einer Familie bis zu einer ganzen Nation reichen kann, sowie Prozessbeschreibungen, wie einem schnellen Ausbruch, Handlungen getätigt zum Zweck des Selbstschutzes, begrenzten Warn- sowie Evakuierungs-/ Räumungsmöglichkeiten, wenn er von einem allgemeinen Verständnis und Konsens über *disasters* spricht, der sowohl von Laien als auch Experten geteilt wird. Unterschiede bei der Definition des Terminus *disaster* findet man v.a. seit den Anschlägen auf das World Trade Centre von 9/11 und der damit verbundenen neuen Bedrohung durch den islamistischen Terrorismus, darüber, welche Ereignisse als *disaster* klassifiziert werden. Die „klassischen Ereignisse", die zu einem *disaster* führen können, sind Naturkatastrophen; jedoch ist nicht geklärt, ob die modernen Krisensituationen, also jegliche unerwarteten Ereignisse, wie die Terrorattentate von New York 9/11 oder London 7/7, die Anthrax-Krise oder auch die havarierten Atomkraftwerke von Tschernobyl und Fukushima auch *disasters* darstellen (Boin, 2005; Cutter, 2005; Quarantelli, 2005). Zum anderen ist anzunehmen, dass es kulturelle Unterschiede in der Nutzung des Worts *disaster* gibt: Was im vergleichsweise sicheren Europa als *disaster* zählt, kann in China als Unfall klassifiziert werden (Boin, 2005). Daher schlägt Boin (2005) vor, das Konzept des Begriffs *crisis* einzuführen, der mit der Definition „*a serious threat to the basic structures or fundamental values and norms of a social system, which – under time pressure and highly uncertain circumstances - necessitates making critical decisions (Rosenthal, Charles and t´Hart 1989:10)*" (p.161) alle modernen Bedrohungen, auch diese, die nicht im klassischen Sinn als *disasters* verstanden werden,

umfasst. Daher wird in der vorliegenden Dissertation zur Spezifizierung des vorliegenden Forschungsvorhabens die deutsche Übersetzung des Terminus *crisis*, also Krisensituation, da neben den klassischen Naturkatastrophen auch weitere technologische, von Menschen verschuldete Bedrohungen, wie Terrorattentate, Großbrände und Gebäudeeinstürze als Ereignis in die Stichprobe integriert wurden, genutzt. Zusätzlich wurde eine operative Definition für Krisensituationen vorgenommen, die es möglich macht unterschiedliche Charakteristika der Situation in die Untersuchungen einzubeziehen. Krisensituationen werden als die negativen sozialen Konsequenzen, durch die bestimmte Auslöser, wie Terrorattentate, Naturkatastrophen, etc. der Gesellschaft ihre Verletzbarkeit aufzeigen, definiert.

Die Studie ist in das sozialwissenschaftliche Verständnis von *disaster research* (Katastrophenforschung) als Untersuchung von menschlichem Reaktionen und Interaktionen in Krisensituationen eingebettet, weiter ausdifferenziert wird jedoch in dieser Arbeit ein psychologischer Standpunkt eingenommen. Aus Sicht der klinischen Psychologie sind Krisensituationen und Katastrophen ein möglicher Auslöser für Posttraumatische Belastungsstörungen (PTSD). In dem Klassifikationssystems des *Diagnostic and Statistical Manual of Mental Disorders IV* wird das für eine PTSD Diagnose notwendige A-Kriterium mit einem Ereignis, das entweder zu tatsächlichem oder drohendem Tod, ernsthaften Verletzungen oder einer Gefahr der körperlichen Unversehrtheit der eigenen oder anderer Person(en) führt, spezifiziert. Zusätzlich werden die emotionalen und kognitiven Reaktionen auf das Ereignis, wie intensive Furcht, Hilflosigkeit oder Entsetzen als notwendige Kriterien für eine PTSD- Diagnose festgelegt (APA, 2000). Darauf basierend sind eine Vielzahl an psychologischen Studien (klinische Untersuchungen, epidemiologische Studien, deskriptive Befragungen, Interviews, Meta-Analysen, etc.) zur Erfassung von PTSD- Symptomen, aber auch Depression, Angst- sowie Anpassungsstörungen und deren Prädiktoren nach dem Erleben von Krisensituationen vorgenommen worden (Frans, Rimmö, Åberg and Fredrikson, 2005; Galea et al., 2002; Johannesson et al., 2009; Neria et al., 2006; Ozer, Best, Lipsey &

Weiss, 2003; Perkonnig, Kessler, Storz & Wittchen, 2000; Schuster et al., 2001; Silver, Holman, McIntosh, Poulin & Gil-Rivas, 2002; Wahlström Michelsen, Schulman & Backheden, 2008), wohingegen die Untersuchung der Verknüpfung von menschlichen Verhalten während der Krisensituationen mit den posttraumatischen Stresssymptomen nicht primäres Ziel dieser Studien war.

Der Fokus der vorliegenden Untersuchung von menschlichem Reaktionen in Krisensituationen lag auf der Verknüpfung von peritraumatischen, behaviouralen, kognitiven und emotionalen Reaktionen und deren Auswirkung auf posttraumatische Stresssymptome unter Berücksichtigung von Gedächtnisfunktionen, situationalen Charakteristika der Krisensituation und individueller Faktoren der Überlebenden. Die Studie besitzt aufgrund des bisherigen Forschungsstandes der Katastrophenforschung in der Psychologie einen explorativ- deskriptiven Charakter.

Empirischer Rahmen. Die Bedenken über Auswirkungen von Naturkatastrophen und die Bedrohungen durch Terrorismus führten in Europa zu einem Zusammenschluss von Forschungsgruppen zur Erklärung von menschlichen Reaktionen während und nach Krisensituationen sowie der Erarbeitung psychologischer Interventionen und Gefahrenprävention (BeSeCu, 2012). Die vorliegende Studie fand in einem europäischen Rahmen statt, an dem die Länder Deutschland, England, Polen, Spanien, Schweden, Tschechien und Türkei teilnahmen. Tabelle 1 gibt einen Überblick über Statistiken zur Anzahl der Ereignisse und Toten bei Terrorattentaten, Erdbeben, Fluten und Bränden in den sieben europäischen Ländern.

Tabelle 1: Statistik zur Anzahl der Krisensituationen Terrorattentat, Erdbeben, Flut und Brände sowie Anzahl der dadurch verursachten Todesfälle in den Ländern Schweden, Tschechien, Deutschland, England, Polen, Spanien und Türkei

		SW	CZ	GER	UK	PL	ESP	TUR
Terrorattentat[1]	Anzahl	8	3	15	25	-	732	477
(2000-2006)	Tote	0	0	1	56	-	241	169
Erdbeben[2]	Anzahl	0	0	1	1	0	0	15
(2000-2009)	Tote	0	0	0	0	0	0	252
Flut[2]	Anzahl	0	6	6	15	5	8	18
(2000-2009)	Tote	0	38	29	26	30	35	208
Brände[3]/Durchschnitt	Anzahl	26.772	19.369	184.485	489.942	179.815	-	59.618
pro Jahr (2002-2006)	Tote	105	102	479	532	503	-	340

Statistiken von [1]nationmaster.com (2011); [2]EM-DAT (2011); [3]CTIF (2008)

Zunächst werden psychologische Konsequenzen von Krisensituationen am Beispiel von Terrorattentaten in der Allgemeinbevölkerung beschrieben und mit theoretischen Modellen zur Risikowahrnehmung verknüpft sowie empirisch belegt.

Krisensituationen: Risikowahrnehmung und Auswirkungen auf die Bevölkerung. Grimm, Hulse und Schmidt (2009) zeigten in einer Übersichtsarbeit am Beispiel der Krisensituation Terrorattentat, dass die psychischen Auswirkungen von Krisensituationen, wie den World Trade Centre Terrorattentaten, aber auch den Attentaten in London 2005 und Madrid 2004, die sich in posttraumatischen Stresssymptomen, Angst und Depression, sowie erhöhtem Alkohol,- Nikotin- und Drogenkonsum zeigen, nicht nur auf direkte Opfer beschränkt sind (Galea et al., 2002; Miguel-Tobal et al., 2006; Rubin, Brewin, Greenberg, Simpson &

Wessely, 2005; Rubin et al., 2007; Schuster et al., 2001; Silver et al., 2002; Vlahov et al., 2002). Diese können sogar zu Verhaltensänderungen, wie Vermeidung bestimmter Plätze oder Verkehrsmittel in der Bevölkerung führen (Gigerenzer, 2006; Godwin, Wilson & Gaines, 2005; Lopez-Rouseau, 2005). Ergebnisse der Übersichtsarbeit legen nahe, dass psychische Reaktionen auf Terrorattentate mit sozio-demographischen Variablen, wie Alter, Geschlecht, Migrationsherkunft etc. und individuellen Einflüssen, wie psychiatrische Vorerkrankung oder Persönlichkeitsmerkmale zusammenhängen, aber nicht ausschließlich durch diese zu erklären sind (Grimm et al., 2009).

Hierbei ist anzunehmen, dass auch das Konstrukt der Risikobewertung mit psychischen Konsequenzen nach Terrorattentaten zusammenhängt. Die Society for Risk Analysis (2011) definiert Risiko bzw. Risikoeinschätzung als "*the potential for realization of unwanted, adverse consequences to human life, health, property, or the environment; estimation of risk is usually based on the expected value of the conditional probability of the event occurring times the consequence of the event given that it has occurred*" (http://www.sra.org/resources_glossary_p-r.php). Slovic, Finucane, Peters und MacGregor (2010) messen zusätzlich der emotionalen Wahrnehmung und Verarbeitung von Risiken eine hohe Bedeutung zu, wenn sie „*risk as feelings*" als evolutionspsychologisches Erbe mit „*fast, instincitve and intuitive reactions to danger*" (p. 21) beschreiben.

Ein Erklärungsansatz der beide Definitionen berücksichtigt, ist die theoretische Differenzierung zwischen genereller/ objektiver Risikowahrnehmung (d.h., der Einschätzung der räumlich und zeitlich begrenzten Auftretenswahrscheinlichkeit einer Krisensituation) und persönlicher/ subjektiver Risikowahrnehmung (d.h., der Einschätzung der Wahrscheinlichkeit, Opfer einer bestimmten Katastrophe zu werden) (Fischhoff, Gonzalez, Small & Lerner, 2003; Godwin et al., 2005; Huddy, Feldmann, Capelos & Provost, 2002). Hierbei wird angenommen, dass die persönliche Risikowahrnehmung mit emotionalen Konstrukten, wie Angst oder Depression sowie somatischen Beschwerden und zusätzlich mit

behaviouralen Veränderungen, wie Vermeidungsverhalten nach Terrorattentaten, einhergeht (Godwin et al., 2005; Huddy et al., 2002). Dieser angenommene Zusammenhang zwischen psychischen Stresssymptomen und Risikowahrnehmung wurde jedoch in der Studie von Rubin et al. (2007) nach den Terrorattentaten in London nicht empirisch bestätigt: weder die wahrgenommene subjektive Bedrohung durch Terrorattentate noch ein geringes Gefühl von Sicherheit waren Prädiktoren für Stresssymptome (Rubin et al., 2007).

Ein weiterer Ansatz zur Erklärung von Risikowahrnehmung ist das psychometrische Modell (Fischhoff, Slovic, Lichtenstein, Read & Combs, 1978; Slovic, 1987), das sich auf Charakteristika der Krisensituation bezieht, wobei das Grauen, also der "dread" Faktor derjenige ist, der am höchsten mit der Risikowahrnehmung korreliert, (Fischhoff et al., 1978; Slovic, 1987). Das psychometrische Modell wurde im Fall von Terrorattentaten von Sjöberg (2005) bestätigt, der nachweisen konnte, dass der Faktor des Grauens eines Ereignisses bei der Risikowahrnehmung von Terrorattentaten relevant ist. Zusätzliche Varianz wurde jedoch auch durch eine generell risikoreiche subjektive Einschätzung der Welt sowie Persönlichkeitsattribute, die durch Pessimismus und Verschwörungsszenarien gekennzeichnet sind, erklärt (Sjöberg, 2005).

Zusammenfassend lässt sich sagen, dass in der derzeitigen Forschung bei der Überprüfung verschiedener theoretischer Konstrukte mit empirischen Daten, die Auswirkungen und Verknüpfung von Risikowahrnehmung auf emotionaler, kognitiver und behaviouraler Ebene noch nicht ausreichend belegt sind. Zwar konnte gezeigt werden, dass die Höhe der Risikowahrnehmung mit der räumlichen Entfernung von den Orten der Terrorattentate und der Anzahl von Terrorattentaten betroffener Familienmitglieder oder Freunden zusammenhängt (Fischhoff et al., 2003; Steger, Frasier & Zacchanini, 2008). Jedoch wurde bisher noch keine Verbindung zwischen der hypothetischen Risikowahrnehmung von Krisensituationen und der tatsächlichen Risikowahrnehmung während einer Krisensituation und den daraus folgenden Auswirkungen, wie peritraumatisch gezeigten Emotionen,

Kognitionen und Verhalten sowie psychologischen Auswirkungen und Spätfolgen hergestellt. Obwohl eine systematische Erfassung, etwa im Rahmen einer Meta-Analyse, zu dem jetzigen Zeitpunkt aufgrund der verschiedenen Fragestellungen, Stichprobenzusammensetzungen und mangelnden theoretischen Konzepten noch nicht möglich war, konnten relevante zukünftige Forschungsfragen identifiziert werden. Vor allem von Interesse sind hierbei inwiefern die Charakteristiken bzw. Arten von Krisensituationen zu einer erhöhten Risikowahrnehmung führen und wie dadurch Auswirkungen auf die psychische Gesundheit und Einschränkungen im Verhalten entstehen.

Fragestellung

Die Aufmerksamkeit, Risikowahrnehmung und Ängste, die Krisensituationen, wie beispielsweise die Terrorattentate des World Trade Centers 2001 (Grimm et al., 2009) oder Naturkatastrophen, wie dem kürzlich aufgetretenen Tsunami 2011 in Japan und dem daraus resultierenden havarierten Atomkraftwerk von Fukushima, hervorrufen, sind in der Bevölkerung sehr hoch. Dennoch existieren in der öffentlichen Wahrnehmung häufig falsche Annahmen über menschliches Verhalten in Krisensituationen. So wird das Auftreten von Massenpanik und antisozialem Verhalten, wie Plündern, als in der Situation häufiges oder normales Verhalten angesehen (Alexander, 2007). Auch sind menschliche Reaktionen in Krisensituationen auf emotionaler, kognitiver und behaviouraler Ebene noch nicht vollständig erklärt, was sich vor allem auf interindividuelle Unterschiede bezieht. Beispielsweise zeigt ein Teil der Betroffenen bei Ausbruch einer Krisensituation die Bereitschaft zum Selbstschutz, während andere völlig reaktionslos bleiben (Leach, 2004). Daher bemüht sich die Wissenschaft um integrative Ansätze zum besseren Verständnis von Krisensituationen und Katastrophen, um die Verletzbarkeit der Gesellschaft zu minimieren und Reaktion sowie Entscheidungen in Krisensituationen zu optimieren (Cutter, 2003).

Mit der vorliegenden Dissertation wurden folgende, explorative Forschungsfragestellungen, bezogen auf die Katastrophen Terrorattentate, Naturkatastrophen sowie Gebäudebrände und Gebäudeeinstürze in sieben Ländern Europas untersucht.

Wie verhalten, denken und fühlen Menschen während einer Krisensituation?

- Sind peritraumatische, emotionale, kognitive und behaviourale Reaktionen bzw. deren Intensität universell oder unterscheiden sie sich in verschiedenen Krisensituationen?
- Stehen peritraumatische, emotionale, kognitive und behaviourale Reaktionen im Zusammenhang mit posttraumatischem Stress?
- Wie wird eine Krisensituation erinnert? Welchen Einfluss haben:
    A) die Art der Krisensituation,
    B) der posttraumatischer Stress,
    C) die Zeit zwischen der Befragung und dem Ereignis?

Welchen Einfluss auf posttraumatischen Stress nach Krisensituationen haben

A) peritraumatische, emotionale und kognitive Reaktionen,

B) sozio-demographische Variablen, wie Geschlecht, Alter und Bildung,

C) Charakteristika der Krisensituation, wie Art der Krisensituation, ausgesetzt sein mit Tod und Verletzungen?

Wie kann man peritraumatische Emotionen und Kognitionen in Krisensituationen messen?

Theorie

Um die vorliegende Arbeit in einen wissenschaftlichen Kontext einzubinden, werden relevante psychologische Modelle und Theorien zur Erklärung von Verhalten, Emotionen und Kognitionen in Krisensituationen herangezogen und dargestellt.

Theorien und empirische Erkenntnisse zu Reaktionen in Krisensituationen. Auf dem bisherigen psychologischen Forschungsstand gibt es kein umfassendes theoretisches Modell zu Reaktionen von Menschen in Krisensituationen, das sowohl als multi-dimensionales Konstrukt emotionale, kognitive, behaviourale und physiologische Komponenten berücksichtigt als auch empirisch belegt wurde. Leach (1994) definiert in seinem Buch *Survival Psychology* eine Krisensituation mit einem dynamischen Ansatz über die fünf Stadien Prä-Einschlagphase (*pre-impact phase*), mit den beiden untergeordneten Stadien der Bedrohung und der Warnung, der Einschlagphase (*impact phase*), der Phase des Rückschlags (*recoil phase*), der Rettungsphase (*rescue phase*) und schließlich der posttraumatischen Phase (*post-trauma phase*), wobei es für jede Phase psychologische Muster und Verhaltensmuster gibt, die unabhängig von der Art der Krisensituation gezeigt werden. Besonders hebt er die Bedeutung der Verdrängung bzw. des „Nicht-Wahr-Haben-Wollens" der Krisensituation sowie das behaviourale Dependent dazu, die Inaktivität, trotz objektiv erklärbarer Bedrohung und Warnung hervor. Dies zeigt sich vor allem in den ersten beiden Phasen der Krisensituation und wirkt sich nachteilig auf das Überleben aus (Leach, 1994). Weiterhin nimmt Leach (1994; 2004) an, dass während der *impact phase* der Krisensituation drei Arten von Reaktionen zu unterscheiden sind: 10-20% der Betroffenen bleiben ruhig und sind damit fähig Entscheidungen zu treffen sowie adäquat zu reagieren; 75% der Betroffenen sind überfordert, erleben Beeinträchtigungen im kognitiven Bereich und können nur noch in einer automatischen Art und Weise reagieren; 10-15% der Betroffenen zeigen kontraproduktives und nicht kontrollierbares Verhalten, wie beispielsweise Erstarren (Leach, 1994; 2004). Die häufigsten individuellen Reaktionen in Krisensituationen sind Panik, lähmende Angst, Wahrnehmungseinschränkungen, wie einen Tunnelblick, Verdrängung, Hypoaktivität, Apathie, Hyperaktivität, stereotypisches Verhalten (d.h. unpassendes, automatisches Verhalten, das eigentlich im Alltag gezeigt wird), irrationales Verhalten, Wut, Schuld (in der posttraumatischen Phase) und psychologischer Zusammenbruch (Leach, 1994). Leach's

Annahmen basieren auf Analysen der Berichte von Überlebenden von Krisensituationen, jedoch nicht auf quantitativ oder qualitativ erhobenen, kontrollierten Studien. In bisherigen psychologischen Studien, wie die von Prati, Catufi und Pietrantoni (2012) sowie Sotgiu und Galati (2007), wurden Überlebende von Erdbeben und Fluten mit standardisierten Erhebungsinstrumenten befragt und wiesen auf vergleichbare emotionale Reaktionen, v.a. Angst und Trauer hin. Auf Verhaltensebene wurde über altruistisches Verhalten, wie die Unterstützung/ Helfen von Freunden und Familie, aber auch die Reaktionen, Flucht, Erstarren und keine Reaktion, da man sich den Dimensionen der Katastrophe nicht bewusst war, berichtet (Alexander, 1990; Prati et al., 2012). Auf dem jetzigen Forschungsstand gibt es wenige standardisierte Befragungen von direkten Überlebenden verschiedener Krisensituationen. Auch wurden bisher Berichte über menschliche Reaktionen auf Naturkatastrophen und von Menschen geschaffenen, technologischen Krisensituationen nicht mit denselben Erhebungsinstrumenten durchgeführt und verglichen (Galea, Nandi & Vlahov, 2005).

Theorien und empirische Erkenntnisse zu peri- und posttraumatischer Verarbeitung in Krisensituationen. Zur Erklärung emotionaler und kognitiver Reaktionen in und nach Krisensituationen können unter anderem theoretische Ansätze derzeitiger PTSD Modelle, wie das *Kognitive Modell* von Ehlers und Clark (2000) in Betracht gezogen werden. Das Modell von Ehlers und Clark (2000) zieht zwei unterschiedliche Arten der Wahrnehmung bzw. Verarbeitung des Traumas zur Entstehung von PTSD heran und unterscheidet zwischen einer konzeptbezogenen und einer ereignisbezogenen Verarbeitung. Während die erstere mit einer klaren und analysierenden Wahrnehmung des Traumas sowie einem geringeren posttraumatischen Stresslevel verbunden ist, wird bei der zweiten Art der Verarbeitung, die zu höherem posttraumatischem Stress führt, das Ereignis vermehrt als überwältigender Eindruck aus emotionalen und sensorischen Eindrücken beschrieben (Ehlers & Clark, 2000). Dies zeigt sich auch in der Qualität des Erlebens des Traumas, bei dem die selbstbezogene Perspektive

bzw. die Aufgabe des Selbst und die Intensität von peritraumatischer Dissoziation erhöht ist (Ehlers & Clark, 2000). Einflussfaktoren der kognitiven Verarbeitung nach Ehlers und Clark (2000) können Charakteristiken des traumatischen Ereignisses, wie Dauer und Voraussehbarkeit, sowie der individuelle Zustand, also Höhe des Arousals und der Angst, Beeinträchtigung durch Alkohol- und Drogenkonsum sein. Verschiedene empirische Untersuchungen konnten weitere Prädiktoren posttraumatischen Stresses in Krisensituationen identifizieren. Dieses sind zum einen peritraumatische Emotionen und Kognitionen, wie Intensität der wahrgenommenen Angst, Kontrollverluste, Bedrohung des eigenen Lebens, physiologische Reaktionen und Dissoziation (Basoglu, Salcioglu & Livanou, 2002; Basoglu, Kihk, Salcioglu & Livanou, 2004; Brunet et al., 2001; Fikretoglu et al., 2007; Hollifield, Hewage, Gunawardena, Kodituwakku & Weerarathnege, 2008; Marmar et al., 1997; Ozer et al., 2003; Simeon, Greenberg, Knutelska, Schmeidler & Hollander, 2003; Sumer, Karanci, Berument & Gunes, 2005), zum anderen Art und Charakteristika der Krisensituation sowie der Grad des Augesetztseins mit dem traumatischen Ereignis, wie etwa durch Tod von Verwandten und Freunden oder eigenen Verletzungen (Galea et al., 2003; Johannesson et al., 2009; Shakespeare-Finch & Armstrong, 2010; Wahlström et al., 2008). Eine Verknüpfung zwischen den gefundenen Faktoren und ihrer Auswirkung auf behaviourale Reaktionen wurde bisher noch nicht untersucht.

Emotionale und traumatische Erinnerungen. Bei retrospektiven Untersuchungen, wie Befragungen zu dem Erleben von Krisensituationen, die emotional bis traumatisch sein können, sollten die Gedächtnisfunktionen von Betroffenen berücksichtigt werden (Stallings, 2007). Obwohl Studien sowohl zu emotionalem als auch traumatischem Gedächtnis zu inkonsistenten und unterschiedlichen Ergebnissen geführt haben (Sotgiu & Mormont, 2008), kann ein hohes emotionales Arousal bei dem Erleben einer Situationen zu einer exponierten Stellung im autobiographischen Gedächtnis führen (Christianson, 1992; Hulse, Allan, Memon & Read, 2007; Giezen, v., Arensman, Spinhoven & Wolters, 2005). Diese wird durch

Charakteristiken, wie Distinktivität, überraschendes Auftreten, häufiges Abrufen und Wiederholen (auch Erzählen) der Erinnerungen, ggf. gesellschaftliche Bedeutung des Ereignisses begünstigt (Pohl, 2007). In Krisensituationen werden vor allem Erinnerungen an die Notfallphase im Vergleich zur Vorbereitungsphase besser und über eine längere Zeit erinnert (Fivush, McDermott Sales, Goldberg, Bahrick & Parker, 2004; Bahrick, Parker, Fivush & Levitt, 1998). Im Gegensatz zu emotionalen Erinnerungen kann die Entwicklung von traumatischen Stresssymptomen oder einer Posttraumatischen Belastungsstörung (PTSD) die Gedächtnisfunktionen, bezogen auf das traumatische Ereignis, schwer beeinträchtigen (Brewin & Holmes, 2003). Auf der einen Seite haben Betroffene Probleme, willentlich autobiographische Erinnerungen des traumatischen Ereignisses abzurufen, auf der anderen Seite erleben sie häufig unfreiwillig sehr lebhafte, sensorische und emotionale Teile des Ereignisses als Teil der Gegenwart, sog. „*flashbacks*“, wieder (Ehlers & Clark, 2000). Analog zu dem kognitiven Modell von Ehlers und Clark (2000) neigen Personen, die unter PTSD-Symptomen leiden, zu einer ereignisbezogenen Verarbeitung, bei der die Integration des traumatischen Ereignisses in das autobiographische Gedächtnis vermindert oder gar nicht möglich ist (Ehlers & Clark, 2000; Kleim, Wallot & Ehlers, 2008). Empirisch ließ sich nachweisen, dass sowohl eine ereignisbezogene, als auch eine von der selbstbezogenen Perspektive entfernte Verarbeitung sowie Dissoziation mit einer geringeren Gedächtnisorganisation des traumatischen Ereignisses verbunden waren (Halligan, Michael, Clark & Ehlers, 2003).

Methoden

In der vorliegenden Studie wurden verschiedene Krisensituationen in sieben europäischen Ländern mit den Standorten Greifswald und Hamburg, Deutschland; London, England; Barcelona, Spanien; Stockholm, Schweden; Izmir, Türkei; Warschau, Polen und Prag, Tschechien durch eine Erhebung, die qualitative und quantitative Methoden kombiniert,

untersucht. Alle Teilstudien wurden von nationalen Ethikkommissionen positiv geprüft. Einschlusskriterien für Teilnehmer waren: (a) das Auftreten und Erleben einer lebensbedrohlichen Krisensituation, eines nicht-infektiösen Typs, (b) die Krisensituation trat vor max. 10 Jahren auf und war zeitlich/ örtlich begrenzt, (c) das Leben und Eigentum von vielen Menschen war bedroht (subjektive oder objektive Wahrnehmung), (d) Notfalleinsatzkräfte (Polizei, Feuerwehr, Notarzt, etc.) waren aufgrund der Krisesituation vor Ort, (e) eine Evakuierung/ Räumung wurde ganz oder in Teilen vorgenommen/ versucht, (f) Teilnehmer sind über 18 Jahre. Gemäß der vorliegenden Einschlusskriterien wurden 134 Überlebende der Krisensituationen Elbeflut (2002), Marmara Erdbeben (1999), Gebäudeeinstürze in Kattowitz und Barcelona (2006), Gebäudebrände, wie beispielsweise in einer Diskothek in Göteborg (1998) oder einem Krankenhaus in Hamburg (2007), Terrorattentate in London (2005) und Mumbai (2008), zu dem Ereignis befragt.

Die Koordination der Studie (u.a. Erstellen von Manualen und Datenmasken zur Studiendurchführung und –auswertung, Analysestrategien, finale Aufbereitung der Daten) fand an der Universität Greifswald am Lehrstuhl für Gesundheit und Prävention statt. Die Studienplanung (Erstellung der Instrumente, Festlegung von Einschlusskriterien, Stichprobengestaltung, etc.) wurde in internationalen Meetings durchgeführt. Rekrutierung sowie Datenerhebung und -aufbereitung wurde auf nationaler Ebene ausgeführt (Grimm, Hulse, Preiss & Schmidt, a, *in press*; Grimm, Hulse, Preiss & Schmidt, b, *in press*).

Interviews und Fokus Gruppen. Der erste Untersuchungsschritt waren Befragungen zum Erleben in Krisensituationen, die in Interviews und Fokus Gruppen durchgeführt wurden (Grimm et al., a, *in press*). Zur Erhebung wurde ein strukturierter, halb-standardisierter Fragebogen erarbeitet, der Techniken des Kognitiven Interviews nutzt, um das Erinnerungsvermögen der Teilnehmer zu erhöhen (Köhnken, Milne, Memon & Bull, 1999). Zunächst wurden die derzeitigen PTSD-Symptome mit der jeweils national validierten Version der Impact of Event Scale - Revised (IES-R; Weiss & Marmar, 1997) vor der

Befragung erhoben. Nach der Befragung wurde den Teilnehmern ein Fragebogen zu dem Ereignis inklusive einer retrospektiven Erfassung von emotionalem Stress und Risikowahrnehmung zum Zeitpunkt der Krisensituation sowie soziodemographischen Daten ausgehändigt. Alle Interviews wurden nach festgelegten Transkriptionsrichtlinien bearbeitet und übersetzt. Auf einem internationalen Meeting wurde auf Basis einer Stichprobe von Interviews aus allen Ländern über jede Krisensituation ein theoretischer Leitfaden (*theoretical framework*) erarbeitet, der als Ausgangsbasis für eine Inhaltsanalyse diente. Interviews wurden in den Zentren darauf basierend analysiert. An der Universität Greifswald wurde eine finale Zusammenführung der Datensätze durchgeführt. Die darauffolgende Analyse umfasste sowohl Inhalte der Interviews als auch die Anzahl der Erinnerungseinheiten und eine zufriedenstellende Analyse der interkulturellen Reliabilität der Befragung (Grimm et al., a, *in press*; Grimm et al., b, *in press*).

Fragebogendesign. Aus den vorliegenden Ergebnissen der internationalen Inhaltsanalyse wurde ein interkultureller Fragebogen für Überlebende von Krisensituation erstellt. Ziel war die Entwicklung einer retrospektiven, standardisierten Erhebung von peritraumatischen Emotionen und Kognitionen, die auf den dynamischen Ablauf von verschiedenen Krisensituationen maßgeschneidert ist (Grimm, Hulse & Schmidt, 2012). Zur Erstellung der Skalen und Items wurden zum einen die Dimensionen und Kategorien der Inhaltsanalyse genutzt, zusätzlich wurde die Anzahl der Aussagen als Kriterium für die Aufnahme eines Items in den Fragebogen genommen. Zum anderen wurden Konstrukte und Theorien sowie empirische Forschungsergebnisse zu peritraumatischen Reaktionen in Krisensituationen integriert.

Dem größten Teil der Studienteilnehmer (N= 311) wurde ein Szenario über eine Krisensituation (Terrorattentat, Brand, Flut oder Erdbeben), basierend auf den Erzählungen der Interviews vorgelegt, mithilfe dessen sie den Fragebogen beantworteten. Zusätzlich wurden 25 Überlebende von Krisensituationen mithilfe von kognitiven Debriefings befragt.

Um mögliche Konfundierungen zu vermeiden, wurde das Konstrukt der subjektiven Risikowahrnehmung erfasst. Es wurde angenommen, dass die Konstruktvalididtät des Fragebogens erhöht ist, wenn Items zur subjektiven Risikowahrnehmung faktorenanalytisch anderen Skalen zugeordnet werden können, wie Items zu peritraumatischen Emotionen und Kognitionen in Krisensituationen. Reaktionen in Krisensituationen wurden mit Hilfe eines dynamischen Ansatzes, dem sog. *Staging* erfasst, bei dem peritraumatische Emotionen und Kognitionen zu drei Zeitpunkten der Krisensituation (Realisierung, Evakuierung und Post-Evakuierung, also der Zeitpunkt nach der Rettung) abgefragt wurden. Eigenschaften von Items und Skalen zu peritraumatischen Emotionen und Kognitionen sowie Risikowahrnehmung wurden in der vorliegenden Studie psychometrisch und inhaltlich getestet (Grimm et al., 2012).

Ergebnisse

In der vorliegenden Studie wurden mehrere Erkenntnisse zu Verhalten, Emotionen und Kognitionen in verschiedenen Arten von Krisensituationen sowohl mit quantitativen als auch mit qualitativen Methoden gewonnen.

Reaktionen in Krisensituationen. Aus den Erzählungen von Überlebenden von Krisensituationen wurde ein interkultureller, theoretischer Leitfaden (*theoretical framework*) erstellt, der einen umfassenden Überblick sowohl zu dem Ablauf der Krisensituation, von der Realisierung bis zur Evakuierung, als auch zu den häufigsten emotionalen, kognitiven und behaviouralen Reaktionen gibt (Grimm et al., a, *in press*). Der Ablauf der Krisensituation wurde durch die Phasen Ausgangssituation (Realisierung mit 137 Nennungen und Interpretation mit 65 Nennungen) und Notfallphase (Reaktion mit 228 Nennungen, Entschluss über Evakuierung mit 82 Nennungen und Verlauf der Evakuierung mit 207 Nennungen) sowie Anregungen/ Verbesserungsvorschläge (91 Nennungen) beschrieben. Die emotionale und kognitive Verarbeitung während der Krisensituation wurde mit 120 Nennungen zur

Erinnerung von Emotionen, 223 zur Erinnerung von Kognitionen (133 zur Selbstwirksamkeit sowie 90 Nennungen zur Risikowahrnehmung) und 64 Nennungen zum schlimmsten Moment der Krisensituation dargestellt.

Die häufigsten Verhaltensweisen waren zum einen adaptiv und zum anderen von altruistischer Natur, wie Familie und Freunden zu helfen oder sie zu informieren, danach erst folgten Vorbereitung der Evakuierung und Informationssuche. Überlebende berichteten im gleichen Maß über instinktiv-automatische Reaktionen als auch rationale, überlegte und ruhige Reaktionen. Nur ein geringer Prozentsatz berichtet über Resignation während der Krisensituation. Die am häufigsten berichtete Emotion war Angst, gefolgt von den emotionalen Zuständen Panik, peritraumatische Dissoziation und Derealization sowie begleitenden physiologischen Reaktionen.

Im Allgemeinen lässt sich sagen, dass behaviourale Reaktionen direkt nach der Realisierung, dass man sich in einer Krisensituation befand, überwiegend universell waren. Auch wurden in allen Krisensituationen dieselben emotionalen und kognitiven Reaktionen berichtet. Unterschiede zwischen den Krisensituationen wurden zur Realisierung berichtet, die anhand unterschiedlicher Charakteristika, wie Explosionen, Rauch, Flammen, Feuer oder Wasser durchgeführt wurde. Auch wurde in Erdbeben und Bränden häufiger über eine korrekte Interpretation der Eigenschaften der Krisensituationen berichtet (Grimm et al., a, *in press*).

In der Untersuchung gab es Hinweise darauf, dass bestimmte, proaktive Verhaltensweisen, wie die Vorbereitung auf Evakuierung aus dem gefährdeten Gebäude, aber auch Informationssuche während der Krisensituation eher von Personen mit geringerem posttraumatischem Stress berichtet wurden. Auch berichteten vermehrt Personen mit hohem posttraumatischem Stress darüber, dass Sie bei Beginn der Krisensituation in der Wahrnehmung eingeschränkt waren (bspw. durch Schlaf, Alkoholkonsum) und somit nicht direkt das Ausmaß der Situation realisierten. Auf der anderen Seite, waren die Arten der Reaktion, rational-ruhiges Verhalten, automatisch-instinktives Verhalten, aber auch

Resignation, nicht mit dem derzeitigen posttraumatischen Stress verbunden. Personen mit hohem posttraumatischem Stress berichtetem vermehrt über peritraumatische Dissoziation und Derealization aber auch physiologische Reaktionen wie Herzrasen oder Schweißausbrüche, das Auftreten der am häufigsten berichteten Emotion Angst während der Situation war jedoch nicht mit späterem posttraumatischen Stress verbunden (Grimm et al., a, *in press*).

In der vorliegenden Interviewstudie konnte zunächst aufgrund der Rückmeldungen von Interviewern eine gute Gedächtnisfunktion von Überlebenden von Krisensituationen bestätigt werden. Die meisten Erinnerungen hatten Überlebende an die tatsächliche Notfallphase, die vorangehende Situation wurde nur mit der Hälfte an Erinnerungseinheiten beschrieben. Es gab keine Unterschiede bei der Anzahl der Erinnerungseinheiten zwischen den verschiedenen Krisensituationen sowie der Höhe des posttraumatischen Stresses der Befragten. Die Zeit, die zwischen der Befragung und der Krisensituation lag, wirkte sich nur negativ auf die Anzahl der Gedächtnisinhalte zur Ausgangssituation aus (Grimm et al., a, *in press*).

Peritraumatische Reaktionen, sozio-demographische Variablen, Charakteristika der Krisensituation und posttraumatischer Stress. Obwohl die berichteten Emotionen universell waren, unterschied sich die Intensität des peritraumatischen emotionalen Stresses und der Risikowahrnehmung, als auch die des posttraumatischen Stresses signifikant zwischen den Krisensituationen (Grimm et al., b, *in press*). Bei einer differenzierten Betrachtung fällt auf, dass die höchsten Werte bei peritraumatischen Reaktionen (Terrorattentate gefolgt von Gebäudeeinstürzen, Bränden und Flut) nicht zum höchsten posttraumatischen Stress führten (Gebäudeeinstürze, gefolgt von Bränden, Terrorattentaten und Flut). Trotz hoher Interkorrelationen zeigte die statistische Auswertung, dass die peritraumatischen Variablen keine Funktionen des derzeitigen posttraumatischen Stresses sind und dass unterschiedliche Konstrukte gemessen wurden (Grimm et al., b, *in press*).

Weitere Einflussgrößen, abgesehen von der Art der Krisensituation, die für peritraumatischen, emotionalem Stress und Risikowahrnehmung sowie posttraumatischem Stress ein signifikanter Prädiktor war, sind weibliches Geschlecht und eigene Verletzungen als Prädiktoren für postraumatischen Stress sowie weibliches Geschlecht, geringe Bildung, Tote während der Situation, Zeit zwischen der Krisensituation und dem Interview für peritraumatischen emotionalen Stress (Grimm et al., b, *in press*).

Fragebogenerstellung. Basierend auf den vorgestellten Theorien und Modellen sowie den qualitativen und quantitativen Ergebnissen der Befragung von Überlebenden verschiedener Krisensituationen wurde ein Fragebogen entwickelt und international mit Überlebenden von Krisensituationen und Szenario-Teilnehmern getestet (Grimm et al., 2012). Zur Erfassung peritraumatischer Emotionen und Kognitionen wurden Items zu den Skalen peritraumatische Emotionen (*peritraumatic emotions)* und peritraumatische Kognitionen (*peritraumatic cognitions)* mit den Konstrukten wahrgenommene Bedrohung (*perceived threat*), Kontrollüberzeugung (*control beliefs*) und Coping Strategien (*coping strategies*) sowie subjektive Risikowahrnehmung (*risk perception*) entworfen.

Der Fragebogen wurde im kognitiven Debriefing von Überlebenden von Krisensituationen als verständlich und realitätsnah bewertet. Zwanzig Prozent der entworfenen Items wurden aufgrund von psychometrische Kriterien, wie niedrige Item-Skalen-Korrelation und Erhöhung der Reliabilität (Cronbach's α) der Skala bei Löschen des Items, und zusätzlich berichteten Verständnisproblemen gelöscht. Inhaltlich traten kaum Unterschiede in der Antworttendenz von Überlebenden und Szenarioteilnehmern auf. Signifikante Unterschiede gab es hingegen zwischen den Geschlechtern und der Zuordnung zu einem Szenario. Diese zeigten sich vor allem bei peritraumatischen Emotionen sowie Risikowahrnehmung als auch in den ersten beiden Wiederholungen der Items. Die Relevanz des dynamischen Ansatzes des Fragebogens wurde dadurch bestätigt, dass alle Items - mit Ausnahme von „blocking the siutation out“- im Verlauf des Fragebogens signifikante Unterschiede zeigten.

Es zeigte sich, dass die dem Fragebogen zugrunde liegenden Konstrukte zu peritraumatischen Emotionen und Kognitionen faktorenanalytisch abgebildet wurden. Obwohl die Skalen teilweise hoch interkorreliert waren, luden die Items zu peritraumatischen Emotionen und Kognitionen auf unterschiedlichen Faktoren, wie die Items zu subjektiver Risikowahrnehmung (Grimm et al., 2012).

Diskussion

Die vorliegende Studie ist eine der ersten explorativen Untersuchungen, die emotionale, kognitive und behaviourale Reaktionen während verschiedener europäischer Krisensituationen mit denselben Messinstrumenten erhebt. Zusätzlich zu einer umfassenden Darstellung unterschiedlicher Reaktionen in Krisensituationen, wurde erstmals eine Vielzahl an Parametern, wie die Art der Krisensituation, aber auch der Einfluss individueller und situationsbedingter Variablen in Bezug auf verschiedenste Outcomevariablen, wie Gedächtnisfunktionen oder post- und peritraumatische Faktoren, in einer europäischen Stichprobe untersucht. Durch die Interviews mit Überlebenden konnte eine Vielzahl an Informationen generiert werden, die für weitere Forschungszwecke, wie der Entwicklung eines quantitativen Forschungsinstruments oder der Aufstellung von Hypothesen herangezogen werden können.

Die Interviews mit Überlebenden unterstützen die Ergebnisse bereits durchgeführter Studien zu Verhalten in Krisensituationen (Prati et al., 2012; Sotgiu & Galati, 2007). So zeigte sich, dass Menschen sich in Krisensituationen meist adaptiv und zu einem hohen Anteil alturistisch verhielten, weiterhin wurde als häufigste Emotion Angst und als kognitive Bewertung eine hohe Risikowahrnehmung berichtet (Grimm et al., a, *in press*). Die gefundenen Reaktionen zeigten sich in verschiedenen Krisensituationen als überwiegend universell. Unterschiede gab es in der Realisierung der spezifischen Krisensituation und daraus folgend der Interpretation von Hinweisreizen, wobei die Krisensituationen Brand und Erdbeben schneller realisiert

wurden (Grimm et al., a, *in press*). Eine detaillierte Beschreibung unterschiedlicher Krisensituationen und deren spezifischer Charakteristika sollte daher von Relevanz für Notfalltrainings sein, um eine schnelle Identifikation von Krisensituationen und die Abrufbarkeit von korrektem Verhalten zu erleichtern.

Eine differenziertere Betrachtung von menschlichem Verhalten während Krisensituationen wurde durch den Einbezug der Intensität von posttraumatischem Stress der Befragten zu dem Zeitpunkt der Interviews erhalten. Es zeigten sich Unterschiede bei proaktiven Verhaltensweisen, wie der Vorbereitung einer Evakuierung und dem Suchen von Informationen zur Bewältigung der Krisensituation, die vermehrt von Personen mit geringem posttraumatischem Stress berichtet wurden. Von Teilnehmern mit hohem posttraumatischem Stress wurde berichtet, dass sie zu Beginn der Krisensituation häufiger in ihrer Wahrnehmung eingeschränkt waren und somit eine direkte Realisierung der Krisensituation nicht möglich war. Auch litten sie im Lauf der Krisensituation häufiger unter peritraumatischer Dissoziation und Derealization sowie physiologischen Reaktionen, die auf eine Panikattacke hinweisen (Grimm et al., a, *in press*). In Anlehnung an Leach (1994; 2004), konnte die vorgenommene Unterteilung von Verhalten in Krisensituationen in rational-ruhig, automatisch- instinktiv und resigniert unterstützt werden, jedoch nicht in Zusammenhang mit späterem posttraumatischem Stress gebracht werden (Grimm et al., a, *in press*). Der herausgearbeitete Forschungsansatz, die Verknüpfung von peritraumatischen Faktoren, wie Emotionen und Kognition sowie gezeigtem Verhalten während Krisensituationen, durch den Reaktionen in Krisensituationen als multidimensionales Konstrukt verstanden werden, ist weiterhin zu bearbeiten. Von Interesse sind hierbei eine detaillierte Erfassung und Untersuchung des Verlaufs sowie der Intensität von emotionalen und kognitiven Reaktionen in Krisensituationen, ihren physiologischen Komponenten und denen daraus resultierenden Handlungstendenzen, da in der vorliegenden qualitativen Studie nur eine kategoriale Erfassung möglich war. Eine differenzierte, valide, retrospektive Erhebung dieser Faktoren kann sowohl untersuchen,

wieso manche Menschen in Krisensituationen keine adäquaten Reaktionen abrufen können, als auch für die weitere Erklärung des Entstehens von posttraumatischen Anpassungs-, Stress- und Angst- sowie Depressionssymptomen relevant sein. Obwohl in der vorliegenden Studie, die Intensität des posttraumatischen Stresses keinen Einfluss auf die Anzahl der Erinnerungseinheiten hatte (Grimm et al., a, *in press*), ist die Einbeziehung sowohl der Art der kognitiven Verarbeitung als auch der Gedächtnisstruktur und Gedächtnisfülle während sowie nach dem Erleben einer Krisensituation in Anlehnung an die kognitiven Modelle zur Entstehung von PTSD (Brewin & Holmes, 2003; Ehlers & Clark, 2000), ggf. auch unterstützend in experimental-psychologischen Szenario-Studien, zu empfehlen. Eine mögliche Erklärung für den geringen Einfluss des posttraumatischen Stresses auf die Gedächtnisfunktion, kann die sozial-gesellschaftliche Komponente von Krisensituationen (bspw. hohe mediale Aufmerksamkeit, großer Betroffenenkreis, etc.) und das dadurch entstehende Interesse an Berichten von Überlebenden sein.

Eine weitere Forschungsfrage, nämlich die Identifikation des Einflusses von individuellen und situationalen Faktoren auf peri- und posttraumatische Reaktionen in Krisensituationen wurde in der Studie untersucht (Grimm et al., b, *in press*). Dabei zeigte sich, dass soziodemographische Faktoren, wie Geschlecht, Alter und Bildung in der Stichprobe einen geringeren Einfluss auf peri- und posttraumatische Faktoren ausübten, wie situationale Faktoren, wie die Art der Krisensituation, eigene Verletzungen und das Erleben des Sterbens anderer Menschen. Dennoch ist es aufgrund der Limitationen der Studie, wie der begrenzten Stichprobe sowie der Konfundierung der Variablen Kultur und Art der Krisensituation, empfehlenswert, die gefundenen Ergebnisse in einer repräsentativen quantitativen Studie zu verifizieren. Zusätzlich wird empfohlen, den Einfluss von situationalen Einflüssen auf weitere Faktoren, wie Explosionen, Rauchentwicklung, Dauer und Ruckartigkeit des Einsetzens der Krisensituation sowie Faktoren des Ortes, wie Erreichbarkeit der Notausgänge, Verschüttungen von Fluchtwegen oder die Verfügbarkeit von rettungsrelevanten

Informationen, also weiteren Faktoren, die bedeutsam für peritraumatische Reaktionen sein könnten, zu erweitern. Dabei kann es von Relevanz sein, den Einfluss von anderen Menschen, wie Familie, Freunde oder Unbekannte, die gemeinsam Opfer einer Krisensituation werden, bei der Untersuchung von peri- und posttraumatischen Stresssymptomen und Verhalten von Individuen einzubeziehen.

Um die beschriebenen Forschungsfragen in einem quantitativen Setting zu untersuchen, wurde unter Einbeziehung der Ergebnisse der Interviewstudie, ein Instrument zur Erfassung von emotionalen, kognitiven und behaviouralen Reaktionen in Krisensituationen entwickelt. Die Konstrukte peritraumatische Emotionen sowie Kognitionen wurden an einer Szenariostichprobe und Überlebenden von Krisensituationen inhaltlich und psychometrisch getestet. Generell hat sich dieser Ansatz als empfehlenswert erwiesen. Trotz der herausfordernden Stichprobenproblematik in der *disaster research* wurde eine erste Validierung des Instrumentes auch anhand inhaltlicher Kriterien durchgeführt. Hierbei zeigte sich vor allem, dass der *Staging*-Ansatz, also die differenzierte Erfassung von peritraumatischen Emotionen und Kognitionen zu verschiedenen Zeitpunkten einer Krisensituation von Relevanz ist und zu neuen Erkenntnissen bei der Untersuchung der Entwicklung von posttraumatischen Stresssymptomen sowie dem Einfluss von situationalen Faktoren der Krisensituation führen kann. Der nächste Schritt führt zur empirischen Validierung des interkulturellen Fragebogens.

Limitationen

Generell muss bei der Interpretation und Anwendung der Studienergebnisse bedacht werden, dass die Untersuchungen einen explorativen Charakter haben. Im Fall der Interviewstudie sind deskriptive Beschreibungen in Hinblick auf Hypothesengeneration eher möglich als Rückschlüsse auf tatsächliche Zusammenhänge zu Reaktionen in Krisensituationen. Weitere Limitationen beziehen sich auf die Größe und die Zusammenstellung der Stichproben.

Aufgrund der Abhängigkeit der Stichproben vom Auftreten von Krisensituationen (Stallings, 2007) ist die Interviewstudie nicht repräsentativ, weder auf europäischer noch auf der Ebene verschiedener Krisensituationen. Vielmehr kann davon ausgegangen werden, dass die Variablen „Kultur“ und „Art der Krisensituation“ miteinander konfundiert sind. Da es Hinweise auf interkulturelle Unterschiede in der Nutzung von emotions- und kognitionsbezogenen Worten in der Erzählungen der Interviewstudie gibt (Freitag, Grimm & Schmidt, 2010), kann auch der Einfluss von Kultur auf die Intensität der berichteten peritraumatischen Emotionen und Kognitionen sowie die Höhe der posttraumatischen Stresssymptome nicht ausgeschlossen werden.

Wie Alexander (2007) zeigte, basieren die Überzeugungen von Laien in Bezug auf Verhalten in Krisensituationen häufig auf falschen Annahmen. Daher ist es möglich, dass sich die Antworttendenzen der bei Fragebogenentwicklung eher auf laienhafte Konstrukte über Krisensituationen, als auf die tatsächlichen Muster und Verhaltensweisen in Krisensituationen beziehen. Weiterhin diente der Pilottest dem Erstellen sowie der psychometrischen Testung eines Fragebogens zu peritraumatischen Emotionen und Kognitionen, die Überprüfung von theoretischen Modellen konnte in diesem Szenariosetting nicht unternommen werden.

Die detaillierte Befragung und Auseinandersetzung mit der Krisensituation kann dazu geführt haben, dass Personen mit hohen posttraumatischen Stresssymptomen und damit verbundenen Vermeidungsverhalten und/ oder Schwierigkeiten, den Hergang des Ereignisses in ihr autobiographisches Gedächtnis zu integrieren (Ehlers & Clark, 2000), eine Teilnahme an der Studie abgelehnt haben. Daher ist anzunehmen, dass auch die darauf basierende Fragebogenentwicklung eher zu einer retrospektiven Befragung von Personen mit geringeren posttraumatischen Stresssymptomen geeignet ist.

Zusammenfassend gibt die explorative Studie einen umfassenden Einblick in den Ablauf und die menschlichen Reaktionen in verschiedenen, europäischen Krisensituationen unter

Berücksichtigung posttraumatischer Stresssymptome und Gedächtnisfunktionen. Um die gewonnenen Erkenntnisse umzusetzen, sind die Untersuchung der entstandenen Hypothesen sowie eine Validierung des entwickelten Fragebogens in einer interkulturellen Feldtestung empfehlenswert.

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Risikowahrnehmung und psychologische Reaktionen in öffentlichen Krisensituationen am Beispiel von Terrorattentaten

Die Betrachtung der Risikowahrnehmung der Bevölkerung ist nicht nur in Bezug auf unmittelbare Gesundheitsrisiken von Relevanz, sondern auch mit Blick auf öffentliche Krisensituationen, die gesundheitliche Folgen für direkt oder indirekt von ihnen Betroffene nach sich ziehen können. Dieses wird im Folgenden exemplarisch an den psychischen Reaktionen auf Terrorattentate und an deren Auswirkung auf die Risikowahrnehmung in der Bevölkerung aufgezeigt.

Mit dem Terrorattentat vom 11. September 2001 auf das World Trade Center in New York (im Folgenden häufig 9/11-Attentat genannt) und den darauffolgenden Attentaten wie dem Zugattentat in Madrid vom 11. März 2004 und den London-Subway-Selbstmordattentaten vom 7. Juli 2005 hat der internationale Terrorismus eine bisher nicht gekannte Gefahrenstufe erreicht. Obwohl schon viel früher in Teilen Europas – beispielsweise durch die IRA oder ETA – Terrorattentate verübt wurden, hat sich mit den jüngsten Terroranschlägen für die Bevölkerung eine neue Dimension der Bedrohung entwickelt. Kernelemente dieser Attentate sind die scheinbare Randomisierung von Zeit, Ort und Personen sowie die große Zahl an Personen, die mit dem Anschlag in ihrem Leben bedroht werden.

Direkt nach 9/11 gaben 86% der Europäer an, persönlich Angst vor Terrorismus zu haben; 79% hatten Angst vor dem Einsatz atomarer, biologischer oder chemischer Massenvernichtungswaffen, und 64% hatten zu diesem Zeitpunkt Angst vor einem Weltkrieg [1]. Im Verlauf eines Jahres nahm die große Angst der Europäer vor einem erneuten Terrorattentat aber wieder ab. Die Einschätzung der Terrorgefahr war jedoch stark situationsabhängig: Unmittelbar nach den Attentaten in London und Madrid wurde der Terrorismus erneut als eines der wichtigsten Probleme eingeschätzt. Dieser Meinung waren jedoch nur Befragte in den Ländern, die Ziele von Terrorattentaten gewesen waren. Gegenwärtig sind die Ängste vor Terrorismus den Ängsten vor einer Inflation und vor steigenden Preisen (50%) sowie vor der schlechten Wirtschaftslage (23%) gewichen. Daher gaben im aktuellen Bericht des Eurobarometers nur noch 2% der Befragten an, dass Terrorismus sie derzeit persönlich beschäftige.

Anders verhält es sich mit der Terrorwahrnehmung in den Vereinigten Staaten. Zwar haben auch in den USA Meinungsbefragungen (Polls) gezeigt, dass die im Oktober 2001 bestehende große Angst vor Terroranschlägen in den darauffolgenden Jahren wieder abnahm (wenige Tage nach den 9/11-Terrorattentaten waren 51% der Befragten besorgt oder sehr besorgt, dass sie oder ihre Familie Opfer eines erneuten Terrorattentats werden könnten; im September 2008 lag diese Zahl nur noch bei 38%). Verglichen mit der Zeit vor 9/11 (beispielsweise im April 2000: Zu diesem Zeitpunkt gaben 24% der Befragten an, solche Ängste zu haben), ist die Angst der Bevölkerung vor persönlichen Verlusten durch erneute Attentate jedoch auch heute noch nicht unerheblich [2].

Bei den Terrorattentaten vom 9. September 2001 in New York sind 2749 Menschen ums Leben gekommen [3]. Im Zeitraum vom 11. bis 28. September 2001 wurden in New York 6232 Menschen aufgrund von Verletzungen als Folge der Attentate in Notaufnahmen behandelt. Zusätzlich wurden 477 Personen stationär in Krankenhäuser aufgenommen [4]. Bei den Terrorattentaten in London starben von über tausend betroffenen Personen 52, mehr als 700 Menschen wurden verletzt [5].

Die Mehrzahl der Überlebenden der Terrorattentate vom 9. September 2001 berichten über Atemwegsprobleme wie Husten, Kurzatmigkeit und Sinusirritationen. Die häufigste mit den Terrorattentaten verbundene, neu diagnostizierte Erkrankung ist Asthma [6]. Neben den direkten Folgen von Attentaten (Todesopfer und Verletzte) gibt es auch etliche auf ökonomischer, gesellschaftlicher, physischer und psychischer Ebene. So wird geschätzt, dass von den Menschen, die von den 9/11-Terrorattentaten als Beschäftigte, Anwohner oder Notfallpersonal betroffen waren, zwischen 34.600 und 70.200 eine posttraumatische Belastungsstörung (PTSD) entwickelt haben und 9700 bis 20.000 auch noch bis zu drei Jahren danach unter psychischen Folgen litten [6].

Das Konstrukt Risikowahrnehmung

Bei der Risikobeurteilung/Risikowahrnehmung gehen Laien- und Experten-

urteile häufig weit auseinander. Selbst die Einschätzung einfacher Wahrscheinlichkeiten ist für den Laien schwierig [7]. So konnte in Studien nachgewiesen werden, dass die Eintrittswahrscheinlichkeit für Ereignisse, die vertraut und mit geringen Risiken verbunden sind (beispielsweise sich einen grippalen Infekt zuzuziehen), eher überschätzt wird. Hingegen wird sie für Ereignisse, die mit hohen Risiken verbunden sind (beispielsweise bei einem Autounfall zu sterben) unterschätzt. Die Eintrittswahrscheinlichkeit für bisher unbekannte und Furcht einflößende Ereignisse wie Terrorattentate wird häufig überschätzt [8]. Zur Erklärung der Risikowahrnehmung von Krisensituationen existieren unter anderem folgende zwei Ansätze: das psychometrische und das heuristische Modell. Diese werden im Folgenden näher vorgestellt.

Der psychometrische Ansatz

Das psychometrische Modell basiert auf der kognitiven Psychologie. Es versucht zu erklären, wie sich die intuitive Risikowahrnehmung von der Expertenmeinung unterscheidet und wie Laien ihr Urteil über die Eintrittswahrscheinlichkeit eines Risikos bilden. Der psychometrische Ansatz wurde in den 1970er-Jahren von Fischhoff entwickelt [9]. Er schlägt ein multidimensionales Konstrukt vor [10, 11]. In empirischen Untersuchungen bewerteten Studienteilnehmer 30 Risikoquellen auf neun siebenstufigen Skalen, die qualitative Merkmale der Risikoquellen abbilden (freiwillig, chronisch, katastrophenartig, alltäglich, tödlich, unmittelbar, feststellbar, kontrollierbar und neuartig) [10].

Faktorenanalytisch konnten zwei Risikodimensionen identifiziert werden: Zum einen die „Unknown Risk“: Hier ist von Bedeutung, ob das Risiko den Betroffenen und der Wissenschaft bekannt ist/war, wie ungewöhnlich es ist, ob sich Betroffene dem Risiko freiwillig aussetzen, ob es nicht wahrnehmbar ist und ob Folgeerscheinungen verspätet eintreten. Zum anderen gibt es die „Dread Risk“: Das „Grauen“ beziehungsweise die „Schrecklichkeit“ bezieht sich hier auf die Ernsthaftigkeit der Konsequenzen und auf das Katastrophenpotenzial eines Risikos. In einer Erweiterung der Studie durch Slovic und Kollegen wurde der psychometrische Ansatz der Risikowahrnehmung um den Faktor „Exposure“ erhöht [12]. Insgesamt reichen diese drei Faktoren aus, um einen großen Teil der Varianz der Risikodimension aufzuklären [13]. Jedoch ist der erste Faktor derjenige, der am meisten mit der allgemeinen Einschätzung des Risikos korreliert.“

Zwar lassen sich mit dem psychometrischen Ansatz auf den vorliegenden Risikodimensionen verschiedene Risiken unterscheiden, kritisch zu beurteilen ist jedoch, ob mit seiner Hilfe eine Einschätzung der individuellen Risikobeurteilung möglich ist.

Bezogen auf Terrorattentate ist anzunehmen, dass die beide Dimensionen „Unknown Risk“ und „Dread Risk“ als sehr hoch anzusiedeln sind. So erklärt sich, dass die Bevölkerung die Eintrittswahrscheinlichkeit für ein erneutes Attentat überschätzt, was wiederum umfassende psychologische, politische und gesellschaftliche Konsequenzen hat [8]. Die dritte Dimension der Risikowahrnehmung, „Exposure“ oder „Magnitude“, die nicht in allen Studien propagiert wird, bezieht sich auf das „Ausgesetzt sein“ gegenüber einer Risikosituation und auf die Anzahl der potenziell davon Betroffenen. Mit Blick auf die Terrorattentate vom 11. September 2001 ist der Faktor „Exposure“ auf zwei Weisen von Bedeutung: Zum einen, weil eine große Zahl an Menschen direkt betroffen war und zum anderen, weil die mediale Aufbereitung der Terrorattentate eine große Wirkung auch auf nicht direkt Betroffene hatte [14].

Der heuristische Ansatz

Wichtig für das Verständnis der auf Terrorattentate bezogenen Risikowahrnehmung sind sogenannte Heuristiken, die „Daumenregeln“ bei der Interpretation von Risiken. Besonders hervorzuheben ist hier die Verfügbarkeitsheuristik. Diese besagt, dass Menschen ihre Entscheidungen auf Ereignisse gründen, die ihnen in ihrer Erinnerung am präsentesten sind. Ereignisse, die sowohl selten als auch emotional sehr aufgeladen sind, werden mit einer höheren Wahrscheinlichkeit erinnert [15]. Im Falle des Terroranschlages vom 11. September 2001 und auch anderer Terrorattentate ist es nicht zu bestreiten, dass ihre große mediale Präsenz und die damit verbundene indirekte Betroffenheit zu einer Überschätzung der Eintrittswahrscheinlichkeit weiterer Attentate führten.

Eine weiterer für die Betrachtung der diesbezüglichen Risikowahrnehmung relevanter, kognitiver Bias ist der „Probability Neglect“, also die Vernachlässigung von Wahrscheinlichkeiten bei der Urteilsbildung. Dies geschieht vor allem dann, wenn sich Menschen bei ihrer Risikoeinschätzung maßgeblich durch die negativen Auswirkungen eines Ereignisses leiten lassen [16].

Bei der retrospektiven Bewertung der Risikowahrnehmung ist vor allem der Rückschaufehler („Hindsight Bias“) von Bedeutung. Da in den USA kein weiteres Attentat stattfand, wurde von Befragten die damalige eigene Einschätzung der Eintrittswahrscheinlichkeit eines zweiten Terroraktes retrospektiv geringer eingeschätzt. Dies ist vor allem von Interesse, wenn rückwirkend politische und gesellschaftliche Entscheidungen bewertet werden, die als Reaktion auf die Angst vor einem weiteren Terrorattentat gefällt wurden [17].

Methodik

Literaturrecherche

Für das vorliegende Themenfeld wurde ein exploratives Vorgehen mit dem Ziel gewählt, den bisherigen Stand der Forschung zur auf Terrorattentate bezogenen Risikowahrnehmung und zu daraus resultierenden Verhaltensänderungen zu charakterisieren und empirische Forschungsgegenstände zu beschreiben. Es wurden die nach den Terrorattentaten vom 11. September 2001 zu diesen Fragen durchgeführten Untersuchungen analysiert, das heißt, frühere Studien wurden ausgeschlossen. Relevante Übersichtsarbeiten zum Konstrukt „Risikowahrnehmung“ wurden beibehalten. Es erfolgte eine Analyse der Datenbanken „Medline“ und „EMBASE“ zu den Themen Risikowahrnehmung und Verhaltensänderungen aufgrund von Terrorattentaten für den Zeitraum ab September 2001. Zur Re-

cherche wurden folgende Stichworte unter Verwendung der Verknüpfung „and/or“ benutzt: „risk perception“, „terror attacks“, „terrorism“, „WTC/ 9/11“, „behaviour terror attacks“, „Madrid bombings“, „London bombings“. Aus den aufgefundenen Publikationen wurden relevante Arbeiten herausgefiltert und in deren Literaturverzeichnis zudem (nach dem Schneeballprinzip) nach weiteren relevanten Publikationen gesucht.

Die hier vorliegende Übersichtsarbeit erhebt jedoch keinen Anspruch darauf, alle publizierten Studien zur Terrorwahrnehmung systematisch und vollständig darzustellen. Es handelt sich bei ihr vielmehr um eine Zusammenfassung der bisherigen Erkenntnisse über die psychischen Reaktionen auf Terrorattentate und über die darauf bezogene Risikowahrnehmung.

Entsprechend wurden nur die Studien, die sich auf die psychologischen Konstrukte von „Risikowahrnehmung“ und „Verhaltensänderung“ sowie auf die „psychische Folgen“ von Terrorattentaten beziehen, ausgewählt. Es wurden deskriptive Befragungen, Surveys, die Erfassung klinischer Parameter und die Analyse von Sekundärdaten zur Untersuchung der psychischen Reaktionen auf Terrorismus berücksichtigt.

Ergebnisse

Es wurden 23 Studien zu den definierten Kriterien identifiziert. **Tab. 1** fasst alle Studien unter Berücksichtigung von Stichprobe, Messinstrumenten und Forschungsdesign zusammen.

Der Fokus der vorliegenden Übersichtsarbeit liegt weniger auf der Darstellung unterschiedlicher psychometrischer und sozialpsychologischer Konstrukte sowie experimenteller Studien zur Risikowahrnehmung als auf der Erläuterung der auf Terrorattentate bezogenen Risikowahrnehmung und auf der Darstellung der mit solchen Attentaten verbundenen Auswirkungen, zum Beispiel der damit verbundenen Ängste und Verhaltenskonsequenzen (beispielsweise Vermeidungsverhalten). Da kaum Studien identifiziert wurden, die ein theoretisches Konstrukt/einen Zusammenhang zwischen den psychischen Reaktionen auf

Zusammenfassung · Abstract

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A. Grimm · L. Hulse · S. Schmidt

Risikowahrnehmung und psychologische Reaktionen in öffentlichen Krisensituationen am Beispiel von Terrorattentaten

Zusammenfassung

Die Reaktionen auf die Terrorattentate vom 9. September 2001 in New York waren in der westlichen Bevölkerung immens. In der vorliegenden Übersichtsarbeit werden die Auswirkungen von Terrorattentaten durch Einbeziehung bevölkerungsrepräsentativer Untersuchungen, Surveys, klinischer Interviews und Einstellungsbefragungen dargestellt, die über eine deskriptive Literaturrecherche ermittelt wurden. Als Ergebnis des Reviews zeigt sich, dass die Angst vor weiteren Terrorattentaten in der Bevölkerung vergleichsweise hoch und mit zahlreichen psychologischen Folgen und Reaktionen assoziiert ist. Die Einschätzung der Auftretenswahrscheinlichkeit eines Terrorattentats hängt unter anderem mit den besonderen Charakteristika und der hohen medialen Präsenz des Themas zusammen. Die Anzahl der Stresssymptome bis hin zu psychiatrischen Diagnosen erwies sich in mehreren unabhängigen Untersuchungen mit einer hohen Risikowahrnehmung assoziiert. Dies ließ sich nicht nur bei den Opfern von Terrorattentaten, sondern auch bei indirekt Betroffenen zeigen. Darüber hinaus gibt es mehrfache Belege dafür, dass die Anzahl der Stresssymptome mit der Dauer des TV-Konsums über Neuigkeiten zu Terrorattentaten zusammenhing. Als methodische Kritik ist an den gegenwärtigen Untersuchungsszenarien einzuwenden, dass es derzeit keine tiefer gehenden Analysen zur Entwicklung der Risikowahrnehmung und zu ihrem Einfluss auf die Gesundheit gibt. Aufgrund der internationalen Bedeutung des Themas und der interkulturellen Unterschiede im Umgang mit Krisensituationen ist eine internationale Standardisierung von Untersuchungszugängen wünschenswert.

Schlüsselwörter

Risikowahrnehmung · Psychologische Reaktionen · Terrorismus · Übersichtsarbeit

Risk perception and psychological reactions in public crisis situations using the example of terror attacks

Abstract

The reactions to the 9/11 terror attacks were immense in the western population. In the current review, the impact of terror attacks is presented with surveys, clinical interviews, and scientific polls, which were identified in a comprehensive literature search. Results show that the fear of further terror attacks is comparatively overestimated in the population and is associated with numerous psychological consequences and reactions. The overestimation of the probability of further terror attacks is related among other reasons to its unique features and its strong representation in the media. Several independent studies proved that the number of stress symptoms and psychiatric diagnoses is associated with a high risk perception in relation to terror attacks. This was not only the case for victims of terror attacks, but also for people indirectly exposed to the terror attacks. In addition, there is evidence that the number of the stress symptoms correlate with the duration of TV consumption of new findings about terror attempts. Methodologically, there is a critical lack of more in-depth analyses to explain the development of risk perceptions and its influence on mental and physical health. Because of the international importance and cross-cultural differences, an international standardization of research is desirable.

Keywords

Risk perception · Psychological reactions · Terrorism · Review

Tab. 1 Auswahl wissenschaftlicher Studien zu psychologischen Reaktionen auf Terrorattentate und zur Risikowahrnehmung von Terrorattentaten

Autoren	Jahr	Titel/Gegenstand	Stichproben	Methode	Design	Messinstrumente	Ergebnis
Reaktionen auf Terrorattentate (direkt und indirekt betroffene Bevölkerung)							
Rubin et al.	2005	Psychological and behavioural reactions to the bombings in London on 7 July 2005: cross sectional survey of a representtative sample of Londoners	N=1010	Randomisierte Telefonbefragung	Retrospektive Befragung	Selbstentworfener Fragebogen über Stresssymptome, Sicherheit, Verhaltensänderungen und Kommunikation	32% der Londoner hatten wenige Tage nach dem Terrorattentat die Absicht, öffentliche Verkehrsmittel weniger zu nutzen und Besuche in Central London zu verringern. Weiterhin berichten 31%, vor allem Muslime, über ausgeprägte Stressreaktionen, jedoch nur 1% wollte sich in therapeutische Unterstützung begeben
Rubin et al.	2007	Enduring consequences of terrorism: 7-month follow-up survey of reactions to the bombings in London on 7 July 2005	N=574	Telefonbefragung	Retrospektive Follow-up-Befragung	Erhebung Stresssymptome, Sicherheitserleben, Wahrscheinlichkeit eines erneuten Attentats und Verhaltensänderungen	7 Monate nach den Terrorattentaten in London haben sich ausgeprägte Stressreaktionen (11%) unter den Befragten verringert. 19% haben tatsächlich die Besuche in Central London verringert, und zwischen 3 und 17% der Befragten haben ihre Freizeitaktivitäten umgestellt. 43% sind der Meinung, dass Terrorattentate weiterhin ihr Leben bedrohen
Silver et al.	2002	Nationwide longitudinal study of psychological responses to September 11	N=2729 N=933 N=787	Web-basierte Befragung	Longitudinalstudie mit 3 Messzeitpunkten	1) Stanford Acute Stress Reaction Questionnaire 2) Impact of Event Scale-Revised 3) Vaughan Perceived Risk Scale 4) Hopkins Symptom Checklist	Akute und posttraumatische Stresssymptome nahmen signifikant nach dem ersten Messzeitpunkt ab, auch wenn die Angst vor weiteren Terrorattentaten und Gefahren für die eigene Familie weiter besteht. Prädiktoren für diese Stresssymptome sind unter anderem weibliches Geschlecht, Schweregrad der Betroffenheit mit Terrorattentaten, auch durch Dauer des TV-Konsums
Torabi et al.	2004	National study of behavioural and life changes since September 11	N=807	Telefonbefragung	Retrospektive Befragung	Selbstentworfener Fragebogen mit 29 Items	23% der Befragten haben direkt nach 9/11 ihr Reiseverhalten verändert und Aktivitäten im Freien verringert (25%). Weiterhin haben 97% mit anderen Menschen über die Attentate gesprochen und 86% sich im TV ausführlich darüber informiert
Schuster et al.	2001	A national survey of stress reactions after the September 11, 2001, terrorist attacks	N=560	Telefonbefragung (CATI)	Bevölkerungsrepräsentatives Survey	Erwachsene: Modifizierte Version der Posttraumatic Stress Disorder Checklist Elternauskunft: Modifizierte Version des Diagnostic Interview Schedule for Children IV (parents version)	44% der befragten Amerikaner berichteten 2–5 Tage nach 9/11 über ausgeprägte Stresssymptome bei sich und 25% auch bei ihren Kindern. Diese traten meist in Kombination mit hohem TV-Konsum auf. Die häufigsten Reaktionen nach den Terrorattentaten: mit Familie/Freunden darüber sprechen, Religion, Spenden
Galea et al.	2002	Psychological sequelae of the September 11 attacks in New York City	N=988	Telefonbefragung	Retrospektive Befragung, klinische Interviews	PTSD: Modifizierte Version des Diagnostic Interview Schedule for PTSD Depression: Modifizierte Version des strukturierten Interviews des DSM 4 (major depression)	Die Prävalenz 5 Wochen nach 9/11 bei Bewohnern Manhattans von PTDS war 7,5%, die von Depression 9,7%. Prädiktoren waren hispanische Wurzeln, Panikattacken direkt nach 9/11, räumliche Nähe zu den Attentaten, 2 oder mehr stressige Lebensereignisse in der jüngeren Vergangenheit

Tab. 1 Auswahl wissenschaftlicher Studien zu psychologischen Reaktionen auf Terrorattentate und zur Risikowahrnehmung von Terrorattentaten (Fortsetzung)

Miguel-Tobal et al.	2006	PTSD and depression after the Madrid March 11 train bombings	N=1589	Telefonbefragung	Retrospektive Befragung, klinische Interviews	PTSD: Modifizierte Version des Diagnostic Interview Schedule for PTSD Depression: Modifizierte Version des strukturierten Interviews des DSM 4 (major depression)	Replikation der Studie von Galea (2002) nach den Madrid Zugattentaten: 2,3% der Befragten berichteten über Symptome, die auf PTSD-Diagnose rechtfertigen, 8,0% über Symptome einer Depression. Bei Befragten, die im direkten Umfeld der Attentate leben, erhöhte sich die Prävalenz auf 4,3% und 10,4%
Schlenger et al.	2002	Psychological reactions to terrorist attacks: findings from the national study of Americans' reaction to September 11	N=2273	Web-basierte Befragung	Epidemiologische, deskriptive Untersuchung	PTSD Checkliste PCL Brief Symptom Inventory (BSI)	Die Prävalenz von möglicher PTSD war in New York mit 11,2% signifikant höher als im übrigen Land, wo sie ungefähr die normalen Prävalenzraten widerspiegelt. Weiterhin im Zusammenhang mit PTSD stehen: Alter, weibliches Geschlecht, Anwesenheit im WTC während der Attentate und hoher TV-Konsum
Vlahov et al.	2002	Increased use of cigarettes, alcohol and marijuana among Manhattan, New York, residents after the September 11th terrorist attacks	N=988	Telefonbefragung	Klinische Befragung	5 Fragen zu Substanzgebrauch PTSD: Modifizierte Version des Diagnostic Interview Schedule Measure (DSM-IV) Depression: Structured Clinical Interview (DSM-IV)	Ungefähr 2 Monate nach 9/11 wurden Bewohner Manhattans zu Veränderungen im Drogenkonsum befragt. 9,7% geben an, mehr zu rauchen, 24,6% trinken mehr Alkohol, und 3,2% rauchen mehr Marihuana. Befragte, die vermehrt zu Drogen griffen, berichteten eher über posttraumatische Stresssymptome und Depression
Neria et al.	2006	Posttraumatic stress disorder in primary care one year after 9/11	N=930	Klinische Studie	Stukturierte klinische Interviews	PTSD Checklist Primary Care Evaluation of Mental Disorders (PRIME-MD) Patient Health Questionnaire Medical Outcome Study 12-Item Short Form Health Survey	Im Primary Care Setting wurde das Auftreten von PTSD nach 9/11 in Stichproben mit vermehrt hispanischen Migranten untersucht. In der Stichprobe war je nach Cut-off-Wert die Prävalenz von PTSD zwischen 4,7% und 10,2%. 6 von 10 Patienten mit PTSD berichteten über eine PTSD vor 9/11
Adams et al.	2004	Predictors of help seeking among Connecticut adults after September 11, 2001	N=1762	Telefonbefragung	Einstellungsbefragung	Selbstentworfener Fragebogen zu Inanspruchnahme von psychischer Unterstützung, psychischer und körperlicher Gesundheit, Suchtverhalten und Betroffenheit durch 9/11	Ungefähr die Hälfte der Befragten berichtet über mindestens 1 Problem wie Nervosität, Ängste, Hoffnungslosigkeit. 5% berichten über erhöhten Substanzmissbrauch. 6,4% haben sich psychische Unterstützung gesucht, assoziiert damit sind Opfer von 9/11 oder Familienmitglied/Freund Opfer, Schlafprobleme und Substanzmissbrauch
Gigerenzer	2006	Out of the frying pan into the fire: Behavioural reactions to terrorist attacks (9/11)		Analyse von Sekundärdaten	Analyse von Statistiken	Statistik: U.S. Department of Transportation, Federal Highway Administration	Als indirekte Folge von 9/11 wurde in den USA die Möglichkeit zu fliegen durch PKW-Fahrten ersetzt. Dies führte zu einer einjährigen Erhöhung des Verkehrs auf den Highways und somit auch der Anzahl der tödlichen Unfälle (ungefähr 1500) verglichen mit der 5-Jahres-Baseline

Tab. 1 Auswahl wissenschaftlicher Studien zu psychologischen Reaktionen auf Terrorattentate und zur Risikowahrnehmung von Terrorattentaten (Fortsetzung)

López-Rousseau	2005	Avoiding the death risk of avoiding a dread risk – The aftermath of March 11 in Spain		Analyse von Sekundärdaten	Analyse von Statistiken	Statistiken: Dirección General de Ferrocarilles, Dirección General de Carreteras, Dirección General deTráfico	Zwar gab es kurzfristige (2 Monate) Verringerungen der Zugnutzung nach den Terroranschlägen in Madrid, jedoch wurde dies nicht durch eine erhöhte Nutzung es PKW ausgeglichen. Mögliche soziopolitische Erklärungen für dieses Verhalten kann die jahrzehntelange Auseinandersetzung Spaniens mit Terror und dessen Konsequenzen sein
Fischhoff et al.	2004	Travel risks in a time of terror: judgments and choises	N=710	Survey	Marktforschungsstudie	Selbstentworfener Fragebogen zu Risikoeinschätzung für Terrorattentate (allgemein und in unterschiedlichen Ländern), Reiseintentionen und Risikobereitschaft	Als risikoreichstes Urlaubsland in Bezug auf Terrorattentate wurde Israel eingeschätzt, als sicherstes Kanada. Die Bereitschaft, ein als gefährlich eingeschätztes Land zu besuchen, war verbunden mit einer generell höheren Risikobereitschaft und einer geringeren Einschätzung des Terrorrisikos
Comer et al.	2008	Children and terrorism-related news: Training parents in coping and media literacy	N=90 Kinder N=90 Mütter	Randomisierte, experimentelle Studie	Randomisierte Zuteilung der Mütter/Kinder zu einer der 3 Intervention und 3-fache Messung	State trait Anxiety Inventory (Children /Adultes) und Frage nach Wahrscheinlichkeit eines Terrorattentats in den USA 1 und dass sie persönlich betrifft 2 (Kinder: visuelle Likert-Skala, Mütter: Prozente)	Medienkonsum über Terrorattentate erhöht bei Kindern und vor allem Jugendlichen die Angst vor Terror, aber auch generell vor anderen Krisensituationen. Mütter, die ein spezielles Training durchlaufen, können sowohl mit ihrer eigenen Angst besser umgehen, als auch die Angst bei ihren Kindern vermindern
Risikowahrnehmung							
Halpern-Felsher et al.	2002	The effects for terrorism on teens' perception of dying: the world is riskier than ever	N=160 N=119 N=227	Web-basierte Befragung	Längsschnittstudie bei verschiedenen Kohorten über die Wahrscheinlichkeit tödlicher Risiken	Selbstentworfene Rating Skala mit Prozentangaben (0–100%)	Die Wahrscheinlichkeit, bei einem Tornado (34,62% vs. 64,33%) oder einem Erdbeben (24,64% vs. 41,94%) zu sterben, wurde nach 9/11 von Jugendlichen doppelt so hoch eingeschätzt
Fischhoff et al.	2003	Judged terror risk and proximity to the World Trade Center	N=973 N=830 Erwachsene N=143 Jugendliche	Web-basierte Panel-Befragung	Befragung zu Terrorrisiken mit 3 randomisierten experimentellen Emotionsmanipulationen	Persönliches und gesellschaftliches Risiko in Prozent (0–100%) zu 5 Terrorrisiken und 3 alltäglichen Risiken Entfernung des Wohnorts der Befragten und WTC	Entfernung von 9/11 korreliert nur bei Erwachsenen signifikant mit den Bewertungen für Terrorrisiken, nicht aber mit der Bewertung von alltäglichen Risiken. Es ergaben sich Interaktionseffekte: Männer, Weiße und Republikaner außerhalb von NYC berichteten nur über weniger Bedrohung durch Terrorattentate, wenn sie außerhalb NYC lebten
Fischer et al.	2006	Terror salience and punishment: Does terror salience include threat or social order?	N=154 N=60 N=120 N=68	(Quasi-)Experimentelle Untersuchung	1 quasi-experimentelle und 3 experimentelle Studien mit terrorbezogenen Manipulationen	Manipulationscheck: Wahrscheinlichkeit des persönlichen Terrorrisikos/gesellschaftlichen Risikos in Deutschland (10-stufig) Bewertung einer unbezogenen Straftat	Teilnehmer, der terrorbezogenen Manipulation berichteten höhere Angst vor Terrorattentaten und der Bedrohung für die gesellschaftliche Ordnung. Terror-saliente Reize verstärken den Wunsch nach Bestrafung bei nicht damit verbundenen Straftaten. Dieser Effekt konnte nicht für andere Krisensituationen wie Naturkatastrophen nachgewiesen werden

Tab. 1 Auswahl wissenschaftlicher Studien zu psychologischen Reaktionen auf Terrorattentate und zur Risikowahrnehmung von Terrorattentaten (Fortsetzung)

Fischhoff	2005	Evolving judgements of terror risks: foresight, hindsight and emotion	N=973 N=532	Web-basierte Panel-Befragung	2-faktorielles, experimentelles Design mit 2 Messzeitpunkten	Persönliches und gesellschaftliches Risiko in Prozent (0–100%) zu 5 Terrorrisiken und 3 alltäglichen Risiken 5-stufige Emotionsskala	Teilnehmer zeigten bei der nachträglichen Einschätzung des Terrorrisikos von 2001 einen 10%igen Hindsightbias. Die beiden experimentell induzierten Emotionen Angst und Wut konnten sowohl die Vorhersagen und Erinnerungen an die Einschätzung des Terrorrisikos verändern
Sjöberg	2005	The perceived risk of Terrorism	N=294	Befragung	Querschnittstudie	Selbstentworfener Fragebogen mit 386 Fragen zu persönlichem und gesellschaftlichem Risiko unterschiedlicher Katastrophen, Befragung zu 9/11, Mediennutzung und Gründen für Risiken	Die Wahrscheinlichkeit eines Terrorattentats in Schweden wurde sehr gering eingeschätzt, wobei Frauen, ältere Teilnehmer und Teilnehmer mit niedrigem SES dieses höher schätzen. Das persönliche Risiko wurde geringer eingeschätzt als das Risiko für die Gesellschaft
Goodwin et al.	2005	Terror threat perception and its consequences in contemporary Britain	N=100 (Study 1) N=240 (Study 2)	Befragung	Prospektive Studie	Selbstentworfener Fragebogen zu Werten, Normen, wahrgenommenem Risiko und Verhaltensänderung Schwartz Person Profile Questionnaire IV Adaptierter Fragebogen zu Verhaltensänderungen von Huddy (2002)	Soziodemografische Variablen (Geschlecht, Alter und ländlicher Wohnsitz), normative und soziale Werte, wie Offenheit und Hedonismus, sind Prädiktoren für eine erhöhte Risikowahrnehmung. Diese wiederum erklärt Verhaltensänderungen, wie vermehrten Kontakt zu Familie und Freunden
Eisenman et al.	2009	Terrorism-related fear and avoidance behaviour in a multiethnic urban population	N=2317	Randomisierte Telefonbefragung in 6 Sprachen	Querschnittstudie	Rating des HSAS (Nationales Sicherheitsbarometer zur Sicherheit der Bevölkerung vor einem terroristischen Anschlag in den USA) Kessler-6 (K6) Scale of psychological distress)	Vulnerable Subgruppen wie psychisch kranke Menschen, Behinderte und Migranten überschätzen die Terrorgefahr. Weiterhin zeigen sie erhöhte Angst und Vermeidungsverhalten
Shiloh et al.	2007	Cognitive and emotional representations of terror attacks: a cross-cultural exploration	N=185 (T) N=166 (I)	Survey	Befragung von 2 interkulturell vergleichbaren Stichproben von Studenten in der Türkei und Israel	Terror Risk Perception Questionnaire (TRPQ): Selbstentworfener Fragebogen (27 Items), basierend auf 50 qualitativen Interviews Kognitive und emotionale Repräsentationen von Terrorattentaten auf einer 7-stufigen Skala	Das Konstrukt Risikowahrnehmung von Terrorattentaten wurde durch die Faktoren „Costs" (Konsequenzen von Terrorattentaten), „Vulnerability" (Wahrscheinlichkeit des Erlebens), „Trust" (Vertrauen in Autoritäten) und „Control" (eingeschätzte Hilflosigkeit) erklärt. Die türkische Stichprobe gab an, signifikant weniger Kontrolle über Terrorattentate zu haben
Huddy et al.	2002	The consequences of terrorism: Disentangling the effects of personal and national threat	N=1221	Survey	Randomisierte Telefonbefragung	Selbstentworfener Fragebogen zu persönlicher und gesellschaftlicher Bedrohung, Einschätzung der nationalen Wirtschaftslage und Verhaltensänderungen aufgrund der Terrorattentate	6 Wochen nach 9/11 waren 82% der Befragten beängstigt vor einem weiteren Terrorattentat, 70% hatten das Gefühl, dass sie persönlich Angst vor einem Terrorattentat haben müssen. Männer und besser Gebildete nahmen weniger Terrorrisiko wahr. Je höher das Terrorrisiko wahrgenommen wurde, desto schlechter fiel bei den Befragten die Wirtschaftsprognose für die nächsten 5 Jahre aus

Terrorattentate und der auf solche Attentate bezogenen Risikowahrnehmung beziehungsweise Risikobeurteilung herstellen, werden beide Dimensionen zunächst getrennt voneinander dargestellt.

Psychische Reaktionen auf Terrorattentate

Unmittelbar nach den Terrorattentaten vom 11. September 2001 wurden zahlreiche empirische Untersuchungen über die psychischen Reaktionen auf diese durchgeführt. Die erste Befragung zur Erfassung der Stresssymptome in der Bevölkerung fand bereits drei Tage nach dem Anschlag statt. Die Daten der hier vorgestellten Studien wurden telefonisch (CATI) oder webbasiert (PANEL) erhoben. Es handelt sich in allen Fällen um deskriptive Analysen der Reaktionen. Dargestellt werden die Reaktionen der Bewohner New Yorks und der USA auf 9/11 sowie der Bewohner Londons auf die Anschläge vom 7. Juli 2005. Bei der Mehrzahl der Untersuchungen handelt es sich um bevölkerungsrepräsentative Surveys.

Stresssymptome und Hinweise auf psychische Störungen

Drei Monate nach 9/11 wurden bei 7,5% der Bewohner Manhattans Hinweise auf eine PTSD festgestellt, bei 9,7% eine Depression. Es zeigte sich ein direkter Zusammenhang zwischen der Nähe der Befragten zum Ort der Terrorattentate und dem Auftreten der PTSD. 20% der Personen, die in der Nähe des World Trade Centers (WTC) wohnten, berichteten über Hinweise auf eine PTSD [18]. Von den Menschen, die sich während der Attentate im WTC aufhielten, entwickelten 37% eine PTSD. 30% der Personen, die durch die Attentate verletzt wurden, entwickelten ebenfalls eine PTSD [14]. Bei einer Befragung von Erwachsenen in Connecticut ein bis drei Monate nach 9/11 zeigte sich, dass etwa die Hälfte von ihnen unter mindestens einem der angegebenen Probleme wie Hoffnungslosigkeit, Ängste, Nervosität etc. litt. 5% gaben an, mehr Alkohol und/oder Nikotin zu sich zu nehmen [19]. Personen, die in unmittelbarer Nähe zu dem WTC lebten, gaben fünf bis acht Wochen nach den Terrorattentaten an, den Konsum von Zigaretten (9,7%), Alkohol (24,6%) und Marihuana (3,2%) deutlich erhöht zu haben. Zusätzlich berichteten diese Gruppen über mehr posttraumatische Stress- und Depressionssymptome als Personen, die den Substanzgebrauch nicht erhöht hatten [20].

Es zeigt sich zudem, dass auch von Personen, die nicht direkt vom Terrorattentat betroffen waren, eine erhöhte psychische Belastung wahrgenommen wurde. In einer bevölkerungsrepräsentativen Befragung drei bis fünf Tage nach den Anschlägen berichteten 44% der Befragten unter mindestens einem der fünf abgefragten Stresssymptome zu leiden: Bestürzung, wenn sie durch etwas an die Terrorattentate erinnert werden, Ein- und Durchschlafstörungen, Wut, verminderte Konzentrationsfähigkeit, wiederkehrende und belastende Erinnerungen an die Terrorattentate [21]. Stresssymptome, die unmittelbar nach 9/11 von der Bevölkerung berichtet wurden, nahmen im Laufe der Zeit rapide ab. Silver und Kollegen führten eine bevölkerungsrepräsentative Studie zu drei Zeitpunkten nach den Terrorattentaten durch: neun bis 23 Tage danach, zwei Monate und schließlich ein halbes Jahr nach den Anschlägen. Nach zwei Monaten klagten 17% über Stresssymptome, vier Monate später hat sich diese Zahl auf 5,8% verringert [22].

Mit Blick auf den zeitlichen Verlauf der psychischen Beeinträchtigung ist es relevant, zwischen der Gesamtbevölkerung und den Bewohnern New Yorks zu unterscheiden, die unmittelbar von den Terrorattentaten betroffen waren. Schlenger erfasste Hinweise auf posttraumatische Belastungen bei Menschen innerhalb und außerhalb der Terrorzonen. Er kam zu dem Ergebnis, dass zwar die Prävalenz von PTSD in der Gesamtbevölkerung zwei Monate nach 9/11 der sonst üblichen Prävalenz von 4,3% entsprach, diese in New York jedoch überproportional erhöht war (Prävalenz von 11,2%) [23].

Ein vergleichbares Bild zeigte sich bei Befragungen nach Terrorattentaten in Europa. Unmittelbar nach den Attentaten vom 7. Juli 2005 in London berichteten 31% der 1010 Befragten über erhebliche Stresssymptome. Dieser Anteil reduzierte sich jedoch in einer Follow-up-Befragung nach sieben Monaten merklich auf 11% [24, 25]. Eine Replikation der Studie von Galea kam zu dem Ergebnis, dass ein bis drei Monate nach den Madrid-Attentaten die Zahl der durch ein klinisches Interview erhobenen Depressions- und PTSD-Diagnosen geringer war als in der Population Manhattans. 2,3% der Befragten zeigten Symptome, die eine PTSD-Diagnose rechtfertigen, bei 8,0% fanden sich Hinweise auf eine Depression [26]. Auch hier waren die Prävalenzen höher, wenn die Befragten in der Nähe des Orts der Terrorattentate lebten.

Prädiktoren für Stress und Hinweise auf PTSD

Konsistent mit der Forschung zur Risikowahrnehmung zeigt sich deutlich, dass Frauen vermehrt über Stresssymptome klagen und sich bei ihnen häufiger Hinweise auf posttraumatische Belastungsstörungen finden [21, 22, 23]. Nach den Terrorattentaten in London gaben vor allem Muslime an, vermehrt unter Stresssymptomen zu leiden [24]. Im Primary Care Setting bei einer Stichprobe hispanisch stämmiger Migranten mit niedrigem sozioökonomischem Status lag die Prävalenz je nach Untersuchungsinstrument zwischen 4,7 und 10,2%. Entscheidend für die Ausprägung einer PTSD nach 9/11 war, dass sie schon vorher einmal aufgetreten war. Eine PTSD als Folge einer „indirekten Exposure“ (TV) trat sogar nur bei Personen auf, die bereits in ihrer Vorgeschichte an einer solchen gelitten hatten [27].

Weiterhin litten sowohl Migranten, vor allem mit hispanischen Wurzeln, als auch Menschen, die bereits vor 9/11 psychisch erkrankt waren, eher unter den Folgen der Terrorattentate. Hinweise auf Depressionen oder posttraumatische Belastungsstörungen zeigten sich vor allem, wenn als Folge des Terrorattentats eine Panikattacke auftrat. Weitere Prädiktoren sind ein niedriger sozioökonomischer Status und wenig soziale Unterstützung [18, 26].

Wie oben beschrieben, zeigt sich, dass vor allem die Nähe zum Ort des Geschehens mit dem Auftreten von Stresssymptomen korreliert [14, 18, 23]. Von Bedeutung ist auch die Dauer und Intensität des TV-Konsums. In einer Studie gaben 86% der Teilnehmer an, sich ab dem Zeitpunkt der 9/11-Attentate bis zu einigen Wochen danach aktiv und intensiv

im TV darüber informiert zu haben. Im Durchschnitt gaben sie an, am Tag der Attentate 8,1 Stunden ferngesehen zu haben. 43% gaben an, sich ein bis drei Stunden und 26% sich vier bis sechs Stunden täglich über Neuigkeiten zu den Terrorattentaten über TV informiert zu haben. In mehreren Untersuchungen korrelierte die Anzahl der Stunden, die während oder direkt nach 9/11 vor dem TV verbracht wurden, signifikant mit Hinweisen auf eine PTSD [22, 23]. Im Vergleich dazu war in der Studie von Schlenger die Anzahl von Stresssymptomen bei Befragten, deren Familie oder Freunde verletzt oder getötet wurden, zwar erhöht, dies aber statistisch nicht signifikant.

Psychische Reaktionen von Kindern

Zusätzlich zu den Reaktionen der Erwachsenen auf die Terrorattentate wurden auch die diesbezüglichen Einschätzungen von Kindern und Jugendlichen erfasst. Schuster et al. und Schlenger et al. ermittelten die Reaktionen der Kinder über Elternbefragungen [21, 23]. In der Studie von Schuster und Kollegen gaben 35% der Eltern an, dass ihr Kind unter mindestens einem Stresssymptom leide, 47% gaben an, dass es sich über seine eigene Sicherheit und die seiner Familie sorge. Stresssymptome traten bei Kindern auf, wenn auch die Eltern über erhöhten Stress berichteten und das Kind ohne Einschränkung fernsehen ließen. Die Anzahl der Stresssymptome korrelierte mit den Stundenzahlen, die das Kind vor dem TV verbrachte. In einer anderen Studie gaben 60% der Eltern in New York und 50% der Eltern im Rest der Vereinigten Staaten an, dass ihr Kind traurig über die Ereignisse sei. 19,8% der Kinder hatten Einschlafprobleme, 29,9% waren leicht reizbar und 26,5% hatten Angst, von den Eltern getrennt zu sein [23]. In Fokusgruppen-Interviews mit Kindern zeigte sich, dass sich Kinder im Alter von sechs bis 16 Jahren, obwohl sie über einige Aspekte der Terrorattentate unsicher waren, über die Tragweite von 9/11 bewusst waren [28].

Behaviourale Reaktionen und Verhaltensveränderungen

Die häufigsten Reaktionen unmittelbar nach 9/11 waren „mit Anderen über Gefühle sprechen", „Religion", „Spenden" und „Informationen über den Verbleib aller Familienmitglieder suchen" [21]. Ungefähr ein Jahr nach den Attentaten gaben nur noch 30% an, mit anderen über ihre Gefühle bezüglich 9/11 zu sprechen, 47% informierten sich hingegen immer noch gezielt über die Terrorattentate durch TV. 25% berichteten, dass sie Aktivitäten im Freien aus Angst vor Attentaten vermeiden, und 23% haben ihre Reisegewohnheiten umgestellt. 10–15% gaben an, wegen eines verminderten Sicherheitsgefühls, ihr Haus mehr geschützt zu haben, sich zu überlegen, eine Waffe zu kaufen und Notfallvorräte (Nahrung und Geld) angelegt zu haben. 29% berichteten über Veränderungen in ihrer Lebenseinstellung wie erhöhte Wachsamkeit, aber auch Dankbarkeit für ihr Leben und ihre Familie [29].

In einer Untersuchung in New York, Queens und Long Island unmittelbar nach 9/11 (ein bis zwei Monate danach) zeigten sich ähnliche Muster: 26% der Befragten haben Flüge abgesagt, 7% ihre Urlaubspläne geändert, 18,4% vermieden es weitestgehend, nach Manhattan zu fahren, und 13% berichteten, die öffentlichen Verkehrsmittel nach Manhattan weniger zu nutzen. 31% gaben auch an, ihren Alltag verändert zu haben, um mehr Zeit mit ihren Kindern und mit ihrer Familie zu verbringen [30]. Menschen veränderten ihre Reisegewohnheiten, wenn sie ein hohes Risiko für ein Terrorattentat sahen und im Allgemeinen weniger risikobereit waren. Als am gefährlichsten wurde von den Befragten ein Aufenthalt in/eine Reise nach Israel eingeschätzt, am sichersten eine nach Kanada [31].

Vor dem Terrorattentat in London gaben nur wenige an, ihr Verhalten zu verändern, um einem möglichen Attentat aus dem Weg zu gehen. Dennoch berichtete ein großer Teil, dass sie sich mehr um ihre Familie kümmern [32]. Von den 32%, die unmittelbar nach dem 7. Juli 2005 angaben, seltener öffentliche Verkehrsmittel zu benutzen sowie die Zahl der Besuche in Central London zu verringern [24], taten dies sieben Monate danach noch immer 19% beziehungsweise 17%. Insgesamt berichtete fast ein Drittel (28%) der Befragten, ihr Verhalten aufgrund der Attentate verändert zu haben, jedoch begab sich nur 1% wegen der Terrorattentate in psychologische Betreuung [25]. In einer Studie in Connecticut zur Inanspruchnahme psychischer Unterstützungen aufgrund von 9/11 gaben 6,4% an, sich diese gesucht zu haben. Die Inanspruchnahme korrelierte signifikant mit mehreren Variablen wie: Opfer von 9/11, Familienmitglied oder Freund eines Opfers von 9/11, Schlafprobleme und Substanzmissbrauch [19].

Die Veränderungen bei der Wahl der Transportmöglichkeiten in den USA zeigten sich auch bei einer Analyse der Highwaystatistiken [33]: Das Auto wurde vermehrt genutzt, und der Flugverkehr verringerte sich. Als indirekte Folge der Terrorattentate erhöhte sich damit die Anzahl der Todesopfer im Straßenverkehr in den 12 Monaten unmittelbar nach 9/11 auf 1500. Auch in Spanien wurde das Zugfahren nach den Madrid-Attentaten vermieden. Jedoch hielt dieser Effekt nur kurz an; es kam auch nicht zu einer vermehrten Nutzung des Autos [34]. Im Gegenteil: Nach den Attentaten wurden auch Pkws weniger häufig genutzt.

Risikowahrnehmung und Terrorismus

Nach 9/11 haben einige Studien versucht, die speziellen Eigenschaften der Risikowahrnehmung von Terrorattentaten im Vergleich zu anderen Risikofaktoren sowie deren gesellschaftliche Implikationen herauszuarbeiten. Zu den Untersuchungen in den USA über die psychischen und behavioralen Folgeerscheinungen der Terrorattentate kamen weitere Studien zur Einschätzung ihrer Eintrittswahrscheinlichkeit durch die Bevölkerung. Diese Untersuchungen wurden zum Teil in den Vereinigten Staaten, aber auch in Ländern, in denen teilweise noch nie ein Attentat verübt worden war, durchgeführt.

Noch vor den Attentaten in London wurde in England eine Untersuchung zur dortigen Terrorbedrohung durchgeführt. Tatsächlich schätzen 46–60% der Studienteilnehmer zu zwei Messzeitpunkten die Wahrscheinlichkeit für ein Attentat in England als sehr hoch ein [32]. Wurden sie nach der empfundenen subjektiven Gefahr gefragt, hielten es 20–34% für möglich, dass sie und ihre Familie von einem Attentat betroffen sein könnten. In

der Untersuchung wurden verschiedene normative und soziale Werte wie Offenheit und Hedonismus als Prädiktoren für eine erhöhte Risikowahrnehmung beschrieben. Weiterhin hatten soziodemografische Variablen wie weibliches Geschlecht, Alter und ländlicher Wohnsitz den höchsten Einfluss auf die Risikowahrnehmung. Menschen, die über erhöhte Angst berichteten, ein Opfer von Terrorattentaten zu werden, gaben weiterhin an, dass sie als Folge der Terrorattentate von 9/11 mehr Zeit mit ihrer Familie und ihren Freunden verbringen. Ein halbes Jahr nach den Terrorattentaten in London hielten 90% der Befragten weitere Attentate in der Stadt für wahrscheinlich, 52% hielten ihr Leben, 43% das ihrer Familie für bedroht [25].

In New York wurde ein Monat nach 9/11 die Risikoeinschätzung in Bezug auf die nationale beziehungsweise persönliche Bedrohung erhoben [30]. 82% hielten einen weiteres Terrorattentat für wahrscheinlich, 70% fühlten sich persönlich bedroht. Je höher die Risikowahrnehmung war, desto schlechter wurde die Wirtschaftsprognose für die nächsten fünf Jahre bewertet. In einer Studie zur Risikowahrnehmung in Schweden, wo noch nie ein öffentliches Terrorattentat mit Bedrohung größerer Menschenmassen verübt worden ist, zeigte sich einige Zeit nach 9/11, dass eine relativ geringe diesbezügliche Sorge besteht [13]. Dort wurden wirtschaftliche Probleme und Probleme im Gesundheitswesen als gravierender eingestuft. In Übereinstimmung mit den oben genannten Untersuchungen wurde auch hier das persönliche Risiko im Vergleich zu dem für die Nation als geringer eingeschätzt. Eine erhöhte Risikowahrnehmung korrelierte mit weiblichem Geschlecht, Alter und einem geringen sozioökonomischen Status.

In einer bevölkerungsrepräsentativen Studie von Fischhoff wurden die Nähe/Entfernung zum WTC als Marker genommen und die Teilnehmer in zwei Gruppen unterteilt [Kriterium: a) Wohnort in der Nähe des WTC, b) Wohnort 100 Meilen vom WTC entfernt]. In der Untersuchung wurden fünf auf Terrorattentate bezogene Aspekte und drei allgemeine Risiken sowie deren Eintrittswahrscheinlichkeit für den durchschnittlichen Amerikaner beziehungsweise für die befragte Person erfasst. Die auf Terror bezogenen Aspekte waren: die Wahrscheinlichkeit, in einem Terrorattentat verletzt zu werden, Schlafstörungen wegen Terrorangst, Verringerung der Reisetätigkeit, Briefe auf verdächtige Hinweise untersuchen, Medikamente gegen Anthrax nehmen (die Untersuchung wurde während der Anthrax-Krise durchgeführt). Alltagsrisiken waren: an Grippe zu erkranken, Opfer einer Straftat zu werden und aus einem anderen Grund zu sterben (Krankheit, Unfall etc.). Zwischen den beiden Gruppen gab es bei der Einschätzung der Wahrscheinlichkeit für das Eintreffen der Alltagsrisiken keine Unterschiede. Bei der Einschätzung der Risiken für ein weiteres Terrorattentat zeigte sich jedoch zwischen den Gruppen ein signifikanter Unterschied. Weiterhin gab es einen signifikanten Interaktionseffekt, der schon in anderen Studien belegt worden war: Männer, Weiße und Republikaner berichteten, wenn sie außerhalb von New York leben, über ein geringeres Bedrohungsgefühl durch Terrorattentate, hingegen nahmen die anderen Gruppen auch für Regionen außerhalb von New York eine erhöhte Bedrohung wahr [35]. Jedoch konnte auch Fischhoff zeigen, dass sich die Risikoeinschätzungen im Laufe der Zeit veränderten: Ließ man die Teilnehmer nachträglich die Wahrscheinlichkeit eines Terrorattentats für das Jahr 2001 einschätzen, hielten sie diese für geringer als zum damaligen Zeitpunkt [17]. Der Hindsight-Bias korrigierte die Risikowahrnehmung ungefähr um 10% nach unten, was mit den Erfahrungen aus anderen Studien übereinstimmt. Ein Jahr nach den Terrorattentaten wird die Welt wieder als sicherer eingeschätzt, was die Risikowahrnehmung im Rückblick verringert. Dies impliziert jedoch auch, dass Entscheidungen, die aufgrund einer großen Angst vor Terrorattentaten getroffen wurden, im Nachhinein weniger verständlich wirken können.

Der Einfluss von Terrorattentaten auf die allgemeine Risikowahrnehmung

Verheerende Ereignisse wie Terrorattentate können sich auch auf die allgemeine Risikowahrnehmung auswirken. Jugendliche haben direkt nach 9/11 die Wahrscheinlichkeit, durch eine Naturkatastrophe wie ein Erdbeben zu sterben, doppelt so hoch eingeschätzt als zu Messzeitpunkten vor dem 11. September 2001 [36].

Die Einschätzung der Terrorwahrscheinlichkeit durch bestimmte Gruppen

Wie Surveyuntersuchungen zeigten, finden sich nach Terrorattentaten vor allem unter Migranten sowie bei psychisch Kranken und Behinderten höhere Prävalenzen für psychische Störungen und Reaktionen [18, 27]. Die Terrorgefahr im eigenen Land wird gerade von diesen Personen überschätzt. Die Einstellung bestimmter Gruppen zu Terrorrisiken wurde in den USA in einer Telefonbefragung in sechs Sprachen mit 2317 Teilnehmern untersucht. Ziel dieser mehrsprachigen Befragung war es, die Drop-out-Rate von Migranten und anderen meist schwer zugänglichen Bevölkerungsgruppen zu verringern. In den USA wird die Bevölkerung durch das Homeland Security Advisory System (HSAS) über die Einschätzung der aktuellen Terrorgefahr mithilfe eines fünffarbigen Ampelsystems informiert. Migranten und psychisch Kranke haben das HSAS im Vergleich zu anderen Personen signifikant häufiger überschätzt und berichten auch über vermehrte Angst vor Terrorattentaten. Beispielsweise gaben 17,0% der Befragten mit einer ernsthaften psychischen Grunderkrankung an, dass sie „häufig“ oder „sehr häufig“ aus Angst vor einem Terrorattentat bestimmte Dinge vermeiden, die sie gern tun würden. Hingegen äußerten sich nur 4% der Personen ohne psychische Erkrankung in dieser Weise [37].

Kulturelle Unterschiede bei der Einschätzung von Terrorattentaten

Um zu verstehen, wie Menschen unterschiedlicher Kultur Terrorattentate einschätzen und daraus eine Risikobewertung ableiten, wurde ein interkultureller Vergleich zur kognitiven und emotionalen Repräsentation von Terrorrisiken in der Türkei und in Israel durchgeführt [38]. Beide Länder sind häufig Ziele von Selbstmord- und Terrorattentaten. Der Fragebogen „Terror Risk Perception Questionnaire“ (TPQR) mit den vier Faktoren „Costs“ (Konsequenzen von Terroratten-

taten), „Vulnerability“ (Wahrscheinlichkeit des Erlebens eines Terrorattentats), „Trust“ (Vertrauen in Autoritäten) und „Control“ (eingeschätzte Hilflosigkeit) wurde zwei Stichproben aus Israel und der Türkei vorgelegt. Die Faktoren, die die Risikowahrnehmung am stärksten beeinflussen, waren in beiden Ländern der Cost-Faktor, also die Konsequenzen von Terrorattentaten und der Control-Faktor: Je mehr die Befragten Terrorattentate mit hohen Konsequenzen und wenig Kontrolle assoziierten, desto häufiger wurden negative Emotionen berichtet – insbesondere bei Frauen. Türkische Teilnehmer hatten signifikant häufiger das Gefühl, weniger Kontrolle darüber zu haben, ob sie Opfer eines Terrorattentats werden. Dies ist jedoch im Zusammenhang mit der Tatsache zu sehen, dass die Untersuchungen unmittelbar nach einem Selbstmordattentat in Istanbul durchgeführt wurden.

Sozialpsychologische Untersuchungen zur Risikowahrnehmung und zu ihren Folgen

Aufgrund der vorliegenden Hinweise, dass durch eine hohe, auf Terrorattentate bezogene Risikowahrnehmung auch das Eintreffen anderer potenzieller Krisensituationen als wahrscheinlicher eingestuft wird [36], untersuchten Fischer et al. die gesellschaftlichen Folgen dieser Einschätzungen – in seiner Untersuchung am Ausmaß der Bereitschaft von Testpersonen dargestellt, auch nicht mit Terror assoziierte Taten zu bestrafen [39]. Dazu erzeugte er bei einer Gruppe von Testpersonen experimentell Angst vor Terrorattentaten in Deutschland. Tatsächlich zeigten die Teilnehmer dieser Gruppe eine erhöhte Risikowahrnehmung in Bezug auf solche Attentate. Von dieser Gruppe wurde auch deutlich häufiger der Wunsch geäußert, Straftaten, die nicht mit Terror im Zusammenhang stehen, härter zu bestrafen. Dieser Effekt trat nicht auf, wenn Teilnehmer gegenüber anderen Krisensituationen (wie Naturkatastrophen) sensibilisiert wurden. Somit konnten Fischer et al. zeigen, dass Terrorattentate als aggressive Hinweisreize fungieren. Teilnehmer der ersten Gruppe besaßen außerdem einen ausgeprägteren Wunsch nach Aufrechterhaltung der sozialen Ordnung.

Fazit

Zum gegenwärtigen Zeitpunkt stehen die Untersuchungen zur Terrorangst und zur diesbezüglichen Risikowahrnehmung erst am Anfang. Es zeigt sich aber bereits, dass sich diese Risikowahrnehmung zwischen verschiedenen Gruppen unterscheidet, und dass eine hohe Risikoeinschätzung mit zahlreichen Verhaltenskonsequenzen sowie Folgen für die psychische Gesundheit einhergehen kann. Kritisch ist einzuräumen, dass die bisher eingesetzten Erhebungsansätze nicht die dynamischen Aspekte der Risikowahrnehmung aufzeigen können, also zum Beispiel nicht zeigen, wie Risikowahrnehmung entsteht beziehungsweise sich entwickelt und wie sie durch die besonderen Charakteristika einer Situation gefördert oder abgeschwächt wird. Ein Großteil der zu diesem Thema vorliegenden Studien wurde in den USA durchgeführt. In Deutschland fehlen entsprechende Daten noch. Daher ist anzustreben, auch hier epidemiologische Studien zur Sicherheits- und Risikowahrnehmung unterschiedlicher Katastrophen und Krisensituationen durchzuführen. Als methodische Kritik ist zum einen anzumerken, dass es keine psychologischen Modelle zur situationsbezogenen Wahrnehmung spezieller Risiken – zum Beispiel von Terrorattentaten – gibt. Auch die Verknüpfung zwischen der Bedrohungswahrnehmung und ihren Auswirkungen auf Kognition, Verhalten und Emotion sowie die diesbezüglichen Unterschiede zwischen verschiedenen Risikofaktoren wurden noch nicht weitergehend analysiert und theoretisch erfasst. Der Zusammenhang zwischen verschiedenen Krisensituationen, ihren spezifischen Charakteristika und den daraus folgenden Verhaltensänderungen sowie gesundheitlichen Konsequenzen ist auf interkultureller Ebene noch nicht hinreichend geklärt. Aufgrund der internationalen Bedeutung des Themas und der interkulturellen Verhaltensunterschiede in Krisensituationen ist eine internationale Standardisierung von Untersuchungszugängen wünschenswert. In der Studie Behaviour, Security and Culture (BeSeCu) – gefördert von der Europäischen Kommission im 7. Rahmenprogramm – werden interkulturelle Verhaltensunterschiede in Krisensituationen sowie in der Einschätzung von Risiken in sieben europäischen Ländern unter Einsatz gemeinsam entwickelter, international validierter Instrumente untersucht. Mit dieser Studie werden erstmals vergleichbare Daten vorliegen [40].

Besondere Zielgruppen der Forschung zur Risikowahrnehmung und zu ihren Konsequenzen sind die indirekt von Terrorattentaten Betroffenen sowie Migranten und Kinder. In verschiedenen Untersuchungen zeigte sich, dass ein Zusammenhang zwischen TV-Konsum und dem Auftreten von Stresssymptomen besteht [22, 23], wobei die Dauer des TV-Konsums mit dem Schweregrad der psychischen Beeinträchtigung korrelierte. Comer und Kollegen konnten in einer Studie zur Schulung von Müttern zum Umgang mit terrorbezogenen Nachrichten nachweisen, dass sich nicht nur die Angst der Kinder durch eine spätere Aufbereitung des Gesehenen mit der Mutter verringert, sondern sich auch die Fähigkeit der Eltern, mit ihren eigenen Ängsten umzugehen, verbesserte [41].

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Behavioural, emotional and cognitive responses in European disasters: Results of survivor interviews

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Behavioural, emotional and cognitive responses in European disasters: Results of survivor interviews

Running head: Interviews with survivors of disasters

Abstract

In the European multi-centre study BeSeCu, interviews in seven countries were conducted in order to explore emotional, behavioural and cognitive responses during disasters as experienced by survivors. Interviews (either in groups or one-to-one) were run by type of event: terror attack, fire, collapse of a building, earthquake and flood. While the environmental cues and ability to recognise what was happening varied in different disasters, survivor responses tended to be more universal across events, and were most often adaptive and non-selfish. Several peritraumatic factors related to current levels of posttraumatic stress were identified, while memory quantity did not differ as a function of event type or posttraumatic stress. Time since event had a small effect on what was recalled. Based on the findings, suggestions for emergency training are made.

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Introduction

In the last decade (2000-2009), 899 natural and technological disasters took place in Europe with 89317 people killed and 9196702 people affected (EMDAT, 2012). Amongst the most common events in Europe are natural disasters (EMDAT, 2012), with more notable recent cases including the floods in Poland in 2010, Czech Republic and Germany, 2002, plus the L'Aquila earthquake in Italy, 2009 and Marmara earthquake in Turkey, 1999. In addition to this Europe has seen some high profile man-made disasters, such as the bombings in London, 2005 and in Madrid, 2004. Since these terror attacks and those on the World Trade Center in 2001, public awareness of man-made disasters has heightened in Europe (Grimm, Hulse and Schmidt, 2009). Coupled with the incidence rates, this suggests an increasing need for disaster research/emergency psychology in Europe. This is especially the case given that studies are revealing several misconceptions surrounding the types of responses that emergencies evoke in people. For example, it has been shown that widely-held beliefs in public opinion and the media such as that mass panic, looting and selfish behaviours are common in disasters are incorrect, and should be abandoned in favour of a realistic, proactive emergency knowledge (Alexander, 2007; Prati, Catufi and Pietrantoni, 2012*)*. By better understanding what actions people actually take and their thought processes as an emergency unfolds, members of the public and emergency personnel will be better equipped to deal with a disaster, and the physical, psychological and economic consequences of such events can be mitigated. Identifying and understanding emotional responses relevant to counterproductive behaviour during disasters and development of later psychological distress will also aid the public and professionals, both during and after an incident.

One fruitful approach for identifying actual human behaviour, as well as emotional and cognitive processing, in disasters is to investigate retrospective narratives of survivors. Sotgiu and Galati (2007) asked survivors about their experience during the 2000 flood in Italy and found that participants remembered well the emergency phase of the flood and reported a

variety of emotions, such as fear, surprise and sadness. Prati, Catufi and Pietrantoni (2012) found similar emotional responses were reported by survivors of earthquakes in Italy. The authors also identified main coping responses during the earthquake as being: flight; freeze; seek shelter; no reactions, because they did not realize what was happening; look for relatives and try to protect them; look for additional information from the social environment; and completion of previous activities. Prosocial behaviours were frequent and looting did not occur. These studies suggest that the most frequently experienced emotions and behaviours in disasters may be adaptive (e.g. to fear life-threatening stimuli and to look for ways to avoid or limit the negative consequences) and non-selfish. They also suggest that responses may depend on a person's ability and/or need to recognise and make sense of cues to the life-threatening stimuli. The current study sought to complement this field of research by widening the focus to include survivor accounts from a variety of European natural and man-made disasters, examining the behaviours, emotions and cognitions described therein.

When including survivors' descriptions of events, functions of memory must be considered. There is reason to believe that many details of disasters will be recalled to good effect by the people who experienced them first hand, even when a number of years have passed. Considering accuracy and consistency of eyewitness reports about emotional events, studies in forensic and cognitive psychology have shown that arousal enhances the remembering of situations (Christianson, 1992; Hulse, Allan, Memon and Read, 2007; van Giezen, Arensman, Spinhoven and Wolters, 2005). In the case of natural disasters, emotional involvement and exposure to an earthquake has been associated with improved recall of the event itself (Neisser, 1996), in comparison to only seeing the event on TV (Er, 2000). Additionally, disaster-related interviews about Hurricane Hugo and Hurricane Andrew have revealed remarkable memory stability over time (Fivush, McDermott Sales, Goldberg, Sales, Bahrick and Parker, 2004; Bahrick, Parker, Fivush and Levitt, 1998; Norris and Kaniasty, 1992). However, while exposure to and greater involvement in emergency events that produce

heightened emotional states may help enhance memory, such experiences may also contribute to the development of posttraumatic stress symptoms in some individuals (Bernat, Ronfeldt, Calhoun and Arias, 1998). Posttraumatic stress, conversely, is linked with impaired memory functions. For example, PTSD sufferers may find that certain aspects of the traumatic event come to mind easily and vividly while other details are difficult to intentionally recollect in sequence or at all (Halligan, Michael, Clark and Ehlers, 2003). Also, there is evidence that the memories of persons who suffer from PTSD about the traumatic events are disjointed from autobiographical memory and feature different characteristics such as sensory components or the feeling that the memory is not in the past but happening "here and now" (Kleim, Wallott & Ehlers, 2008). Thus, it is important to take into account the presence of posttraumatic stress symptoms in survivors when examining how they recall their disaster experience.

Apart from memory function, posttraumatic stress after a disaster experience is closely related to survivors' peritraumatic responses. Studies have shown that posttraumatic stress symptoms are best predicted by peritraumatic factors, e.g. emotions and cognitions displayed by survivors during the event (Ozer, 2003), such as negative feelings and perceived threat (Brunet et al., 2001), dissociation (Marmar et al., 1994) and physiological factors related to a panic attack (Fikretoglu, 2007). However, while the influence of peritraumatic emotional and cognitive processing on posttraumatic outcome is well-established, to our knowledge no studies have investigated yet the relationship between peritraumatic behavioural responses and posttraumatic stress. Ehlers and Clark's (2000) cognitive model of PTSD suggests that PTSD sufferers are likely to use dysfunctional cognitive strategies after experiencing the traumatic event. Following this approach, it can be assumed that counterproductive behaviour during the traumatic situation will be more likely to lead to the development and maintenance of PTSD symptoms, as PTSD sufferers generalize from the behaviour displayed in the traumatic situation to their general behaviour in their everyday lives. Therefore we believe

that there is reason to investigate the relationship between peritraumatic behaviour and the development of posttraumatic distress.

The following exploratory study aimed to collect accounts from survivors of a wide range of European natural and man-made disasters using a standardised interview procedure as well as identify which kinds of behavioural, emotional and cognitive responses were displayed. It was investigated whether these responses were related to (i) the type of disaster and (ii) levels of posttraumatic stress, while (iii) taking memory functions into account.

As studies about a single natural hazard (i.e. flood/ earthquake) have reported similar, adaptive responses (Sotgiu & Galati, 2007; Prati, Catufi & Pietrantoni, 2012), the current study investigated if survivor responses displayed in different types of natural and man-made disasters would also be similar or if they would be specific to the incidents. Accounts were grouped according to the type of disaster experienced. It was expected that survivor responses, while featuring some differences across different disasters according to the incident-related cues of specific situations, would nevertheless be adaptive.

The influence of current level of posttraumatic stress was assessed and accounts from participants with lower posttraumatic stress were compared to accounts from participants with higher posttraumatic stress. Retrospective assessments of the intensities of peritraumatic emotions and cognitions have revealed differences related to the level of traumatisation (Basoglu, Salcioglu & Livanou, 2002; Basoglu, Kihk, Salcioglu & Livanou, 2004; Brunet et al., 2001; Ozer, 2003), therefore we expected not just emotional and cognitive responses to differ but also peritraumatic behaviour, such as the way of reacting (e.g. instinctive, rational, resigned) or discrete actions such as actively rescuing oneself or others, as a function of posttraumatic stress.

Finally, possible confounds had to be considered in the analysis: Differences in the accounts between groups with high and low levels of posttraumatic stress might also arise from memory functions. Therefore the quantity of information recalled by both groups was

compared. In order to further consider effects influencing the reliability of the analysis, memory retrieval as a function of time passed since the event was investigated. Although autobiographical memory for emotionally arousing events is meant to be relatively stable due to characteristics such as the distinctiveness, sudden occurrence or, due to public interest, the repeated reporting of the incident (Pohl, 2007), we nevertheless decided to assess the time factor in our sample. Also of interest was whether the interview would generate similar levels of detail for all types of disasters and therefore differences in memory quantity/ reporting units were compared across events. It was believed that no differences in memory/ reporting quantity would be a positive outcome for the reliability and validity of the analysis.

Methods

The study described in this paper is part of a larger cross-cultural multi-centre research project called BeSeCu (*Be*haviour, *Se*curity, *Cu*lture), with participating centres in: Greifswald, Germany; London, UK; Barcelona, Spain; Warsaw, Poland; Hamburg, Germany; Prague, Czech Republic; Stockholm, Sweden; and Izmir, Turkey. The study was approved by all national institutional ethics committees.

Events

Of interest were emergency events with the following characteristics: (a) occurred within approximately 10 years of the interview, concentrated in a particular time and space; (b) concerned an identifiable hazard that posed a physical threat but of a non-infectious kind (i.e. excluding emergency events such as epidemics); (c) the threat was posed to lives and/or property (with the lives and/or property being many, e.g. a large number of people in a single structure or smaller groups of people located across a number of nearby structures); (d) the emergency services attended the scene; and (e) a full or partial evacuation of the affected

structure(s) was attempted, either by the victims or by official agents. A variety of events occurring in the participating centres' countries met the above criteria: i.e. Czech Republic floods in 2002; Marmara earthquake in Turkey, 1999; collapse of buildings such as the Katowice Trade Hall roof collapse in Poland, 2006 and the collapse of a multi-storey residential building in Spain, 2006; severe fires in public buildings and multi-storey residential buildings such as the Gothenburg discotheque fire in Sweden, 1998 and a fire in a Hamburg hospital in Germany, 2007; and the 7/7 London bombings in the UK, 2005. The Mumbai bombings in India, 2008, were also of interest as several German tourists were caught up in the attacks.

Participants

Recruitment was performed in each centre individually, using word-of-mouth campaigns and advertising campaigns conducted via the media, self-help groups and the emergency services. Adult survivors were invited to contact the researchers if they wished to take part in an interview. Participation was restricted to persons who had directly experienced the emergency event - bystanders and relatives of victims were excluded. Also excluded were persons who had survived incidents which turned out not to match all of the aforementioned event characteristics. From a total of 134 persons who voluntarily participated in the study, 125 were included in the analysis, with approximately equal numbers being female (52.8%) and male (47.2%). Nine percent of participants had a migrant background but no significant differences were found between migrants and natives considering education, gender, age and type of event. Therefore migrant status is not discussed further in this paper. Socio-demographic, incident-related characteristics and Impact of Event Scale – Revised (IES-R) total mean scores of participants are reported in Table 1.

Instruments

Interview. A semi-structured interview was designed by an intercultural and interdisciplinary team of experts such as scientists, fire safety engineers, firefighters, psychotherapists specialized in trauma, and emergency physicians. The interview included techniques from a cognitive interview (Fisher and Geiselman, 1992) such as asking participants to mentally reinstate the context and to start with an uninterrupted free narrative. Cognitive interview techniques have been shown to enhance the recall of event details (Köhnken, Milne, Memon and Bull, 1999). The narrative was followed by probing questions focusing on four main themes: Eight questions were asked about the 'initial context' (i.e. the initial context surrounding the disaster, such as the setting and the recognition/realization that an emergency was occurring), thirteen about the 'emergency phase' (i.e. when survivors and others began to respond to the emergency, e.g. details about reactions, evacuation, emergency services' interventions), three questions about emotional processing and four questions about cognitive appraisal (e.g. risk perception, self-efficacy) during the disaster.

Questionnaires. Two questionnaires were administered. The first asked participants for socio-demographic information (age, gender, etc.) and incident details (e.g. date, duration). The second was a validated national version of the Impact of Event Scale-Revised (IES-R; Weiss and Marmar, 1997; Maercker and Schützwohl, 1998; Baguena, Villarroya, Belena, Diaz, Roldan and Reig, 2001; Preiss, Mohr, Kopeček, Melanová, Janečka, Rodriguez and Hájek, 2004; Corapcioglu, Yargic, Geyran and Kocabasoglu, 2006; Juczyński and Ogińska-Bulik, 2009; Sveen, Low, Dyster-Aas, Ekselius, Willebrandt and Gerdin, 2010). The IES-R is a commonly used self-report measure that assesses posttraumatic stress symptomatology in the past seven days and possesses satisfactory psychometric properties (Joseph, 2000; Sundin & Horowitz, 2003). Although the IES-R is usually applied to more recent events than those studied here, it was administered because to our knowledge there is no comparable, cross-

culturally validated instrument which can be applied to any specific life-event (e.g. different types of disasters).

Procedure

Participants were first asked to complete the two questionnaires in relation to the disaster they would go on to describe. They were then interviewed. Interviews were conducted either in groups (e.g. dyads, triads, mini-groups, being grouped by kind of event) or on a one-to-one basis. One-to-one interviews were generally chosen when the event was particularly traumatic or sensitive. Overall 29 group interviews and 12 one-to-one interviews were conducted across centres. All interviews were led by experienced psychologists and recorded on audio- or videotape with the participants' consent. Average interview duration was 1.5 hours. Interviewers were vigilant to signs of upset and participants were informed from the outset that they could take a break or withdraw from the study altogether if they so wished.

Data Analysis

Content analysis. Interviews were transcribed verbatim according to transcribing guidelines. At an international workshop, a theoretical framework based on statements from each country and each event was designed in order to conduct a content analysis. Statements were assessed per interview. Content analyses were done in each country separately with two independent coders. The quantity of categories was assessed across all interviews at the final data checking by the coordinating centre. Statements given by participants were classified into course of event (initial context and emergency phase) and emotional and cognitive processing of the event. Analysis revealed the following dimensions: recognition/realization, interpretation, reaction, evacuation decision, evacuation process, emotion, self-efficacy, risk perception, worst moment and improvement (s. Table 2). As the information given was very rich,

dimensions had to be divided into domains and then into categories. Considering the scope of this paper, only an overview of the most common dimensions, domains and categories for the initial context and emergency phase of the disaster and the emotional and cognitive processing of the event are presented in the Results.

Intercoder reliability. For the assessment of intercoder reliability, an international team of three centres was established (Lauf, 2001). The coding process was evaluated in one step from identifying relevant talk in the full transcript until final choice of categories according to the theoretical framework. Reliability of data was calculated with Krippendorff's alpha (Krippendorff, 2004). Advantages for using Krippendorff's alpha are the ability to deal with small sample sizes and multiple coders but also its accommodation and comparability to all common scales of measurement. It must be noted that intercoder reliability was higher when conducting it in national centres, .91, but still sufficient in binational ratings, .79 and .80. Intercoder reliability for dimensions varied across transcripts (s. Table 3). The dimensions interpretation, evacuation process and worst moment were especially high. Other dimensions varied across transcripts with sufficient ratings. Only in the dimension evacuation decision, intercoder reliability was not sufficiently high so that validity of data for this dimension cannot be assumed.

Statistical analysis. The content analysis produced dichotomous nominal data. In order to assess the influence of posttraumatic stress and type of event on survivor accounts, Chi^2-tests were conducted. Additionally, the effect sizes Cramer's V and Cramer's Phi were calculated for type of event and posttraumatic stress respectively. There were no missing cases for the condition type of event. Missing cases on the IES-R (four single items) were imputed using a regression model (*conditional mean imputation*; Schafer & Graham, 2002).The IES-R was

used in order to group participants for high and low posttraumatic stress by a cut-off of the total IES-R score of 33 suggested by Creamer, Bell and Faila (2003). Group interviews were grouped in the high stress condition if mean scores of all participants were above the cut-off score and vice versa for low stress group. As not all focus groups could clearly be grouped, analyses involving posttraumatic stress include 15 out of the 29 group interviews and all of the one-to-one interviews. The influence of posttraumatic stress, time elapsed since the event and type of event on memory retrieval/ reporting units was assessed with T-tests, correlations and ANOVAs, respectively. The effect sizes partial eta squared and Cohen's *d* were calculated for type of event and posttraumatic stress respectively All statistical data analyses were conducted with PASW 18.0.

Results

Behavioural, emotional and cognitive responses

Participants' responses are illustrated in Tables 4 and 5. As can be seen, the most commonly reported behavioural response to a disaster was a supportive one. Many participants reported people helping each other through the incident. Actions taken to save other people's lives were also common. After these altruistic acts, the next most commonly reported behaviours were preparing for evacuation and seeking information.

Regarding how participants felt during the disaster, fear and panic were the two most commonly reported emotions, with nervousness coming next. Following that, participants reported experiencing physiological reactions, such as palpitations, and feelings of derealization or dissociation. Their thoughts appeared to centre largely on the threat posed with the most commonly reported cognition being the perception of high risk. However, participants also reported what went through their mind when they were initially presented with cues to the emergency, whether these cues were from the environment or from other

people. Cognitions in this phase centred most frequently on their understanding of what was happening and whether they estimated the seriousness of the situation appropriately.

Of interest next to the types of reactions was the way of reacting. Three ways of reacting were reported. Instinctive reactions described automatic responses with participants reporting that they just reacted during the event; they did not think about what to do next, nor did they reflect on emotional or cognitive states or plan their behaviour. Participants reporting a rational way of reacting stayed calm, and anticipated the possible actions in the given situation and their consequences. Also they were mainly proactive in trying to manage an evacuation/ rescue. In all, there was little difference between whether participants reported reacting in an instinctive or rational way. A third way of reacting was resignation. Here people reported about being convinced that they were at the mercy of the situation and were not able to influence the outcome, therefore they showed no reaction. Only a small percentage of survivors reported resignation.

Type of event and responses

As one might expect, how participants came to recognise the situation they were in differed across disasters. Smoke/flames/fire were reported in fires and terror attacks (Chi^2 (4,41)= 23,01, $p< .001$; V= .37), explosion in terror attacks and collapse of a building (Chi^2 (4,41)= 15,72, $p< .01$; V= .31). Water was only mentioned as a cue in the flood condition (Chi^2 (4,41)= 33,21, $p< .001$; V= .45). Realization of something unusual happening occurring from people shouting and noise was not related to any specific disaster (Chi^2 (4,41)= 6,82, $p= .15$; V= .20). Neither were participants more significantly informed by others in any specific incident (Chi^2 (4,41)= 9,36, $p= .06$; V= .24). Participants reported significantly more often about their ability to recognise/realize their situation being impaired, mainly through being asleep, during the initial phase of collapses of buildings (Chi^2 (4,41)= 12,01, $p< .05$; V= .27). The correct interpretation of the disaster was usually made in fires and earthquakes (Chi^2

(4,41)= 14,49, $p< .01$; V= .30). Underestimation of seriousness was mainly reported in floods (Chi^2 (4,41)= 14,29, $p< .01$; V= .29).

Considering reactions, neither instinctive nor rational reactions were related to specific incidents with Chi^2 (4,41)= 4,32 $p= .36$; V= .16 and Chi^2 (4,41)= 7,12, $p= .13$; V= .21 respectively. Also resignation was not related to any specific incident (Chi^2 (4,41)= 3,81 $p= .43$; V= .15). Supportive behaviour was reported in all cases except for fires (Chi^2 (4,41)= 16,28, $p< .01$; V= .31). Saving family and friends was reported more often in domestic or professional settings, such as in a fire, flood, earthquake and collapse of a building then in public places such as in terror attacks (Chi^2 (4,41)= 10,06, $p <.05$; V= .25). Preparation for evacuation was not related to any event (Chi^2 (4,41)= 7,04, $p= .13$; V= .21), also seeking information was independent of the disaster participants were experiencing (Chi^2 (4,41)= 3,50, $p= .48$; V= .15).

Regarding emotional and cognitive processing, fear, nervousness, panic, dissociation/ derealisation and physiological reactions were not related to specific incidents with Chi^2 (4,41)= 3,24, $p= .52$; V= .14, Chi^2 (4,41)= 4,57, $p= .33$; V= .17, Chi^2 (4,41)= 3,24, $p= .52$; V= .14, Chi^2 (4,41)= 8,51, $p= .07$; V= .23 and Chi^2 (4,41)= 8,45, $p= .08$; V= .23 respectively. Although high level of perceived risk was not related to any incident (Chi^2 (4,41)= 4,87, $p= .30$; V= .17), low level of perceived risk was reported significantly more in fires (Chi^2 (4,41)= 10,93, $p< .05$; V= .26).

Effect sizes of significant results ranged from V= .25 to V= .45 and from V= .14 to V= .24 for insignificant results.

Posttraumatic stress and responses

Experiencing an explosion and being impaired at the initial stage of the disaster was reported significantly more often by the high than the low posttraumatic stress group (s. Table 4). The only behavioural responses that differed according to current levels of posttraumatic

stress were preparing for evacuation and seeking information: Participants in the low posttraumatic stress group reported these behaviours significantly more often than the high stress group. Concerning emotional and cognitive responses, the high posttraumatic stress group reported significantly more about experiencing derealisation/dissociation and physiological reactions than did the low stress group. The low stress group in turn reported significantly more often about low perceived risk (s. Table 5). No other significant differences were found as a function of posttraumatic stress. Effect sizes of significant results ranged from Phi= .37 to Phi= .47, effect sizes from insignificant results ranged from Phi= .02 to Phi =.37

Effects on memory quantity

On average, 31.51 (SD = 6.64) statements were given per interview. When dividing this into the different phases of the disaster per interview, about the initial context a mean of 5.76 (SD = 1.73) statements were given. In the emergency phase more than twice as much statements were given (M= 13.49, SD= 3.23). A mean of 2.73 (SD =1.25), statements were given about emotions and 5.76 (SD = 2.59) about cognitions (self-efficacy and risk perception).

One-way ANOVAs indicated no significant main effect of the type of disaster for the memory quantity of the overall amount of statements (F (4,40)= 1.08, p= .38; η^2= .15) but also not of the initial context (F (4,40)= 0.74, p= .57; η^2= .09), emergency phase (F (4,40)= 1.55, p= .21; η^2= .21), emotional (F (4,40)= 0.47, p= .76; η^2= .07) or cognitive processing (F (4,40)= 2.09, p= .10; η^2= .16). Nor was there any significant effect of posttraumatic stress on the amount of statements reported overall (T= -0.49, p= .63; d= .19) and about the initial context (T= 1.69, p= .10; d= .72), emergency phase (T= -1.08, p= .29; d= .26), emotional (T= 1.58, p= .13; d= .59) or cognitive processing (T= -.49, p= .62; d= .10). Finally, no significant relationship was found between the time since the event and the amount reported in the

interviews overall (r= .03, *p*= .86) and about emergency phase (r= .03, *p*= .87), emotional (r= .06, *p*= .71) or cognitive processing (r= .21, *p*= .19). Only for the time passed since the incident and the statements given by participants about the initial context a significant negative correlation was found (r= -.22, *p*< .05).

Discussion

This is the first explorative study investigating behavioural, emotional and cognitive responses during disasters using interviews with a wider sample of European disaster survivors. First of all, it was possible to assess the experiences of natural catastrophes flood and earthquake, the man-made disaster terror attacks as well as fires and collapses of buildings within one study with the same set of instruments. It was also possible to obtain detailed recollections despite the disasters occurring several years ago.

The main findings from this study somewhat confirm the indications from previous interviews with disaster survivors (Sotgiu and Galati, 2007; Prati, Catufi and Pietrantoni, 2012): that is, the responses displayed by survivors during the event are most often adaptive, to an extent, and non-selfish. The most frequently reported emotions and cognitions were fear and the perception of high risk, while the most frequently reported behaviours were being supportive to others and attempting to save lives. This shows that survivors had recognized the danger present and yet acted in ways that did not benefit their own survival at a cost to that of others. Of course, aiding others could arguably be described as *maladaptive* behaviour – the consequences could be a delay to one's own evacuation and an increase in personal risk. However, it should be borne in mind that in some of the disasters sampled, for example the 2005 London bombings, evacuation was not always a viable immediate option. Some survivors were trapped for an hour or more. Thus the altruistic behaviour displayed was not necessarily putting the survivors' personal wellbeing in jeopardy. Moreover, taking steps during the event to be with people and aid their wellbeing could conceivably help reduce the

trauma to survivors both at the time (cf. social attachment model, Mawson, 2005) and in the long term (e.g. minimize survivor guilt). Therefore a more detailed analysis of altruistic responses in disasters is relevant: Are there specific circumstances when altruistic behaviour is displayed? Will altruistic behaviour stop at saving the core family or extend to saving strangers if they are also present? How do altruistic persons rate their own peritraumatic risk? As there is obviously a need in humans to not only save their own lives but also to help others, results of further investigations could be implemented into emergency training so that counterproductive attempts to rescue others are avoided and disaster victims apply the right strategies.

This study also supported the idea that survivor responses may depend on one's ability/need to recognise and make sense of cues to the life-threatening stimuli. The detailed analysis of the content revealed that despite the different disasters being indicated by clear characteristics such as fire, flames, smoke, explosions, water, etc., in only less than half of all interviews did participants report making the right interpretation of the cues. Furthermore, in about one third of all interviews, participants were underestimating the seriousness of the event. Compare this with Prati, Catufi and Pietrantoni's (2012) study about the Umbria-Marche earthquake, where 10% of survivors did not realize or understand what was happening. The correct interpretation was more often made in the current study in fires and earthquakes, which might be due to emergency trials and thus public knowledge about these situations or past experience of these disasters (Alexander, 1990). Underestimation of the seriousness was reported by participants experiencing a flood. Reason for this might be the long onset of this disaster which could in turn lead to a delay in self-evacuation and increase the need for the emergency services to direct resources to rescue operations. Based on these results, we suggest public security training is tailored to specific disasters, instructing people about the unique characteristics of different events, thereby helping them to recognise these cues and the dangers attached to them more quickly, and increasing their understanding of

how to react appropriately. The results also imply further research needs to be conducted with representative samples in a quantitative research setting, gathering survivor accounts of different types of disasters in order to generalize event-related cues across different events.

The reports of impairments (e.g. sleeping through the initial cues, consumption of alcohol) in this study, although few in comparison, suggest there is also still room for improvements to warning systems and devices to aid quicker awareness of what is happening. A very challenging task in this field will be to improve rescue aids or evacuation strategies for people impaired due to alcohol or drug abuse. The importance of a further investigation of states of impairment is underlined by the finding that this was found more often in the group with higher levels of posttraumatic stress (cf. Ehlers & Clark, 2000). For medical and psychological support after disasters, it should be clarified if alcohol/ drug consumption during the event could be classified as vulnerability criteria for the development of later psychological distress.

Leach (2004) divided human responses to disasters roughly into three groups: calm; reflexive, almost automatic; and counterproductive behaviour, adding to the victim's danger, appearing in 10-15%, 75% and 10-15% of the population respectively. In the current study there were almost an equal number of reports of instinctive and rational reactions, with no significant effect of type of disaster or level of posttraumatic stress. Similarly, reports of reacting with resignation did not occur according to type of disaster or level of posttraumatic stress. It is perhaps too early to conclude that whether people react automatically/instinctively as opposed to with more controlled, conscious processing, or whether they are likely to just give up, may depend more on characteristics belonging to the individual, independent of the situation and later emotional and cognitive states. For future research, a further investigation with a larger sample into ways of reacting in disasters would likely enhance understanding about the influence of peritraumatic states on posttraumatic outcome, particularly as according to the Cognitive Model of PTSD (Ehlers & Clark, 2000), PTSD sufferers tend to

generalize from having no control during the disaster to having no control in their lives. Moreover, the influence of past experience of disasters and security training should be considered. Training in survival procedures would also be recommended in order for people to create memory schemas of actions during disasters and thus ease the appropriate response in disasters (see Leach, 2004). Additionally, a classification of human responses during disasters might help emergency services to interact with survivors in relevant situations.

Despite some reports of resignation, among the most frequently reported behaviours were to prepare for evacuation and seek information about the rescue, which suggests that many participants were optimistic of escaping the situation. Preparation for evacuation might indicate a delay in flight, especially in domestic settings if people cannot override the usual actions they might take before leaving their home, i.e. getting dressed, collecting one's wallet, keys, etc. and thus pose a threat to survival. However, survivors also reported about interactions with rescue services and being told to prepare for leaving their home whilst waiting for firefighters in order to be guided out of the building using masks. In comparable situations an immediate flight without professional assistance could have lethal consequences. It is interesting that both responses were reported more by participants with lower current posttraumatic stress. One might assume that actively planning/ assisting in the rescue gave survivors a feeling of control over the situation which might have a positive effect on the development of posttraumatic stress symptoms. Indeed, there is some research which has drawn a link between peritraumatic helplessness and posttraumatic stress (Joseph, Yule, Williams & Hodgkinson, 1994) and so it should follow that a sense of not feeling helpless during the event would reduce the likelihood of developing posttraumatic stress.

While fear was a dominant emotion in the current study, reported across all types of disaster, "panic" was reported just as frequently; much more than in other similar research (e.g. only 8% of participants reported panic in the Prati, Catufi and Pietrantoni study about the Umbria-Marche earthquake, 2012). But, a clarification must be made: our participants tended

to use "panic" in a colloquial way, meaning a negative form of excitement and an amplification of "fear", rather than mass panic (see Dombrowsky and Pajonk, 2005) or psychological definitions of panic attacks in themselves or others. From analysis of the transcripts, the occurrence of a mass panic with fatalities can only be assumed for one occasion.

As well as reporting about feelings, participants often referred to physiological reactions associated with heightened emotional states and the sense of dissociation. These phenomena were reported significantly more often by participants in the high than the low posttraumatic stress group. This would appear to compliment results from a meta-analysis, conducted by Ozer, Best, Lipsey, and Weiss (2003), which revealed that peritraumatic variables were better predictors of posttraumatic stress disorder than pre- or posttraumatic variables, and that peritraumatic dissociation was the strongest predictor. Also, Fikretoglu et al. (2006) found physiological symptoms of a panic attack during the traumatic event to be a good predictor of later posttraumatic distress. A relationship with posttraumatic stress would also be expected based on other research on this topic, concerning perceived life threat and fear (Simeon, Greenberg, Knutelska, Schmeidler and Hollander, 2003; Basoglu, Salcioglu and Livanou, 2002; Basoglu, Kihk, Salcioglu and Livanou, 2004). However, there is reason for caution: due to the fact that only the occurrence and not the intensity of peritraumatic states was collected, definitive relationships between fear/ risk perception and posttraumatic stress cannot be derived from the above research. Findings involving retrospective ratings of the intensity of peritraumatic emotional stress and risk perception and their influence on current PTSD symptoms in this sample are given elsewhere (see Grimm, Hulse, Preiss & Schmidt, *under revision*); in brief, those findings demonstrated that the relationship between peritraumatic and posttraumatic states is not necessarily straightforward.

Factors such as one's ability to detect cues being initially impaired and exposure to certain types of cue were reported more often in groups with higher posttraumatic stress

symptomatology, but so were the behavioural responses that occurred prior to evacuation. With this study then, a first link between peritraumatic behaviour and posttraumatic stress was made. However, due to characteristics of the sample such as its size we believe that further investigations of this topic with larger, representative samples will be useful in order to better understand peritraumatic behaviour, its interaction with peritraumatic emotional and cognitive states across different types of disasters and posttraumatic stress symptoms. Further investigation of the different components of both the situation and the individual responses to it will be beneficial for the understanding of the development of posttraumatic stress following disasters. As disaster victims do not only suffer from material loss or physical injuries, but also from psychological distress after disasters (PTSD, acute stress disorder, depression or anxiety symptoms), which cause a lot of damage to victims, families and society, a broad knowledge of disaster responses and vulnerability factors will lead to more effective medical and psychological interventions after disasters.

A significant link between posttraumatic stress and the amount of information recalled was not found in this sample, either for the different phases of the disaster or for the overall reports. It would be premature to conclude from this that posttraumatic stress has no effect on memory for disaster experiences, as current experimental studies suggest that traumatic memories of PTSD sufferers are disjointed from their autobiographical memories (Kleim et al., 2008). It must be considered that the societal interest in disasters (e.g. sharing experiences with other victims, family members, friends, local authorities and/or media) might enhance the consistency of reports. Indeed, disaster survivors have been found to show higher consistency of retrospective reports of peritraumatic states in comparison to victims of physical abuse/ assault (Ouimette, Read & Brown, 2005). Due to our recruitment strategy, it is possible that a self-selection bias might have hindered persons with disorganized or incomplete memories due to traumatic stress taking part in the study. However, there was a significant difference in the amount recalled for the different phases independent of level of

posttraumatic stress. The initial context was less well remembered than the emergency phase, with more than twice as much statements being reported about the latter. This could simply be due to the fact that more probing questions were asked about the emergency phase in the interview than about the initial context. Nonetheless, this finding is consistent with that of Sotgiu and Galati (2007) and Bahrick, Parker, Fivush and Levitt (1998) who assessed the memories of, respectively, adult and child natural disaster survivors, suggesting that people do tend to recall best the most critical phase of an emergency event. The fact that fewer statements were made comparatively speaking about emotional processing and cognitive appraisal likely reflects the fact that fewer questions were asked about these aspects than about the phases of the event, but also perhaps reflect the fact that participants' emotions and thoughts of risk did not vary much as the event unfolded. To our knowledge there is to-date no other study that has compared the recall of the disaster phases with the recall of emotional processing and cognitive appraisal in a free narrative or prompted interview and further research in this area would be welcome to clarify the relationship between memory for these different aspects of a disaster experience.

No relationship between time since event and amount of information recalled was found, except for the amount recalled about the initial context. Here, more statements were given when the time between the event and interview was shorter. Jones, Harvey and Brewin (2007) found that trauma narratives, independent of the level of traumatic stress, became more coherent but also shorter over time. Our finding suggests that the information omitted over time may belong to a specific phase in the event (information about the setting for example) rather than details scattered across the event, and further supports the idea that the more critical part of an emergency event is remembered best.

Finally, a few limitations of the qualitative and exploratory approach of this study have to be taken into account. Although the discussions were rich and illustrative, participants may have influenced each other. Also differences in responding between one-to-one and

group interviews must be considered. However, in order to control group influence, numbers of statements were assessed per group and not per participant. The influence of the interviewer on the interview, regardless of whether it was a group or one-to-one interview, was controlled as much as possible, as participating centres were instructed by a manual as well as an international workshop before the study. The study was designed in order to give first insights into narratives from a wider sample of survivors experiencing different types of disasters; the different sample sizes per disaster were affected somewhat by the different incidence rates of each disaster type and this study is not claiming that the responses of our participants are representative of all populations who experience these types of disasters. Nevertheless the behavioural, cognitive and emotional responses identified here might assist in deriving research hypotheses for a broader quantitative setting.

In summary, the current study gives an overview of the most common responses to different natural and man-made disasters occurring in domestic and public settings in a wider European sample. Although participants reported that the environmental cues and the ability to recognise what was happening varied in the different disasters, behavioural, emotional and cognitive responses tended to be more universal across events, and were most often adaptive and non-selfish. Several peritraumatic factors related to current levels of posttraumatic stress were identified, while memory quantity was similar across event types and posttraumatic stress levels. Time since event had a small effect on what was recalled.

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Table 1: Socio-demographic and incident related characteristics of participants

Characteristics	N	%
Participant		
Native	113	90.4
Migrant	12	9.6
Age (M, [SD])	48.01	[14.15]
Sex of participant		
Male	59	47.2
Female	66	52.8
Education		
Primary	23	18.4
Secondary	44	35.2
Tertiary	35	28.0
Other	8	6.4
Total [missing]	110 [15]	88.0 [12.0]
Country		
Czech Republic	42	33.6
Turkey	19	15.2
Poland	16	12.6
Spain	15	12.8
Germany	14	11.2
UK	10	8.0
Sweden	9	7.2
Type of event		
Fire	52	41.6

Flood	35	28.0
Collapse of a building	16	12.8
Terrorist attack	12	9.6
Earthquake	10	8.0
Injuries to participants	32	25.6
Fatal casualties during the disaster	51	40.8
Damage to property of survivors	91	72.8
Time since event (M, [SD] in years)	4.06	[2.95]
Duration of event (M, [SD] in hours)	23.46	[52.51]
Impact of Event Scale – Revised (M, [SD])	32.19	[21.16]

Table 2: Theoretical framework resulting from content analysis with numbers of statements describing the different dimensions/ domains

Dimension Domain	Total no. of statements
Course of the event (Initial context and emergency phase)	
Recognition/ Realization	137
Environmental cues: Direct and indirect cues	82
Information	46
Impairment	9
Interpretation	65
Reaction	228
Way of reacting	44
Type of reaction	184
Evacuation decision	82
Evacuation process	207
Evacuation route	45
Way finding	41
Obstacles & challenges	61
Interactions	60
Improvement	91
Emotional and cognitive processing of the event	
Emotion	120
Fear and other fearful emotions	40
Detachment	13
Panic	40

Relief	11
Other	16
Self-efficacy	133
Locus of control	44
Emotion regulation	28
Expected outcome	43
Post-crisis impact	18
Risk perception	90
Level of risk perception	60
Nature of risk perception	30
Worst moment	64
During the situation	44
After the situation	20

Table 3: Intercoder reliability of binational and national ratings of transcripts

Dimension	Group interview (binational) Fire		Interview (binational) Terrorist attack		Interview (national) Terrorist attack	
	α	[95% ,CI]	α	[95% CI]	α	[95% CI]
Recognition/ Realization	.25	[-.50; 1.0]	1.0	[.00; 1.0]	1.0	[.00; 1.0]
Interpretation	1.0	[.00; 1.0]	1.0	[.00; 1.0]	1.0	[.00; 1.0]
Reaction	1.0	[1.0; 1.0]	.42	[-.16;.80]	.81	[.42; 1.0]
Evacuation decision	.59	[-.22; 1.0]	.06	[-.57; .69]	1.0	[.00; 1.0]
Evacuation process	1.0	[1.0; 1.0]	1.0	[1.0; 1.0]	1.0	[.00; 1.0]
Improvement	.75	[.00; 1.0]	.55	[-.13; 1.0]	1.0	[.00; 1.0]
Recall of emotion	.46	[-.35; 1.0]	.74	[.20; 1.0]	1.0	[.00; 1.0]
Self-efficacy	1.0	[1.0; 1.0]	1.0	[1.0; 1.0]	.64	[1.0; 1.0]
Risk perception	.50	[-.25; 1.0]	1.0	[1.0; 1.0]	1.0	[.00; 1.0]
Worst Moment	1.0	[.00; 1.0]	1.0	[.00; 1.0]	1.0	[.00; 1.0]
All	.80	[.65; .93]	.79	[.64; .91]	.91	[.78; 1.0]

Table 4: Descriptions of initial context and emergency phase resulting from content analysis divided in categories with examples of statements from transcripts

Dimension/ Category	Citation from interview	N (41)	High stress (12)	Low stress (15)	Chi^2	*P*	Phi
Realization/ Recognition							
Explosion	"When it exploded. It was a big bang and the lights went out…"	22	10	7	3.80	*<.05*	.37
Smoke/ flames/ fire	"I saw the smoke and the flames rising."	23	8	8	0.49	.48	.13
Water	"The water went over the road"	5	0	4	3.75	.06	.37
Noise/ shouting	"They were shouting."	13	5	5	0.19	.66	.08
Informed by others	"…firefighters came and told me I have to evacuate, because there is a fire in the building."	19	9	6	3.31	.07	.35
Impaired	"We didn't hear anything, nothing, we were sleeping"	8	4	0	5.87	*<.05*	.47
Interpretation							
Correct interpretation	"When I woke up I immediately realized that there was a fire."	17	6	4	1.56	.21	.24
Underestimation of seriousness	"My friend pulled me inside, (…) because I wasn't taking this seriously, just being in my own little world"	14	2	7	2.70	.10	.32

Reaction							
Way of reacting							
Instinctive - Automatic	"I turned back and hesitated where to hide myself, it was such an unconditioned reaction, save yourself, man!"	23	9	7	2.22	.13	.29
Rational - Calm	"At that time I acted wisely."	21	4	7	0.49	.48	.13
Resignation	"I understood straight away- I´m not getting out- it´s all over, so I have to inhale enough smoke to be able to, well, pass out."	7	2	3	0.05	.82	.17
Type of reaction							
Supportive behaviour	"Everyone helped each other."	32	9	13	0.60	.43	.15
Save people (family, friends, strangers)	"I turned back and started running, to wake my sister up who was sleeping."	25	7	9	0.01	.93	.02
Prepare for evacuation	I said to my wife „get dressed, but properly. Where are the papers?" Firstly, the wallet, packed all the other stuff and then we were thinking about what to do next."	20	2	9	5.18	<.05	.44
Seek information	"We were walking to and fro all the time (…), tried to call someone to get some information."	18	2	8	3.84	<.05	.38

CLINICAL RESEARCH ARTICLE

COACTION PUBLISHING

Post- and peritraumatic stress in disaster survivors: an explorative study about the influence of individual and event characteristics across different types of disasters

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Background: Examination of existing research on posttraumatic adjustment after disasters suggests that survivors' posttraumatic stress levels might be better understood by investigating the influence of the characteristics of the event experienced on how people thought and felt, during the event as well as afterwards.

Objective: To compare survivors' perceived post- and peritraumatic emotional and cognitive reactions across different types of disasters. Additionally, to investigate individual and event characteristics.

Design: In a European multi-centre study, 102 survivors of different disasters terror attack, flood, fire and collapse of a building were interviewed about their responses during the event. Survivors' perceived posttraumatic stress levels were assessed with the Impact of Event Scale-Revised (IES-R). Peritraumatic emotional stress and risk perception were rated retrospectively. Influences of individual characteristics, such as socio-demographic data, and event characteristics, such as time and exposure factors, on post- and peritraumatic outcomes were analyzed.

Results: Levels of reported post- and peritraumatic outcomes differed significantly between types of disasters. Type of disaster was a significant predictor of all three outcome variables but the factors gender, education, time since event, injuries and fatalities were only significant for certain outcomes.

Conclusion: Results support the hypothesis that there are differences in perceived post- and peritraumatic emotional and cognitive reactions after experiencing different types of disasters. However, it should be noted that these findings were not only explained by the type of disaster itself but also by individual and event characteristics. As the study followed an explorative approach, further research paths are discussed to better understand the relationships between variables.

Keywords: *Emergency psychology*; *impact of event scale-revised*; *disaster*; *hazard*; *peritraumatic emotion*; *risk perception*; *posttraumatic stress*

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Mass crisis situations such as the 2004 Tsunami, the terrorist attacks in New York, London and Madrid, have had a massive impact on the survivors of these incidents (Galea et al., 2003; Kumar, Murhekar, Subramanian, Ramachandran, & Gupte, 2007; Miguel-Tobal et al., 2006). Studies conducted on disasters have mainly investigated psychological impairment in the aftermath, such as stress-symptoms and

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posttraumatic stress disorder (PTSD) diagnosis, depressive and anxiety disorders at an epidemiological level and their predictors (Galea et al., 2002; Schuster et al., 2001; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002). The predictors include: Socio-demographic and individual factors, such as female gender (Schlenger et al., 2002), low socio-economic status (Kumar et al., 2007), age (Telles, Sing, & Joshi, 2009), migrant background (Rivière et al., 2008; Rubin, Brewin, Greenberg, Simpson, & Wessely, 2005) and a psychiatric diagnosis of the survivor before the event (Neria et al., 2006). Also, culture is believed to have an influence, on emotional and cognitive processing both during and after the disaster (Freitag, Grimm, & Schmidt, 2010; Steger, Frazier, & Zacchanini, 2008). Considering peritraumatic emotional and cognitive factors, (life) threat, loss of control, and fear have all been reported to be related to posttraumatic stress in cases of natural disasters such as the 2004 Tsunami and the 1999 Marmara earthquake, or in terror attacks such as those on the World Trade Center in 2001 (Basoglu, Kihk, Salcioglu, & Livanou, 2004; Basoglu, Salcioglu, & Livanou, 2002; Hollifield, Hewage, Gunawardena, Kodituwakku, & Weerarathnege, 2008; Simeon, Greenberg, Knutelska, Schmeidler, & Hollander, 2003).

Furthermore, characteristics of the disaster, including exposure severity, injuries incurred, and the death of family members or friends during the event, have been found to predict psychological distress, depression and posttraumatic stress in different types of disasters (Galea et al., 2003; Johannesson et al., 2009; Wahlström, Michelsen, Schulman, & Backheden, 2008). Studies have also shown that stress symptoms may diminish the more time passes since the event, which has been demonstrated across a variety of disasters, and even in highly traumatized groups (Sundin & Horowitz, 2003).

Nevertheless, one important factor, the influence of the type of the disaster itself, has not been fully investigated yet. Although there is currently no consensus among experts on how to define a disaster, previous comparisons of different disasters have tended to categorize the events as man-made/technological vs. natural. For example, in a meta-analysis about the epidemiology of PTSD after disasters by Galea, Nandi, and Vlahov (2005), studied events were classified broadly into these two categories of disaster, with the conclusion that PTSD is higher after man-made/technological disasters than after natural disasters. However, such a general classification of disasters poses problems. Firstly, a strict isolation of natural vs. man-made disasters is very difficult. For example, even though the cause of a disaster is natural, such as an earthquake, the reason for the disruption can be man-made such as a weak building structure leading to a collapse of a building (Alexander, 2005). Secondly, characteristics of disasters such as their onset time or environmental stimuli e.g., fire, water, etc. may differ considerably within these two categories. Therefore, the dichotomous classification "man-made/technological vs. natural" might be better used when considering, say, perceived culpability. Furthermore, there are some, among the social sciences, who would argue that the focus should not be so much on the hazard itself but on the negative consequences following the hazard. In other words, a disaster is an outcome of the vulnerability of society caused by the disruption of an event (Perry, 2007; Quarantelli, 2005). When considering the influence of the disaster type on post-and peritraumatic impact in the current study, it was decided that, given all the aforementioned problems surrounding what is a disaster, an operational definition of "disaster type" would be used, one that categorizes events in a less general way than done previously—that is, based on the direct cause of the negative consequences or disruption (i.e., fire, flood, terror attack, collapse of building)—and that disaster type would be investigated alongside other event and individual characteristics.

Another issue hindering comparisons of the impact of different disaster types is that studies have rarely used the same set of psychological instruments, and there have been sample differences between kinds of disasters. Thus, it is not entirely clear how different crisis situations, and especially which of their inherent characteristics, are relevant factors for the development of PTSD symptoms (Galea et al., 2005). Nor is it clear how these variables might influence survivors' emotional and cognitive responses during the incident. This is why in the current study different types of disasters were assessed together using the same instruments, and with consideration to the cultural diversity in the sample tested. The sample was drawn from residents of the seven participating centres' countries. This would allow for a cross-cultural comparison, with country of residence acting as a proxy for culture. However, the participants had to have experienced the disaster in their country of residence. This was so as to avoid possible confounds; experiencing a disaster in a foreign country could lead to increased trauma due to victims not being at home and thus not being familiar with the national emergency services or being exposed to cultural differences in disaster response. On the other hand, experiencing a disaster abroad could have the opposite effect also, as victims would not be confronted with a major loss of property/housing or disruption to their daily routines to the same extent than if they had been at home.

Objective

We hypothesize that the type of disaster, and thus the investigation of its unique characteristics, are important for a better understanding of perceived post- and peritraumatic stress levels in survivors. Additionally personal and situational characteristics are also likely to play a role

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in how survivors think and feel during the event. Therefore, in this exploratory study, a selection of individual characteristics (gender, education, age), event characteristics (time since event, fatalities, injuries), peritraumatic emotional and cognitive factors (emotional stress, risk perception) and posttraumatic stress symptoms were assessed across different types of disasters, with data collected from several countries.

Method

The study described in this paper is part of a larger cross-cultural multi-centre research project called BeSeCu (Behaviour, Security, Culture), with the following centres participating: Greifswald, Germany; London, UK; Barcelona, Spain; Warsaw, Poland; Hamburg, Germany; Prague, Czech Republic; Stockholm, Sweden and Izmir, Turkey. The study was approved by all national institutional ethics committees.

Events

Of interest were emergency events that met the following criteria: (1) occurred within approximately 10 years prior to the research interview, concentrated in a particular time and space; (2) concerned an identifiable hazard that posed a physical threat but of a non-infectious kind (i.e., excluding emergency events such as epidemics); (3) the threat was posed to many lives and/or property; (4) the emergency services attended the scene; and (5) a full or partial evacuation of the affected structure(s) was attempted, either by the victims or by official agents. A variety of events occurring in the participating centres' countries met the above criteria: i.e., Czech Republic floods in 2002; collapse of buildings such as the Katowice Trade Hall roof collapse in Poland, 2006 and the collapse of a multi-storey residential building in Spain, 2006; severe fires in multi-storey residential or public buildings across Europe such as the Gothenburg discotheque fire in Sweden, 1998 or a fire in a Hamburg hospital in Germany, 2007; and the 7/7 London bombings in the UK, 2005.

Overall, the average time elapsed since the event was 3.86 years. Most injuries (around half of the participants) had incurred during terror attacks and collapses of buildings. In fires, about 25% and in floods about 10% of participants were injured. Fatalities during the incidents in the direct surrounding of participants were reported in all cases of terrorist attack and collapse of a building and in nearly half of all fire events. Floods were reported as having caused no fatalities in the surrounding of the interviewed victims.

Participants

Recruitment was performed in each centre separately, using a combination of word-of-mouth campaigns and advertising campaigns conducted via the media, self-help groups and the emergency services. Adult survivors were invited to contact the researchers if they wished to take part in an interview. Participation was restricted to persons who had directly experienced the emergency event—bystanders and relatives of victims were excluded. Also excluded were persons who had survived incidents which turned out not to match all of the aforementioned event criteria. Finally, four participants were excluded due to the fact that the respective disasters did not happen in any of the countries of the participating centres. This left a total of 102 participants in the study. There was an almost even split of females (51.4%) and males (48.6%). Mean age was 49.58 years (SD = 14.15). Concerning education, 25.3% of all participants had a university degree, 21.8% were educated to only primary level and 43.7% to secondary education level. The remaining 9.2% had added further education qualifications. Eleven percent of participants had a migrant background but no significant differences were found between migrants and natives regarding gender, age, education, or event type.

Measures and procedure

When participants agreed to take part in the study, a comprehensive interview was conducted about emotional, behavioural, and cognitive responses during the disaster (results of the content of survivors' narratives can be found in Grimm, Hulse, Preiss, & Schmidt, *in press*). Furthermore, a set of psychological instruments were applied and socio-demographic and incident-related characteristics were assessed. The interview procedure borrowed techniques from the cognitive interview (Fisher & Geiselman, 1992) to help participants mentally recreate the past event; the entire interview lasted on average 90 min. After revisiting the event in the interview, participants were asked to retrospectively rate their emotional stress and risk perception at the stage when they realized that they were actually experiencing a disaster. They did this on a 4-point scale with zero indicating no stress/ risk and four indicating high stress/ risk. Asking participants to retrospectively rate their emotions and cognitions a few years after they experienced them is not ideal as their current state and beliefs could bias their recollections of past states (Robinson & Clore, 2002). Nevertheless, there is research which indicates that memory for emotion-related experiences is more resistant to decaying over time (e.g., Burke, Heuer, & Reisberg, 1992; Ritchey, Dolcos, & Cabeza, 2008). Furthermore, there is some experimental evidence that retrospective ratings, at least of emotion, might provide reasonable approximations of momentary ratings (Barrett, 1997). In addition, it was expected that the interview and its context reinstatement memory aids would make the relevant past states more accessible. Thus, while bearing the potential for recall-related biases in mind, the emo-

tional stress and risk ratings were included to explore peritraumatic states.

Current posttraumatic stress was assessed with the Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997) which is employed in order to assess current subjective distress for any specific life event. Also, the IES-R is a widely used measure of posttraumatic stress with satisfactory psychometric properties (Joseph, 2000; Sundin & Horowitz, 2003). It was administered prior to the interview, in order to avoid event recall potentially influencing responses about current state, and was provided in nationally validated versions (Baguena et al., 2001; Juczyński & Ogińska-Bulik, 2009; Maercker & Schützwohl, 1998; Preiss et al., 2004; Sveen et al., 2010). Missing cases on the IES-R (four single items) were calculated using a regression model.

Statistical analysis

In order to detect effects of individual and event characteristics on post- and peritraumatic outcome variables, separate multiple regressions with simultaneous inclusion of predictors were run with IES-R total scores, peritraumatic emotional stress and risk perception as outcome variables. Where reference categories were required, the group with the largest membership was used as the reference (i.e., Education_2, Fire). Before including predictors, correlations between variables were calculated. As none of the variables were highly correlated, all could be included as predictors. Due to the incidence rates of certain disasters varying in different geographical regions, culture was confounded in some cases with type of event. As fires were common across all BeSeCu countries, preliminary analyses of variance were conducted for the IES-R, emotional stress and risk outcomes of fire survivors with culture as the independent variable. Similarly, a series of *t*-tests were conducted on the outcomes of Polish vs. Spanish survivors of collapses of buildings. No significant differences were found on these assessments (all ps >0.17), therefore culture was omitted as a variable from any further analysis.

While the main purpose of the paper was to explore the relationships between the individual and event characteristics and each of the peri- and posttraumatic outcomes, it was nevertheless of interest to also examine the relationship between the three outcomes. Thus, in addition to the regressions, correlations and a MANCOVA were conducted and followed up with discriminant analysis and canonical correlation analysis. All statistical analyses were conducted with PASW version 18.0.7.

Results

Descriptive results

Mean total IES-R scores plus mean scores of peritraumatic emotional stress and risk perception are shown across different types of disasters in Table 1.

Effects of individual and event characteristics on post- and peritraumatic outcome variables

The individual characteristics gender, age, education and the event characteristics time since event, injuries, fatalities, plus type of event were entered into the regression models simultaneously. The results for the outcome variables posttraumatic stress, peritraumatic emotional stress and peritraumatic risk perception are shown in Tables 2, 3 and 4 respectively. The predictors explained most variance in the assessment of posttraumatic stress ($R^2 = 0.59$ [adjusted $R^2 = 0.54$]), then in the assessment of peritraumatic emotional stress ($R^2 = 0.56$ [adjusted $R^2 = 0.48$]), followed by the assessment of peritraumatic risk perception ($R^2 = 0.42$ [adjusted $R^2 = 0.32$]). While type of event was always a significant predictor, the variables gender and education only predicted two measures each (IES-R scores/emotional stress and emotional stress/risk perception respectively), and injuries, time since event and fatalities were only significant predictors of single measures (the first IES-R scores, the latter two emotional stress).

Relationship between outcome variables across different types of disasters

All outcome variables were significantly intercorrelated; IES-R scores were correlated more highly with peritraumatic emotional stress ($r = 0.49$, $p = 0.000$) than with risk perception ($r = 0.28$, $p = 0.01$). The highest correlation was between the two peritraumatic variables ($r = 0.69$, $p = 0.000$). Given these findings, a MANCOVA was run and confirmed that, even when the relationships between IES-R scores, peritraumatic emotional stress and risk

Table 1. Mean IES-R total, peritraumatic emotional stress, and peritraumatic risk perception scores (and SDs), all across different types of disasters

Scale (range)	All	Fire	Flood	Collapse	Terror attack
Total IES-R (0–96)	30.78 (21.85)	37.94 (21.63)	16.34 (12.93)	54.80 (14.91)	27.62 (15.54)
Emotional stress (0–4)	2.39 (1.02)	2.33 (0.76)	2.14 (0.97)	3.33 (0.82)	3.69 (0.59)
Risk perception (0–4)	2.35 (1.08)	2.26 (0.90)	2.09 (0.99)	2.22 (1.39)	4.00 (0.00)

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Table 2. Regression results showing individual and event characteristic predictors of IES-R total scores

	B	SE B	β	*T*	*p*
Constant	69.28	14.29	–	4.85	0.000
Gender[a]	7.71	3.25	0.18	2.37	0.02
Age	−0.02	0.12	−0.01	−0.16	0.88
Education$_1$[b]	8.26	4.88	0.14	1.69	0.09
Education$_3$[b]	−3.25	4.43	−0.06	−0.73	0.47
Education$_4$[b]	−1.82	6.10	−0.02	−0.30	0.77
Time since event	−0.00	0.00	−0.08	−0.80	0.43
Injuries[c]	−19.55	4.39	−0.40	−4.46	0.000
Fatalities	−4.14	5.36	−0.09	−0.77	0.44
Flood[d]	−16.15	5.54	−0.35	−2.92	0.01
Terror attack[d]	−16.53	6.69	−0.21	−2.47	0.02
Collapse[d]	10.96	5.44	0.18	2.02	0.05

[a]Gender *M*(SD): Female 35.90(23.11); Male 28.00(20.34).
[b]Reference category: Education$_2$.
[c]Injuries *M*(SD): Yes 50.37(20,43); No 25.01(18.31).
[d]Reference category: Fire.

perception were taken into account, type of event still had a significant effect on all three outcome variables, Pillai's Trace = 0.59, $F(9, 108) = 2.91$, $p = 0.004$. The MANCOVA was followed up with a discriminant analysis, using type of event as the grouping variable and the post- and peritraumatic outcome variables as independents. This analysis revealed three discriminant functions. The first function explained 51% of the variance (canonical $R^2 = 0.36$), the second explained 46% (canonical $R^2 = 0.34$), and the third only 3% (canonical $R^2 = 0.03$). In combination, these three discriminant functions significantly differentiated event types, Wilk's Lambda = 0.42, $X^2(9) = 55.03$, $p = 0.000$. When the first function was removed, the second and third functions together were still able to significantly differentiate event types, Wilk's Lambda = 0.65, $X^2(4) = 27.40$, $p = 0.000$. However, the third function on its own was not able to significantly differentiate the groups, Wilk's Lambda = 0.97, $X^2(1) = 1.80$, $p = 0.18$. The correlations between the outcomes and the discriminant functions revealed the following: IES-R scores loaded extremely highly on the first function ($r = 0.95$) but far less on the second and third functions ($r = 0.11$ and $r = 0.28$, respectively); emotional stress loaded very highly on the second function ($r = 0.85$) but more moderately on the first and third functions ($r = 0.41$ and $r = -0.33$, respectively); and risk perception loaded very highly on the second function ($r = 0.88$), moderately on the third function ($r = 0.48$) and almost negligibly on the first function ($r = 0.06$). The group centroids demonstrated that the first function discriminated the event flood from the events fire, terror attack and collapse of a building, the second function discriminated the event terror attack from the events fire, flood and collapse of a building, while the third function discriminated the events fire and terror attack from the events flood and collapse of a building.

Table 3. Regression results showing individual and event characteristic predictors of peritraumatic emotional stress

	B	SE B	β	*T*	*p*
Constant	3.19	0.91	–	3.51	0.001
Gender[a]	0.60	0.19	0.30	3.11	0.003
Age	−0.01	0.01	−0.13	−1.44	0.16
Education$_1$[b]	0.64	0.26	0.26	2.52	0.01
Education$_3$[b]	0.15	0.24	0.07	0.61	0.55
Education$_4$[b,c]	−0.30	0.41	−0.07	−0.72	0.48
Time since event	0.00	0.00	−0.28	−2.22	0.03
Injuries	0.03	0.28	0.01	0.09	0.93
Fatalities[d]	−0.70	0.35	−0.33	−2.01	0.05
Flood[e]	0.43	0.30	0.21	1.41	0.16
Terror attack[e]	1.12	0.37	0.35	3.00	0.004
Collapse[e]	1.00	0.45	0.28	2.23	0.03

[a]Gender *M*(SD): Female 2.77(1.00); Male 2.16(0.91).
[b]Reference category: Education$_2$.
[c]Education *M*(SD): Primary 2.79(1.12); Secondary 2.28(0.93); Tertiary 2.69(1.03); Further 2.00(0.82).
[d]Fatalities *M*(SD): Yes 3.22(0.78); No 2.12(0.90).
[e]Reference category: Fire.

Discussion

The current exploratory study is one of the first to compare perceived post- and peritraumatic stress levels of survivors across different types of disasters. Terror attacks, although rated by the public as a high-impact disaster for survivors (Grimm, Hulse, & Schmidt, 2009), was not the disaster evoking the highest posttraumatic stress here. However, unexpectedly high levels of posttraumatic stress were found in this study for collapses of a shopping centre in Katowice and a residential building in Barcelona, and also for fires in residential and public buildings across a number of locations. Considering peritraumatic responses, participants who experienced terror attacks reported the highest levels of emotional stress and risk perception.

At a first glance, the man-made/technological disasters in this sample had a greater post-event influence than did the (single) natural disaster, which is consistent with Galea et al.'s (2005) meta-analysis findings. However, as argued in the introduction, we believe that researchers should take a closer look at event type, beyond this general classification, and that the characteristics of events may better explain these findings. The natural disaster flood was the only event with a long onset; victims were warned about the upcoming threat and able to take

Table 4. Regression results showing individual and event characteristic predictors of peritraumatic risk perception

	B	SE B	β	*T*	*p*
Constant	3.77	1.05	–	3.60	0.001
Gender	0.09	0.22	0.04	0.40	0.69
Age	0.00	0.01	0.05	0.47	0.64
Education$_1^a$	0.57	0.31	0.20	1.82	0.07
Education$_3^a$	−0.61	0.29	−0.24	−2.07	0.04
Education$_4^{a,b}$	−0.63	0.50	−0.13	−1.27	0.21
Time since event	0.00	0.00	−0.26	−1.79	0.08
Injuries	−0.34	0.32	−0.13	−1.07	0.29
Fatalities	−0.50	0.37	−0.22	−1.34	0.19
Flood[c]	0.29	0.38	0.13	0.76	0.45
Terror attack[c]	1.65	0.46	0.44	3.56	0.001
Collapse[c]	−0.51	0.44	−0.15	−1.18	0.24

[a]Reference category: Education$_2$.
[b]Education *M*(SD): Primary 2.64(0.78); Secondary 2.25(1.11); Tertiary 2.22(1.26); Further 1.75(0.96).
[c]Reference category: Fire.

safety measures which might have resulted in them scoring the lowest in post- and peritraumatic stress. Furthermore, significant differences were found between different types of man-made/technological disasters, which suggest that they might not necessarily have equivalent effects. With regards to the environmental cues of the disaster, we know from the interviews conducted in this study that survivors of disasters with sudden violent cues, such as explosions, reported significantly higher posttraumatic stress (Grimm et al., in press). As such cues characterized the terror attacks and collapses of buildings, it might also explain their survivors' high ratings on the peritraumatic variables.

When taking a look at the influence of predictor variables on post- and peritraumatic stress, the type of event significantly explained variance in all three measures. This was in accordance with our hypothesis. The moderating effect of time on PTSD is well established (Sundin & Horowitz, 2003), therefore our finding that only the rating of peritraumatic emotional stress altered with time passing was unexpected. However, the fact that the score of the peritraumatic measure lowered with time is important to note and suggests that the events were even more stressful originally than was reported here.

The influence of the individual characteristic female gender was related to higher peritraumatic and posttraumatic stress but not to higher risk perception. Regarding the influence of gender on PTSD, current research studies have not come to a definite conclusion. In Sundin & Horowitz (2003) meta-analysis about the use of the IES-R, gender was, in comparison to the type of traumatic event, relatively insignificant. However, it needs to be considered that this meta-analysis included all types of traumatic events, not just disasters. Brewin, Andrews, and Valentine (2000) found in their meta-analysis that female gender is a modest risk factor for PTSD. When the type of traumatic event was taken into account, studies of disasters showed the lowest impact of gender in comparison to studies of other non-combat/war events. Regarding the present study's results for other socio-demographic factors, age had no significant influence either on post- or on peritraumatic stress, while education had a little influence on both peritraumatic variables. Meta-analysis results have revealed that age and education effects on posttraumatic stress can be smaller or less consistent in certain groups (Brewin et al., 2000) and this may in part account for the results here.

Although Koren, Hemel, and Klein (2006) suggest in their review article that peritraumatic factors such as perceived threat to one's life during the trauma are increased by bodily injuries incurred during the traumatic event, being injured did not have a significant effect on the peritraumatic variables here. However, a significant relationship was established between posttraumatic stress and being injured during a disaster. Koren et al. (2006) have concluded that PTSD symptoms increase if survivors are injured during a traumatic event, but that the relationship between PTSD and injuries is a complex one, which can be further explained by the factors pain, disfiguration, social isolation, hospitalization and medical procedures; factors that were not considered in this study. Other event characteristics, such as fatalities, were related to higher peritraumatic emotional stress but not to posttraumatic stress in the current study. In an investigation of Bloody Sunday, Shevlin and McGuigan (2003) found highest IES-R mean scores in the immediate family of victims who lost their lives. In our sample there were no reports of losing family members, however there were reports of other fatalities occurring during the event. Johannesson et al. (2009) found that both types of death exposure, the loss of relatives and seeing many dead bodies, contributed to posttraumatic distress after the Tsunami in 2004. Therefore we believe that this variable is of relevance. However, it is likely that the magnitude of exposure to dead bodies was lower in our studied disasters than in the Tsunami of 2004.

Previous research has found negative peritraumatic emotional and cognitive states (e.g., fear, thinking one's life is in danger, loss of control, dissociation) to be good predictors of posttraumatic stress (Basoglu et al., 2002; Basoglu et al., 2004; Hollifield et al., 2008; Ozer, Best, Lipsey, & Weiss 2003; Simeon et al., 2003). Thus, we are left with the question of why in this study events that, according to self-reports, evoked the highest stress and perceived risk at the time did not lead onto the highest level of later stress. The correlations revealed that the outcome variables were positively related to one another but to differing extents. While the peritraumatic measures

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were quite closely related—perhaps understandably, given they share a moment in time—and current posttraumatic stress and peritraumatic emotional stress were moderately related, peritraumatic risk perception was not so strongly related to current posttraumatic stress. These results suggest that some aspect(s) of the emotional states experienced during the event may carry over and/or be shared with a survivor's later current state but that the perceived risk at the time of the event may not inevitably induce a stressful state for some time to come afterwards. It could be argued that a realistic appraisal of risk during the situation, irrespective of whether the risk was perceived as high or low, might help in dealing with the circumstances afterwards. Alternatively, the effect of perceived risk might be moderated by the survivors' coping strategies (or lack of).

The discriminant analysis looked into the relationships between the outcome variables further, in the context of their ability to discriminate type of event. The analysis revealed three discriminant functions. The IES-R loaded the most on the first function while emotional stress loaded more moderately and risk perception barely at all. This function accounted for most variance. In contrast, the two peritraumatic measures loaded highly on the second function (which accounted for slightly less variance) and the IES-R made little contribution here. Risk perception was the measure that loaded most on the third function but this function was not good, at least not on its own. Of note, each function differentiated event types differently. These findings then provide further evidence that, despite being related, the three outcome measures are not simply interchangeable. It appears that when assessing the effects of different types of event on disaster survivors measuring peritraumatic states can be useful as can measuring posttraumatic states, but a better assessment is achieved when the relative contribution of each state is combined.

Ultimately, several limitations of this study have to be taken into account. It has to be remembered that the IES-R, although a good indicator of posttraumatic stress, was not used to diagnose PTSD and several predictors relevant for the psychological outcome of survivors, such as pre-event psychological morbidity and peritraumatic detachment, were therefore not included. Thus, how our findings fit within what is already known about predictors of actual PTSD requires further research. As commonly reported in disaster research, recruitment strategy and inclusion criteria led to a purposive sample (Stallings, 2007). This means that the different sample sizes per disaster were affected somewhat by the different incidence rates of each disaster type across Europe, which also led to the fact that the variables type of event and culture were somewhat confounded. One of the strengths of the study, to only include survivors of real life-threatening events, has as a consequence reduced the overall sample size even further and contributed to the uneven sample sizes across events. Both issues have meant a reduction in the power of the study and might prohibit a generalization of the presented findings. Finally, Steger et al. (2008) found terrorism worries significantly differed between Spanish and American students. This was not entirely explained by symptoms of PTSD or exposure to terror attacks, instead indicating cultural differences. Although we did not find any influence of culture on perceived post- and peritraumatic stress levels, tendencies for cross-cultural differences in talking about the traumatic event in this sample have been reported elsewhere (Freitag et al., 2010), and thus evidence would suggest that culture should remain a consideration in this field of research. For future studies with larger, more heterogeneous samples it might be worth operationalizing the variable culture not as country of residence but as a function of other cultural aspects such as race (Norris, Perilla, Ibanez, & Murphy, 2001); many countries in Western Europe are common in this respect and this might also explain our non-significant findings for culture.

Conclusion

In conclusion, an explorative approach was taken to study post- and peritraumatic reactions to different types of disasters, including a test of the influence of a selection of individual and event characteristics. The results suggest that the type of event people experience with its specific situational factors has an influence on post- and peritraumatic reactions. Therefore two future research paths are suggested: the first would be to replicate and extend this study with a larger sample, still using a methodology that allows for direct comparisons across different types of disasters. Such a study would benefit from including more individual and event characteristics (e.g., being trapped during the event, social affiliation, etc.) and examining their relative effects on post- and peritraumatic outcomes but also their relative prevalence in each type of event. Secondly, as our results showed, people's emotions and cognitions during the event may be influenced by disaster characteristics, just as their emotions and cognitions may be affected afterwards. Therefore we believe that it is worth having a closer look at event characteristics and how these interact with individuals' peritraumatic responses. We know from interviews with survivors of disasters that survivors with lower current posttraumatic stress were more often able to actively manage their escape by preparing for evacuation or contacting emergency services in order to plan their rescue or seek information about how to behave (Grimm et al., in press). Also, social affiliation and the place people are in at the moment of the disaster could be relevant factors in the influence of the type of event. Prati, Catufi, and Pietrantoni (2012) showed that persons

who were in the company of their families were less likely to flee the endangered place as being in their homes during the disaster was also related to a higher feeling of safety. Therefore we believe that an inclusion of peritraumatic behavioural responses during disasters will further understanding of post- and peritraumatic stress.

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There is no conflict of interest in the present study for any of the authors.

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Human Responses to Disasters: A Pilot Study on Peritraumatic Emotional and Cognitive Processing

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Abstract

This research article presents the qualitative development and cross-cultural pilot testing of a new instrument measuring emotional and cognitive processing during disasters. The instrument was developed according to a theoretical framework based on narratives from survivors of different types of disaster across Europe. Peritraumatic emotions and cognitions were assessed at three different stages of a disaster. The pilot study consisted of 311 participants responding to the questionnaire using scenario versions of disasters as well as 25 survivors working through the questionnaire using their experiences of real disasters. Both types of analysis were performed across seven countries. Differences in emotions and cognitions during the course of a disaster were displayed. Also, gender, the type of scenario participants were allocated to, and professional experience of emergencies led to differences in item response. As there was little difference between survivors' and scenario participants' responses, the use of a scenario in order to test pilot forms of questionnaires for purposive samples with certain characteristics such as limited sizes or access can be supported. For future research, the instrument should be field tested. It is envisaged it will be beneficial for a cross-cultural understanding of the influence of peritraumatic emotions and cognitions not only on posttraumatic

psychological outcomes but also on related behavioural responses displayed during disasters.

Keywords: Cross-cultural development, disaster research, pilot study, peritraumatic emotion and cognition, risk perception

In the last few decades several major disasters have struck Europe, for example: floods in Poland, 2010, Czech Republic and Germany, 2002; earthquakes in L'Aquila, Italy, 2009 and Marmara, Turkey, 1999; plus bombings in London, 2005 and Madrid, 2004. Of interest is whether people's responses to disasters can be generalized or whether they will be unique according to the specific circumstances. That is, will people's behaviour during a disaster follow a similar general pattern or will it vary according to surrounding factors such as the people's prior knowledge and encounters going into the event, what they think and feel as the event unfolds, the environment in which the event occurs and to which the people belong, or even the type of event itself? There is reason to believe these circumstances surrounding people's experiences of disasters may be relevant for their responses to disasters and may even interact with one another. For example, while fires and natural catastrophes such as floods, storms and earthquakes are among the most common disasters in Europe (Preventionweb, n.d.), public and media attention is mainly drawn to man-made disasters such as terror attacks (Grimm, Hulse, & Schmidt, 2009). Therefore it is possible that people's perception of the threat or significance posed by disasters may vary according to the type of disaster instead of, or in addition to, their exposure to disasters. Regarding people's feelings, fear is often the most reported emotion experienced during disasters (e.g. Prati, Catufi, & Pietrantoni, 2012; Sotgiu & Galati, 2007). However, while the specific characteristics of basic emotions like fear, such as rapid onset, automatic appraisal, certain aspects of antecedent events, etc., are universal (Ekman, 1992; Ekman & Friesen, 1971), recent research suggests that the intensity of emotional responses and cognitive appraisals during disasters differs across cultures. A study examining narratives from European disaster survivors found that not only did the narratives differ significantly across countries in the amount of reported emotional or anxiety words but also in the use of descriptions of cognitive processing (Freitag, Grimm, & Schmidt, 2011). Also, culture's influence has been shown on risk perception without it being related to rates of actual exposure to terror attacks or tsunamis (Gierlach, Belsher, & Beutler, 2010) or explained by individual exposure to terror attacks or symptoms of posttraumatic stress disorder (PTSD) (Steger, Frazier, & Zacchanini, 2008).

The above research may demonstrate links between several surrounding circumstances, but can one go a step further and draw a link between these factors and people's behavioural responses during disasters? Several recent research studies focusing on survivor narratives have found hints that human behaviour during disasters (e.g. preparing for evacuation, seeking information about the situation, etc.), as well as the victim's surroundings (e.g. being in a familiar place, being with relatives/known persons), can be relevant to not just emotional/cognitive processing during the event but also later posttraumatic stress (Grimm, Hulse, Preiss, & Schmidt, 2011a; Prati, Catufi, & Pietrantoni, 2012; Sotgiu & Galati, 2007).

People's post-event responses to disasters, such as posttraumatic stress symptoms, have received relatively greater attention from researchers and some of this work has highlighted the influence of certain surrounding circumstances. For example, several theoretical models and frameworks for the explanation of PTSD have a focus on cognitive processing (Brewin & Holmes, 2003; Ehlers & Clark, 2000). In their cognitive model of PTSD, Ehlers and Clark (2000) distinguish data-driven processing and conceptual processing during the traumatic event. While conceptual processing is described as an analytic and calm view of the situation, data-driven processing refers to a very sensual and emotional experience mainly in accordance with bewilderment. The latter is said to contribute to PTSD symptoms and disorganized memory functions (Ehlers & Clark, 2000; Halligan, Michael, Clark, & Ehlers, 2003). In a meta-analysis, peritraumatic psychological processes were found to be the strongest predictor of PTSD (Ozer, Best, Lipsey, & Weiss, 2003) and a growing body of research has demonstrated the influence of peritraumatic distress and dissociation on posttraumatic stress outcome (Birmes et al., 2005; Brunet et al., 2001; Fikretoglu et al., 2006; Marmar et al., 1994).

Taken together, the above literature emphasizes the need to consider the specific circumstances surrounding people's experiences of disasters when attempting to understand their responses to disasters – responses both during the event and afterwards. In particular, the research literature suggests directing attention to the circumstances involving how people think and feel during the event. However, in a study where different types of disasters were considered, although peri- and posttraumatic outcome variables were significantly correlated, the event with the highest retrospectively reported peritraumatic emotional stress and perceived risk was not the one with the highest posttraumatic stress (Grimm, Hulse, Preiss, & Schmidt, 2011b). Thus, there is clearly much still to learn about the influence of specific circumstances on responses to disasters and the nature of the relationships between the circumstances and the responses. The aim of this study was to take a

first step at addressing this issue by developing a new self-report instrument and conducting a cross-cultural pilot study on emotional and cognitive processing during disasters. It should be noted that a few measures of peritraumatic states already exist, e.g. the Peritraumatic Distress Inventory (Brunet et al., 2001) and the Peritraumatic Dissociative Experience Questionnaire (Marmar et al., 1997). However, despite their good reliability and validity and therefore clear value in many cases, it was felt that they would not be appropriate for the purposes of the present study. It was considered important to (i) have a broader array of emotional and cognitive state options in order to allow investigation of the links with peritraumatic behavioural responses and (ii) compare these states across a number of stages throughout the course of the event as disasters often unfold in a dynamic manner and peritraumatic responses may need to be adaptive. Furthermore, as this study was part of a wider study seeking to improve public safety by examining aspects of physical structures as well as the human behaviour displayed within them, it was preferential to tailor the instrument to disasters involving evacuation attempts from enclosed settings. Finally, as there is reason to believe that culture may impact on human responses to disasters, a simultaneous cross-cultural development of the instrument was conducted.

Aims

The piloting of the questionnaire had several aims:

- to determine item characteristics
- to assess difficulties and relevance of items in order to identify questions best representing emotional and cognitive processing during disasters
- to assess the influence of certain individual and event characteristics for a better understanding of the constructs (content validation)
- to analyse scale characteristics of anticipated emotional and cognitive responses during disasters plus perceived risk of different types of disasters with explanatory factor analysis (construct validation)

Method

The study described in this paper is part of a larger cross-cultural multi-centre research project called BeSeCu (*Be*haviour, *Se*curity, *Cu*lture) with the following centres participating: Greifswald, Germany; London, UK; Barcelona, Spain; Warsaw, Poland; Hamburg, Germany; Prague, Czech Republic; Stockholm, Sweden; Bologna,

Italy and Izmir, Turkey. The study was approved in all national institutional ethics committees.

Development

The instrument for disaster survivors was developed through two approaches. Firstly, theoretical models and empirical data relating to disasters and peritraumatic factors were reviewed. Secondly, qualitative (single or group) interviews with 125 European survivors of fires, floods, earthquakes and terror attacks were assessed. These actions led to a theoretical framework about emotional, cognitive and behavioural responses during disasters being created (Grimm, Hulse, Preiss, & Schmidt, 2011a). Items for the pilot questionnaire were generated from the theoretical framework. Item generation was performed by an expert group consisting of personnel from three countries (Czech Republic, Germany, UK) and took place at an international meeting of the BeSeCu-consortium. The quantity of statements about emotional and cognitive processing in the theoretical framework was considered as an inclusion criteria. The development of the pilot questionnaire was conducted in English. After being finalized, each question was translated and assessed in the national languages of the other participating centres. A manual was designed in order to assist centres during recruitment, the assessment process and data entry, and a data matrix was sent to the centres into which the data could be entered and stored.

Procedure

There are often great challenges in identifying and accessing disaster survivors for research studies, thus it was decided that the pilot study would use scenarios of disasters. This would mean that anyone could take part in the study, regardless of disaster experience and recruitment of real disaster survivors could be mainly reserved for a final field survey. Therefore participants were given a description either of a terror attack, a fire, a flood or an earthquake that was based on the survivor narratives from the aforementioned qualitative interviews (s. Appendix A). However, each centre did additionally recruit a small sample of real survivors to take part in a cognitive debriefing. In this debriefing, the questionnaire was read out loud in the form of a structured interview and the survivors were invited to comment on the questionnaire's structure, understanding and usability. On average, the questionnaire took 45 minutes to be completed and the cognitive debriefing one hour.

Measurement

The pilot form of the questionnaire consisted of questions about (anticipated) behavioural, emotional and cognitive responses during disasters plus questions about general emergency knowledge, risk perception and socio-demographic data. Considering the scope of this paper, only the analysis of two domains – the peritraumatic factors emotional and cognitive processing, consisting of 14 items, and risk perception, consisting of four items – is presented.

In order to create a more detailed representation of human responses as a disaster unfolds, the questionnaire was separated into three distinct stages of a disaster: realization (of what is happening), during evacuation and after evacuation, and peritraumatic emotions and cognitions were measured at each stage. Risk perception was only assessed once along with general emergency knowledge at the end of the questionnaire. For the pilot study, participants' responses were recorded using a five-point Likert scale, with 0= not at all, 1= a little, 2= moderately, 3= strongly and 4= very strongly.

Peritraumatic emotion. When taking a look at peritraumatic responses to disasters, emotions play a key role, especially when considering their traits such as quick onset, automatic appraisal and unbidden occurrence (Ekman, 1992). Survivors from the aforementioned interviews did not report a great variety of emotional states, mainly peritraumatic detachment, fear and "panic" (Grimm, Hulse, Preiss, & Schmidt, 2011a). Other states reported less often were anger, sadness and depression. States assessed in the Peritraumatic Distress Inventory's negative emotions scale (Brunet et al., 2001), such as guilt and shame or feeling horrified/ helpless were seldom reported by the interviewees and therefore omitted from the piloted instrument. However, an item referring to the concept of controlling one's emotions was assessed in the peritraumatic cognition scale. Fear, one of the strongest predictors for psychological distress following a disaster (Başoğlu, Kiliç, Salcioğlu, & Livanou, 2004; Başoğlu, Salcioğlu, Livanou, 2002), was assessed using the gradations survivors reported during interviews: nervous, scared, and scared to death. Additionally, the peritraumatic feeling of anger was assessed with the items angry and annoyed. As "panic" during disasters has been reported by survivors in current interview studies, albeit with differing quantities of statements (Grimm, Hulse, Preiss, & Schmidt, 2011a; Prati, Catufi, & Pietrantoni, 2012), it was decided to include this item in the questionnaire. Although survivors reported experiencing dissociation and depersonalization during the disaster, it was decided not to integrate dissociative symptoms into the stages part of the questionnaire, for two reasons. Firstly, recent studies support the finding that peritraumatic distress and dissociation are conceptually different, both

predicting in unique ways PTSD symptoms (Birmes et al., 2005; Fikretoglu et al., 2006). Secondly, dissociation is closely linked with memory disorganization (Halligan et al., 2003). Therefore it was decided that if dissociation were to be of interest, its investigation would be better served by a separate, single assessment using a measure such as the Peritraumatic Dissociative Experience Questionnaire (Marmar et al., 1997).

Leach (1994; 2004) has defined three categories of human responses to disasters: calm; reflexive, almost automatic behaviour; and counterproductive reactions. It was decided that the manner of emotional reaction should also be assessed using the items calm and, as its opposite, excited as both were in accordance with Leach's theory and reported by interviewed survivors (Grimm, Hulse, Preiss, & Schmidt, 2011a; Leach, 1994; Leach, 2004).

Peritraumatic cognition. Cognitive appraisals of peritraumatic emotions as well as of the disaster situation were assessed with the constructs coping strategies, perceived threat and control beliefs. During disasters, participants' thoughts may centre on comprehending the incident and appraising the situation for risk (Grimm, Hulse, Preiss, & Schmidt, 2011a). As a traumatic event can also be classified from an individual perspective as an emotional and cognitively overwhelming situation (Ehlers & Clark, 2000), victims' coping strategies were of interest. As several interviewed survivors reported employing strategies to help deal with the traumatic situation, their statements were reworded in order to generate items. Coping strategies presented in the pilot form were controlling the emotions, focusing on surviving and blocking the situation out. However, it must be noted that such strategies were not reported that often. Feedback indicated that this was either because emotional, cognitive and behavioural responses seemed to happen automatically (s. domain peritraumatic emotion) or because participants could either not remember applying or did not apply any coping strategies.

Leach (1994) suggests that a threat perception is, from a survival-psychological view, an appraisal occurring when people face the possible occurrence of a disaster, which is mainly accompanied, at least initially, by the behavioural components inactivity and denial. In the aforementioned interviews, participants reported the perceived risk of danger to life and health. As the influence of perceived life threat is related not only to greater posttraumatic distress (Hollifield, Hewage, Gunawardena, Kodituwakku, & Weerarathnege, 2008; Johannesson et al., 2009; Ozer, Best, Lipsey, & Weiss, 2003; Sumer, Karanci, Berument, & Gunes, 2005) but also to a possible change in behavioural reactions during disasters (Leach, 1994; Prati, Catufi, & Pietrantoni, 2012), it was decided that aspects of threat should be assessed in the pilot form.

Perceived threat was assessed as being concerned about one's safety; this was in order to reflect both the cognitive and the emotional aspects of the construct. A similar item "I felt afraid for my safety" is part of the Peritraumatic Distress Inventory, appearing in the scale on perceived life threat and bodily arousal (Brunet et al., 2001).

Internal locus of control or personal control beliefs are usually assessed as a stable construct, functioning as a resilience factor to posttraumatic distress after disasters (Mellon, Papanikolau, & Prodromitis, 2009; Sumer, Karanci, Berument, & Gunes, 2005). However, perceived control over the traumatic situation as it was happening could be related to posttraumatic outcomes as well, as persons with higher PTSD levels might tend to generalize from the state of having no control during the disaster to an overall trait of having no control over their lives (Ehlers & Clark, 2000). In the pilot study, the assessment of control beliefs was limited to cognitions during the incident; items were created using internal locus of control and external loci of control derived from interviewee narratives.

Risk perception. Risk perception consists of two domains, general/ objective risk and personal/ subjective risk, which are well established in risk research and have been assessed in studies dealing with the influences and consequences of risk perception after terror attacks and natural hazards in affected geographical areas or nationwide (Fischhoff, Gonzalez, Small, & Lerner, 2003; Goodwin, Wilson, & Gaines, 2005; Ho et al., 2008; Huddy et al., 2002; Kellens et al., 2011). Huddy et al. (2002) showed that general and personal risk are, although correlated, different dimensions; general risk involves people's opinions about the likelihood/ probability of events occurring in the future in a country or area, while personal risk is connected to emotional and behavioural constructs such as anxiety, fear and somatic symptoms or avoidance behaviour (Goodwin, Wilson, & Gaines, 2005; Huddy et al., 2002). Therefore it was believed that the assessment of personal risk would be possible with the use of disaster scenarios and could reveal something of interest regarding answering tendencies about anticipated cognitive and emotional responses to disasters. It was expected that the construct validity of the questionnaire would be enhanced if personal risk loaded on factors other than just peritraumatic emotional and cognitive responses to a hypothetical disaster scenario. Following the approach taken in other studies, it was decided that personal risk would be assessed as concern (Goodwin, Wilson, & Gaines, 2005; Huddy et al., 2002; Kellens et al., 2011).

Participants

Recruitment was performed by each centre in November 2009. Scenario participants were required to be aged between 18 and 60 years. For the cognitive debriefings, participants had to have already experienced one of the following disasters: a flood, a fire, an earthquake, or a terror attack. After giving consent, participants completed a paper/ pencil version of the pilot questionnaire. Questionnaire assessment and cognitive debriefings were conducted using experienced psychologists.

A total of 336 participants took part in the study; 53 from Germany, 20 from the UK, 53 from Spain, 50 from Sweden, 52 from Poland, 54 from the Czech Republic, 48 from Turkey and six from Italy. There was an almost even split of females (55.1%) and males (44.9%). Mean age was 35.5 years (SD = 13.5). Three percent of participants had a migrant background; as this was a small percentage, migrant status was omitted from the analysis. On average, participants had been in education for 16.0 years (SD= 5.9). Twenty percent of participants had experience of working as a police officer or firefighter. Twenty-five participants had already survived a fire, a flood or an earthquake. These events happened on average ten years (SD= 8.5) ago. Participants were divided into the scenarios fire (40%), terror attack (20%), earthquake (20%) and flood (17%). The remaining three percent took part in the cognitive debriefings.

Statistical Analysis

Questionnaire responses were coded and data checked in a standardized PASW/ Excel data matrix by each participating centre. After this, the data matrix and completed questionnaires were sent to the coordinating centre in Greifswald for final checking and data analysis. Implausible data or values out of range were coded as missing if they could not be verified in the completed questionnaire. If two answers were coded instead of a single answer, two raters decided which one to pick. All statistical analyses were conducted with PASW version 18.0. Several tests were applied in order to analyse item and scale characteristics. Descriptive statistics including means and standard deviations were calculated. Effects of gender, scenario type, disaster experience and emergency work experience were analysed with T-tests and univariate ANOVAs. Differences between the three disaster stages were assessed with repeated measures ANOVAs. Scale characteristics were analysed with Cronbach's α, item-scale correlations and scale intercorrelations were assessed with bivariate Pearson-correlations. The structure of the pilot form was assessed with explanatory factor analysis. Regarding item and scale characteristics,

an item was deleted if its substance was diverged, but also if the item-scale correlation was below .30 at all three disaster stages and the scale's Cronbach's α was enhanced by deleting the item.

Results

Cognitive debriefing

In general, the questionnaire sections on peritraumatic emotions and cognitions were considered a good fit to the participants' disaster experiences. Also the structure of the questionnaire, with the repetition of the set of questions about peritraumatic emotions and cognitions at three disaster stages, was found useful in order to illustrate a dynamic experience of peritraumatic states. Feedback included suggestions to simplify or reword several items, especially on the coping strategies and control beliefs scales, in order to increase ease of understanding, e.g. remove double negatives in one sentence. Also several participants found that items about coping strategies were not always applicable in their given situation. Questions rated as unsuitable during the cognitive debriefings were verified again by researchers but only omitted if unsuitability was also indicated by psychometric criteria. A further point raised was that different gradations of fear, such as the items scared and scared to death, were overly similar. Thus, as a consequence of participant feedback and psychometric analysis, items were removed.

Item characteristics

In a first step, three items, one from the emotion scale (calm) and two from the control beliefs scale (control self/ others) were deleted due to low item-scale correlations and changes in Cronbach's α. One further item, being excited, was translated in some countries with a negative connotation and in others with a positive connotation, and was therefore removed by expert consent. Gender differences were apparent on 10-30% of items (depending on the stage of the disaster), predominantly on the emotion scale. For about 60% of all items, the type of scenario participants were allocated to resulted in response differences at the first two disaster stages; differences decreased at the after evacuation stage. Scenario differences were mainly apparent on the emotion and risk scales. When comparing the realization stage items to the during evacuation and after evacuation stage items, significant differences were found on all items except for the blocking the situation out item. Mean item scores decreased significantly across the three stages, except for the being angry item, on which the mean scores increased. Results for the characteristics of the remaining items are shown in Tables 1, 2 and 3.

Table 1: Characteristics (after the scale revisions) of items on peritraumatic emotion at the different disasters stages (n=336)

Scale:	Stage1): Realization				Stage2): During Evacuation				Stage 3): After Evacuation			
Peritraumatic Emotion	M (SD)	Gen	Sce	ISC	M (SD)	Gen	Sce	ISC	M (SD)	Gen	Sce	ISC
I was annoyed. *	1.38 (1.31)		●●	.52	1.20 (1.22)		●●	.60	1.25 (1.28)			.70
I was angry. **	0.91 (1.19)			.60	0.83 (1.11)			.64	1.09 (1.30)			.71
I was nervous. ***	2.15 (1.34)	●●	●●●	.74	1.93 (1.24)	●●	●●●	.72	1.60 (1.19)	●		.65
I was scared. ***	2.37 (1.25)	●●●	●●	.80	1.91 (1.30)	●●●	●●●	.83	1.28 (1.19)	●●	●●●	.78
I was panicking. ***	1.29 (1.33)	●●	●●●	.79	1.00 (1.26)	●●	●●●	.84	0.49 (0.91)		●●●	.70
I was scared to death. ***	1.17 (1.38)	●●	●●●	.79	1.02 (1.37)		●●●	.77	0.48 (0.99)		●●●	.66

Note: Gen = Gender, Sce = Scenario, ISC = Item Scale Correlation (● = $p < .05$; ●●= $p < .01$; ●●●= $p < .001$)
Within subject differences between stages: * = $p < .05$; **= $p < .01$; ***= $p < .001$

Table 2: Characteristics (after the scale revisions) of items on peritraumatic cognitions at the different disaster stages (n=336)

Scale:	Stage1): Realization				Stage2): During Evacuation				Stage 3): After Evacuation			
Peritraumatic Cognition	M (SD)	Gen	Sce	ISC	M (SD)	Gen	Sce	ISC	M (SD)	Gen	Sce	ISC
How concerned were you about your safety? ***	2.54 (1.08)	●●	●●	.63	2.20 (1.12)	●●	●●	.72	1.33 (1.16)			.55
The situation was out of control. ***	1.43 (1.31)		●●●	.69	.92 (1.12)		●●●	.64	.49(.82)		●●●	.46
The situation was in the hands of fate. ***	1.16 (1.35)		●●	.57	.75 (1.11)		●●	.57	.57 (1.01)	●	●●●	.47
I tried to control my feelings. **	2.32 (1.08)			.33	2.26 (1.04)			.29	2.07 (1.12)			.69
I blocked the situation out.	1.25 (1.25)			.39	1.25 (1.22)	●		.53	1.46 (1.27)			.54
I focused on surviving.***	2.61 (1.12)			.59	2.29 (1.26)			.69	1.56 (1.30)			.60

Note: Gen = Gender, Sce = Scenario, ISC = Item Scale Correlation (● = $p < .05$; ●●= $p < .01$; ●●●= $p < .001$)
Within subject differences between stages: * = $p < .05$; **= $p < .01$; ***= $p < .001$

Table 3: Characteristics (after the scale revisions) of items on personal risk (n=336)

Personal risk	M (SD)	Gen	Sce	ISC
How concerned are you about becoming the victim of a fire?	1.36 (0.97)		●●	.74
How concerned are you about becoming the victim of a terror attack?	1.11 (1.13)		●●●	.85
How concerned are you about becoming the victim of a flood?	1.08 (1.11)		●●●	.75
How concerned are you about becoming the victim of an earthquake?	0.86 (1.22)		●●●	.84

Note: Gen = Gender, Sce = Scenario, ISC = Item Scale Correlation (● = $p < .05$; ●●= $p < .01$; ●●●= $p < .001$)

Influence of experience

Few differences in item responses were found between the disaster survivors who completed a cognitive debriefing and scenario participants. However, survivors did rate the situation as being out of control at a significantly higher level for the realization and after evacuation stages (T= -2.08; p< .05 and T= -2.36; p< .05, respectively), while scenario participants gave a significantly higher endorsement of the item about blocking the situation out at all disaster stages (T= 2.08; p< .05, T= 2.93; p< .01 and T= 2.78; p< .05, respectively). Moreover, the item about controlling one's feelings was rated higher by scenario participants at the during evacuation stage (T= 2.28; p< .05).

Differences between participants who had experience of working for the emergency services ("emergency workers") and participants with no emergency work experience ("civilians") were found particularly at the realization and during evacuation stages. The items about being nervous (T= 2.99; p< .01 and T= 2.33; p< .05, respectively) and the situation being out of control (T= 2.80; p< .01 and T= 3.09; p< .01, respectively) differed significantly at both stages, with civilians scoring higher than emergency workers. Also, at the realization stage, civilians reported higher levels of concern about their own safety (T= 3.39; p< .01) and being scared to death (T= 3.00; p< .01), while emergency workers reported significantly higher levels of being annoyed (T= 2.84; p< .01). At the third disaster

stage there were no differences between emergency workers and civilians. However, emergency workers were more concerned about becoming a victim of a fire (T= -3.07; p< .01) and an earthquake than were civilians (T= -2.59; p< .05).

Scale characteristics

The principal component analysis (using Varimax) explained altogether 66.6%, 62.3% and 65.3% of variance for the three disaster stages, respectively. The first factor included four items about the emotional states of fear and panic; at the realization and during evacuation stages, the items about concern and focusing on surviving were also included. The second factor included four items about personal risk at all stages. The third factor had two items regarding anger; at the after evacuation stage this factor also included feeling nervous. Finally, the fourth factor included the coping strategies items and the fifth factor the two remaining control beliefs items. Cronbach's α for the peritraumatic emotion, cognition, and the personal risk scales are shown in Table 4 before and after revisions.

Table 4: Scale characteristics: Cronbach's α before and after revisions

Scale	Peritraumatic Emotion		Peritraumatic Cognition		Personal Risk
Revision	Before	After	Before	After	
Stage 1): Realization	.66	.83	.57	.50	
Stage 2): During Evacuation	.70	.84	.45	.60	
Stage 3): After Evacuation	.65	.78	.32	.54	.82

The peritraumatic emotion and cognition and the personal risk scales were all significantly intercorrelated at all disaster stages. Scale intercorrelations are shown in Table 5. Correlations were beneficial in showing that all scales belonged

to a superordinate construct, but the correlations were not high enough to conclude that the scales were measuring the same thing.

Table 5: Scale intercorrelations (after the revisions) for peritraumatic emotions and cognitions and personal risk

Stage	Scale	Scale II: Peritraumatic Cognition	Scale III: Personal Risk
Stage 1) Realization	Scale I: Peritraumatic Emotion	.54***	.15*
	Scale II: Peritraumatic Cognition	-	.27***
Stage 2) During Evacuation	Scale I: Peritraumatic Emotion	.56***	.19**
	Scale II: Peritraumatic Cognition	-	.36***
Stage 3) After Evacuation	Scale I: Peritraumatic Emotion	.34***	.23***
	Scale II: Peritraumatic Cognition	-	.25***

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

Discussion

In this study, part of a larger international study of human responses to disasters, a new instrument measuring emotional and cognitive processing during disasters was pilot tested across several European countries. The development of the instrument was based on theoretical models from the fields of trauma-, survival-, and social psychology and a theoretical framework generated from survivor narratives. The process consisted of several steps, from interviews with disaster survivors to item development, design of a pilot questionnaire, plus psychometric and content analysis. Pilot testing was performed according to the approach taken by other international research projects and was considered to be a beneficial way of testing psychometric characteristics and usability in order to enhance the questionnaire (Petersen, Schmidt, Power, & Bullinger, 2005; Winkler, Matschinger, & Angermayer, 2006). It was found that, overall, the pilot study

produced a satisfactory instrument for assessing the constructs peritraumatic emotions, peritraumatic cognitions including perceived threat, coping strategies and control beliefs, as well as personal risk. In general, the pilot study supported the use of a questionnaire teamed with event scenarios, especially when recruitment of a purposive sample – in this case, survivors of disasters – is challenged by factors such as limited access and small sizes. While the usability and feasibility of the questionnaire appeared to be enhanced after taking on board the results from both sets of participants, it must be noted that an empirical validation of the employed models and theoretical framework was not possible as most participants were answering based on a scenario and not personal experience.

When comparing the developed instrument with current standardized measures such as the Peritraumatic Distress Inventory (PDI) (Brunet, et al., 2001), differences as well as similarities can be found. The PDI measures reactions to traumatic events with two scales, negative emotions (7 items) and perceived life threat/ bodily arousal (6 items). Both measures contain similar items regarding emotions. In the PDI, the concept of anger is represented as anger/ frustration about not being able to do more, while the developed instrument measures being angry/ annoyed in general. In addition, the PDI emphasizes the feelings of fear, helplessness and horror during the event, in accordance with the DSM-IV PTSD Criterion A2, while the developed instrument focuses on fear and panic. The items sadness/ grief from the PDI were not assessed in the new instrument as these secondary emotions were mainly reported by interviewed survivors as being experienced after the disaster, not during it. Similarly, the PDI items on guilt and shame were not assessed in the new instrument as these were not reported in survivor narratives. It is possible that such items might be more relevant to traumatic events other than major disasters, e.g. interpersonal traumas such as assaults.

Some differences in the conceptual frameworks of both measures are apparent. An item on controlling emotions was present in both questionnaires; in the PDI it belonged to the negative emotion scale, in the new instrument it was seen as a coping strategy and therefore considered a peritraumatic cognition. Conversely, the item "I thought I might die" came under the PDI's perceived life threat scale, while a similar item "I was scared to death" came under the peritraumatic emotion scale in the new instrument. Furthermore, although perceived life threat was part of both instruments, bodily arousal was not measured in the new one. Fikretoglu et al. (2007) found the effect of peritraumatic negative emotions on

dissociation was reduced in police officers, and no longer significant for civilians, when peritraumatic physical and cognitive panic reactions were controlled for. Those authors used the PDI in order to asses panic but suggested that future research should instead control for the presence of a panic attack during the traumatic event. Therefore, in the current study, all symptoms of a panic attack were assessed using the DSM-IV criteria. However, due to the scope of this article, the results of that assessment are not presented here. Several new items were created for coping strategies such as focusing on surviving/ blocking the situation out and external loci of control during the disaster. Like all other items, these items were derived from disaster survivors' narratives, however recent research has also highlighted a need to investigate cognitive strategies during traumatic situations such as self-regulation of emotions and focusing on the reality of the threat in order to better understand mechanisms of peritraumatic responses (Briere, Scott, & Weathers, 2005; Fikretoglu et al., 2006).

In summary, the two measures are similar in some respects but are ultimately different, and not just in the choice of items. The PDI aims to assess if several peritraumatic states were present during a traumatic event and how these influence related states such as peritraumatic dissociation and acute stress disorder (ASD)/ PTSD symptoms. The new instrument was developed to investigate peritraumatic states as the event unfolded, and so incorporated a repeated measures aspect, and the events of interest were specifically disasters, ones which necessitated an evacuation attempt from an enclosed setting. Another aim of the new instrument was to allow the investigation of interactions between peritraumatic emotional and cognitive processing and behavioural responses during a disaster experience.

Effects of gender were detected when considering higher peritraumatic fear/ concern during disasters. Gender effects have also been detected in epidemiological studies on posttraumatic stress reactions after the World Trade Center terror attacks (Silver et al., 2002; Schlenger et al., 2002). However, regarding risk perception, no gender effects were detected, which is not in accordance with recent findings (Armaş, 2006; Huddy et al., 2002). The type of scenario did have significant effects on the answering tendencies. Here, it must be noted that all scenarios described a situation of similar risk, from the stage of realization, to the stage where an evacuation was being initiated, through to the stage of a participant reaching a place of complete safety. Regarding differences in peritraumatic fear and cognition related to the type of scenario, it should be noted that other recent research studies have found significant

differences in survivors' post- and peritraumatic stress depending on the type of disaster they had experienced (Grimm, Hulse, Preiss, & Schmidt, 2011b; Shakespeare-Finch & Armstrong, 2010). One possible explanation regarding the scenario effect on personal risk might be that participants were primed; that is, if a participant was given a scenario describing a terror attack for instance, the scenario itself may have increased salience of terror attacks in the participant's mind, which might have then resulted in higher levels of concern of becoming a victim of a terror attack. In future research, the relationship between the type of disaster with its unique characteristics and levels of peri- and posttraumatic stress should be investigated.

The relevance of the stages approach, i.e. assessing cognitions and emotions during different parts of the disaster, was underlined by significant changes in answering tendencies at realization, during evacuation and after evacuation. The authors believe that a dynamic view of peritraumatic responses will help to further investigate adaptive behaviour during disasters but also its influence on posttraumatic stress outcome.

Overall, item responses did not differ much between real survivors and scenario participants. This underlines the quality of the content validity of the questionnaire, which was undoubtedly enhanced by drawing from detailed survivor narratives. However, prior disaster experience did impact on subjective risk concerning one particular disaster type, fire, although statistical tests revealed a trend just short of being significant. The effect of prior disaster experience on future perceived risk has been shown in several studies for floods, landslides and terror attacks (Kellens et al., 2011; Ho et al., 2008; Fischhoff, Gonzalez, Small, & Lerner, 2003), therefore it is possible that the small number of real disaster survivors in the current sample, and the time that had passed since the incidents (10 years on average), might have produced this non-significant result (see also Helweg-Larsen, 1999). Experience of a different kind, professional emergency experience, had a significant effect on certain answers. Differences between civilians and emergency workers were found at the realization and during evacuation stages on relevant items such as being scared to death, being nervous, being concerned about one's safety and thinking that the situation was out of control, which is in accordance with other studies (Brunet et al., 2001; Fikretoglu et al., 2007).

Regarding the scale structure, it was demonstrated that items were grouped along the factors of emotional and cognitive processing during disasters and

personal risk. However, it must be noted that, especially for the stages during the disaster, a strict isolation of peritraumatic emotions and cognitions might not be possible, which might be related to the characteristics of basic emotions (Ekman, 1992). The scenario group's answers about peritraumatic emotions and cognitions might have been confounded with the actual concern those people had about becoming a victim of a disaster and, to a lesser extent, related to the disaster scenario itself. Relationships between the peritraumatic emotions/ cognitions and personal risk scales were detected via significant positive correlations. However, although the construct of threat during the event was, considering the wording of the items, somewhat connected to the construct of personal risk, the items did load on different factors. Thus, this finding supports the idea that the scales measure different constructs.

Limitations

Although scenario assessment worked in achieving improved usability and feasibility of the instrument, it was not without its challenges. For example, this approach relied on participants being able to put themselves 'in the shoes' of a real disaster survivor and being able to embellish on the information given in the scenario description. Answers about emotional and cognitive disaster experiences would have been drawn from layperson beliefs. As Alexander (2007) showed, there are still many misconceptions about human responses to disasters, such as the frequency of occurrence of mass panic, so the results of the pilot form based on scenario participants may have been influenced by underlying misleading constructs. However, this was addressed by undertaking cognitive debriefings with real survivors and taking their results into account along with those of the scenario participants together with psychometric analysis. In addition, it must be considered that, in order to have a realistic illustration of disasters, the scenarios were based on previous interviews with 125 disaster survivors. Furthermore, the same researchers were engaged in those interviews and the pilot development of the new instrument.

It must be noted that neither the number of cognitive debriefings per centre nor the number of interviews per disaster type and country that the final scales were based on should be considered representative and were rather affected by the incidence rates of disasters across Europe. Therefore a systematic bias in item response due to the disasters experienced across countries might have occurred. Also, a self-selection bias might have been present; survivors with disorganized and incomplete memories or heightened emotional states due to severe

traumatic stress might have avoided taking part in the interviews and cognitive debriefings and so the results on emotions and cognitions might only pertain to survivors with less of a posttraumatic stress outcome (Grimm, Hulse, Preiss, & Schmidt, 2011a). As discussed earlier, there were very few significant differences in answers between real survivors and scenario participants and this could also be a function of the low number of real disaster survivors in the sample. A further limitation concerning the validation of the instrument is that current posttraumatic stress symptoms (deriving from any specific traumatic life event) were not assessed in the sample. According to Ehlers and Clark's (2000) cognitive model of PTSD, individuals with higher current levels of PTSD use several dysfunctional behavioural and cognitive strategies, which assist in maintaining PTSD symptoms. Therefore it could be assumed that if any of the scenario participants had current PTSD symptoms then they may have tended to anticipate their responses to a disaster scenario to be more passive and stressed. However, while this validation of the instrument is of course necessary it will be more reliably assessed in a study where disaster exposure is controlled for.

Finally, the items on emotional and cognitive states were designed for the disaster types fire, flood, earthquake and terror attack, and where an evacuation was attempted from an enclosed setting; generalizing to other disasters cannot be supported at this point. Although development and assessment was performed in seven European countries, cross-cultural validity is not a given yet. Another aim for future research can be to empirically identify differences in emotions and cognitions (Freitag, Grimm, & Schmidt, 2011) as well as in perceived risk of disasters across Europe and compare these to differences indicated in literature (Gierlach, Belsher, & Beutler, 2010; Shiloh, Guvenc, & Onkal, 2007; Steger, Frazier, & Zacchanini, 2008).

Conclusion

In summary, this article presented the cross-cultural development and pilot testing of a new instrument measuring emotions and cognitions during disasters as well as personal risk. The pilot testing was based on psychometric criteria including participants' responses to different types of disaster scenarios and cognitive debriefings involving real disaster survivors. The procedure enhanced the constructs and gave information as to how items could be reformulated for better understanding and usability. Also, pitfalls in cross-cultural research, such as translation problems concerning the connotation of emotion words, were brought to light. Overall, 20% of the initial items were reduced and three scales –

peritraumatic emotion, with its facets fear and anger, as well as peritraumatic cognition and personal risk – resulted from the pilot study. Also, the findings highlighted the relevance of investigating emotions and cognitions during different stages of a disaster. Future research should investigate further the influence of peritraumatic emotions and cognitions during the distinct stages of disasters as this will likely be beneficial for the understanding of posttraumatic psychological outcomes, as well as for the understanding of behavioural responses displayed during disasters. Also beneficial would be further studies on cross-cultural differences in the displayed intensity of such emotions and cognitions as fear, anger, perceived threat, coping strategies and individual control beliefs.

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