

Media Contact and Posttraumatic Stress in Employees of New York City Area Businesses after the September 11 Attacks

Betty Pfefferbaum, MD, JD; Jayme Palka, PhD; Carol S. North, MD, MPE

ABSTRACT

Objective: The objective of this study was to examine associations between media contact and posttraumatic stress in a sample with a large number of individuals who were directly exposed to the September 11, 2001 (9/11) attacks and to compare outcomes in exposed and unexposed participants.

Methods: Structured interviews and questionnaires were administered to a volunteer sample of 254 employees of New York City businesses 35 months after the attacks to document disaster trauma exposures, posttraumatic stress outcomes, and media contact and reactions.

Results: Media variables were not associated with psychopathological outcomes in exposed participants, but media contact in the first week after the attacks and feeling moderately/extremely bothered by graphic 9/11 media images were associated with re-experiencing symptoms in both the exposed and unexposed participants. Feeling moderately/extremely bothered by graphic media images was associated with hyperarousal symptoms in exposed participants.

Conclusions: The findings suggest that media contact did not lead to psychopathology in exposed individuals, although it was associated with normative distress in both exposure groups. Because of the potential for adverse effects associated with media contact, clinicians and public health professionals are encouraged to discuss concerns about mass trauma media contact with their patients and the public at large.

Key Words: disaster trauma exposure, media, posttraumatic stress, September 11 attacks, terrorism

The September 11, 2001 (9/11), attacks remain unprecedented among terrorist events in the United States in terms of human casualties, property destruction, and societal effects. The consequences of the attacks reverberated across the nation, leading to modifications in infrastructures and systems related to emergency response, civil defense, disaster management, transportation, and commerce. Graphic and unrelenting media coverage of the attacks depicted dramatic scenes of human harm and property damage. The attacks and media coverage of them generated concern about the effects of media contact, as well as the physical and emotional outcomes for those most highly affected and for the general public. A sizeable research literature has examined the relationship between contact with media coverage of mass trauma events and various psychological outcomes, especially posttraumatic stress outcomes – posttraumatic stress disorder (PTSD) and posttraumatic stress symptoms or reactions.¹⁻³ In particular, media coverage of the 9/11 attacks in adults has been widely studied.^{1,2,4-20} Media research has also explored more recent terrorist events.²¹⁻²⁵ For example, a series of reports on a survey of the Boston Marathon

bombing²²⁻²⁴ with a follow-up assessment²³ examined media effects on acute stress²²⁻²⁴ and posttraumatic stress.²³

Most studies of the 9/11 attacks have used samples of predominantly trauma-unexposed individuals drawn from the general community in the New York City (NYC) area^{4-7,16} and from distant communities¹⁰ or nationwide,^{8,14-19} using self-report symptom surveys rather than studying samples of directly exposed survivors using diagnostic interviews. Studies of more recent terrorist incidents have also assessed samples drawn from general populations in the disaster or distant communities and/or from national samples using self-report symptom surveys.²¹⁻²⁵ Noteworthy exceptions to the use of general community samples are 9/11 studies of US Pentagon employees, some of whom were onsite at the time of the Pentagon attack,¹³ and of undergraduate college students who, on the day of the attacks, evacuated the university they attended in Ohio when United Air 93 circled overhead prior to crashing in Pennsylvania.⁹ An exception to the use of self-report symptom measures in 9/11 disaster studies, Gershoff and colleagues¹² administered diagnostic

interviews to assess the mothers of children in an NYC school-based sample. Although the authors reported “direct exposure” in many of the mothers,¹² it is unclear how many actually met the PTSD exposure criterion.

THE CURRENT STUDY

Differences in sampling and assessment are of more than academic interest and may have important clinical implications. Relatively few studies have assessed directly exposed samples of survivors. Although early 9/11 studies suggested that media contact may lead to PTSD, the Diagnostic and Statistical Manual (DSM), fifth edition (DSM-5),²⁶ disallowed media contact as a qualifying exposure for the diagnosis. Unfortunately, few studies have distinguished psychopathological and normative outcomes in exposed and unexposed samples. In light of these methodological concerns, the goal of the current study was to extend the extant literature by exploring both psychopathology and normative distress associated with media contact in a sample recruited to include large numbers of 9/11 trauma-exposed individuals and to clarify distinctions between these outcomes in exposed and unexposed groups. Specifically, this study of adult employees of NYC area businesses after the 9/11 World Trade Center (WTC) attacks examined the associations between media contact before and after the disaster and both DSM, fourth edition (DSM-IV),²⁷ PTSD and the 3 PTSD symptom groups (re-experiencing, avoidance and numbing, and hyperarousal) in trauma-exposed survivors, as well as the association between media contact before and after the disaster and the number of posttraumatic stress symptoms in both the exposed and unexposed participants. DSM-IV²⁷ defined PTSD as a disorder that occurs after exposure to a traumatic event with sufficient numbers of new symptoms in 3 symptom groups – groups B (re-experiencing), C (avoidance and numbing), and D (hyperarousal) – lasting for more than 1 month and producing clinically significant distress or functional impairment. The current study also explored how disturbed people were by graphic 9/11 media images. The results are discussed in the context of the extant terrorism media research.

METHODS

The current analysis used data collected from a volunteer sample of 379 employees recruited from 8 businesses affected by the 9/11 attacks on the WTC in NYC.²⁸ Information about the study was distributed by participating businesses to their employees who contacted the research team to participate in the research. The original sample included 176 participants from 3 agencies located in the WTC towers and 203 participants from 5 other agencies in the geographical area. Interviews were conducted a mean of 35 months (range, 27–52 months) after the attacks. The institutional review boards of the collaborating academic institutions for this study approved the project. All participants provided written informed consent.

Assessment Interviews and Questionnaires

Structured interviews used in this study included the Diagnostic Interview Schedule for DSM-IV,²⁹ which has demonstrated reliability for psychiatric disorders, and the Disaster Supplement.³⁰ These interviews were administered by mental health professionals who received formal standardized training on these instruments by authors of the instruments. Both of these instruments have been used successfully in disaster research for decades. Pre-disaster and post-disaster psychiatric disorders were assessed by obtaining onset and recency information for psychiatric disorders relative to the date of the 9/11 attacks. A DSM-IV²⁷ diagnosis of disaster-related PTSD at any time after the disaster (ie, post-disaster prevalence) required meeting criteria for exposure to 9/11 trauma, as well as meeting symptom criteria and duration and distress or impairment requirements. Detailed information was collected in the administered interviews about participants’ disaster experiences, including trauma exposures (direct; witnessed in person; and/or indirect through close family members, friends, or coworkers) according to DSM-IV²⁷ criteria for PTSD.

Respondents also completed the self-report Disaster Supplement Questionnaire (DSQ),³¹ an adaptation of the Disaster Supplement providing more detail of respondents’ disaster experience and its effects on them. This study included new questions that were informed by a large focus group study.^{32,33} The dataset analyzed for this report comprised 254 participants (67% of the sample) who completed the DSQ. The only relevant difference between those who did and did not complete the DSQ was that DSQ completion was associated with a higher prevalence of disaster-related PTSD (22% vs 11%; $\chi^2 = 7.55$, $df = 1$, $P = 0.006$). The DSQ obtained information about contact with news coverage before and after the 9/11 attacks and reactions to the coverage. Specifically, respondents were asked the number of hours per day they spent “obtaining news from all sources” in the month before the 9/11 attacks and in the week after the attacks. They categorized how “bothered” they were by graphic media images as “not at all,” “somewhat,” “moderately,” or “extremely,” and this variable was dichotomized for analysis as “moderately/extremely” versus “somewhat/not at all.”

Data Analysis

The public sector R statistical package (version 3.5.2) was used for data analysis (R Foundation for Statistical Computing, Vienna, 2018). Descriptive findings are presented with raw numbers and proportions for categorical variables and with means and standard deviations (SD) and median values for numerical variables. Categorical variables were compared using 2-sided χ^2 analyses, substituting Fisher’s exact tests when expected cell sizes were < 5 . Continuous variables were predicted from categorical variables using t-tests, substituting Satterthwaite tests for pooled analysis in cases of unequal variance as determined by Levene’s test. Paired t-tests were used to

TABLE 1

Associations of Posttraumatic Stress Symptoms With Media Variables^a

	# Posttraumatic Stress Symptoms	# Re-experiencing Symptoms	# Avoidance and Numbing Symptoms	# Hyperarousal Symptoms
Trauma-exposed (n = 105)				
# Hours per day news contact:				
Month pre-9/11	r = 0.00, P = 0.963	r = 0.03, P = 0.809	r = 0.12, P = 0.228	r = -0.18, P = 0.083
First week post-9/11	r = 0.24, P = 0.016	r = 0.33, P < 0.001	r = 0.08, P = 0.423	r = 0.16, P = 0.102
Bothered by graphic 9/11 media images ^b				
Yes: mean (SD)	8.6 (3.4)	3.1 (1.4)	2.1 (1.8)	3.3 (1.5)
No: mean (SD)	5.8 (3.8)	2.0 (1.5)	1.4 (1.8)	2.4 (2.0)
Significance	t = 3.91, P < 0.001	t = 3.71, P < 0.001	t = 1.89, P = 0.062	t = 2.96, P = 0.004
Trauma-unexposed (n = 149)				
# Hours per day news contact:				
Month pre-9/11	r = 0.07, P = 0.448	r = 0.09, P = 0.288	r = 0.09, P = 0.303	r = 0.03, P = 0.741
First week post-9/11	r = 0.22, P = 0.013	r = 0.25, P = 0.003	r = 0.19, P = 0.024	r = 0.16, P = 0.052
Bothered by graphic 9/11 media images ^b				
Yes: mean (SD)	6.4 (4.2)	2.3 (1.7)	1.3 (1.7)	2.4 (1.7)
No: mean (SD)	4.6 (4.0)	1.5 (1.5)	1.0 (1.3)	2.0 (1.7)
Significance	t = 2.66, P = 0.009	t = 2.95, P = 0.004	t = 1.38, P = 0.171	t = 1.47, P = 0.143

^aStatistical significance threshold is $P < 0.008$ because α level is corrected for a series of 6 multiple comparisons.

^bModerately/extremely.

compare 2-paired continuous variables. Associations between 2 continuous variables were assessed with Pearson's correlations. Because a series of 6 multivariate models was tested (Table 1), a Bonferroni correction was applied to this series of multiple comparisons, for which the α level of statistical significance was reduced to < 0.008 . Otherwise, the statistical significance was set at $\alpha \leq 0.050$. Because unexposed individuals cannot, by definition, develop PTSD in relation to a traumatic event, the diagnosis of PTSD and the PTSD symptom groups were examined only in exposed participants, although symptom counts were examined in both exposure groups.

RESULTS

At the time of the assessment, the sample (N = 254) for the current analysis was almost one-half (45%, n = 115) male with a median age of 44 years, more than two-thirds (69%, n = 174) white, two-thirds (67%, n = 168) college-educated, and approximately one-half (51%, n = 129) currently married. Approximately 40% (41%, n = 105) of the sample had a PTSD-qualifying 9/11 disaster trauma exposure according to DSM-IV²⁷ criteria. Specifically, more than one-fifth (22%, n = 57) were directly exposed to 9/11 trauma, including 36 individuals who were in the WTC towers and another

9 who were immediately outside of the towers during the attacks. Among those directly exposed to 9/11 trauma in the sample analyzed for this report, disaster-related PTSD developed in 30% (n = 17). The mean (SD) number of hours per day of news media contact was higher in the first week after the attacks compared with the month before the attacks (mean = 5.7, SD = 4.8 vs mean = 2.1, SD = 2.1; $t = 12.67$, $df = 225$, $P < 0.001$). More than one-half (56%) of the sample reported that they were either "extremely" (33%) or "moderately" (23%) bothered by graphic media images of the 9/11 attacks; only 18% reported that they were "not at all" bothered by graphic 9/11 media images.

No demographic variables were associated with the amount of contact with news coverage in the month before or the first week after the disaster or with feeling bothered by graphic 9/11 media images. Neither exposure to 9/11 trauma nor working in the WTC towers was associated with the mean number of hours per day of news media contact in the month before or the first week after the attacks or with feeling bothered by graphic 9/11 media images. Injury during the attacks was associated with a higher number of media contact hours per day only in the first week after the attacks ($t = 2.49$, $df = 238$, $P = 0.014$) and was not associated with feeling

bothered by graphic 9/11 media images. The number of hours per day of news media contact in the month before the attacks or in the week after the attacks was not associated with feeling bothered by graphic media images in the full sample in this analysis or in either exposure group. Because of this general lack of associations of media variables with demographic and trauma exposure variables, subsequent comparisons of media variables were conducted using a simple bivariate analysis without adjusting for these other variables in multivariate models.

Table 1 presents associations of media variables with posttraumatic stress symptoms in the 9/11 trauma-exposed and trauma-unexposed groups. Separate bivariate comparisons were made for each of the posttraumatic symptom variables, rather than including them together in multivariate models, because variance inflation testing identified excessive multicollinearity among these variables within multivariate models. In the bivariate comparisons, hours of media contact before and after 9/11 were not associated with the total number of posttraumatic stress symptoms in either exposure group. In both the 9/11 trauma-exposed and trauma-unexposed groups, a higher number of hours per day of media contact in the first week after the attacks was associated with a higher number of re-experiencing but not avoidance and numbing or hyperarousal symptoms. Pre-disaster media contact was not associated with any posttraumatic stress symptom variables. Feeling “moderately/extremely” bothered by graphic 9/11 media images was associated with a higher number of re-experiencing symptoms in both exposure groups and also with total posttraumatic stress symptoms and hyperarousal symptoms in the exposed group only.

DISCUSSION

Media news consumption in this sample of employees of NYC area businesses increased after the 9/11 attacks. The number of hours per day of post-disaster media contact was associated with re-experiencing symptoms in both exposure groups but was not associated with 9/11 trauma exposures or with feeling bothered by graphic media images. Feeling bothered by graphic 9/11 media images was associated with the number of re-experiencing symptoms in both exposure groups and with the number of total posttraumatic stress symptoms and number of hyperarousal symptoms in the trauma-exposed group.

Associations Between Media Contact and Posttraumatic Stress Variables

The use of diagnostic assessment in a sample with many individuals who were directly exposed to the 9/11 attacks offered the opportunity to extend the extant media effects research to examine psychopathological (PTSD) and normative (subdiagnostic distress) responses in both the exposed and unexposed groups.

PTSD Diagnosis Variables

The current study found no association of media contact in the first week after the attacks with PTSD or with any of the PTSD symptom groups in exposed participants. The use of dichotomous PTSD and symptom group variables in this analysis and restricting the analysis to the exposed group may have limited statistical power for these analyses.

Posttraumatic Stress Symptoms

The analysis examined the association between news media contact and posttraumatic stress symptoms in the unexposed group, as well as the exposed group. In individuals without trauma exposures or PTSD, these symptoms do not represent components of the disorder (PTSD) but rather indicators of subdiagnostic distress. Statistical power was amplified in this separate examination of stronger numeric posttraumatic stress symptom variables in place of dichotomous diagnosis and symptom group variables. The analysis of symptom count variables also permitted the analysis of the full sample, including not only exposed participants, but also unexposed participants for whom an examination of PTSD was not justifiable. Media contact was not associated with the number of total posttraumatic stress symptoms in either exposure group. This finding is in contrast to a descriptive review of disaster media effects, which found a significant association between disaster-related television viewing and posttraumatic stress in most studies,² and with meta-analyses of terrorism¹ and mass trauma³ media studies, which found small but significant associations between media contact and posttraumatic stress symptoms^{1,3} in samples with proximal and distal proximities to the disaster.³ The association of greater media contact with the number of re-experiencing symptoms in both the exposed and unexposed groups in the current study is consistent with the possibility that media consumption may contribute to intrusive re-experiencing of the disaster, regardless of personal trauma exposure.

It appears that graphic 9/11 media images, like media contact, in general, may contribute to intrusive re-experiencing of trauma regardless of personal exposure to the disaster. In contrast, associations between feeling bothered by graphic images and both the total number of posttraumatic stress and hyperarousal symptoms depended on exposure in the current study. Perhaps their real-life horrific exposures sensitized directly exposed survivors to hyperarousal and posttraumatic stress symptoms in response to these graphic media images. The relative importance of the role of the 3 groups of PTSD symptoms in the nosology of the disorder, in general, has been explored in prior studies. A number of investigators have found that symptoms in the re-experiencing and hyperarousal groups in the absence of prominent avoidance and numbing consist predominantly of responses reflecting non-pathological distress and that avoidance and numbing symptoms represent the core psychopathology of PTSD.³⁴⁻³⁹ Outside of the context of the diagnosis of PTSD, then, re-experiencing and hyperarousal symptoms may represent normative distress arising from

trauma exposure or distress associated more broadly with other trauma-related stressors. The current study adds to the limited research examining media effects on posttraumatic symptoms in the 3 symptom groups in the disaster context.^{9,11,21,25} A recent meta-analysis found an association between posttraumatic stress symptoms and trauma-related television contact both in studies that examined the content of coverage (eg, graphic images) and in those that did not,³ but the meta-analysis did not explore associations with posttraumatic stress symptoms in the 3 symptom groups. Additional research is needed to clarify the influence of the content of coverage and/or graphic images on these outcomes in both exposed and unexposed samples.

Comparison of the Current Findings With Other Research

This study's finding that media contact was not associated with disaster-related PTSD is supported by 2 studies that also used structured diagnostic interviews, including a study of directly exposed Oklahoma City bombing survivors⁴⁰ and a 9/11 study of mothers of NYC school children.¹² Other studies have yielded positive associations between media contact and posttraumatic stress measures, perhaps due, in part at least, to methodological differences. Unlike most of the extant research that used survey methodology with samples drawn from disaster or distant communities or national samples, the current study used structured diagnostic interviews to assess full DSM-IV²⁷ criteria for PTSD, specifically adhering closely to the trauma exposure criterion in a sample with a large number of directly exposed survivors. For example, a 9/11 study that assessed posttraumatic stress symptoms in a survey of Manhattan residents found that viewing media images of people falling or jumping from the towers was associated with posttraumatic stress symptoms only among those who were "directly involved in or affected by" the disaster.⁴ Unfortunately, some of the 9/11 experiences considered to reflect direct involvement in the study did not constitute qualifying trauma exposures required for the diagnosis of PTSD according to DSM-IV²⁷ criteria. Further, the study's measure of posttraumatic stress did not consider duration of the disturbance or distress or impairment. A Boston Marathon bombing study did measure functional impairment, and investigators clarified that they reported posttraumatic stress symptoms rather than PTSD because many participants did not meet the exposure criterion²³ (therefore only representing distress that is not part of the diagnostic construct). Trauma exposure and psychopathology may be overestimated in studies that do not assess all diagnostic criteria or fully conform to the criteria.³⁸ Thus, the current study augments the literature by its assessment of all diagnostic criteria for PTSD in evaluating psychopathological outcomes.

Strengths and Limitations

A number of strengths and weaknesses of the current study warrant attention. A major limitation was the use of

a non-representative sample of voluntary participants. The recruitment of the sample from agencies affected by the 9/11 attacks, rather than from the general community, permitted assessment of a large number of directly exposed individuals from a range of businesses of varying proximity to the WTC disaster site for comparison with trauma-unexposed individuals. The sample was small, relative to samples in studies that use general population survey methodology but would be considered a large sample for studies using diagnostic interview assessments, which are more burdensome because they require a greater commitment of time and effort for both the researchers and respondents. Furthermore, the response rate in this volunteer sample was similar to that in a study of the WTC Health Registry, which used interviewer-administered symptom surveys.⁴¹

Much of the extant research has not sufficiently considered the PTSD exposure criterion, resulting in the inclusion of unexposed as well as exposed participants in analyzing posttraumatic stress outcomes. Because individuals who do not meet the exposure criterion do not qualify for a diagnosis of PTSD, strengths of the current study were in limiting the analysis of PTSD to exposed individuals and in assessing all diagnostic criteria using methodologically rigorous structured interviews, differentiating PTSD in exposed individuals from distress in unexposed individuals who cannot have PTSD in response to a trauma to which they were not exposed.

The use of an inclusive global measure of media forms, referencing news from all sources rather than querying specific media forms (eg, newspaper, television, radio, Internet), may have influenced the results. A number of studies have used a single item to measure amount of television contact^{7,9,11,13,17,19} or a global item to measure amount of contact with multiple forms of media.²¹ A recent meta-analysis of mass trauma media effects on posttraumatic stress outcomes revealed significant associations regardless of measurement approaches, including studies that examined television or combined media (television and other media forms) coverage of specific incidents, studies that used numeric or subjective quantification of media contact, and studies that did and did not measure the content of media coverage.³ The assessment of feeling bothered by graphic media images in the current study was limited, as graphic images may have generated a psychological effect even if not experienced as bothersome. Other unexamined factors related to media variables may have also influenced outcomes, including the content or specific characteristics of coverage, participants' motivations for media contact, and avoidance or discontinuation of media contact.

Another potential limitation was the timing of this study conducted nearly 3 years after the 9/11 attacks. Studies of retrospective recall of symptoms of acute stress disorder⁴² and of psychological distress⁴³ in individuals directly exposed to trauma have found retrospective recall to be accurate with

slight discrepancies. While they did not measure the accuracy of recalled assessment of media contact in their study of 9/11 media consumption in Canadian undergraduate students 2 years after the attacks, Collimore and colleagues¹¹ inferred support for people's ability to recall distress and television consumption after salient events. A study of the reactions of Oklahoma City bombing survivors to 9/11 media coverage revealed that the amount of time that participants reported spending in contact with 9/11 media coverage in the first week after the attacks was independent of the time that elapsed between the attacks and the research assessment.⁴⁴ Nonetheless, recall bias should not be discounted as a potential source of bias in the interpretation of the results of the current analysis.

CONCLUSIONS

Differences in media effects in exposed and unexposed individuals in the current sample underscore the importance of considering exposure groups in studying media effects and of distinguishing psychopathological and normative reactions to media coverage. In both exposure groups, media contact in the week after the 9/11 attacks and feeling bothered by graphic 9/11 media images were associated with re-experiencing symptoms. Media contact and bothersome graphic media images may have heightened posttraumatic distress or, alternatively, greater posttraumatic distress may have driven participants to consume media coverage. Feeling bothered by graphic media images was associated with hyperarousal symptoms in the exposed group only, perhaps because these survivors were sensitized by their disaster exposures. Relatively few disaster studies have examined media effects on the 3 PTSD symptom groups. Thus, additional research is needed to validate and explicate the current findings.

In contrast to much of the terrorism media research, which has surveyed community and national samples, the current sample was recruited from 9/11-affected agencies and included large numbers of directly exposed individuals. The current study extends the extant research by using rigorous diagnostic interviews to explore pathological and normative outcomes in association with media contact separately in exposed and unexposed participant groups. The failure to find significant associations between media contact and PTSD in exposed participants suggests that media contact did not further contribute to psychopathological outcomes, although it was associated with normative re-experiencing symptoms regardless of 9/11 trauma exposure.

Increased access to traditional and new media forms that may carry graphic content and images of terrorist attacks has intensified interest in terrorism media effects. The current results underscore the importance of attention to media contact in both the exposed and unexposed individuals following incidents like the 9/11 attacks. Because of the potential for adverse effects associated with media contact, clinicians and public

health professionals are encouraged to discuss concerns about mass trauma media contact with their patients and the public at large. Both exposed and unexposed individuals should be cautioned that disaster media contact and graphic images may lead to or exacerbate distress. Although research on disaster media effects has grown substantially over the last 2 decades, many issues remain unaddressed or unresolved. In particular, more studies using rigorous methodology and improved media measures along with greater attention to exposure groups and a host of moderators are needed to fully understand terrorism media effects.

About the Authors

Department of Psychiatry and Behavioral Sciences, College of Medicine, The University of Oklahoma Health Sciences Center, Oklahoma City, OK (Dr Pfefferbaum); Department of Psychiatry, The University of Texas Southwestern Medical Center, Dallas, TX (Drs Palka, North) and Metrocare Services, Dallas, TX (Dr North).

Correspondence and reprint requests to Betty Pfefferbaum, Department of Psychiatry and Behavioral Sciences, College of Medicine, The University of Oklahoma Health Sciences Center, PO Box 26901 – WP3217, Oklahoma City, OK 73126-0901 (e-mail: Betty-Pfefferbaum@ouhsc.edu)

Financial Support

This research was supported in part by the Oklahoma City National Memorial Institute for the Prevention of Terrorism (MIPT; Oklahoma City, OK) and the Office of Justice Programs, National Institute of Justice (Washington, DC), US Department of Justice award MIPT106-113-2000-020 (BP), and by the National Institute of Mental Health (NIMH; Bethesda, MD) grant MH68853 (CSN).

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Disclaimer

Points of view in this document are those of the authors and do not necessarily represent the official position of MIPT, NIMH, US Department of Justice, The University of Oklahoma Health Sciences Center, Metrocare Services, or The University of Texas Southwestern Medical Center.

REFERENCES

1. Houston JB. Media coverage of terrorism: a meta-analytic assessment of media use and posttraumatic stress. *J Mass Commun Q.* 2009;86(4): 844-861.
2. Pfefferbaum B, Newman E, Nelson SD, et al. Disaster media coverage and psychological outcomes: descriptive findings in the extant research. *Curr Psychiatry Rep.* 2014;16:464.
3. Pfefferbaum B, Nitiéma P, Newman E. Is viewing mass trauma television coverage associated with trauma reactions in adults and youth? A meta-analytic review. *J Trauma Stress.* 2019;32:175-185.
4. Ahern J, Galea S, Resnick H, et al. Television images and psychological symptoms after the September 11 terrorist attacks. *Psychiatry.* 2002; 65(4):289-300.
5. Ahern J, Galea S, Resnick H, Vlahov D. Television images and probable posttraumatic stress disorder after September 11. The role of background characteristics, event exposures, and perievent panic. *J Nerv Ment Dis.* 2004;192(3):217-226.

6. Ahern J, Galea S, Resnick H, Vlahov D. Television watching and mental health in the general population of New York City after September 11. *J Aggress Maltreat Trauma*. 2004;9(1/2):109-124.
7. Bernstein KT, Ahern J, Tracy M, et al. Television watching and the risk of incident probable posttraumatic stress disorder. A prospective evaluation. *J Nerv Ment Dis*. 2007;195(1):41-47.
8. Cardeña E, Dennis JM, Winkel M, Skitka LJ. A snapshot of terror: acute posttraumatic responses to the September 11 attack. *J Trauma Dissoc*. 2005;6(2):69-84.
9. Cardenas J, Williams K, Wilson JP, et al. PTSD, major depressive symptoms, and substance abuse following September 11, 2001, in a midwestern university population. *Int J Emerg Ment Health*. 2003;5(1):15-28.
10. Cho J, Boyle MP, Keum H, et al. Media, terrorism, and emotionality: emotional differences in media content and public reactions to the September 11th terrorist attacks. *J Broadcast Electron Media*. 2003;47(3):309-327.
11. Collimore KC, McCabe RE, Carleton RN, Asmundson GJG. Media exposure and dimensions of anxiety sensitivity: differential associations with PTSD symptom clusters. *J Anxiety Dis*. 2008;22(6):1021-1028.
12. Gershoff ET, Aber JL, Ware A, Kotler JA. Exposure to 9/11 among youth and their mothers in New York City: enduring associations with mental health and sociopolitical attitudes. *Child Dev*. 2010;81(4):1142-1160.
13. Grieger TA, Waldrep DA, Lovasz MM, Ursano RJ. Follow-up of Pentagon employees two years after the terrorist attack of September 11, 2001. *Psychiatry Serv*. 2005;56(11):1374-1378.
14. Holman EA, Silver RC, Poulin M, et al. Terrorism, acute stress, and cardiovascular health. A 3-year national study following the September 11 attacks. *Arch Gen Psychiatry*. 2008;65(1):73-80.
15. Huddy L, Feldman S, Lahav G, Taber C. Fear and terrorism: psychological reactions to 9/11. In: Norris P, Kern M, Jest M, eds. *Framing Terrorism: The News Media, the Government, and the Public*. New York, NY: Routledge/Taylor and Francis Group; 2003:255-278.
16. Schlenger WE, Caddell JM, Ebert L, et al. Psychological reactions to terrorist attacks. Findings from the National Study of Americans' Reactions to September 11. *JAMA*. 2002;288:581-588.
17. Schuster MA, Stein BD, Jaycox LH, et al. A national survey of stress reactions after the September 11, 2001, terrorist attacks. *N Engl J Med*. 2001;345(20):1507-1512.
18. Silver RC, Holman EA, Andersen JP, et al. Mental- and physical-health effects of acute exposure to media images of the September 11, 2001, attacks and the Iraq war. *Psychol Sci*. 2013;24(9):1623-1634.
19. Silver RC, Holman EA, McIntosh DN, et al. Nationwide longitudinal study of psychological responses to September 11. *JAMA*. 2002;288(10):1235-1244.
20. Rubin AM, Haridakis PM, Hullman GA, et al. Television exposure not predictive of terrorism fear. *Newspaper Res J*. 2003;24(1):128-145.
21. Dougall AL, Hayward MC, Baum A. Media exposure to bioterrorism: stress and the anthrax attacks. *Psychiatry*. 2005;68(1):28-42.
22. Garfin DR, Holman EA, Silver RC. Cumulative exposure to prior collective trauma and acute stress responses to the Boston marathon bombings. *Psychol Sci*. 2015;26(6):675-683.
23. Holman EA, Garfin DR, Lubens P, Silver RC. Media exposure to collective trauma, mental health, and functioning: does it matter what you see? *Clin Psychol Sci*. 2020;8(1):111-124.
24. Holman EA, Garfin DR, Silver RC. Media's role in broadcasting acute stress following the Boston Marathon bombings. *Proc Natl Acad Sci USA*. 2014;111(1):93-98.
25. Monfort E, Afzali MH. Traumatic stress symptoms after the November 13th 2015 terrorist attacks among young adults: the relation to media and emotion regulation. *Compr Psychiatry*. 2017;75:68-74.
26. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Washington, DC: American Psychiatric Association; 2013.
27. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th ed. Washington, DC: American Psychiatric Association; 1994.
28. North CS, Pollio DE, Smith RP, et al. Trauma exposure and posttraumatic stress disorder among employees of New York City companies affected by the September 11, 2001 attacks on the World Trade Center. *Disaster Med Public Health Prep*. 2011;5:S205-S213.
29. Robins LN, Cottler LB, Compton WM, et al. *Diagnostic interview schedule for the DSM-IV (DIS-IV)*. St. Louis, MO: Washington University; 2000.
30. North CS, Pfefferbaum B, Robins LN, Smith EM. *The disaster supplement to the diagnostic interview schedule for DSM-IV (DIS-IV/DS)*. St. Louis, MO: Washington University; 2001.
31. North CS, Pfefferbaum B. *The diagnostic interview schedule/disaster supplement questionnaire*. St. Louis, MO: Washington University; 2002.
32. North CS, Pfefferbaum B, Hong BA, et al. The business of healing: focus group discussions of readjustment to the post-9/11 work environment among employees of affected agencies. *J Occup Environ Med*. 2010;52:713-718.
33. North CS, Pfefferbaum B, Hong BA, et al. Workplace response of companies exposed to the 9/11 World Trade Center attack: a focus-group study. *Disasters*. 2013;37:101-118.
34. Breslau N, Lucia VC, Davis GC. Partial PTSD versus full PTSD: an empirical examination of associated impairment. *Psychol Med*. 2004;34:1205-1214.
35. Ehlers A, Mayou RA, Bryant B. Psychological predictors of chronic post-traumatic stress disorder after motor vehicle accidents. *J Abnorm Psychol*. 1998;107(3):508-519.
36. Maes M, Delmeire L, Schotte C, et al. Epidemiologic and phenomenological aspects of post-traumatic stress disorder: DSM-III-R diagnosis and diagnostic criteria not validated. *Psychiatry Res*. 1998;81(2):179-193.
37. North CS, Oliver J. Analysis of the longitudinal course of PTSD in 716 survivors of 10 disasters. *Soc Psychiatry Psychiatr Epidemiol*. 2013;48:1189-1197.
38. North CS, Suris AM, Davis M, Smith RP. Toward validation of the diagnosis of posttraumatic stress disorder. *Am J Psychiatry*. 2009;166:34-41.
39. Whitman JB, North CS, Downs DL, Spitznagel EL. A prospective study of the onset of PTSD symptoms in the first month after trauma exposure. *Ann Clin Psychiatry*. 2013;25(2):e8-e17.
40. Pfefferbaum B, North CS, Pfefferbaum RL, et al. Incident-related television viewing and psychiatric disorders in Oklahoma City bombing survivors. *Int J Emerg Mental Health Hum Resil*. 2012;14(4):247-256.
41. Murphy J, Brackbill RM, Thalji L, et al. Measuring and maximizing coverage in the World Trade Center Health Registry. *Stat Med*. 2007;26:1688-1701.
42. Harvey AG, Bryant RA. Memory for acute stress disorder symptoms. A two-year prospective study. *J Nerv Ment Dis*. 2000;188(9):602-607.
43. Brennan AM, Stewart HA, Jamhour N, et al. An examination of the retrospective recall of psychological distress. *J Forensic Neuropsychol*. 2005;4(4):99-110.
44. Pfefferbaum B, Nitiéma P, Pfefferbaum RL, et al. Reactions of Oklahoma City bombing survivors to media coverage of the September 11, 2001, attacks. *Compr Psychiatry*. 2016;65:70-78.