

PTSD Reactions and Coping Responses of American Airlines Flight Attendants Who Were Former Employees of Trans World Airlines: Further Support of a Psychological Contagion Effect

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Previous findings comparing the psychological reactions and functional coping of East Coast- and West Coast-based American Airlines (AA) flight attendants after the attacks on September 11 provide support for a psychological contagion phenomenon (Lating, Sherman, Lowry, Everly, & Peragine, 2004). The purpose of this investigation was to expand these results by creating an additional comparison group consisting of current AA flight attendants not working on either the East Coast or the West Coast and who were also previously working for Trans World Airlines (TWA) before AA took over operating authority in April 2001. As predicted, the results revealed that the rate of probable posttraumatic stress disorder for the former TWA flight attendants (15.1%) was not significantly different from the East Coast and the West Coast AA flight attendants. Moreover, there were no significant differences among the three groups on measures of life functioning, and as hypothesized, there was no difference between the West Coast-based flight crews and the former TWA flight attendants in whether they knew someone who lost his or her life in the aftermath of September 11. Health implications, including multicomponent treatment interventions, are suggested. [*Brief Treatment and Crisis Intervention* 6:144–153 (2006)]

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The terrorist attacks of September 11, 2001, and the subsequent attacks in Madrid on March 11, 2004, and in London on July 7 and 21, 2005, have had a profound impact glob-

ally. The ongoing threat of future attacks has left many parts of the world in a state of residual, elevated uncertainty, high alert, and emotional unrest. Thus, terrorism, once a construct

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with minimal bearings in most parts of the world, has become a real and daunting phenomenon. Moreover, data suggest that compared to natural disasters, human-made disasters, such as terrorist attacks, create more enduring distress (Baum & Davidson, 1985; Smith, North, & Price, 1988).

Despite the challenges of establishing a formal and consistently accepted definition of terrorism (Cooper, 2001), the Federal Bureau of Investigation classifies international terrorism as “the unlawful use of force or violence committed by a group or individual, who has some connection to a foreign power or whose activities transcend national boundaries, against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives” (U.S. Department of Justice, 1996, p. 3). Implied within this definition are the pervasive primary goals of terrorism, which are to create psychological uncertainty, personal vulnerability, and fear (Everly & Castellano, 2005).

Thus, it seems that the death and destruction associated with terrorism may be viewed broadly as a means to an end. More specifically, the central focus of a terrorist attack is to coerce the thought processes of its survivors. As noted by Friedland and Merari (1985), “. . . terrorism bears primarily on the individual’s perceptions, on the ‘public mind’; in other words, it is a form of psychological warfare” (p. 592). Support for this notion comes from the social psychological paradigm known as Terror Management Theory, which was developed in the mid-1980s to address human motivation and coping related to our imminent, ultimate fate of death (Greenberg, Pyszczynski, & Solomon, 1986). According to Terror Management Theory, “what the terrorist attacks have done is to disrupt our normal means of managing our natural terror and, in so doing, threatened to undermine the psychological equanimity necessary for people to function effectively on a daily

basis” (Pyszczynski, Solomon, & Greenberg, 2003, p. 9).

Considering that a primary goal of terrorism is to create psychological morbidity or pervasive fear and uncertainty among its survivors, the putative mechanism of contagion warrants exploration (Saathoff & Everly, 2002). The term contagion has most often been associated with medical diseases, emotional and behavioral reactions, and sociological phenomenon. Regardless of its use, contagion implies a surge or spread of events. From a medical perspective, mostly in relation to infectious agents, contagion refers to transmission of disease by direct or indirect contact, or “something that serves as a medium to transmit disease” (Merriam-Webster’s Collegiate Dictionary, 1993, p. 490). From a psychological or sociological perspective, contagion refers to an “evil or corrupting influence or contact, an influence, doctrine, or emotion that spreads rapidly” (Merriam-Webster’s Collegiate Dictionary, 1993, p. 490).

Implicit within this conceptual definition of psychological contagion is the idea that a medium is required in the aftermath of a terrorist event in order for it to spread its virulent effects. For example, do factors such as physical proximity, personally knowing someone directly involved in the event, lack of social support, or perceived personal threat account for the potent terrorist effect? Having an appreciation of what these most salient media are may enhance the success of initiatives designed to mitigate the duress associated with a terrorist attack. Morbidity data from September 11 (Galea et al., 2002; Schlenger et al., 2002) on representative samples of the general population provide indirect evidence that physical proximity to the attacks may not be the most salient virulent factor.

Initial empirical support for perceived threat to one’s well-being as an influential virulent mechanism of psychological contagion can be found, however, in a study published more

than 60 years ago. In this investigation, McClure (1943) reported on 379 teachers' anonymous ratings of children from 69 London elementary schools located in areas that were badly bombed, slightly damaged, or unharmed in the aftermath of repeated air raids during World War II. Of note, the areas that were labeled "unharmed," due to lack of property damage or loss of life, were located approximately 5 miles from the actual raids. This means that the sounds from the raids could be heard clearly, and rumors about impending raids to the unharmed areas were abundant. The teachers completed a 17-item questionnaire assessing anxiety symptoms, behavioral symptoms, and cognitive functions observable in their students. Overall, the teachers' responses revealed that the impact of the bombings was the same in the undamaged areas as in those badly bombed. McClure concluded that the symptoms seemed to be more related to concomitant factors, "including psychological contagion" (p. 29), than to the raids themselves.

To further investigate this possibility, we assessed the psychological reactions, including symptoms of posttraumatic stress disorder (PTSD) and functional coping, after we separated a sample of 2,050 American Airlines (AA) flight attendants who completed questionnaires in the aftermath of the September 11 attacks into East Coast- and West Coast-based flight attendants (Lating, Sherman, Lowry, Everly, & Peragine, 2004). More specifically, 513 crew members operating out of Boston (Logan), New York (JFK and LaGuardia), and Washington, DC (Dulles), comprised the East Coast-based flight crews, and 353 crew members operating out of Los Angeles (LAX) and San Francisco International comprised the West Coast-based flight crews. Despite significant demographic differences, including most notably that the East Coast-based flight attendants were more than twice as likely to know

someone who perished in the wake of September 11 than were the West Coast-based flight attendants, there was no significant difference between the crews regarding probable PTSD (19.1% and 18.3%, respectively) or on measures of overall life functioning.

The purpose of this current investigation was to expand these psychological contagion results further by creating an additional comparison group using the data gathered from the original sample of 2,050 AA flight attendants. In April 2001, the U.S. Department of Transportation granted the transfer of operating authority from Trans World Airlines (TWA) to AA. Therefore, a number of the 2,050 questionnaires returned after June 2002 were completed by former TWA flight attendants who would have been employed at AA for only approximately 5 months. Consistent with the psychological contagion theory, we hypothesized that there would be no difference in rates of probable PTSD or life functioning among the former TWA flight attendants (who were not working on either the East Coast or the West Coast) and the East Coast and West Coast flight attendants analyzed in our previous study. Moreover, we predicted that the percentage of these former TWA flight attendants who personally knew someone who died in the aftermath of September 11 would be comparable to the West Coast-based flight attendants from our previous study.

Method

Participants and Procedure

Data collection procedures, methods, and measures are described in detail elsewhere Lating, Sherman, Everly et al. (2004). Briefly, demographic and standardized and validated questionnaires were inserted in the June 2002 periodical SKYword sent to approximately 26,000 AA flight attendants 10 times per year.

October 15, 2002, was used as an arbitrary cut-off date for receiving returned answer sheets. From the total sample of 2,050 returned surveys (response rate of 7.9%), we separated the responses by flight-base origin in order to create the East Coast- and West Coast-based flight crews. For this study, we separated the 95 respondents who endorsed the question "Were you a TWA employee who recently became part of American Airlines following the acquisition?" We further refined this group by eliminating from analyses flight attendants who were currently operating on either an East Coast or a West Coast flight base. These selection criteria resulted in a sample of 73 former TWA employees.

Measures

Respondents answered questions on demographic characteristics, such as age, gender, ethnicity, marital status, years as a flight attendant, living arrangement, and personally knowing someone who died as a result of 9/11 or the crash of flight 587.

General well-being, psychological symptoms, and life functioning were assessed using the self-report Psychotherapy Outcome Assessment and Monitoring System—Trauma Version (POAMS-TV; Green, Lowry, & Kopta, 2003). The POAMS-TV has 4 well-being items, 10 life functioning items, and 39 psychological symptom distress items (divided into 12 symptom subscales such as depression, anxiety, and PTSD). Each question is rated on a 5-point Likert-type scale (0 = *extreme distress or dissatisfaction* to 4 = *optimal functioning or satisfaction*). A score of 3 or higher is indicative of healthy functioning, whereas scores less than 2 are indicative of moderate to more severe distress. The responses to the POAMS-TV have demonstrated good internal consistency reliability and concurrent validity compared to measures of similar constructs (Green et al., 2003; Lating, Sherman, Everly, et al. 2004; Lowry, 2003).

Probable PTSD symptoms were assessed with the PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993), a 17-item self-report measure rated on a 5-point scale (1 = *not at all* through 5 = *extremely*). The items on the PCL reflect the three diagnostic categories of symptoms that result in a diagnosis of PTSD (i.e., intrusion, avoidance, and arousal) and assess the degree to which respondents have been disturbed in the past month. When scored continuously, a cutoff score of 50 yielded a sensitivity of 0.78 and a specificity of 0.86 when compared with a diagnosis on the Clinicians Administered PTSD Scale (Blake et al., 1990; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996), and a sensitivity of 0.82, a specificity of 0.83, and a κ of 0.64 when compared to the Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., revised, American Psychiatric Association, 1987; Spitzer, Williams, & Gibbon, 1992; Spitzer, Williams, Gibbon, & First, 1990). For the purpose of this study, we used the Specific Stressor version of the PCL, which asks respondents, in the introduction and in specific questionnaire items, to respond using the "recent terrorist attacks in the US" as the identifying stressor.

Statistical Analyses

Results are reported in terms of means and percentages, along with χ^2 tests of independence, one-way analysis of variance (ANOVA), regression, analysis of covariance, and the Tukey test.

Results

Demographic data, scores on the PCL, and scores on the POAMS-TV for the East Coast- and West Coast-based flight crews were presented in our previous paper Lating, Sherman, Lowry, et al. (2004) but are replicated here in

TABLE 1. Demographic Variables of East Coast, West Coast, and Former TWA Flight Crews^a

Variable	East Coast, mean (SD) (N)	West Coast, mean (SD) (N)	Former TWA, mean (SD) (N)	F value, p value
Age	41.33 (9.5) (516)	43.69 (8.0) (356)	47.30 (10.18) (73)	16.25, *
Years as flight attendant	13.96 (10.2) (520)	16.77 (10.3) (360)	22.16 (11.73) (73)	23.59, *
	Percentage (N)	Percentage (N)	Percentage (N)	χ^2 value, p value
Gender				
Female	78.4 (409)	85.6 (303)	79.2 (57)	7.42, *
Male	21.6 (113)	14.4 (52)	20.8 (15)	
Ethnicity				
Caucasian	84.4 (438)	87.0 (308)	88.9 (64)	1.82, NS
All others	15.6 (81)	13.0 (46)	11.1 (8)	
Marital status				
Single/never married	40.2 (208)	25.9 (93)	36.1 (26)	19.16, *
All others	59.8 (310)	74.1 (266)	63.9 (46)	
Living arrangement				
Alone	29.6 (142)	24.4 (80)	31.9 (22)	3.28, NS
With others	70.4 (337)	75.6 (248)	69.4 (50)	
Personally knowing someone who lost his or her life in 9/11 and beyond				
No	31.3 (163)	69.8 (252)	74.0 (54)	146.16, *
Yes	68.7 (358)	30.2 (109)	26.0 (19)	

Note. Portions of this table are reprinted with permission from Lating, Sherman, Lowry, et al. (2004).

^aSample sizes may vary slightly because of missing data.

**p* < .001; NS, not significant.

Tables 1 and 2 to clarify the comparisons with the sample of former TWA employees. As seen in Table 1, the results of one-way ANOVAs and χ^2 tests revealed significant demographic heterogeneity among the groups except for ethnic-

ity and living arrangement. All groups were prominently female, and although there was no difference in gender between the former TWA flight attendants and the East Coast-based flight crews, χ^2 analyses revealed that the West

TABLE 2. POAMS-TV Values and PCL Percentages

	East Coast, mean (SD) (N) ^a	West Coast, mean (SD) (N) ^a	Former TWA, mean (SD) (N) ^a	F value	p value
Well-being	2.28 (0.89) (519)	2.39 (0.85) (357)	2.36 (1.04) (73)	1.69	.19
Life functioning	2.66 (0.81) (494)	2.71 (0.89) (343)	2.79 (0.95) (67)	0.91	.40
Symptoms	3.20 (0.65) (521)	3.24 (0.67) (359)	3.27 (0.73) (73)	0.72	.49
	Percentage (N)	Percentage (N)	Percentage (N)	χ^2 value	
Probable PTSD	19.1 (99)	18.3 (66)	15.1 (11)	0.71	.70

Note. Portions of this table are reprinted with permission from Lating, Sherman, Lowry, et al. (2004).

^aSample sizes may vary slightly because of missing data.

Coast-based flight crews were more likely to be female. One-way ANOVAs and post hoc analyses using the Tukey test revealed that the former TWA flight attendants were significantly older and had more years of experience as flight attendants than did West Coast-based flight attendants, who in turn were significantly older and had more years of experience than did East Coast-based flight attendants. An initial χ^2 analysis demonstrated a difference in marital status among the three groups of flight attendants. A further χ^2 analysis revealed no statistical difference between the East Coast-based flight crews and the former TWA flight attendants regarding marital status; however, both these groups were more likely than the West Coast-based flight attendants to be single or never married. Consistent with our previous study, East Coast-based flight attendants were more than twice as likely to know significantly more people who perished in the aftermath of September 11 than did the West Coast-based flight crews or the former TWA flight attendants (68.7% vs. 30.2% vs. 26.0%). Moreover, and supportive of one of our hypotheses, an additional χ^2 analysis revealed no difference between the West Coast-based flight crews and the former TWA flight attendants in whether they personally knew someone who lost his or her life in the aftermath of September 11.

Table 2 shows the values of well-being, life functioning, symptoms, and probable PTSD of the East Coast, West Coast, and former TWA flight attendants as assessed by the POAMS-TV and the PCL. As seen in this table, there are no statistically significant differences among the three different groups of flight attendants in the areas of well-being, life functioning, or psychological symptoms on the POAMS-TV. Of note, all three groups demonstrated the greatest difficulty in the area of well-being, which included items on life satisfaction, emotional management, and overall distress, and the least amount of impairment in overall sym-

ptoms. Particularly relevant for support of the psychological contagion theory, Table 2 also shows that the rates of probable PTSD were not significantly different for the East Coast-based flight attendants (19.1%), the West Coast-based flight attendants (18.3%), and the former TWA flight attendants (15.1%; $p = .70$), suggesting diagnostic comparability. Of note, these similarities in functioning and probable PTSD diagnosis occurred despite the demographic differences noted in Table 1.

Although the similarities in probable PTSD and life functioning between the East Coast, West Coast, and former TWA flight attendants are consistent with the principal hypothesis of this study, we performed additional analyses to assess whether the lack of differences among the three groups of flight attendants would remain after statistically controlling for the demographic variables from Table 1 that were significantly different. Multinomial logistic regression (with probable PTSD as the outcome variable) and analysis of covariance (with each of the POAMS-TV values as outcome variables) revealed that after controlling for the significant demographic variables (i.e., age, gender, years as a flight attendant, marital status, and personally knowing someone who lost his or her life in the aftermath of September 11), there remained no significant differences among the three groups of flight attendants on the POAMS values or in probable PTSD.

Discussion

Despite the significant demographic differences among East Coast-, West Coast-, and former TWA-based flight attendants, including most notably that East Coast flight attendants were more than twice as likely to know someone who perished as a result of the tragedies of September 11 and beyond when compared to West Coast and former TWA flight attendants,

there was no significant difference among the three groups regarding the reported incidence of probable PTSD. Also, the probable PTSD prevalence rates for the flight attendants in the current study, ranging from 19.1% to 15.1%, are generally commensurate with the 13% prevalence rate noted in male rescue workers after the bombing in Okalahoma City (North et al., 2002), the 20% prevalence rate noted in residents living near the World Trade Center (Galea et al., 2002), and the 23% probable PTSD prevalence rate of Pentagon staff members (Grieger, Fullerton, & Ursano, 2004). These numbers are also more than three times higher than the probable PTSD national prevalence rate of 4.0% noted by Schlenger et al. (2002) in their Web-based representative sample.

Consistent with the formulations of Everly and Lating (2004), Janoff-Bulman (1992), and Lerner (1980), in this current investigation, the meaning that the flight attendants attached to the potential, unpredictable violation of personal safety may be the principal virulent factor in the development of the probable PTSD symptoms. Importantly, and as hypothesized by contagion theory, contact with the actual threat is not necessary for signs and symptoms of distress to develop.

In the aftermath of September 11, flight attendants, regardless of their flight base of origin or possibly their organizational affiliation, are now confronted with unpredictable personal threats or threats to those with whom they personally identify (i.e., other flight attendants). Unlike other heroic groups, such as firefighters and police officers, who are more likely to respond to the disaster scene following terrorist threats or attacks, flight attendants perceive themselves as working on a potential weapon of mass destruction. The personal impact of this type of immediate, profound vulnerability, coupled in part with the rapid generalizability of constant media exposure, appears to have left flight attendants particu-

larly "at risk" for psychological distress. The genuine perception that "I might be next" may serve as the medium by which terrorism spreads its virulent effects and may be the mechanism that allows a psychological contagion effect to occur.

It is worthwhile to consider the possible implications of these findings. For example, it may be prudent to provide access to accurate information about the terrorist event and its aftermath, including psychological symptoms associated with traumatic stress, to those working in high-risk professions such as health care, emergency services, and mass transportation. These types of interventions may serve as one aspect in an overall response plan designed to mitigate the impact of the event and to help control the possible contagion effects Saathoff & Everly, (2002). Interventions such as preincident preparation and assessment, including stress management education as part of a comprehensive emergency mental health plan designed to foster social cohesion for those working in high-risk environments, may be efficacious.

Most of the limitations of this current study are comparable to those noted in the previous investigations that used these data (Lating, Sherman, Everly, et al., 2004; Lating, Sherman, Lowry, et al., 2004) and include the use of a cross-sectional design with no pre-September 11 assessment of psychological functioning to rule out preexisting symptomatology and the lack of a comprehensive, applied clinical assessment to make a more accurate diagnostic determination. Moreover, the inability to know flight attendants' extent of exposure or involvement in the tragic events, the lack of questions assessing directly the extent of perceived personal relevance these events had on the flight attendants, and the relatively low response rate are other limitations. Also, unique to this study are the possible limitations associated with using the former TWA flight

attendants as a comparison group. Because this comparison group was employed by AA for more than 5 months before the tragedies that began on September 11, it may be that they had ample time to assimilate as AA employees when they responded to the questionnaires. Moreover, given the uncertainty, unrest, and upheaval that was likely occurring at TWA in the months preceding the takeover by AA, it is possible that the former TWA employees may have been responding to these, as well as the recent tragedies, when filling out the questionnaires. Our efforts to address these concerns included eliminating former TWA flight attendants who worked on either the East Coast or West Coast from the analyses, and using the Specific Stressor version of the PCL, which specifically asks for reactions to the recent terrorist attacks in the United States. We realize that these limitations do not preclude other possible interpretations of the current data; however, we believe that the profound personal meaning and contagious aspects of these events in susceptible individuals provide the most parsimonious explanation of the current data.

Conclusions

Given the enduring concern related to travel since September 11, the ongoing war in Iraq, the recurrent instances of terrorist attacks in other parts of the world, and the increased purported threats to homeland security (including bioterrorism), the concept of psychological contagion warrants continued investigation. As noted, the purpose of terrorism is to spread fear, unrest, and vulnerability. Since September 11, 2001, being a flight attendant is now an at-risk occupation and one that is particularly susceptible to the virulent, contagious effects of terrorism. We believe that this paradigm should be investigated in other flight attend-

ants (and also in pilots) from other airlines not affiliated with AA. However, given the massive furloughs and reconfiguring occurring in the entire airline industry in the years since the attacks of September 11, it may be challenging to acquire a current representative sample that does not contain potential confounds. We also suggest assessing other particularly at-risk groups of workers, such as postal employees (due to their possible exposure to anthrax) and more recently mass transit workers, for the possibility of a psychological contagion effect. Moreover, we propose that mental health initiatives, such as psychological first aid, include a phasic, multicomponent intervention system designed to assess, triage, and provide subsequent treatment to help mitigate the potentially widespread effects of contagion.

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