

Adolescent Vulnerability following the September 11th Terrorist Attacks: A Study of Parents and their Children

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Approximately 2 weeks after September 11th, adolescents from a national sample of households who were indirectly exposed to the terrorist attacks through the media completed a Web-based survey that assessed event-related acute stress symptoms. One year later, these adolescents ($N = 142$) and a randomly selected parent from their household completed a second survey. On average, adolescents reported mild to moderate acute stress symptoms shortly after the attacks and few trauma-related symptoms, low psychological distress and functional impairment, and moderate levels of positive affect 1 year later. After adjusting for acute stress symptoms reported after the attacks, greater parent–adolescent conflict was positively associated with adolescents' trauma symptoms, distress, and functional impairment at 1 year. Higher levels of adolescent positive affect at 1 year were associated with greater parental positive affect, greater parental support, and higher levels of parenting self-efficacy. Parents may play an important role in adolescents' responses to stressful national events.

On September 11, 2001, the largest act of terrorism within the United States was perpetrated. Extensive media coverage of the terrorist attacks allowed a significant number of Americans to watch the attacks on live television as they occurred (T. W. Smith, Rasinski, & Toce, 2001). National studies conducted in the first few weeks following the attacks showed that many adults reported substantial posttraumatic stress (PTS) symptoms, sadness, and psychological distress (Ford, Udry, Gleiter, & Chantala, 2001; Schlenger et al., 2002; Schuster et al., 2001; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002), and

these effects continued throughout the country even 6 months post attacks (Silver et al., 2002). These widespread responses to the attacks are not surprising, as mass media coverage of major disasters seems to expand geographically the impact of these events (Wright, Ursano, Bartone, & Ingraham, 1990). To the extent that individuals identify themselves and share values with those directly affected by the events, the impact of events may also widen to include entire communities or a nation (Gurwitch, Sitterle, Young, & Pfefferbaum, 2002). In addition, unlike many traumatic community events that are publicized nationwide, there was great uncertainty on the day of the terrorist attacks about how widespread the impact might be. Therefore, indirectly exposed families living outside New York, Washington, DC, and Pennsylvania could easily have experienced a genuine, immediate sense of fear.

Prior research suggests that indirect exposure to major negative life events can elicit event-related trauma symptoms and general distress among children not directly exposed to the trauma (see Pfefferbaum et al., 2000; Terr et al., 1999). However, there has been a paucity of research conducted on the

We thank the Knowledge Networks Government, Academic, and Non-profit research team of J. Michael Dennis, William McCready, and Kathy Dykeman for providing access to data collected on KN panelists at Wave 1, for preparing the Web-based versions of our surveys, for creating data files, and for general guidance on their methodology. Project funding provided by National Science Foundation grants BCS-9910223, BCS-0211039, and BCS-0215937 to Roxane Cohen Silver.

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impact of indirect exposure to negative events among adolescents. Adolescent cognitive development fosters a greater ability to think beyond the concrete consequences of the events, to imagine what might have happened, to produce alternative explanations, and to feel invulnerable to the risks that others face (Klaczynski, 1997). Moreover, from childhood to adolescence, threat appraisal becomes more differentiated to include appraisals of threat to self, other-related threat, and loss of desired objects and activities (Sheets, Sandler, & West, 1996). These cognitive differences between children and adolescents may lead to different response patterns among adolescents who are indirectly exposed to trauma. The goal of this project was to directly examine the impact of the September 11th attacks on a national sample of adolescents.

Individual Characteristics and Youth Adjustment

Adolescents' immediate reactions to negative life events and the variability in their adjustment over time may be partially explained by preexisting individual characteristics such as age and gender or a history of mental health disorders, learning disabilities, and attention problems. The evidence regarding adolescent gender differences in responses to major life events remains mixed (Silverman & La Greca, 2002). Some studies suggest female adolescents are more vulnerable to a trauma than boys (Bolton, O'Ryan, Udwin, Boyle, & Yule, 2000; Goenjian et al., 2001), yet others suggest that younger boys living in high-risk families are more vulnerable than girls with similar backgrounds (Garbarino & Kostelny, 1996). Several other researchers have reported no significant gender differences in children's and adolescents' distress levels following trauma exposure (La Greca, Silverman, Vernberg, & Prinstein, 1996; Silva et al., 2000).

A history of mental health disorders (e.g., post-traumatic stress disorder [PTSD], anxiety, and depression) may place adolescents at an increased risk for the development of PTSD symptoms and other psychosocial difficulties following exposure to major negative life events (e.g., see Asarnow et al., 1999; La Greca, Silverman, & Wasserstein, 1998; Nolen-Hoeksema & Morrow, 1991). Similarly, a history of learning disabilities (La Greca et al., 1998) or academic problems (Yule, 1994) has been associated with higher levels of symptomatology among children and adolescents following exposure to major negative life events. We might also expect the negative impact of these preexisting characteristics to be modified by aspects of the parent-adolescent relationship.

The Parent-Child Relationship and Youths' Adjustment

Parental mood and parental behaviors have been shown to play an important role in adolescents' psychosocial adjustment. Parents influence their adolescents' adjustment by monitoring, organizing, and regulating their contact with the external world in ways that may either promote or impede psychosocial adjustment (Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999). They can also model to their children how to appraise and respond to stressful situations (Kliewer, Sandler, & Wolchik, 1994).

Parental psychosocial functioning and parental mood are also consequential for adolescents' adjustment. Parents' responses to stressful situations may guide the action of their children and generate a similar emotional state in them (Kliewer et al., 1994). The developmental literature has provided evidence suggesting that among parents of young children, maternal depression is associated with hostile, rejecting, and intrusive parental practices (Cummings & Davies, 1994). Paternal and maternal negative affectivity are also associated with parental behaviors that are less nurturing and positive toward their young children (Belsky, Crnic, & Woodworth, 1995; Conger, McCarty, Yang, Lahey, & Kropp, 1984) and adolescents (Gondoli & Silverberg, 1997). Positive parental mood has been associated with higher levels of positive affect and subjective well-being among their adolescents (Ben-Zur, 2003). In the trauma literature, parents' trauma-related symptoms and their fears about possible future negative events have been positively associated with PTSD symptomatology and overall psychological adjustment among their children, even after controlling for objective characteristics of the negative event (Gil-Rivas, Silver, Holman, McIntosh, & Poulin, 2004; Korol, Green, & Gleser, 1999; McFarlane, 1987). Among children exposed to war experiences, maternal symptoms of trauma-related distress, depressed mood, and anxiety have been associated with higher levels of PTSD symptomatology (Laor, Wolmer, & Cohen, 2001; P. Smith, Perrin, Yule, & Rabe-Hesketh, 2001). However, these findings need to be interpreted cautiously because, with few exceptions (e.g., Gil-Rivas et al., 2004), these studies have relied almost exclusively on parents for the provision of both self-reports and reports of their children's symptomatology following exposure to major negative events. Moreover, the majority of these studies have relied on maternal reports, so it is also unclear whether paternal symptomatology has a similar impact on children's adjustment.

Another means by which parents can exert an impact on adolescents' psychological adjustment is through their perceived levels of parenting self-efficacy. Coleman and Karraker (1998) defined parenting self-ef-

ficacy as “an estimation of the degree to which parents perceive themselves as capable of performing the varied tasks associated with this highly demanding role” (p. 47). Parenting self-efficacy can foster a positive family climate that benefits adolescents (Furstenberg et al., 1999) and increases levels of parental engagement in proactive interventions to prevent negative outcomes for their child (Ardelt & Eccles, 2001). Among economically disadvantaged children, high parenting self-efficacy is associated with better psychological adjustment (Elder, Eccles, Ardel, & Lord, 1995). Parenting self-efficacy is also associated with better treatment outcomes among children with psychological disorders (Hoza et al., 2000). Therefore, it could be expected that parents with high levels of parenting self-efficacy may be more responsive to the needs of their children.

A positive parent–child relationship also plays an important role in explaining psychological, social, and behavioral adjustment among children and adolescents exposed to adversity (Masten et al., 1999). Parents may help their children by providing social support, information, and advice on how best to cope with stressful events (Compas, Worsham, & Ey, 1992; Pynoos, Steinberg, & Warth, 1995). Parent–child relationships characterized by supportive, warm, and caring attitudes appear to influence their children’s overall psychological well-being. For example, warm and caring parental attitudes are associated with lower levels of depressed mood (Gray & Steinberg, 1999; Greenberger & Chen, 1996) and contribute to higher levels of positive affect among adolescents (Ben-Zur, 2003). However, research examining the association between positive family relationships and adolescents’ adjustment in the context of stressful events has led to conflicting conclusions. Higher levels of family support have been associated with lower levels of anxiety and depressive symptomatology in children and adolescents exposed to community violence (Gorman-Smith & Tolan, 1998; Kliewer, Lepore, Oskin, & Johnson, 1998). Similarly, among children exposed to Hurricane Andrew, greater parental support was associated with lower levels of PTS symptoms 7 months later, even when controlling for the degree of exposure, demographic characteristics, and number of negative life events experienced since event exposure (La Greca et al., 1996). In contrast, parental support had no impact on anxiety (White, Bruce, Farrell, & Kliewer, 1998) and internalizing symptoms reported among inner city adolescents’ exposed to violence, and it does not appear to protect them from the negative impact of negative life events more generally (Weist, Freedman, Paskewitz, Proescher, & Flaherty, 1995; Youngstrom, Weist, & Albus, 2003).

At the same time, although intense, frequent parent–adolescent conflict occurs in a minority of families (Montemayor, 1986; Steinberg, 1990), such interactions can have a detrimental impact on adolescents’

well-being. In fact, parent–child conflict has been associated with higher levels of depressive symptomatology among adolescents (Greenberger & Chen, 1996; Greenberger, Chen, Tally, & Dong, 2000). However, surprisingly little is known about how negative interactions with parents (i.e., parent–child conflict) may influence adolescents’ adjustment following major negative life events. When considered in the context of coping with an event like the terrorist attacks, we would expect parent–adolescent conflict to exacerbate adolescents’ negative emotional reactions.

Mothers and fathers differ in their parental roles, behavioral styles, and their involvement with their children. These differences may lead to divergent adolescent perceptions of the quality, frequency, and satisfaction of their interactions. Although adolescents spend more time with their mothers than with their fathers, boys and girls report greater satisfaction in activities that involve fathers than in activities involving mothers (Montemayor & Brownlee, 1987). When compared to maternal expression of negative emotion, paternal expression of negative emotion and adolescents’ perceptions of paternal behavior appear to have a greater impact on adolescents’ satisfaction with the parent–child relationship and their self-esteem (Flannery, Montemayor, & Eberly, 1994; Gecas & Schwalbe, 1986). Therefore, we could expect that parental gender might modify the impact of parental involvement on youths’ adjustment following stressful events.

This Study

We examined the immediate and longer term impact of the September 11th terrorist attacks on a national sample of adolescents and their parents. This study addressed the extent to which parental factors can explain variability in adolescents’ well-being 1 year post attacks. In the interest of understanding adolescent well-being more broadly, we chose to investigate how the impact of these events might be expressed through acute and long-term PTS symptomatology and distress levels, as well as positive emotion and daily functioning outcomes. In the parenting domain, we focused on the direct and moderating effects of five sources of parental influence: (a) parental symptomatology (PTS symptoms and psychological distress levels), (b) parental positive affect, (c) parenting self-efficacy, (d) perceived parental support, and (e) parent–adolescent conflict.

Methods

Participants

The mean age of participating adolescents at Wave 1 was 15.27 years ($SD = 1.14$), and the mean age of the

Table 1. *Demographic Composition of the Sample*

Variables	%
Gender of adolescent	
Male	50.7
Gender of parent	
Male	62.0
Ethnic background	
White	75.2
Black or African American	7.1
Hispanic or Latino	9.9
Other	7.8
Grade in school (adolescents)	
6 th to 7 th	7.7
8 th to 9 th	50.0
10 th to 12 th	42.3
Parental education	
Less than high school	5.7
High school diploma or equivalent	32.6
Some college education	40.4
Bachelor degree or beyond	21.3
Household income	
< 10,000	8.4
10,000–24,999	7.7
25,000–49,999	32.4
50,000–74,999	28.2
≥75,000	23.3

Note: *N* = 142.

participating parents was 45.62 years ($SD = 5.99$). The majority of adolescents (83%) lived in a two-parent household. At the time of the study, 15.6% of the sample lived in the Northeast, 37.6% lived in the Midwest, 30.5% in the South, and 16.3% in the West. Other demographic characteristics are presented in Table 1.

Design and Procedures

Respondents were part of a national sample of households participating in a Web-enabled research panel recruited and maintained by Knowledge Networks, Inc. (KN). KN uses traditional probability methods and stratified random digit dialing methods to recruit participants for their Web-enabled panel (Dennis, 2001). Adult members of this panel agree to complete Internet-based surveys three to four times per month in exchange for a WebTV Internet appliance and an Internet connection provided at no cost by KN. The provision of the Internet appliance and free Internet access promotes the inclusion of households of diverse socioeconomic backgrounds that would not otherwise be included in traditional Internet surveys. When surveys are assigned to individual household members, they receive notice in their unique password protected e-mail account that the survey is available for completion. This process ensures that only the target household member will have access to the assigned survey. Surveys are strictly confidential, self-administered, and accessible any time of day for a designated period of time; and participants can complete a given

survey only once. Members may leave the panel at any time, and receipt of the WebTV and Internet services is not contingent on completion of any particular survey. Preliminary research indicates that experienced panel respondents do not respond significantly differently over time when completing surveys than more naive survey respondents (Dennis, 2001, 2003). Moreover, the Web-based methodology differs greatly from other methodologies in the anonymity it provides respondents. Research comparing interview modalities demonstrates that Web-based data collection improves the accuracy of reports respondents provide over less anonymous interview modalities, particularly telephone interviews (Chang & Krosnick, 2001; Krantz & Dalal, 2000; Reips, 2000).

Between September 20th and October 4th, 2001 (Wave 1), KN fielded an online questionnaire concerning psychological responses to the September 11th terrorist attacks to an adolescent from 987 randomly selected panel households in which parents had provided blanket consent for their adolescents' participation in surveys. A total of 405 adolescents completed the Wave 1 survey during the fielding period (41% cooperation rate); the vast majority (81.3%) did so within 9 to 14 days after September 11th. The survey took an average of 13 min to complete.

Approximately 1 year after the attacks (Wave 2), 266 of those adolescents who completed the Wave 1 survey were made available to our research team for follow up. The remainder of the sample ($n = 139$) had since left the KN panel and was no longer eligible for participation in our study. Parents of adolescents under age 18 who were available for follow up ($n = 230$) were sent an e-mail to their password-protected account requesting informed consent for their child's participation in the Wave 2 survey; 68% granted consent ($n = 156$) during the eligible field period. An additional 36 Wave 1 adolescents were now 18, and therefore, separate parental consent was not required. The Wave 2 survey was thus fielded to 192 Wave 1 adolescents. A total of 146 respondents completed the survey during the eligible field period between October 19th and November 26th, 2002 (76% of those to whom the survey was fielded; 55% of those made available to our research team for follow up and 36% of the Wave 1 sample).

A randomly selected parent from the households of adolescents who were fielded the Wave 2 survey was also invited to complete a companion survey at the 1-year anniversary ($N = 192$). Although the participation of both the parent and the adolescent was encouraged, either member of the dyad could complete the Wave 2 survey without participation of the other. A total of 166 parents (86% of those available for participation) completed a survey during the eligible field period. Overall, complete data from 142 adolescents and their parents were obtained at the 1-year anniversary of the September 11th attacks.

The Wave 2 surveys included questions about experiences surrounding the terrorist attacks, assessments of PTS and general distress, positive affect, the quality of parent–adolescent social interactions and other constructs of interest. Each Wave 2 survey took approximately 25 min to complete, and participants received a \$5 incentive on its completion. The Institutional Review Boards of the University of California, Irvine, and the University of Denver approved the design and procedures of this study.

Analysis of Nonparticipants

Attrition analyses were conducted to determine whether the adolescents who completed the Wave 1 survey ($N = 405$) were significantly different from nonparticipants with regard to demographic characteristics (i.e., age, gender, ethnic background, parental education, household income, and parental marital status). No statistically significant differences were identified between these two groups. In addition, analyses were conducted to determine whether the adolescents who participated at Wave 2 differed from nonparticipants on a number of factors, including the aforementioned demographic characteristics, as well as their responses on the Wave 1 survey. Chi-square and t test analyses indicated that adolescents who completed the Wave 2 survey ($N = 146$) were not significantly different from those who completed only Wave 1 ($N = 259$) with regard to any demographic characteristics or their acute emotional responses to the attacks (all $ps > .05$).

Measures

Wave 1: Adolescents

Demographic characteristics. Demographic information was collected as part of the KN panel household profile at the time of inclusion in the panel. Gender, age, grade in school, and household ethnicity information were obtained.

Experiences related to the attacks of September 11th. Adolescents indicated the number of hours per day they watched TV coverage of the attacks in the week following the events.

Acute stress symptoms. A 26-item modified version of the Stanford Acute Stress Reaction Questionnaire (SASRQ; Cardena, Koopman, Classen, Waelde, & Spiegel, 2000) was used to assess adolescents' trauma-related symptoms at Wave 1. The SASRQ is a self-administered measure of anxiety (6 items), avoidance (4 items), dissociation (10 items), persistent reexperiencing (5 items), and functional impairment (2 items) symptoms specifically designed to

assess acute stress disorder (ASD; American Psychiatric Association, 1994). The items on the SASRQ were modified to read at a 6.5-grade Kincaid reading level, and respondents reported whether they "experienced" or "did not experience" each of the acute stress symptoms specific to the terrorist attacks. A summary score representing the total number of positive items was computed for this scale (Cronbach's $\alpha = .86$).

Wave 1: Parents

Demographic characteristics. Demographic information was collected as part of the KN panel household profile at the time of inclusion in the panel. Gender, age, education, household ethnicity, household income, and marital status were obtained.

Wave 2: Adolescents

Experiences related to the attacks of September 11th. At Wave 2, adolescents completed items drawn from a larger study of national responses to the terrorist attacks (Silver et al., 2002), which addressed respondents' September 11th-related losses including both direct (knew someone who died in the attacks) and vicarious loss (knew someone who had lost someone as a result of the attacks).

PTS symptoms. Because the SASRQ is specifically tailored to assess ASD symptoms within 1 month following exposure to a traumatic event, the PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993) was used to assess PTS symptoms 1 year after the attacks. The PCL is a well-validated, 17-item, self-report measure of intrusion, avoidance, and arousal symptoms with excellent reliability. Adolescents indicated how distressed or bothered they were by symptoms related to the September 11th attacks over the prior 7 days using a scale ranging from 1 (*not at all*) to 5 (*extremely*). A mean score of all items was computed; the scale showed excellent reliability (Cronbach's $\alpha = .93$).

Distress. General distress was assessed using the Brief Symptom Inventory–18 (BSI–18; Derogatis, 2001; Derogatis & Savitz, 2000). The BSI–18 includes three subscales assessing symptoms of depression, anxiety, and somatization; and has been widely used with psychiatric, medical, and community samples. Adolescents indicated how frequently they had been distressed or bothered by symptoms in the prior week using a scale ranging from 0 (*not at all*) to 4 (*extremely*). A mean score was computed; the reliability of the scale was excellent (Cronbach's $\alpha = .94$).

Functional impairment. Four items modified from the RAND Short Form–36 (SF–36; Ware &

Gandek, 1994) were used to assess the impact of mental and physical health problems on adolescents' social and school-related functioning. The SF-36 has been used extensively in medical research to identify health differences between groups (Brazier et al., 1992) and in large community studies addressing quality of life (Jenkinson, Wright, & Coulter, 1994). Participants indicated how often physical and mental health problems had interfered with their social and daily activities in the past 7 days using a scale ranging from 1 (*none of the time*) to 5 (*all of the time*). The reliability of this scale was good (Cronbach's $\alpha = .83$).

Positive affect. Positive affect was assessed using a scale developed by Diener, Smith, and Fujita (1995). This eight-item measure includes two positive affect categories: joy (joy, happiness, contentment, and pride) and love (love, affection, caring, and fondness). Adolescents indicated how often they experienced these emotions in the prior week by using a 5-point scale ranging from 1 (*never*) to 5 (*all the time*). The scale showed excellent reliability (Cronbach's $\alpha = .91$).

Perceived parental support. Parental support was assessed with two items drawn from a measure of social support used in prior survey research (Abbey, Abramis, & Caplan, 1985; Lepore, 1992; Silver, Holman, & Gil-Rivas, 2004). Adolescents reported how frequently their parents had "helped them understand or figure things out" and "had provided them with encouragement" during the previous week using a scale ranging from 1 (*never*) to 5 (*all the time*). A continuous mean score was computed (Cronbach's $\alpha = .80$, $r = .65$).

Parent-adolescent conflict. Parent-adolescent conflict was assessed with a two-item scale drawn from a measure of social conflict used in prior research (Lepore, 1992; Silver et al., 2004; Vinokur & Van Ryn, 1993). Adolescents reported how frequently they had "a disagreement with their parent" and "they became openly angry with their parent" during the previous week using a scale ranging from 1 (*never*) to 5 (*all the time*). A continuous mean score was computed (Cronbach's $\alpha = .73$, $r = .62$).

Wave 2: Parents

History of mental health disorder or learning disability. Parents reported whether their adolescent had ever been diagnosed with a learning disability, anxiety or depressive disorder, PTSD, and other mental health disorders by a health professional (doctor or licensed psychologist).

PTS symptoms. The PCL (Weathers et al., 1993), described earlier, assessed parental levels of

trauma-related symptomatology. A mean score of all items was computed; the scale showed excellent reliability (Cronbach's $\alpha = .90$).

Distress. General distress was assessed using the BSI-18 (Derogatis, 2001; Derogatis & Savitz, 2000). A mean score was computed; the reliability of the scale for parents was excellent (Cronbach's $\alpha = .92$).

Positive affect. Positive affect was assessed using a scale developed by Diener et al. (1995; see previous mention). The scale showed excellent reliability (Cronbach's $\alpha = .93$).

Parenting self-efficacy. Parents completed a nine-item scale assessing parenting self-efficacy. This measure was developed using the literature on parenting self-efficacy (Bandura, 1982; Coleman & Karraker, 1998) and using well-validated, reliable measures designed for parents of younger children as a guide (e.g., Cutrona & Troutman, 1986; Dumka, Stoerzinger, Jackson, & Roosa, 1996; Johnston & Mash, 1989). Knowledge of appropriate parenting responses ("I know what it takes to be a parent of a teen") and parents' confidence in their ability to carry out parenting tasks ("I know things about being a parent that would be helpful to other parents") were both assessed. Parents responded using a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A continuous mean score was computed (Cronbach's $\alpha = .87$).

Analytic Strategy

As this article addresses potential parental influences on adolescents' adjustment following the September 11th attacks, all analyses were conducted using data from the 142 adolescents whose parents also completed the Wave 2 survey. Although the data were collected from both parents and adolescents, this article focuses on adolescents as the unit of analysis; parent-level variables were used only as part of the adolescent's record. Correlational analyses examined the univariate associations between parent and adolescent responses to the survey. One-way analyses of variance (ANOVAs) examined gender differences in adolescents' symptomatology, positive affect, and reports of parental support and parent-adolescent conflict. ANOVAs also explored differences in Parent Gender \times Child Gender for levels of perceived support and parent-adolescent conflict. Regression analyses were used to examine how adolescents' acute stress symptoms were related to demographics, history of a mental health disorder or learning disability, and exposure to the terrorist attacks. Identical regression models were tested for all of the outcomes of interest. The models included demographic characteristics, history of mental health disorder or learning dis-

ability, parental distress and trauma symptoms, parental positive affect and parenting self-efficacy, and perceived parental support and parent–adolescent conflict. Following the recommendations of Kleinbaum, Kupper, Muller, and Nizam (1998, p. 389) for developing parsimonious regression models, variables not significantly associated with the outcomes ($p > .05$) were excluded from the final models.

Interaction terms reflecting the moderating effects of parental variables were tested individually after the main effects had been entered. Several sets of interaction terms were tested in our models: (a) Perceived Parental Support \times Acute Stress Symptoms and (b) Perceived Parental Support \times Mental Health History, because parental support appears to buffer adolescents from the negative impact of negative life events; (c) Parent–Adolescent Conflict \times Acute Stress Symptoms and (d) Parent–Adolescent Conflict \times History of Mental Health Disorder–Learning Disability, because high levels of parent–adolescent conflict may negatively affect adolescent adjustment to stressful events; (e) Gender of Parent \times Perceived Parental Support and (f) Gender of Parent \times Parent–Adolescent Conflict, because parental gender may impact both the nature and perception of parental support and parent–adolescent conflict on psychological symptoms; and (g) Gender of Parent \times Gender of Adolescent, because gender-based differences in the mother–adolescent and father–adolescent relationship might be expected.

To allow retention of six cases that otherwise would have been dropped from the analyses, sample means were inserted for missing values on measures of perceived parental support and parent–adolescent conflict. Because of the potential for increased Type 1 error as a result of missing value replacement, the analyses were conducted twice—with and without these six cases; no significant differences in the results emerged. As adolescent psychological distress and trauma symptoms were positively skewed, we also conducted our analyses using transformed versions of the variables. The results did not change; for ease of presentation and interpretation, we report the findings with the nontransformed variables.

Results

Exposure to the September 11th Attacks

None of the participants had direct first-hand exposure to the attacks, and 1 adolescent and 5 parents reported personally knowing someone who died that day. During the week following the attacks, over 50% of adolescents watched approximately 1 to 3 hr of television coverage per day; only 24% reported watching less than 1 hr per day. Sixty-three percent of parents reported watching the attacks live on television. Despite

this indirect exposure, 60% of adolescents and 57% of parents reported feeling that their own life or the life of someone close to them was threatened or in danger as a result of the attacks. At 1 year post September 11th (Wave 2), 88.7% of adolescents and 85.5% of parents reported watching TV or listening to radio coverage of the anniversary of the terrorist attacks.

The Parent–Adolescent Relationship

There were no gender-based differences in adolescents' perceptions of parental behaviors. Perceived levels of support and parent–adolescent conflict reported by female adolescent–mother dyads were comparable to female adolescent–father dyads. Similarly, male adolescent–mother dyads and male adolescent–father dyads did not differ significantly in reported levels of parental support and conflict.

Adolescents' Acute Stress Symptoms at Wave 1

During the first 2 weeks following the attacks (Wave 1), adolescents reported experiencing on average 4.21 ($SD = 4.13$) September 11th-related acute stress symptoms. Specifically, 68.3% of adolescents reported one or more dissociative symptoms; 45.1% reported anxiety symptoms; 38% reported avoidance symptoms; 35.2% reported reexperiencing symptoms; and 9.9% reported functional impairment as a result of the attacks. Gender differences in mean acute stress symptoms emerged, with girls reporting more symptoms than boys, $F(140, 1) = 4.37, p < .05$. There were no regional differences in adolescents' reports of acute stress symptoms.

Regression analyses indicated that only gender and history of mental health or learning difficulties were significantly associated with adolescents' levels of acute stress symptoms. Girls ($\beta = -.16, p < .05$) and adolescents with a history of a mental health disorder or learning disability ($\beta = .19, p < .05$) reported higher levels of acute stress symptoms shortly after the attacks.

Adolescents' PTS Symptoms 1 Year Post Attacks

On average, adolescents reported low levels of event-related trauma symptoms at Wave 2 ($M = 1.21, SD = .41$, range 0–3). Adolescents' acute stress symptoms at Wave 1 were significantly associated with their level of trauma symptomatology at Wave 2, $r(142) = .49, p < .001$. No gender or regional differences emerged in levels of PTS symptomatology 1 year post attacks.

Table 2 presents results of the hierarchical regression analyses showing that after adjusting for the strong (and expected) relation between initial acute stress symptoms and PTS symptoms, parent–adolescent conflict was significantly associated with higher levels of adolescent PTS symptoms at Wave 2. These

Table 2. Summary of Hierarchical Regression Analyses for Individual and Parental Factors Predicting Adolescents' PTS Symptoms, Psychological Distress, and Functional Impairment 1 Year Post September 11th Attacks (Wave 2)

Variables	PTS Symptoms			Psychological Distress			Functional Impairment		
	B	SE B	β	B	SE B	β	B	SE B	β
Step 1									
Mental health history	-.08	.05	-.12	.03	.07	.04	-.02	.09	-.02
Acute stress symptoms	.05	.01	.48***	.03	.01	.22*	.02	.02	.09
Step 2									
Parental PTS symptoms	.02	.10	.02	.11	.14	.07	.09	.18	.04
Perceived parental support	-.01	.03	-.01	-.04	.04	-.09	-.04	.05	-.07
Parent-adolescent conflict	.10	.03	.21**	.10	.05	.17*	.19	.06	.25**

Note: $N = 142$. PTS symptoms: Adjusted $R^2 = .24$ for Step 1 ($p < .001$); Δ in $R^2 = .05$ for Step 2 ($p < .001$). Psychological distress: Adjusted $R^2 = .09$ for Step 1 ($p < .01$); Δ in $R^2 = .05$ for Step 2 ($p < .001$). Functional impairment: Adjusted $R^2 = .01$ for Step 1 ($p = .27$); Δ in $R^2 = .07$ for Step 2 ($p < .05$). PTS = posttraumatic stress.

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

findings remained robust even after controlling for concurrent levels of adolescent distress. None of the interaction terms described earlier made a significant contribution to explaining the variance in levels of PTS symptoms at Wave 2.

Adolescents' Distress Symptoms 1 Year Post Attacks

At Wave 2, adolescents generally reported low levels of psychological distress ($M = .39$, $SD = .53$, range 0–3). Girls reported higher levels of distress than boys: $M = 1.24$ versus $M = 1.19$; $F(140, 1) = 5.93$, $p < .05$. There were no regional differences in adolescent distress levels at Wave 2. Hierarchical regression analyses revealed that after adjusting for adolescents' history of a mental health disorder or learning disability, adolescents' Wave 1 acute stress symptoms and parent-adolescent conflict were positively associated with higher levels of distress at Wave 2 (see Table 2). Of the six interaction terms testing the potential moderating effects of perceived parental support and parent-adolescent conflict (described in the previous section), only Perceived Parental Support \times History of a Mental Health Disorder–Learning Disability made a unique contribution to the model ($\beta = -.22$, change in Adjusted $R^2 = .04$, $p < .01$; see Figure 1). Specifically, adolescents

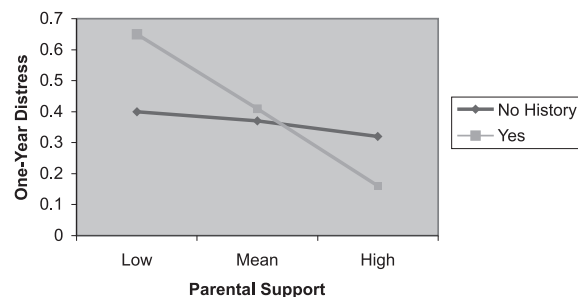


Figure 1. Interaction of Perceived Parental Support \times History of Mental Health Disorder–Learning Disability on adolescents' distress at 1 year post attacks (Wave 2).

with a history of a mental health disorder or learning disability who reported lower levels of parental support reported higher levels of distress at Wave 2.

Correlates of Adolescents' Functional Impairment 1 Year Post Attacks

On average, adolescents reported low levels of functional impairment at Wave 2 ($M = .43$, $SD = .71$, range 0–4); no significant gender or regional differences emerged in reported levels of impairment. Regression analyses indicated that parent-adolescent conflict was the only variable associated with higher levels of functional impairment at 1 year post attacks (Wave 2; see Table 2), and these findings remained robust even after controlling for adolescents' concurrent distress. None of the six interaction terms tested in previous analyses were related to adolescents' levels of functional impairment at Wave 2.

Correlates of Adolescents' Positive Affect 1 Year Post Attacks

At Wave 2, adolescents reported moderate levels of positive affect ($M = 3.50$, $SD = .78$, range 1–5); no gender or regional differences in levels of positive affect emerged in this sample. Compared to the findings reported for adolescents' PTS and distress symptomatology, a somewhat different pattern of relations emerged to explain adolescents' levels of positive affect 1 year post September 11th. Hierarchical regression analyses revealed that, in contrast to the findings for the previously described outcomes, adolescents' acute stress symptoms at Wave 1 were not associated with adolescents' positive affect 1 year after the attacks (see Table 3). Instead, the strongest contributors to adolescents' positive affect at Wave 2 were parental reports of positive affect and parenting self-efficacy. To further understand the mechanism through which parenting self-efficacy exerts an influence on adoles-

Table 3. Summary of Hierarchical Regression Analysis for Individual and Parental Factors Predicting Adolescents' Positive Affect 1 Year Post September 11th Attacks (Wave 2)

Variables	B	SE B	β
Step 1			
Mental health history	-.12	.10	-.10
Acute stress symptoms	.01	.01	.01
Parent gender	.21	.12	.13
Step 2			
Parental positive affect	.38	.08	.35***
Perceived parental support	.01	.08	.01
Parenting self-efficacy	.56	.16	.26**
Step 3			
Parent Gender \times Perceived Parental Support	.20	.10	.23*

Note: $N = 142$. Adjusted $R^2 = .03$ for Step 1 ($p < .05$); Δ in $R^2 = .28$ for Step 2 ($p < .001$); $\Delta R^2 = .02$ for Step 3 ($p < .05$).

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

cents' mood, we examined the possibility that perceived parental support and parent-adolescent conflict mediate the relation between parenting self-efficacy and adolescents' positive affect by following the procedure suggested by Baron and Kenny (1986). The analyses revealed that the relation between parenting self-efficacy and adolescents' positive affect was not mediated by adolescents' reports of parental support or parent-adolescent conflict. Of the six interaction terms tested in this model, only Gender of Parent \times Perceived Parental Support was associated with adolescents' reports of positive affect (see Figure 2). As shown in Figure 2, perceived support from fathers was associated with higher levels of adolescents' positive affect, whereas perceived support from mothers was unrelated to adolescents' reports of positive affect.

Discussion

This study broadens our understanding of adolescent adaptation to major stressful life events by identifying the factors associated with adolescents' well-being following indirect exposure to the September 11th terrorist attacks. Consistent with results from several national studies conducted of adults (Schlenger et al.,

2002; Schuster et al., 2001; Silver et al., 2002), the consequences of the September 11th attacks were not limited to adolescents who were directly exposed. Our findings suggest that adolescents with a history of mental health disorders or learning difficulties are more likely to report experiencing high levels of event-related acute trauma symptomatology, which places them at risk for higher levels of symptomatology over time (see also Asarnow et al., 1999; Birmes et al., 2003; Yule, 1994). In fact, adolescents' acute stress responses to the September 11th attacks were the strongest predictors of their levels of PTSD and distress symptoms at 1 year post attacks. It is interesting to note that neither adolescents' history of a mental health disorder or learning disability nor their initial response to the attacks were associated with their levels of functional impairment or positive affect 1 year later, suggesting that mental health problems and immediate responses to stress are not universal predictors of different aspects of adolescents' overall well-being over time.

Our results also suggest that parent-adolescent interactions may play a critical role in promoting, or perhaps undermining, adolescents' well-being in the aftermath of highly stressful events. The most consistent pattern of findings suggests that negative interactions (i.e., parent-adolescent conflict) are more salient and perhaps more enduring than positive interactions (i.e., social support) in the parent-adolescent relationship (see also Rook, 1984). This may be especially true among families as they coped with the terrorist attacks, as these attacks fostered a sense of anxiety and uncertainty about personal safety in the future (cf. Silver et al., 2002) that could easily heighten parental concerns for the safety of their children. Concerns about safety may also lead parents to enforce family rules and limit adolescents' activities outside the home more vigorously (Furstenberg et al., 1999); that could, in turn, fuel parent-child conflict even further. In this situation, parental attempts to maintain a sense of security and safety may place parents' wishes in direct opposition to their adolescents' strong developmental need for independence.

It is also likely that parent-adolescent conflict serves as an additional source of stress for adolescents, which may have a deleterious impact on adolescents' desire to seek and accept parental support and advice and undermine their coping efforts. The fact that we found social conflict to be associated with functional impairment over and above its relation with psychological distress suggests that parent-child conflict does more than foster distress among adolescents—it may impair adolescents' ability to cope with the daily rigors of social and work-school life.

Although the absence of parental support was not by itself a significant predictor of PTSD symptoms, distress, and functional impairment, the pattern of interac-

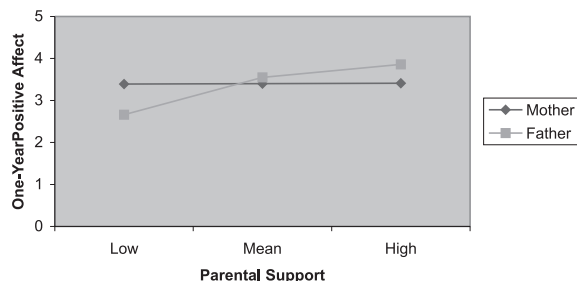


Figure 2. Interaction on Parent Gender \times Perceived Parental Support on adolescents' positive affect at 1 year post attacks (Wave 2).

tions showed that among adolescents with a history of mental health or learning difficulties, lower levels of perceived parental support were associated with higher levels of psychological distress. Adolescents with a history of mental health difficulties may be in greater need of parental support to aid them in the implementation of adaptive coping strategies and in the regulation of their emotional responses to major negative life events. The findings of this study point to the importance of examining both positive and negative aspects of the parent–adolescent relationship that may influence adolescents’ adjustment following major negative life events.

A different pattern of results emerged with regard to adolescents’ levels of positive affect 1 year after the attacks. Parental positive affect was strongly associated with adolescents’ positive affect scores at Wave 2. These findings are consistent with prior research that has demonstrated a positive association between parental and adolescents’ levels of positive affect and subjective well-being (Ben Zur, 2003). The parenting literature further suggests that positive parental emotions may promote sensitive care and parental willingness to teach, comfort, and encourage children to engage in adaptive behaviors (Darling & Steinberg, 1993; Dix, 1991), thus contributing to positive emotionality. Moreover, parents who show positive emotional states may model positive ways of coping with stressful life events.

We found that parent’s perceptions of self-efficacy in the parental role predicted adolescents’ positive affect (even after accounting for perceived parental support and parental positive affect). This suggests that parents’ knowledge about how to parent their child and their confidence in their abilities may be important contributors to adolescents’ well-being. Parents who experience high levels of positive affect and are confident of their parenting abilities may be more sensitive to the needs of their children and more likely to engage in proactive interventions to promote their well-being. It is interesting to note that the association between parenting self-efficacy and adolescents’ positive affect was not mediated by adolescents’ perceptions of parental behaviors (support and parent–adolescent conflict). More research is needed to explore these relationships further and help identify the mechanisms through which such a process takes place.

Consistent with the findings of other studies (e.g., Flannery et al., 1994; Gecas & Schwalbe, 1986), fathers played an important role in the psychological outcomes of their children. Specifically, higher levels of perceived support from fathers was associated with higher levels of positive affect among their adolescents. Perhaps paternal support has a greater impact on adolescents’ well-being because mothers are traditionally expected to maintain more supportive and warm relationships with their children than are fathers. High

levels of support from a father may thus be more salient and have a greater impact on adolescents’ levels of positive affect.

In contrast to some prior research (e.g., Korol et al., 1999; Laor et al., 2001; P. Smith et al., 2001), we did not find parental trauma symptoms and distress to be significantly associated with adolescents’ levels of PTS, distress, and functional impairment 1 year post attacks after accounting for adolescents’ mental health history and their acute stress symptoms. Several possible explanations for these divergent results can be offered. First, this study did not rely on parents as sources of their own and their children’s symptomatology. This may have resulted in a weaker, but perhaps more accurate, pattern of associations. Second, the overall low levels of PTS symptomatology and distress among adolescents in this sample, combined with our small sample size, may have reduced our ability to detect a significant association. Third, unlike previous studies, the majority of our respondents were fathers, who might be less likely to endorse items assessing psychological distress and trauma symptomatology relative to mothers. To the extent that mothers provide greater variability in their emotional responses to the attacks, their responses are more likely to correlate with the responses of their children.

Contributions and Limitations

This study had several strengths. First, we assessed adolescents’ responses to the September 11th attacks within the first few weeks after the events and followed them over the course of 1 year. Second, we relied on both parents and adolescents for reports of their own symptomatology. Finally, we examined adolescents’ responses to the attacks among a wider range of outcome variables. Nonetheless, we recognize a number of limitations of this investigation. First, the cross-sectional nature of the data assessing parental factors, as well as the reliance on adolescents’ reports of parental support and parent–adolescent conflict, limit our ability to reach strong conclusions about the direction of the relationships identified in this study. Second, although our sample closely resembles the demographic characteristics of the U.S. population, the generalizability of our findings is limited by our relatively small sample size and the fact that we have only a small percentage of adolescents from diverse ethnic backgrounds or living in poverty. Third, it is likely that our relatively small sample size did not provide adequate power to fully investigate the interaction effects (e.g., Parent Gender \times Adolescent Gender) on our outcomes; this issue is worthy of further study. Fourth, we were not able to follow all our adolescents from shortly after the attacks to Wave 2 for a variety of reasons, including the fact that a portion of our Wave 1 sample had left the Web-enabled panel by 1 year post attacks, and several

parents of other Wave 1 participants did not complete a second round of informed consent during our field period. However, analyses that we conducted that compared participants with nonparticipants suggest that we did not suffer any clear biases in the nonparticipation of our adolescent sample over time. More important, there were no differences between Wave 2 participants and nonparticipants on any measured demographic characteristics or acute emotional responses to the attacks, suggesting that our attrition was essentially random. Fifth, despite our assessment of a wider range of outcome variables than is true of many studies that examine the impact of trauma, we did not assess externalizing problems in which the adolescent might have been engaged (e.g., oppositional behaviors, substance abuse). Finally, although we examined a number of factors in this investigation, characteristics of parents and adolescents that might also affect adolescents' adjustment, such as adolescents' temperament and problem behaviors and spousal conflict, were not assessed.

Future Directions

The majority of adolescents in this study reported feeling threatened by the terrorist attacks of September 11th, but for the most part levels of stress symptoms were low to moderate in the first few weeks after the attacks and declined over the subsequent year. Those adolescents with a history of mental health or learning difficulties were clearly more vulnerable to the negative impact of these events, and intervention efforts might target such "at-risk" youths following traumatic events in the future. Moreover, it is important to recognize that parents can play an important role in the outcomes of their children, as they can exert both a beneficial and detrimental impact on adolescents' well-being following major negative life events.

Nonetheless, as the impact of stressful life events on adolescents can also be expressed through engagement in problem behaviors, it would be important to consider to what extent these events can contribute to behavioral problems such as substance abuse and delinquent behaviors. It is also important to consider the many ways in which families may influence adolescents' appraisal and coping efforts through the mechanisms of instruction or assistance and modeling (Kliewer et al., 1994). Future research involving comprehensive, dyadic examination of important components of parenting (e.g., parental responsiveness, perspective taking, monitoring, and parental warmth) is needed to provide us with a more thorough understanding of the processes by which parents may affect their adolescents' adjustment following exposure to major stressful life events. In so doing, we hope to identify ways to help our youth thrive when faced with life's more challenging moments.

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Received December 1, 2003

Revision received March 15, 2004

Accepted March 19, 2004