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Objectives: The present study examined the impact of cumulative trauma exposure on current posttraumatic stress disorder (PTSD) symptom severity in a nonclinical sample of adults in their 60s. The predictive utility of cumulative trauma exposure was compared to other known predictors of PTSD, including trauma severity, personality traits, social support, and event centrality.
Method: Community-dwelling adults ($n = 2515$) from the crest of the Baby Boom generation completed the Traumatic Life Events Questionnaire, the PTSD Checklist, the NEO Personality Inventory, the Centrality of Event Scale, and rated their current social support.
Results: Cumulative trauma exposure predicted greater PTSD symptom severity in hierarchical regression analyses consistent with a dose–response model. Neuroticism and event centrality also emerged as robust predictors of PTSD symptom severity. In contrast, the severity of individuals' single most distressing life event, as measured by self-report ratings of the A1 PTSD diagnostic criterion, did not add explanatory variance to the model. Analyses concerning event categories revealed that cumulative exposure to *childhood violence* and *adulthood physical assaults* were most strongly associated with PTSD symptom severity in older adulthood. Moreover, cumulative self-oriented events accounted for a larger percentage of variance in symptom severity compared to events directed at others.
Conclusion: Our findings suggest that the cumulative impact of exposure to traumatic events throughout the life course contributes significantly to posttraumatic stress in older adulthood above and beyond other known predictors of PTSD.

Keywords: cumulative trauma exposure; PTSD symptom severity; personality; event centrality; social support

According to United States population estimates, the majority of individuals who experience a trauma report exposure to more than one traumatic event during their lifetime (Breslau et al., 1998; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). The widespread prevalence of multiple lifetime traumas has driven interest in understanding the cumulative effects of exposure to trauma given the potential for important treatment and policy implications. Determining the role of cumulative trauma exposure in the development of trauma-related psychopathology may also elucidate the mechanisms underlying the observed heterogeneity in how individuals respond to traumatic events. Accordingly, a growing body of research has documented the impact of cumulative trauma exposure on a wide-range of psychological outcomes, including posttraumatic stress disorder (PTSD; Breslau, Peterson, & Schultz, 2008), depression (Kraaij & de Wilde, 2001), and life satisfaction (Krause, 2004).

In general, this research indicates that exposure to multiple traumatic events exerts a greater negative impact on the severity of posttraumatic outcomes compared to singular, discrete trauma (Green et al., 2000; Schnurr, Spiro, Vielhauer, Findler, & Hamblen, 2002; Turner & Lloyd, 1995). Such findings support a dose–response model in which stressors of greater severity (as measured by proximity, duration, or frequency) are associated with greater impairments. However, the majority of studies concerning cumulative trauma have tested young adults (Lloyd &

Taylor, 2003), samples ranging broadly in age with age covaried (Seery, Holman, & Silver, 2010), military service members (Clancy et al., 2006), or effects of cumulative trauma experienced during select developmental periods (i.e., childhood; Anda et al., 2006). It is important to investigate whether findings from such studies extend to lifetime trauma exposure among older adults who may be more likely to encounter traumatic events with age (Creamer & Parslow, 2008; Glaesmer, Gunzelmann, Braehler, Forstmeier, & Maercker, 2010; Spitzer et al., 2008) and exhibit greater stress symptoms following recent traumas compared to younger adults (Kimhi, Hantman, Goroshit, Eshel, & Zysberg, 2012). Moreover, several factors specific to older adulthood may increase older adults' vulnerability to negative posttraumatic outcomes compared to younger individuals (for reviews see Averill & Beck, 2000; Hiskey, Luckie, Davies, & Brewin, 2008). Older adults may be more likely to experience certain types of trauma, in particular, unexpected deaths of close others, which has been linked to greater PTSD severity (Breslau et al., 1998). Loss of loved ones may have the secondary effect of diminishing social support networks, which may further increase PTSD severity (Brewin, Andrews, & Valentine, 2000). Certain normative life events that occur during older adulthood, such as retirement, are also associated with the resurgence or triggering of PTSD symptoms (Kaup, Ruskin, & Nyman, 1994; Schnurr, Lunney, Sengupta, & Spiro, 2005). Related to physical health,

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research has shown that age-related changes in health status and mobility are accelerated by cumulative trauma exposure (Krause, Shaw, & Cairney, 2004). Furthermore, some researchers have proposed that PTSD may manifest differently in older adulthood, as indicated by more frequent reports of poor health, chronic pain, and cognitive impairment among older compared to younger adults with trauma histories (Graziano, 2003). The number of risk factors in older adulthood that contribute to an elevated risk of negative posttraumatic outcomes calls for wider investigation of how the health and well-being of older adults is impacted by the cumulative burden of traumatic life events.

The need for more research on cumulative trauma exposure in aging populations is further underscored by recent studies of adults ages 50 and older in which complex relations between cumulative trauma and various indices of psychological health and functioning were found. Keinan, Shrira, and Shmotkin (2012) reported that cumulative exposure to self-oriented traumatic events, or events directed at oneself, was associated with more depression symptoms and lower well-being, whereas cumulative exposure to other-oriented events (i.e., traumas directed at others) was associated with positive mental health outcomes, including well-being and optimism. Similarly, Shrira, Shmotkin, and Litwin (2012) found that self-oriented traumas experienced in adulthood were associated with greater depressive symptoms and lower life satisfaction, whereas early life other-oriented traumas were associated with lower depression and higher well-being. Collectively, these patterns of integrated resilience and vulnerability indicate that the relation between cumulative trauma exposure and posttraumatic outcomes may become more complex with age and that the extent of negative outcomes resulting from cumulative trauma exposure may depend on objective characteristics of the events including the target of the trauma. To date, however, it is unclear whether this mixed pattern of resilience and vulnerability for self-oriented compared to other-oriented traumas extends to PTSD in older adulthood.

The present study was designed to add to the literature concerning cumulative trauma in aging populations by examining the impact of cumulative trauma exposure on PTSD symptom severity in a large nonclinical sample of older adults in their 60s from the Baby Boom generation. We applied a life-span developmental framework to our study by examining the cumulative impact of all traumas experienced at every stage of the life course. We consider community-dwelling adults in their 60s an ideal population to examine the effects of cumulative trauma because they have lived long enough to potentially be exposed to many different types of trauma, they generally have intact cognitive abilities to report their experiences, and they are less likely to be suffering from chronic disease compared to older generations (Pruchno, 2012). Moreover, according to Life Course Theory (Elder, 1998), the historical timing and context of development shapes the way cohorts are differentially influenced by their life experiences. Thus, the extent to which data from other cohorts (i.e., Great Depression generation, Holocaust survivors) can be extrapolated to Baby Boomers is limited by

Boomers' experiences of important historical events at particular points in development (e.g., the Vietnam War as they transitioned to young adulthood which delayed education and family formation for many, the Civil Rights and gender equality movements of the 1960s, global economic insecurity as they face retirement). Furthermore, understanding how cumulative trauma impacts the lives of Boomers is growing more critical, given recent demographic shifts that have resulted in Boomers comprising an increasingly disproportionate percentage of the population of the United States and Western Europe.

To extend previous research on cumulative trauma, we first examined whether the relation between cumulative trauma and PTSD symptom severity varied for self-oriented versus other-oriented events. Because different types of adversity subsumed within broad domains of cumulative trauma may differentially influence PTSD symptoms, events were further divided into various categories of cumulative exposure. In addition, the relation between cumulative trauma and PTSD symptom severity was compared to the predictive utility of individuals' ratings of the severity of their most distressing trauma as indexed by the A1 PTSD diagnostic criterion (DSM-IV-TR; American Psychiatric Association, 2000), according to which a person must have experienced, witnessed, or confronted 'an event or events that involved actual or threatened death or injury, or a threat to the physical integrity of the self or others' (p. 467). The inclusion of the A1 criterion in the DSM-IV-TR and its retention in the DSM-V is based on research suggesting that events perceived as life-threatening are associated with more severe PTSD symptoms than non-life-threatening traumas (Kilpatrick et al., 1998; Ozer, Best, Lipsey, & Weiss, 2003). However, considerable debate exists regarding how to best measure trauma severity and the utility of the A1 as a diagnostic requirement (Rubin & Feeling, in press; Weathers & Keane, 2007).

Based on research showing that individual-differences contribute more variance in PTSD symptoms than objective characteristics of traumatic events (e.g., Weaver & Clum, 1995), several measures of individual-differences that have been linked to an elevated risk of PTSD were also examined. First, we compared cumulative trauma exposure to the personality domains included in the Five Factor Model (Costa & McCrae, 1992) based on reports of robust associations between certain personality traits and an elevated risk of PTSD. In particular, neuroticism, an enduring disposition characterized by high negative affect, has been shown to increase the likelihood of encountering negative and traumatic events (Lauterbach & Vrana, 2001; Magnus, Diener, Fujita, & Pavot, 1993; Specht, Egloff, & Schmukle, 2011) as well as PTSD symptom severity (Parslow, Jorm, & Christensen, 2006; Rubin, Berntsen, & Bohni, 2008a). Neuroticism increases the availability of memory for stressful events (Rubin et al., 2008a) and the tendency to interpret neutral or ambiguous stimuli in a negative or threatening manner (Costa & McCrae, 1990), which in turn may increase PTSD symptoms. Relations between PTSD and other personality traits have also been reported, including lower

agreeableness, extraversion, and conscientiousness (Chung, Berger, & Rudd, 2007; Rubin, Boals, & Berntsen, 2008b). However, little research has examined the effects of personality on PTSD symptoms in older adults. Existing work has focused on neuroticism (van Zelst, Deeg, & van Dyck, 2003) or tested combat veterans (e.g., Davidson, Kudler, & Smith, 1987).

The second individual-difference factor examined in the present study is event centrality, or the perception of traumas as central to identity. Greater event centrality is thought to increase PTSD severity by enhancing the emotional salience of the trauma as well as the frequency and ease with which trauma memories come to mind (Berntsen & Rubin, 2006). Repeatedly reexperiencing the trauma through vivid intrusive memories or flashbacks that are typical of PTSD may also promote integration of the trauma memory into one's autobiographical narrative, thereby increasing the likelihood that the event will be perceived as a highly salient turning point in the life story (Thomsen & Berntsen, 2008). Event centrality has emerged as a strong predictor of a wide-range of negative posttraumatic outcomes including symptoms of PTSD and depression (Berntsen & Rubin, 2007), lower self-esteem (Robinaugh & McNally, 2011), and poor physical health (Boals, 2010).

The third individual-difference factor examined in the present study was perceived social support based on findings that low social support is one of the strongest predictors of PTSD among trauma-exposed adults (Brewin et al., 2000; Ozer et al., 2003). According to the stress-buffering hypothesis (Cohen & Wills, 1985), supportive relationships help trauma survivors cope by assisting them in re-conceptualizing the event that decreases the likelihood of developing stress-related psychopathology. However, in an alternative account, the withdrawal and emotional numbing that is typical of PTSD can erode or impair interpersonal relations and over time reduce the availability and quality of social support (King, Taft, King, Hammond, & Stone, 2006). Understanding the impact of trauma on social support among older adults is especially important given the beneficial effects of social connectedness on well-being in older adulthood (Antonucci, 1991; Carstensen, 1992). Social support has also been cited as an important resource for older adults confronting stress and loss associated with aging, such as the death of significant others and life-threatening illness (Krause, 2001, 2005).

Four hypotheses were formulated based on the aforementioned literature. First, the relation between cumulative trauma exposure and PTSD symptoms was expected to be consistent with a dose–response model in which greater exposure to traumatic events throughout the life course would predict greater symptom severity in older adulthood. Second, cumulative trauma exposure was expected to be a stronger predictor of PTSD symptoms than the severity of individuals' most distressing traumatic life event based on studies showing that lifetime cumulative trauma exerts a greater negative influence on psychological health than single, discrete traumas. Our third hypothesis maintained that individual-difference factors, including personality, event centrality, and social support would more strongly predict PTSD symptom severity than cumulative trauma based on prior studies showing that individual-differences typically account for greater variance in PTSD symptoms than objective event characteristics. Fourth, we hypothesized that self-oriented but not other-oriented traumas would predict PTSD symptom severity consistent with previous studies showing a detrimental effect of self-oriented events on psychological health and a beneficial effect of other-oriented events. Cumulative trauma was further divided into more distinct categories of events to explore which trauma categories were most strongly associated with greater PTSD symptom severity.

Method

Participants

Data were drawn from the 12th wave of the University of North Carolina Alumni Heart Study (UNCAHS), an ongoing longitudinal study of students who entered the University of North Carolina, Chapel Hill, in 1964–1966 and their spouses (Siegler et al., 1992). Detailed information concerning recruitment procedures and participation rates of the UNCAHS are published elsewhere (Hooker, Hoppmann, & Siegler, 2010). Of the 3682 individuals who completed the wave 12 questionnaire, our analyses were limited to the 3420 respondents born in the 1940s to provide a more uniform age range of individuals belonging to the young–old period of older adulthood, and within this group to the 2515 who reported their lifetime exposure to traumatic events at wave 12, completed measures of event centrality, social support, and PTSD symptoms at wave 12, and the NEO Personality Inventory previously during the study. Focusing our analyses on those born in the 1940s with the majority born in 1946–1949 allowed us to evaluate an important cohort at the crest of the Baby Boom (Carstensen & Hartel, 2006). An analysis comparing UNCAHS respondents included in the present report to those who were excluded due to missing data indicated that the groups did not differ on key demographic characteristics including income and marital status. Although the former group was slightly older and more educated, the sizes of the differences were small (birth year and education η_p^2s were .02 and .01, respectively). Comparison of the gender compositions indicated that the group of respondents in the present analyses had a greater proportion of males, $\chi^2 = 128.72$, $p < .001$.

The final sample included 805 females. Mean age was 60.83 ($SD = 1.55$). Participants were predominantly Caucasian (99.3%). Approximately 9% had less than a college degree, 18.37% had Bachelor's degrees, 26.04% had Bachelor's degrees plus additional training, 25.45% had Master's degrees, and 21.59% had advanced degrees. The median annual household income reported in 2001–2002 was in the $70–99,999 range.

Measures

Traumatic events

The Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000) assesses lifetime exposure to a

Table 1. Prevalence rates of traumatic events.

Category	Potentially traumatic event	N (%) reported	N most distressing event
Death and illness	Unexpected death of loved one (O)	1673 (66.52)	779
	Illness or accident of loved one (O)	1001 (39.80)	239
	Personal life-threatening illness (S)	561 (22.31)	345
	Abortion/stillbirth (S/O)	901 (35.83)	110
Adult physical assault	Armed robbery to self or other	237 (9.42)	39
	Physical assault by stranger (S)	168 (6.68)	23
	Witness attack or murder (O)	135 (5.37)	21
	Death threat (S)	393 (15.63)	27
	Intimate partner physical abuse (S)	227 (9.03)	31
	Stalked (S)	160 (6.36)	16
Sexual assault	Touched sexually against will (S)	309 (12.29)	62
Accidents and disaster	Motor vehicle accident (S)	569 (22.62)	162
	Natural disaster (S)	178 (7.08)	81
	Other serious accident to self or other	250 (9.94)	51
Childhood violence	Childhood physical abuse (S)	167 (6.64)	26
	Witnessed family violence (O)	316 (12.56)	87
Warzone exposure	Warzone exposure	266 (10.58)	110
Unclassified	Other distressing event	614 (24.41)	158
	Nondisclosed event	132 (5.25)	50

Notes: S = self-oriented event. O = other-oriented event. Abortion/stillbirth was classified as a self-oriented event for women and as an other-oriented event for men. Participants rated the PTSD symptom severity of their self-nominated most distressing traumatic life event.

wide-range of potentially traumatic events (Table 1). Participants reported the number of times they experienced each event using a 7-point scale. For the most serious occurrence of each event type, participants reported their age at the event and whether or not they experienced fear, helplessness, or horror during or immediately after the event. The TLEQ has strong psychometric properties and high convergent validity with structured clinical interviews (Kubany et al., 2000). Similar to epidemiological studies of trauma exposure that used mail surveys (e.g., Kessler et al., 1995), TLEQ items were modified to provide respondents extra privacy in reporting and to reduce redundancy. Specifically, one item ('*Have you had any experiences like these that you feel you can't tell about?*') was added, two items regarding miscarriage and abortion were combined, and four items concerning sexual assaults were collapsed to form one question. Participants were also asked whether or not the event met the DSM-IV-TR A1 criterion, which was analyzed as our measure of self-reported event severity. Our measure of *cumulative exposure* was defined as lifetime exposure to potentially traumatic events and was calculated by summing the number of events reported on the TLEQ.

TLEQ items were first classified as *self-oriented* (i.e., directed toward the self) or *other-oriented* (i.e., affected the self primarily through their impact on others). Five TLEQ items (Table 1) were not included in this classification because the subject of the event was unspecified. Separate proportion scores were calculated for each participant based on the number of self-oriented and other-oriented events.

TLEQ items were further grouped into six categories derived from classifications used in previous studies (Clancy et al., 2006; Dedert et al., 2009). The categories with the corresponding TLEQ items are listed in Table 1.

Two TLEQ items (*other life-threatening event*, *nondisclosed events*) were not classified due to a lack of description. Proportion scores for each category were calculated for each participant.

PTSD symptom severity

The PTSD Checklist-Stressor Specific Version (PCL-S; Weathers, Litz, Huska, & Keane, 1994) is a 17-item measure of PTSD symptoms in reference to a specific event. Using 5-point scales (1 = not at all, 5 = extremely), respondents indicate whether a specific event produced each of the B, C, and D DSM-IV-TR PTSD symptoms during the previous month. The PCL has strong psychometric properties (Cronbach's α = .94; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996) and has been shown to have high agreement with clinician-diagnosed PTSD (r = .93). Cronbach's α for the current sample was .93. Respondents completed the PCL-S in reference to the self-nominated TLEQ event that currently bothered them most. Ninety-eight participants did not identify the event for which they reported PTSD symptoms.

Personality

The NEO Personality Inventory (NEO; Costa & McCrae, 1992) assesses the Five-Factor Model of personality including the domains of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The NEO was administered twice in the UNCAHS (at baseline and in 1997; see Costa, Herbst, McCrae, & Siegler, 2000). Internal consistency for the domain scales ranged from .76 to .93 in the UNCAHS. Scores for adults are relatively stable with 3- to 6-year retest coefficients ranging from .63 to .83. Average t-scores for each domain were analyzed.

Event centrality

The Centrality of Event Scale (CES; Berntsen & Rubin, 2006) assesses the extent to which a trauma forms a central component of personal identity, a turning point in the life story, and a reference point for everyday inferences. Items were rated on 5-point scales (1 = totally disagree, 5 = totally agree). Respondents completed the 7-item version of the CES. Reported reliability is .88. Mean scores were analyzed.

Social support

Social support was assessed using an item from a measure of health and well-being in late and middle age (Siegler, 2004). Respondents rated 'the support they receive from persons close' to them using a 4-point scale (1 = poor, 4 = excellent).

Procedure

UNCAHS members first received instructions to complete the wave 12 questionnaire online. Individuals who did not respond were mailed an identical paper survey up to three times. On the questionnaire, participants first answered questions concerning their health and social support, followed by the TLEQ. The CES and PCL were then completed in relation to the TLEQ event that currently bothered them most. All waves of the UNCAHS were approved by the Duke University Medical Center institutional review board.

Data analysis

Hierarchical regressions were conducted to examine the impact of cumulative exposure on PCL severity scores in relation to known risk factors for PTSD, including event severity, personality, event centrality, and social support. The predictive utility of cumulative exposure to various categories of traumatic events was also examined.

Hierarchical regressions permitted examination of the variance accounted for by each predictor. Education, gender, income, and marital status were entered first (step 1), followed by NEO domain scores (step 2), social support (step 3), event centrality scores (step 4), and cumulative trauma exposure (step 5). In a separate model with a subset of participants who rated the severity of their currently most distressing trauma (n = 1949), self-rated event severity was added on step 5 followed by cumulative exposure (step 6). Statistical significance was based on tests at the .05 level.

Results

Prevalence of traumatic events

The modal number of traumatic events was 2 and the mean was 6.15 (SD = 6.14, range = 1–56). Table 1 displays the frequency of each of the TLEQ events grouped into six event categories and the number of participants that nominated each event as their currently most distressing trauma.

Preliminary analyses

The means (SDs) for variables included in the regressions were agreeableness, 47.69 (9.74); conscientiousness, 51.87 (10.30); extraversion, 49.29 (9.52); neuroticism, 48.83 (9.97); openness, 53.11 (10.67); social support, 3.48 (.67); event centrality, 2.44 (1.23); PCL symptom severity, 22.74 (8.88); other-oriented events, .32 (.19); self-oriented events, .13 (.13); death and illness, .41 (.23); adult physical assaults, .09 (.14); childhood violence, .10 (.24); sexual assault, .12 (.33); accidents and disaster, .13 (.20); warfare exposure, .11 (.31). Approximately 58% of participants endorsed the A1 criterion for their most distressing event. Table 2 contains intercorrelations among predictor variables and PCL symptom severity scores. Significant associations emerged among PCL symptom severity scores and all socio-demographic variables. Cumulative

Table 2. Intercorrelations among predictor variables and PTSD symptom severity.

	1	2	3	4	5	6	7	8	9	10	11	12	13
(1) Education													
(2) Gender	−.19***												
(3) Income	.20***	−.04*											
(4) Marital status	.03	−.03	.28***										
(5) Agreeableness	−.13***	.34***	−.15***	.05**									
(6) Conscientious	.08***	−.06**	.18***	.04*	−.18***								
(7) Extraversion	−.08***	.07***	.16***	.09***	.06***	−.07**							
(8) Neuroticism	−.07***	.25***	−.13***	−.09***	.03*	.08**	−.21***						
(9) Openness	.17***	.17***	−.10***	.14***	.12***	−.11***	−.01	.07***					
(10) Social support	.05*	−.04*	.14***	.21***	.08***	.08***	.17***	−.20***	−.02				
(11) Event centrality	−.03	.19***	−.11***	−.12***	.04*	−.01	−.03	.23***	.14***	−.11***			
(12) Cumulative	.00	−.01	−.09***	−.10***	−.13***	−.02	.00	.09***	.15***	−.10***	.27***		
(13) Event severity[a]	.00	.03	−.05*	−.03	−.02	−.02	−.03	.06**	.04*	−.02	.29***	.18***	
(14) PCL severity	−.02	.17***	−.12***	−.14***	−.03	−.06**	−.09***	.33***	.12***	−.25***	.56***	.35***	.17***

Notes: Gender: 0 = male, 1 = female. Marital status: 0 = other, 1 = married. Cumulative = cumulative trauma exposure. PCL severity = PTSD Checklist symptom severity scores. Given that education is an ordinal variable, Spearman rank correlation coefficients are presented. All other values are Pearson correlation coefficients.
*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$. [a]n = 1949.

exposure was associated with lower agreeableness, higher neuroticism, higher openness, lower social support, higher event centrality scores, greater event severity, and greater PCL severity scores.

Main analyses

Overall cumulative trauma exposure

Table 3 presents results from a hierarchical regression testing the relation between cumulative exposure and PTSD symptom severity above and beyond other known predictors of PTSD. In the final model, cumulative exposure predicted greater PTSD symptom severity and increased the explained variance in PCL symptom severity scores from 39% to 42%. Figure 1 displays PCL severity scores as a function of cumulative exposure. As predicted, the relation between cumulative trauma exposure and PTSD symptom severity was consistent with a dose–response model.

Regressions conducted to examine the predictive utility of cumulative exposure relative to participants' ratings of the severity of their most distressing trauma revealed that, consistent with hypothesis 2, cumulative exposure significantly increased the explained variance in PTSD symptom severity ($\beta = .20$, $p < .001$), but self-rated event severity did not ($\beta = -.01$). The ΔR^2 for cumulative exposure on step 6 was .03, $F(1, 1935) = 115.48$, $p < .001$. In contrast, when cumulative exposure was added on step 5 and self-rated event severity was added on step 6, ΔR^2 on step 6 was .00, $F(1, 1935) = .41$. In a more conservative test of hypothesis 2, the index of cumulative exposure was restricted to TLEQ items for which participants endorsed the A1 criterion (i.e., cumulative A1 exposure). Results were not substantively changed. The regression equation in standardized betas for all variables significant at the $\le .05$ level was $+.05$ gender, $-.06$ agreeableness, $-.07$ conscientiousness, $-.05$ extraversion, $+.17$ neuroticism, $-.12$ social support, $+.48$ event
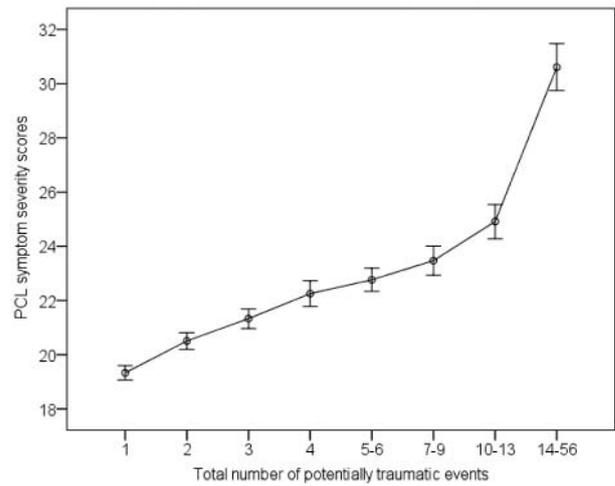

Figure 1. PTSD Checklist (PCL) symptom severity scores as a function of the total number of events endorsed on the Traumatic Life Events Questionnaire. For the purpose of the figure, data points were combined into groups of 200 or more participants. The error bars represent ± 1 standard error from the mean.

centrality, $-.04$ event severity, $+.15$ cumulative A1 exposure (final model, $F(13, 1935) = 102.02$, $p < .001$, $R^2 = .40$). The ΔR^2 for cumulative A1 exposure on step 6 was increased by .02, $F(1, 1935) = 56.39$, $p < .001$. In contrast, when cumulative A1 exposure was added on step 5 and event severity was added on step 6, ΔR^2 on step 6 was .00, $F(1, 1935) = 4.79$, $p < .05$. These results suggest that the severity of participants' most distressing life event had little to no observable association with PTSD symptom severity when cumulative trauma exposure was included in the model.

In partial support of hypothesis 3, event centrality and personality traits (entered as a group) explained more variance in PTSD symptom severity than cumulative trauma exposure.

Table 3. Impact of cumulative trauma exposure on PTSD symptom severity: Standardized coefficients by step ($n = 2515$).

Variables	Step 1 Demographics	Step 2 Personality	Step 3 Social support	Step 4 Event centrality	Step 5 Cumulative exposure
Education	.01	.00	.00	.00	.01
Gender	.16***	.11***	.11***	.04*	.05**
Income	−.08***	−.05*	−.04	−.01	.00
Marital status	−.11***	−.07***	−.05*	−.02	−.01
Agreeableness		−.10***	−.08***	−.07***	−.04*
Conscientiousness		−.08***	−.06**	−.06***	−.06***
Extraversion		−.03	−.01	−.02	−.03
Neuroticism		.28***	.26***	.17***	.17***
Openness		.07***	.07***	.03	.00
Social support			−.16***	−.14***	−.13***
Event centrality				.49***	.45***
Cumulative exposure					.20***
ΔR^2	.05***	.09***	.02***	.22***	.03***
R^2	.05	.14	.17	.39	.42
F (df)	34.14*** (4, 2514)	46.64*** (9, 2514)	50.19*** (10, 2514)	143.50*** (11, 2514)	151.54*** (12, 2514)

Notes: Gender: 0 = male, 1 = female. Marital status: 1 = married, 0 = other.
*$p \le .05$, **$p \le .01$, ***$p \le .001$.

Categories of cumulative trauma exposure

To examine whether cumulative exposure to self- versus other-oriented traumas differentially predicted PTSD symptom severity, proportion scores for cumulative self-oriented and other-oriented traumas replaced overall cumulative trauma exposure on step 5 of the regression model. In contrast to hypothesis 4, cumulative exposure to both other-oriented ($\beta = .03$, $p < .05$) and self-oriented traumas ($\beta = .13$, $p < .001$) predicted symptom severity (final model, $F(13, 2514) = 129.45$, $p < .001$, $R^2 = .40$).

To explore the relation between cumulative exposure and PTSD symptom severity for more distinct categories of trauma, a final regression included proportion scores for cumulative exposure to the traumatic event categories on step 5. PCL severity scores were predicted by greater cumulative exposure to *childhood violence* ($\beta = .09$, $p < .001$), *adult physical assaults* ($\beta = .07$, $p < .001$), *warzone exposure* ($\beta = .06$, $p < .01$), *sexual assaults* ($\beta = .05$, $p < .001$), and *death and illness* ($\beta = .03$, $p = .05$) (final model, $F(17, 2514) = 101.91$, $p < .001$, $R^2 = .41$).

Discussion

In the present study, greater exposure to traumatic events over the life course predicted more severe symptoms of PTSD in a nonclinical sample of adults in their 60s with a broad range of trauma histories. Our results extend previous research on the relation between cumulative trauma and PTSD by demonstrating that the cumulative burden of exposure to multiple traumatic events persists into older adulthood even among community-dwelling Baby Boomers who, based on their education and cohort membership, may have greater access to resources that protect against posttraumatic stress than other generations (Pruchno, 2012). Our results also revealed that although the self-rated severity of older adults' currently most distressing trauma was positively correlated with PTSD symptoms, the association attenuated to nonsignificant levels in regression models with cumulative trauma exposure included. Moreover, when the measure of cumulative exposure was restricted to severe, life-threatening events, results further indicated that the severity of a single trauma did not explain unique variance in PTSD symptoms. Overall, our findings support a dose–response model, according to which the cumulative burden of lifetime trauma exposure is a stronger predictor of PTSD symptoms than the severity of a single traumatic event.

Our findings concerning individual-difference factors revealed that the extent to which older adults' construed their most distressing trauma as central to their identity accounted for the largest percentage of explained variance in PTSD symptom severity. This finding corroborates previous studies in which subjective appraisals of traumas emerged as stronger predictors of posttraumatic outcomes compared to objective event characteristics, including whether or not the events were life-threatening (e.g., Boals & Schuettler, 2009; Kira et al., 2011; Martin, Cromer, DePrince, & Freyd, 2013). Notably, event

centrality accounted for more variance in PTSD symptoms than low social support, which was identified as the strongest risk factor for PTSD in a previous meta-analysis (Brewin et al., 2000). Such results are commensurate with a core principle of Life Course Theory (Elder, 1998), which holds that the extent to which cumulative disadvantages negatively impact individuals' developmental trajectories depends on their perceptions of their circumstances and their ability to mobilize resources. Additional research should seek to understand how event centrality impacts the aging process. According to Eriksonian theory (1982), the process of evaluating and accepting the events of one's life is the primary developmental task of older adulthood. Our results suggest that treatment efforts aimed at reducing the centrality of traumas as they are evaluated during the life review process (Butler, 2002) may be especially beneficial for older adult trauma survivors.

Our findings also add to the scarce literature concerning the impact of personality on PTSD among older adults. Of the five personality domains measured by the NEO, higher neuroticism scores emerged as the strongest predictor of PTSD symptom severity, followed by lower conscientiousness and lower agreeableness. Neuroticism is thought to increase the availability of memory for stressful events (Rubin et al., 2008a), which may in turn enhance and maintain PTSD symptoms. Neuroticism has also been linked to less adaptive coping strategies (Carver & Conner-Smith, 2010), increased symptom reporting (Coleman, 1997), and the tendency to interpret neutral or ambiguous stimuli in a negative manner (Costa & McCrae, 1990), all of which may influence the development of PTSD symptoms. In contrast, less is known about the mechanisms underlying the relations between other personality profiles and greater vulnerability to PTSD. Further research is needed to investigate the causal mechanisms underlying the relation between personality traits and PTSD symptomology in older adulthood.

Our study is the first to examine the potential differential impact of cumulative self- and other-oriented trauma exposure on PTSD symptom severity. Contrary to studies showing that cumulative other-oriented trauma is associated with positive posttraumatic outcomes, we found that cumulative exposure to both self-oriented and other-oriented traumas predicted greater PTSD symptom severity. The stronger association between PTSD symptoms and self-oriented traumas is consistent with studies in which a greater negative impact was found for self- compared to other-oriented events on depressive symptoms (Shmotkin & Litwin, 2009) and loneliness (Palgi, Shrira, Ben-Ezra, Shiovitz-Ezra, & Ayalon, 2012). As noted by Shmotkin and Litwin (2009), compared to self-oriented traumas, other-oriented traumas may be accompanied by a greater sense of social responsibility to care for individuals directly impacted by the event. The heightened sense of responsibility to support others may in turn limit the severity of PTSD symptoms associated with other-oriented traumas, while promoting a greater sense of well-being as reported by Keinan et al. (2012) and Shrira et al. (2012).

Our results concerning the extent to which cumulative trauma and PTSD symptom severity varied for more distinct categories of events revealed that greater cumulative exposure to *childhood violence* was the strongest predictor of PTSD symptom severity, followed by *adult physical assaults*, *warzone exposure*, *sexual assaults*, and *death and illness*. The finding that greater exposure to events involving physical violence in childhood and adulthood predicted greater PTSD symptom severity relative to other events is consistent with research by Breslau, Chilcoat, Kessler, and Davis (1999) in which assaultive violence among 18- to 45-year-olds conferred a higher risk of PTSD compared to other types of trauma. Our results add to this literature by showing that repeated exposure to assaultive violence throughout the life span has detrimental effects on mental health during older adulthood. This finding suggests that it may be important for clinicians to routinely assess lifetime exposure to assaultive violence when seeking to identify factors contributing to current distress among older adults.

Several limitations of this study should be noted. First, the UNCAHS is comprised of undergraduates who attended college in the 1960s. Although our relatively advantaged sample in terms of socio-economic status is typical of longitudinal studies, the underrepresentation of females, individuals with low education, and ethnic minorities limit the generalizability of our results to the general population. In spite of the select nature of our sample, results indicated that traumatic events and PTSD symptoms were not uncommon, even among a well-educated, predominantly male older adult sample for whom social and economic resources that may help protect against the negative effects of traumas may be readily available. Second, our findings may be subject to bias due to retrospective reports and defensive reporting, given the perceived stigma of certain events. The majority of trauma research is, however, based on retrospective self-reports of uncertain validity. Research suggests that such reports are likely to promote underreporting (Hardt & Rutter, 2004), which may underestimate the negative consequences of cumulative trauma exposure. Finally, the correlational nature of our analyses prevents definitive conclusions regarding causal relations. Longitudinal and prospective studies are needed to delineate the causal relation between trauma, individual-differences, and PTSD symptoms. Despite these limitations, our findings underscore the importance of examining the broader context of lifetime trauma, as well as individual-differences in personality, stressor appraisal, and social support, when seeking to understand factors that influence posttraumatic stress among members of the Baby Boom generation.

Funding

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