Aging & Mental Health
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/camh20

The influence of prior rape on the psychological and physical health functioning of older adults

Natalie Sachs-Ericsson[a], Kathleen A. Kendall-Tackett[b], Julia Sheffler[a], Darleine Arce[a], Nicole C. Rushing[a] & Elizabeth Corsentino[a]

[a] Department of Psychology, Florida State University, Tallahassee, USA

[b] Department of Pediatrics, Texas Tech University Health Sciences Center, Amarillo, USA

Published online: 13 Feb 2014.

To cite this article: Natalie Sachs-Ericsson, Kathleen A. Kendall-Tackett, Julia Sheffler, Darleine Arce, Nicole C. Rushing & Elizabeth Corsentino , Aging & Mental Health (2014): The influence of prior rape on the psychological and physical health functioning of older adults, Aging & Mental Health, DOI: 10.1080/13607863.2014.884538

To link to this article: http://dx.doi.org/10.1080/13607863.2014.884538

Aging & Mental Health, 2014
http://dx.doi.org/10.1080/13607863.2014.884538

Routledge
Taylor & Francis Group

The influence of prior rape on the psychological and physical health functioning of older adults

Natalie Sachs-Ericsson[a]*, Kathleen A. Kendall-Tackett[b], Julia Sheffler[a], Darleine Arce[a], Nicole C. Rushing[a] and Elizabeth Corsentino[a]

[a]*Department of Psychology, Florida State University, Tallahassee, USA;* [b]*Department of Pediatrics, Texas Tech University Health Sciences Center, Amarillo, USA*

(*Received 6 September 2013; accepted 13 January 2014*)

Objectives: Older adults who have experienced traumatic events earlier in life may be especially vulnerable to additional challenges associated with aging. In a cross-sectional study of older females, the present study examines whether a history of rape is associated with current psychological and health problems.
Method: This study used existing data from the female respondents ($N = 1228$) in the National Social Life, Health, and Aging Project (NSHAP), a national probability sample of adults between the ages of 57 and 85 interviewed in their homes. It was determined whether or not the participant experienced forced sexual contact since the age of 18. Measures of psychological health (e.g., scales of depression, anxiety, and loneliness), the presence or absence of a number of serious health problems, and a one-item measure of self-esteem were obtained.
Results: Adult rape occurred in 7% of the sample. On average, 36 years had elapsed since the rape had occurred. Using structural equation modeling (SEM), rape was associated with lower self-esteem, psychological, and physical health functioning. Self-esteem partially mediated the association between rape and psychological functioning, but not health functioning. These associations were significant even after controlling for participant characteristics and risky health behaviors.
Conclusions: Mechanisms linking prior rape to psychological and health problems in older age are discussed, as well as treatment recommendations for symptomatic older adults.

Keywords: mood disorders; anxiety- and trauma-related disorders; trauma-related disorders; physical disorders abuse/neglect

The influence of prior rape on the psychological and health functioning of older adults

Nearly one in five women experiences rape in their lifetime (Black et al., 2011; Welch & Mason, 2007). The research literature has established that 'rape is one of the most severe of all traumas, causing multiple, long-term negative outcomes' (Campbell, Dworkin, & Cabral, 2009). In particular, rape often has negative consequences to one's mental and physical health (Kendall-Tackett, Cong, & Hale, 2013; Nishith, Mechanic, & Resick, 2000; Sachs-Ericsson, Verona, Joiner, & Preacher, 2006).

Studies have examined the short-term effects of rape (Elklit & Christiansen, 2010); however, relatively few population studies have focused on whether older adults who experienced rape earlier in their adult life (e.g., rape at the age of 18+ years) also report increased levels of psychological and health functioning problems. In the current cross-sectional study of older women, we examined the association between a history of rape and current psychological and health functioning. We wished to determine if a history of rape is associated with psychological distress and health dysfunction in older age.

Older age presents new life challenges such as role changes, retirement, and death of close friends and family – any of which may increase stress and deplete resources of the aging individual. For individuals who have experienced past traumatic events, new life challenges may be particularly difficult (Kraaij et al., 2003). Specifically, Davison et al. (2006) proposed that there may be a re-emergence of symptoms in late-life related to earlier trauma, including increased thoughts, reminiscences, and emotional responses to past traumatic experiences in the context of losses associated with aging. Thus, older individuals who have experienced a traumatic event earlier in life may be especially vulnerable to additional challenges associated with aging (Cook, 2001). For example, aging Holocaust survivors (Solomon & Ginzburg, 1999) were found to have more difficulties with the milestones of aging (i.e., retirement, children leaving home, or becoming ill) compared to an age-matched control group. These milestones triggered past traumatic memories and were associated with a more difficult time coping and increased health problems.

Psychological functioning and rape

Research has established an association between rape and an array of negative psychiatric outcomes. Self-blame associated with experiencing rape appears to contribute to depression and loneliness (Anderson, Miller, Riger, Dill, & Sedikides, 1994). Adults with histories of sexual, physical, or emotional abuse are at increased risk for developing anxiety (Molnar, Buka, & Kessler, 2001; Spataro, Mullen, Burgess, Wells, & Moss, 2004) and depression (Kendall-Tackett et al., 2013; Molnar et al., 2001; Sachs-Ericsson

*Corresponding author. Email: sachs@psy.fsu.edu

et al., 2006; Turner & Muller, 2004). In this regard, depression is one of the most prominent forms of psychopathology among older adults (Blazer, 1994). Additionally, loneliness has been identified as an important indicator of psychological distress in older adults (Paul, Ayis, & Ebrahim, 2006).

There are only a handful of epidemiological studies on the long-term psychological effects of rape among older adults. Specifically, population studies of older adults have found high rates of symptoms of post-traumatic stress disorder (PTSD) in women who survived rape committed by soldiers in World War II (Kuwert et al., 2010; Lueger-Schuster, Gluck, Tran, & Zeilinger, 2012). Additionally, sexual assault during adulthood is significantly associated with depressive symptoms in late adulthood (Kraaij et al., 2003) and with symptoms of PTSD (e.g., autonomic arousal and emotional avoidance symptoms) (Acierno et al., 2007).

Physical health functioning

In general, there are serious negative effects of rape on physical health (Campbell, Sefl, & Ahrens, 2003). In a series of epidemiological investigations, Golding and colleagues consistently found a relationship between lifetime sexual abuse and measures of overall health (Golding, 2003; Golding, Cooper, & George, 1997). Rape survivors experience more acute and chronic physical health problems than do women who are not victimized (Golding, 1994; Koss, Koss, & Woodruff, 1991), and these problem may increase with age (Rich-Edwards et al., 2010).

Individuals who have been raped show a higher prevalence of a diverse number of medical disorders (Golding, 1999) commonly including chronic pain syndromes and gastrointestinal disorders (Kendall-Tackett et al., 2013; Koss et al., 1994). Rape survivors are also at increased risk for cardiovascular disease, diabetes, and metabolic syndrome (Kendall-Tackett, 2007; Rich-Edwards et al., 2010). Rape also specifically impacts sleep, which affects multiple levels of health functioning (Kendall-Tackett et al., 2013; Krakow et al., 2000a; Krakow et al., 2001).

The extent to which earlier experiences of rape are associated with current health problems in older women has not been well investigated. However, there have been a handful of studies that have examined if a history of trauma is associated with health functioning. One nationwide survey of older adults ($N = 1518$) (Krause, Shaw, & Cairney, 2004) examined the relationship between a history of exposure to trauma and physical health status. Data revealed that trauma was associated with worse health. Additionally, in a cross-sectional study of older adults, a history of rape was associated with an increased risk of arthritis and breast cancer (Stein & Barrett-Connor, 2000).

One reason for this association between rape and health is the link between abuse and certain risky health behaviors such as increased alcohol intake and smoking, as well as exhibiting more risky sexual behaviors (Campbell, Sefl, & Ahrens, 2004; Dobie et al., 2004). Indeed, studies have shown that the coping mechanisms used by abuse survivors who are distressed can lead to an array of negative health behaviors (Springer, 2009).

Self-esteem

A large body of evidence demonstrates an association between exposure to traumatic stress and the development of lower self-esteem (Cheng & Lam, 1997; Kreger, 1995; Lo, 2002). Developmentally, an individual's self-esteem has been shown to be affected negatively by rape in general (Murphy et al., 1988) and specifically by intimate partner sexual assault (Campbell, 1989). These negative effects may be further exacerbated by decreases in self-esteem that accompany older age.

High self-esteem may facilitate accommodation to negative health-related circumstances in later life (Bailis & Chipperfield, 2002). In contrast, lower levels of self-esteem have been associated with increased psychiatric morbidity and poor health functioning (Trzesniewski et al., 2006). Low self-esteem operates as a risk factor for depressive symptoms at all phases of the adult life span (Orth, Robins, Trzesniewski, Maes, & Schmitt, 2009) and is associated with behavior that does not promote a healthy lifestyle (e.g., alcohol and tobacco use and low levels of exercise) (Packard et al., 2012). Other studies of older adults have found that positive self-assessments are associated with positive changes in health behaviors (Reitzes & Mutran, 2006).

The current study

In the current cross-sectional study, we used structural equation modeling (SEM) to examine the association between retrospective reports of adult rape (e.g., occurring at the age of 18 or older) and current psychological and physical health problems with a population sample of older women (57+, mean age 67). Psychological functioning was measured as a latent construct based on several scales (e.g., depressive symptoms, anxiety symptoms, and loneliness). We also included in the model a latent construct of health functioning derived from self-reports of the presence or absence of several serious health problems. Participants' age, smoking, and alcohol use behavior were also included as covariates.

We expected that rape would be associated with lower self-esteem, greater psychological distress, and poorer physical health functioning. We also expected that self-esteem would mediate the association between rape and psychological and physical health problems.

Additionally, among the women who reported being raped, we performed exploratory analyses to determine if the perpetrator's relationship to the victim (e.g., stranger, spouse/romantic partner, co-worker, friend, or other) was associated with any of the outcome variables. Similarly, we performed exploratory analyses to determine if the number of times an individual experienced forced sex and their age at the time of the rape was related to the outcome measures.

Method

Participants. This study used existing data from the National Social Life, Health, and Aging Project (NSHAP). The methodology has been described previously (Suzman, 2009). Briefly, NSHAP is a National Institute of Health (NIH)-supported study at the University of Chicago Pritzker School of Medicine. Participant recruitment was conducted from 2005 to 2006. The NSHAP study is approved yearly by the University of Chicago Institutional Review Board.

Demographics and interview procedures

The NSHAP is a national probability sample of older adults ($N = 3005$) the ages of 57 and 85. Participants were interviewed in their homes between 2005 and 2006 by trained interviewers from the National Opinion Research Center (NORC), an organization associated with the University of Chicago. For data collection procedures please refer to Suzman (2009). The study achieved a final weighted response rate of 75.5%. NSHAP used a modularized questionnaire design so that some questions were included in a leave-behind questionnaire. Questions regarding forced sex were obtained from the leave-behind questionnaire. The final response rate for the post interview questionnaire was approximately 84% (Smith et al., 2009).

We included only female participants in the current study because only five males reported a history of rape. Furthermore, to accomplish the goal of the current project, we excluded participants from the analyses who reported that their most recent rape had occurred before age 18 ($n = 23$). Thus, in the current study there were 1,228 female participants in the NSHAP sample who completed data necessary for the current analyses.

All questionnaire materials were developed in English and translated into Spanish. Additionally, if two individuals over the age of 57 resided in the home, only one was selected (at random) to participate in the study. The current study used only the first wave of data collection. For additional information regarding statistical design and estimation of data collection please refer to O'Muircheartaigh, Eckman, and Smith (2009).

Consent. Participants were excluded if they were unable to provide consent to participate in the study. The consent procedures are described in detail by Smith et al. (2009). At the beginning of the interview respondents were asked whether they would like to read the Questionnaire and Physical Measures Consent Form or have the interviewer read the form to them. To ensure that respondents did not receive information that did not apply to them, separate male and female versions of the consent form were used. After the form was reviewed the respondent was asked to sign the consent form. A copy of the form was given to respondents for their records.

Measures

Rape. In the leave-behind questionnaire participants were asked the following: 'Thinking about your entire life so far, has anyone ever made you have sex by using force or threatening to harm you or someone close to you?' If participants answered 'Yes,' they were asked 'How old were you the most recent time this happened?' The participant was then asked about their relationship to the perpetrator. Specifically, they were asked to identify which of the following characterized the perpetrator during their last forced sex experience (e.g., romantic partner, parent, stranger, co-worker, friend, or other).

Psychological measures: depression, anxiety, loneliness, and self-esteem

As described in greater detail below, a modified version of the CES-D (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993; Radloff, 1977) was used to assess depressive symptoms, a modified version of the UCLA loneliness scale (Russell, 1996) assessed loneliness, and a modified version of the Hamilton Anxiety Scale (HADS; Zigmond & Snaith, 1983) assessed anxiety. NSHAP research conducted extensive psychometric examination of the shortened versions and found them to be adequate (Shiovitz-Ezra, Leitsch, Graber, & Karraker, 2009). The researchers (Shiovitz-Ezra et al., 2009) also reported that the population scores on the psychological measures generally reflected lower psychological distress, which would be expected in a non-clinical sample.

Depressive symptoms. The NSHAP included 11 of the 20 items from the Center for Epidemiologic Studies-Depression scale (CES-D). The CES-D is a self-report adult instrument designed to measure common symptoms of depression that have occurred over the past week, such as poor appetite, hopelessness, pessimism, and fatigue (Radloff, 1977). Questions are answered on a scale of 0–3, with 0 indicating no symptom presence and with 3 representing symptoms 'most or all of the time.'

NSHAP used the shorter 11-item Iowa form of the CES-D scale, utilizing the same response categories as in the original 20-item scale. Factor analysis reveals that this short form captures the same dimensions as the long-form CES-D scale while giving up little precision (Kohout et al., 1993). Cronbach's alpha for the current study was .80.

Loneliness. The NSHAP survey included 3 of the 20 items from the UCLA scale (Russell, 1996). The items included lack of companionship, feeling left out, and feeling isolated. Participants responded using a 3-point Likert-type scale (1 = 'hardly ever or never,' 2 = 'some of the time' and 3 = 'often'). Russell (1996) found the UCLA loneliness scale to be reliable for internal consistency (coefficient alpha ranging from .89 to .94) and test–retest reliability over a one-year period ($r = .73$). Convergent validity for the scale was indicated by significant correlations with other measures of loneliness (Hughes, Waite, Hawkley, & Cacioppo, 2004).

NSHAP researchers described the use of the short form of the UCLA loneliness scale as follows: the three items indicating loneliness as well as the response categories were adopted from the HRS 2002 loneliness module.

These items were taken from the Revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). In the current study Cronbach's alpha was .80.

Anxiety. Six items were included in the survey from the HADS symptom scale (Zigmond & Snaith, 1983). These items included 'felt tense or wound up,' 'something awful is about to happen,' 'worrying thoughts went through mind,' 'I have butterflies in my stomach,' 'I feel restless,' and 'I have sudden feelings of panic.' In the current study Cronbach's alpha was .74.

The NSHAP researchers (Shiovitz-Ezra et al., 2009) reported a very extensive analysis of the selection of the HADS items and response categories used in the survey. They reported that the standardized Cronbach's alpha coefficient indicating internal consistency for the HADS-A was .76 for the entire sample. The authors suggested that the level of anxiety was relatively low in this sample, as has been found in non-clinical samples (Caci et al., 2003). Furthermore, the researchers reported using a principal component analysis (PCA) to examine the factor structure of the HADS-A in the NSHAP. The PCA verified the one-factor solution. The seven items loaded heavily on one factor that accounted for 42% of the variance.

Self-esteem. Participants were asked how true the following statement is for them: 'I have high self-esteem.' Responses were reported using a five point scale anchored by 'not very true of me,' to 'very true for me.' The researchers (Shiovitz-Ezra et al., 2009) described their selection of their self-esteem measure as follows: time constraints did not allow for an in-depth assessment of self-esteem. However, Robins, Hendin, and Trzesniewski (2001) established strong convergent validity of a single item taken from the Rosenberg Self-Esteem Scale with the other self-esteem constructs. The item, 'I have a high self-esteem,' also behaved similarly with a wide range of criterion measures.

Health problems. Participants were asked if a doctor had diagnosed them with any of the following health problems (Yes/No): heart problems, pain when walking, arthritis, ulcers, and emphysema/asthma, stroke, diabetes, and thyroid.

Health behaviors. Participants were asked about their drinking behavior (e.g., do you currently drink alcohol, did you ever think you had an alcohol problem, have you been criticized for your drinking, and do you feel bad about your drinking behavior?) (Yes/No). Participants were also asked about their past and current use of cigarettes (Yes/No). Participants were also asked to estimate the number of total lifetime sexual partners.

Sampling and weighting

Data were weighted to adjust for differential probabilities of selection within households, systematic non-response, and residual socio-demographic-geographic differences between the sample and the census. For the SEM analyses, sample weights, stratification, and clustering variables were controlled for in analyses using the clustering option in MPlus (Muthén & Muthén, 1998–2010).

Analyses

SEM was performed using MPlus version 5.2 (Muthén & Muthén, 1998–2010). Because rape was coded as a dichotomous variable, we used the weighted least-squares mean and variance adjusted estimator (WLSMV), which is better suited for handling categorical outcome variables. The sampling and weighting procedures were accounted for by using the COMPLEX analysis option in MPlus. Descriptive statistics were calculated in SPSS (2009), and significance levels were calculated in MPlus using the COMPLEX analysis option which also allows for the proper consideration of weighting variables, stratification, and clustering of data. Standard fit criteria were used to evaluate the overall model fit, with non-significant χ^2 value, comparative fit index (CFI) values greater than .95, Tucker-Lewis index (TLI) values greater than .90, and root mean square error of approximation (RMSEA) values of less than .06 all indicating good fit (Hu & Bentler, 1999). It should be noted that in large samples, such as the current study, the χ^2 is often significant regardless of fit, and thus, one needs to rely on the other fit indicators (e.g., CFI, TLI, RMSEA) to examine model fit (Kline, 2005).

Results

Demographics

There were 1228 female participants in the NSHAP sample who completed data necessary for the current analyses. There were 7% who reported experiencing forced sex in adulthood. The average age of participants was 68.5 (SD = 8) years. As described in Table 1, participants who

Table 1. Demographics and key variables by rape status (N = 1228).

	Not raped ($N = 1142$)	Raped ($N = 86$)	F/χ^2	p-value
Age	68.7 (7.7)	65.1 (6.8)	17.7	$p < .01$
Education				
Less than HS	18.4%	12.8%	3.7	ns
HS		28.8%	24.4%	
Some college		33.5%	38.4%	
College or more		19.3%	24.4%	
Race				
White	80.6%	75.0%	3.9	ns
African American		8.1	14.1	
Hispanic/non-Black		6.5	4.7	
Other		2.3	2.4	
Marital status				
Married	58.7%	47.7%	51.3	$p < .01$
Living with a partner	01.8%	10.5%		
Separated	0.6%	01.2%		
Divorced	11.2%	27.9%		
Widowed	24.7%	10.5%		
Never married	2.9.3%	02.3%		

Table 2. Rape status, psychological and health functioning: multivariate analyses controlling for age.

	Not raped ($N = 1142$)	Raped ($N = 86$)	F/χ^2	p-value
Self-esteem	4.0 (1.1)	03.7 (1.3)	08.3	$p < .01$
CESD[a]	16.5 (5.2)	17.5 (518)	08.02	$p = .08$
UCLA lonely	1.3 (0.9)	0.8 (0.9)	34.02	$p < .01$
HADS	4.5 (2.1)	3.8 (1.2)	05.6	$p < .01$
Sick	2.6 (1.6)	3.0 (1.8)	05.5	$p = .02$

[a]Please note that the CESD score presented here is not based on the traditionally scaling of the CES-D. (e.g., a score of 16 or higher does not represent depression).

had been raped were somewhat younger 65.1 (SD = 6.8 years) than those who did not report rape 68.7 (SD = 7.7 years). There were no differences in education. The sample was predominately White (82.8%), and there were no differences in the racial composition of the groups. Of interest, there was a difference in marital status. In particular, rape victims were more likely to be currently divorced than non-raped participants (27.9% vs. 11.2%), $p < .01$. Among individuals who reported being raped the average age when the last rape occurred was 30 (SD = 11.5) years, and the median was 25 years. The age range for when the rape occurred was from 18 to 66. On average 36 years (SD = 13.3) had elapsed since the rape. Thus, while the age in which the rape occurred tended to be much earlier in life, there was considerable variability.

As described in Table 2, in multivariate analyses controlling for age, rape victims reported more symptoms across most of the psychological symptom scales (e.g., UCLA loneliness scale, and the HADS), all $p < .01$. However, the difference between groups was not significant for the CES-D ($p = .08$). Rape victims also reported a lower level of self-esteem ($p < .01$).

Risky health and sexual behaviors

As described in Table 3, approximately half of the sample reported that they currently used alcohol. However, the percentage of current alcohol users was greater among those who had been raped (66.3% vs. 52.9%). Individuals who experienced rape, compared to those who had not, more often thought that they should cut down on alcohol consumption (30.4% vs. 7.8%), had been criticized as drinking too much (13.8% vs. 3.1%) and had felt bad about drinking (21.0% vs. 5.3%), all $p < .01$.

People who had been raped were more likely to have smoked cigarettes (both currently and in the past); indeed, over one-fourth of the participants who experienced rape were current smokers, which were double the rate of those who had not experienced rape (25.8% vs. 12.6%).

Furthermore, individuals who experienced rape were more likely to have had significantly more sexual partners (8.3 partners vs. 2.3 partners), all $p < .01$.

Table 3. Risky health and sexual behaviors.

	Not raped ($N = 1142$)	Raped ($N = 86$)	F/χ^2	p-value
Lifetime number of sexual partners	2.3 (4.7)	8.3 (1.2)	99.0	$p < .01$
Alcohol use				
Currently drink alcohol	52.9%	66.3%	5.8	$p < .01$
Need to cut down	7.8%	30.4%	44.0	$p < .01$
Criticized for drinking	3.1%	13.8%	22.4	$p < .01$
Feel bad about drinking	5.3%	21.0%	30.1%	$p < .01$
Smoking				
Current	12.6%	25.8%	11.1%	$p < .01$
Past	41.7%	57.1%	5.6%	$p = .01$

Sexual perpetrators

Participants who had been raped were asked to identify their relationship to the perpetrator. Sadly, the victim's spouse or romantic partner accounted for the highest percentage of perpetrators. Specifically, participants reported that the perpetrator was a spouse/intimate partner (41.1%), stranger (20.0%), friend (13.0%), co-worker (7.4%), or other (18.5%). There was considerable overlap between the type of perpetrator and the number of times an individual was raped. It appears that the individuals who were victims of intimate partner rape experienced episodes of assault numerous times. Specifically, for spouse/partner the numbers of forced sexual experiences were 7.9 (SD = 12.1), stranger rape 1.35 (SD = 0.88), co-worker 1.2 (SD = 0.4), for friend 1.9 (SD = 1.0), and for other 1.6 (SD = 0.7).

In a following section we examine the association between perpetrator type, the number of times an individual experienced forced sex, and their age when it last occurred in relation to outcome measures.

Health problems

Rape victims had on average *more* health conditions than non-raped victims, even after controlling for age (2.6 vs. 1.6), $F(1,1212) = 5.5$, $p = .02$. However, as shown in Table 4, contrary to predictions, there were few differences in the percentage of specific health problems between female raped and non-raped participants. However, the female rape victims had almost twice the rate of asthma than non-rape victims (26.3% vs. 12.0%, $\chi^2 = 13.0$, $p < .01$). They also reported more ulcers (22.4% vs. 13.2%, $\chi^2 = 50.6$, $p < .01$).

Table 4. Chi-square differences on health conditions by rape status.

	Not raped ($N = 1142$) (%)	Raped ($N = 86$) (%)	χ^2	p-value
Pain walking	30.8	48.7	1.8	ns
Arthritis	60.1	60.5	0.005	ns
Ulcers	13.2	22.4	50.6	$p < .01$
Emphysema	11.6	17.1	0.20	ns
Asthma	12.0	26.3	13.0	$p < .01$
Stroke	8.1	07.9	0.02	ns
Diabetes	19.9	21.1	0.34	ns
Thyroid	23.3	26.3	0.33	ns

Table 5. Lifetime sexually transmitted diseases (STD) by rape status.

	Not raped ($N = 1142$) (%)	Raped ($N = 86$) (%)	χ^2	p-value
Herpes	1.4	3.5	2.4	ns
Genital warts	1.4	2.4	0.34	ns
Trichomoniasis	1.4	8.1	20.3	$p < .01$
Gonorrea	0.7	0.0	0.62	ns
Chlamydia	1.4	3.5	2.5	ns
Pelvic inflammatory Disease	0.4	7.0	37.5	$p < .01$
Syphilis	0.4	1.2	1.22	ns
Number of STD	0.07 (.27)	0.27 (.58)	$F = 34.1$	$p < .01$

The participants who had been raped, on average, experienced more sexually transmitted diseases (STDs) than participants who had not been raped (see Table 5). Additionally and possibly related to STDs, women who had been raped reported a higher prevalence of cervical dysplasia (15.9% vs. 8.7%, $p < .05$).

Structural equation modeling

CFI/TLI

Model fit. The SEM model (see Figure 1) provided a good fit to the data ($\chi^2 = 1045.04$, $df = 80$, $p < .01$, CFI = 0.94, TLI = 0.91, RMSEA = .03). Table 6 describes the relationships among the variables in the model. Three scales loaded onto the construct of Psychological functioning (e.g., depression, loneliness, and anxiety). Four items (e.g., pain while walking, arthritis, asthma, and ulcers) loaded onto the health construct. However, diabetes, thyroid, stroke, and emphysema did not significantly load onto the construct of health, and thus, they were excluded from the model.

Table 6. Structural equation model: standardized model effects.

	StdYX estimate	Std estimate	p-value
Health problems by			
Pain when walk	0.737	0.748	$p < .01$
Arthritis	0.498	0.501	$p < .01$
Ulcers	0.362	0.363	$p < .01$
Asthma	0.353	0.355	$p < .01$
Psychological functioning by			
CESD	0.866	4.566	$p < .01$
Lonely	0.502	0.526	$p < .01$
Anxiety	0.707	2.495	$p < .01$
Emotion on			
Rape	0.114	0.468	$p < .01$
Age	0.015	0.002	ns
Esteem	−0.341	−0.297	$p < .01$
Alcohol	−0.109	−0.216	$p < .01$
Smoking	0.114	0.339	$p < .01$
Health on			
Rape	0. 119	0.488	$p = .01$
Age	0. .038	0.005	ns
Esteem	−0.133	−0.116	$p < .01$
Alcohol	−0.198	−0.392	$p < .01$
Smoking	0.069	0.205	$p = .08$
Esteem on			
Rape	−0.053	−0.247	$p = .046$
Indirect effects of self-esteem			
Emotion			
Total indirect	0.018	0.073	($p = .045$)
Health			
Total indirect	0.007	0.029	($p = .08$)

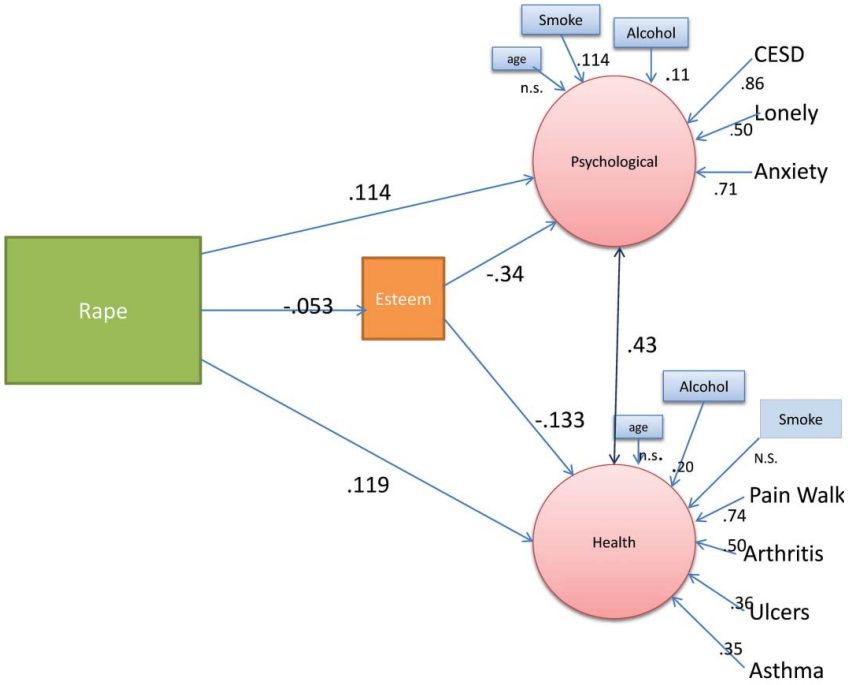

Figure 1. Self-esteem partially mediated the relationship between rape and psychological functioning ($B = .018$).

Significant pathways. In the model, we found that rape was associated with lower self-esteem ($\beta = -.053$, $p = .046$). In regard to psychological functioning, we found that rape ($\beta = .114$, $p < .01$) and lower self-esteem ($\beta = -.34$, $p < .01$) were associated with increased psychological distress. Older age was not related to psychological functioning. Both current nicotine use ($\beta = .114$, $p < .01$) and current alcohol use ($\beta = .11$, $p < .01$) were associated with poorer psychological functioning.

Similarly, rape ($\beta = .119$, $p = .011$) and low self-esteem ($\beta = -.133$, $p < .01$) were associated with poorer physical health status. Older age was not associated with health status. Current alcohol use ($\beta = .20$, $p < .01$) was associated with increased health problems; however, smoking approached significance ($\beta = .07$, $p = .08$).

In order to test whether self-esteem mediated associations between rape status and psychological status, we used the Model Indirect function in MPlus to generate indirect effect indices for the original source variables. In this model, we found that self-esteem partially mediated the relationship between rape and psychological status ($\beta = 0.018$, $p = .045$). However, self-esteem was not a mediator between rape and physical health ($p = .08$).

Characteristics of the rape, health, and psychological functioning

We performed exploratory analyses to determine if perpetrator status (e.g., romantic partner/spouse, stranger, friend, co-worker, or other) was associated with any of the psychological or health outcomes. We performed a multivariate analysis controlling for current age (see Table 7). This included psychological scales (depression, anxiety, and loneliness) as well as self-esteem. We also examined the type of perpetrator in relation to the number of health problems. There were no differences by perpetrator status.

Second, we examined the association between the number of times an individual was forced to have sex and each of the outcome measures. We examined this relationship in the context of an SEM model as well as in regression analyses using each of the measures comprising the latent constructs as the dependent variable. We conducted these analyses while controlling for age. The associations were not significant.

Finally, we examined if there was an association between their age when they last experienced forced sex and the outcome measures. We conducted these analyses using both regression models as well as in an SEM. There were no significant associations.

Discussion

The experience of rape has been found to have lasting and damaging effects on the individual's psychological and health functioning. However, there has been limited information available as to whether the detrimental effects of experiencing rape are evident in late adulthood. Older age presents new life challenges such as role changes, retirement, death of close friends and family, and functional losses. For older adults who have experienced past traumatic events, these new life challenges may be

Table 7. Key-dependent variables by perpetrator (estimated means controlling for age).

				95% Confidence interval		
Dependent variable	Relationship to person who forced sex	Mean	Std. error	Lower bound	Upper bound	*F*
Health problems	Spouse or romantic partner	2.900	.389	2.123	3.677	.183
	Stranger	2.907	.537	1.834	3.981	
	Friend	3.331	.630	2.073	4.589	
	Co-worker	3.056	.974	1.110	5.002	
	Other	2.676	.456	1.765	3.587	
CESD	Spouse or romantic partner	18.264	1.154	15.958	20.569	.69
	Stranger	17.135	1.593	13.952	20.318	
	Friend	18.118	1.868	14.386	21.849	
	Co-worker	14.317	2.890	8.544	20.090	
	Other	19.178	1.353	16.475	21.881	
HADS anxiety	Spouse or romantic partner	3.800	.374	3.052	4.548	1.14
	Stranger	3.846	.517	2.813	4.879	
	Friend	4.301	.606	3.090	5.511	
	Co-worker	4.750	.938	2.876	6.623	
	Other	3.055	.439	2.179	3.932	
UCLA loneliness	Spouse or romantic partner	.759	.185	.388	1.129	0.26
	Stranger	.847	.256	.336	1.359	
	Friend	.705	.300	.105	1.304	
	Co-worker	.996	.464	.068	1.924	
	Other	.999	.217	.565	1.434	
Self-esteem	Spouse or romantic partner	3.761	.251	3.260	4.263	0.66
	Stranger	3.569	.346	2.877	4.261	
	Friend	3.734	.406	2.923	4.545	
	Co-worker	4.641	.628	3.386	5.896	
	Other	3.981	.294	3.394	4.569	

Note: Analyses are controlled by age of respondent. None of the comparisons are significant.

particularly difficult (Davison et al., 2006; Kraaij et al., 2003). Specifically, trauma-related changes occurring earlier in life may interact with the normal aging process, leading to accelerated age-related health decline (Lapp, Agbokou, & Ferreri, 2011). Additionally, age-related changes may lead to an increase in intrusion of trauma-related memories, thus increasing subjective distress (Floyd, Rice, & Black, 2002).

In the current study, a population sample of older women (57+), we used an SEM to examine whether a history of rape was associated with psychological and health functioning problems in late adulthood. Among the sample 7% reported having been raped in adulthood. This percentage is clearly substantially lower than the 20% estimates of lifetime rape reported in other general population surveys (Black et al., 2011; Welch & Mason, 2007). The lower percentage among these older adult women may be related to under-reporting. It also may reflect a cohort effect such that rape may be more frequent in younger cohorts.

In the SEM, we found that rape was associated with both psychological and physical health dysfunction. We also found rape to be associated with lower self-esteem, and lower self-esteem partially mediated the association between rape and psychological functioning (but not physical health functioning). In examining specific characteristics of the rape, we found that the woman's romantic partner/spouse was most often the perpetrator. Furthermore, there was a relationship between the number of times an individual was forced to have sex and perpetrator status. Specifically, rape occurred more frequently among those whose perpetrator was a spouse or romantic partner compared to a stranger, friend, co-worker, or other. However, additional exploratory analyses failed to find any other associations between the characteristics of the rape (e.g., perpetrator status, age at the time of rape, and the number of times forced to have sex) and any of the outcome measures. This may have been due in part to limited power.

Health behavior and rape

Consistent with other studies (Davis, Combs-Lane, & Smith, 2004), we found participants who had been raped to have a higher rate of detrimental health behaviors, specifically smoking and drinking. Health problems associated with smoking and drinking often become more severe with advanced age (Akushevich, Kravchenko, Ukraintseva, Arbeev, & Yashin, 2013). Additionally, literature suggests that abuse survivors are more likely to participate in risky sexual behaviors (Kendall-Tackett et al., 2013). Indeed, in the current study, the participants who had experienced rape reported dramatically higher numbers of sexual partners than those who had not been raped. These behaviors may also contribute to the high rates of STDs found in this sample.

Psychological functioning and rape

The current study demonstrated an association between retrospective reports of rape and a latent construct of psychological functioning assessed by scales of loneliness, depression, and anxiety. Findings are consistent with the literature showing rape to be associated with psychiatric symptoms in young and middle aged adults. Likely several mechanisms underlie the association between rape and psychological distress. One mechanism that may increase the risk of developing psychiatric symptoms, and particularly anxiety disorders, is the heighted activity of the hypothalamic–pituitary–adrenal (HPA) system. Anxiety is thought to reflect a stress-induced incomplete adaptation of the neurobiological systems to exposure to severe stressors (Heim & Nemeroff, 2009). The glucocorticoid cascade hypothesis (Sapolsky, 2000) contends that stress initiates neurological changes that in turn lead to prolonged activation of the HPA axis. Hypersecretion of glucocorticoids stimulates fear and arousal behaviors and, thus, may lead to anxiety-related symptoms. Additionally, prolonged stress is associated with depression (Juster et al., 2011) and cognitive decline (Sachs-Ericsson, Joiner, Plant, & Blazer, 2005).

Second, it is unfortunately common for rape victims to blame themselves for the occurrence of rape, and such cognitive processes are related to a number of subsequent negative psychological symptoms (Campbell et al., 2009). Self-blaming may drive the negative cognitive processes that exacerbate distress associated with rape (Gibb, 2002; Kendall-Tackett et al., 2013; Koss & Aurelio, 2004) and that pose a risk for depression (Alloy et al., 1999) as well as PTSD (Ali, Dunmore, Clark, & Ehlers, 2002). The number of challenging life events that occur in older age may be more difficult to navigate when the individual has developed such negative cognitions after experiencing rape.

Interestingly, both smoking and alcohol use were associated with increased psychological distress. There is considerable literature documenting that smoking, even among older adults, is much higher among individuals who have higher levels of psychological disorders (Sachs-Ericsson, Collins, Schmidt, & Zvolensky, 2011). Similar results have been found for comorbidity of psychiatric disorders and substance use (Gum, King-Kallimanis, & Kohn, 2009).

Rape and health functioning

Consistent with the literature on younger and middle age adults, we found a history of rape to be associated with poorer health functioning. Rape victims had on average more health problems than non-rape victims. In particular, rape victims had twice the rate of asthma and also a greater frequency of ulcers. In the SEM, we found that rape was associated with the latent construct of health functioning defined by pain while walking, arthritis, asthma and ulcers.

The mechanism by which rape is associated with physical health is likely multi-determined (Kendall-Tackett, 2003). First, the rape itself may lead to direct injury (Leserman et al., 1997). Additionally, rape may result in STDs (Hillis, Anda, Felitti, Nordenberg, & Marchbanks, 2000). In the current study, rates of STDs

were dramatically higher in those who had been raped. Rape may also lead to unwanted pregnancy (Dietz et al., 1999; McFarlane et al., 2005), which may in turn lead to subsequent health problems in late adulthood.

Importantly, stress may lead to lasting physiological changes that influence one's physical health. Individuals have biological mechanisms to maintain homeostasis in response to stressors, referred to as 'allostasis' (Ganzel, Morris, & Wethington, 2010; McEwen, 1998). In response to stressors, the allostatic systems may remain 'turned on' even when no longer needed. This produces wear and tear on the body and brain termed 'allostatic load' and can lead to illness (McEwen & Wingfield, 2003). Allostatic load is associated with systemic dysregulation of metabolic, inflammatory, and cardiovascular biomarkers (Juster, McEwen, & Lupien, 2010). Importantly, the aging brain and body appear to be more vulnerable to such effects (McEwen, 2002). One effect of this process is suppression of the immune system (Groer, Thomas, Evans, Helton, & Weldon, 2006), and rape has been found to activate suppression of adaptive immunity (Altemus, Cloitre, & Dhabhar, 2003; Heim & Nemeroff, 2002).

Alternatively, it has been suggested that trauma can increase the immune response leading to inflammation and contribute to an array of health problems (Kendall-Tackett, 2009; O'Donovan, Neylan, Metzler, & Cohen, 2012). For example, one epidemiological study found an association between trauma exposure with airflow limitation and asthma, which they suggested may have been mediated by inflammatory processes (Spitzer et al., 2011). Such trauma-related physiological changes occurring earlier in one's life may interact with the normal aging process leading to accelerated, age-related health decline (Lapp et al., 2011).

We also found an increase rate of ulcers among women who had been raped. While earlier explanations for ulcers were related to theories of stress response, more recently it has become apparent that bacterium *Helicobacter pylori* (*H. pylori*) is present in more than 90% of duodenal ulcers and about 80% of stomach ulcers (Kuipers, Thijs, & Festen, 1995). Nonetheless, certain risky health behaviors are associated with the development of ulcers, among which are alcohol use and smoking. These behaviors were found to be more frequent among the women in this sample who experienced rape. Indeed, in the SEM, alcohol was associated with health functioning.

Partner violence

Consistent with the literature (Black et al., 2011), we found it was the individual's spouse or romantic partner who most often was the perpetrator of the rape (approximately 41%). Among women who had experienced partner violence compared to no violence, they were 2.6 times more likely to report severe depressive symptoms (Bonomi et al., 2006). A study of adults who had experienced partner rape found that the negative psychological effects persisted for many years (on average 11 years) after the incident (Kilpatrick, Best, Saunders, & Veronen, 1988).

In the current study, individuals who experienced partner rape reported that it occurred on several occasions – and considerably more frequently than other rape victims. The consequences of such repeated stress on the individual within the context of such an important interpersonal relationship are likely linked to both psychological and physical health-related problems. However, as described below, in the current study there were no apparent differences in the frequency of psychological or health problems in relation to perpetrator – at least not in regard to the psychological or physical health problems measured in the current study.

Characteristics of the rape and outcome

There were no significant associations between the perpetrator status or the number of times an individual was forced to have sex and the outcome variables. It may be the case that an individual who experienced stranger rape (on average 1.35 forced sexual experiences) may have as much, if not more residual trauma, as an individual who experienced partner violence (on average 7.9 forced sexual experiences). We suspect that variations in the severity of trauma experienced may involve characteristics not measured in the current study. However, notably these characteristics do not appear to be simply explained by the perpetrator status, the number of times raped or, as described below, even the age at which the rape occurred.

We also conducted analyses in which we examined the association between the person's age at the time of the rape and the outcome variables. We had sought to examine whether the age or developmental period at the time of the rape had a differential effect on outcomes. In the current study we had specifically excluded individuals with childhood rape (e.g., rape before age 18). Such trauma experienced early in life is thought to be a significant risk factor for an array of psychiatric disorders (Teicher & Samson, 2013). Nonetheless, we found no associations. However, the limited sample size of individuals who had been raped and the diversity of the ages at which the rapes occurred may have limited our power in examining this hypothesis.

Self-esteem

Rape is possibly the most potent adverse experience one may endure within the context of an interpersonal relationship. In the current study, rape was associated with lower self-esteem. There has been a documented association between exposure to trauma and lowered self-esteem (Lo, 2002; Turner, Taylor, & Gundy, 2004). In particular, negative attributional style and self-blame in relation to the rape may lead to lower self-esteem (Hazzard, 1993).

Importantly, as predicted, we found lower self-esteem appeared to partially explain the association between rape and mental health. Low self-esteem may be a risk factor for the development of psychological distress, in part,

because low self-esteem may lead to a negative self-representation and negative cognitive style, which is thought to adversely affect the individual's interpretation of stressful life events. Catastrophic cognitions associated with the rape may heighten the experience of the trauma and increase levels of distress (Feiring, Taska, & Chen, 2002). Older adults with lower self-esteem may have more difficulty navigating the varied stressful life events that occur in older age.

Treatment

Older adults who have experienced rape earlier in their life may not associate their current psychological distress or physical health problems to this previous trauma. Health professionals, as well as the older individuals themselves, may attribute current distress to more proximal issues and to the aging process and not relate symptoms to events that occurred long ago (Owens, Baker, Kasckow, Ciesla, & Mohamed, 2005). It is important that clinicians recognize that previous rape, or other significant past trauma for that matter, may have significant impact on older adults. Trauma-focused interventions for rape victims should specifically address both mental and physical health (Amstadter, McCauley, Ruggiero, Resnick, & Kilpatrick, 2011).

Cognitive therapy, a frontline treatment, may be particularly helpful if there is a re-examination of cognitions that involve self-blame **(**Koss & Figueredo, 2004). Treatments that target traumatic memories may be beneficial for older adults who are experiencing psychiatric symptoms (Creamer & Parslow, 2008). This may help both physical and mental health and decrease the risk of serious health problems (Kendall-Tackett, 2013).

Sleep problems in individuals with trauma should also be addressed (Babson & Feldner, 2010). Disturbed sleep increases both systemic inflammation and insulin resistance, increasing vulnerability to heart disease, metabolic syndrome, and diabetes (Kendall-Tackett, 2009). Furthermore, sleep problems exacerbate PTSD and depressive symptoms. Cognitive-behavioral therapy and sleep-hygiene techniques are particularly helpful in addressing sleep issues in trauma survivors (Krakow et al., 2000b).

Treatment strategies that increase coping and resiliency may offer the potential to modify negative cognitions, self-blame, and in turn minimize the negative impact of rape on psychological and health functioning during older age. More recently, mindfulness-based integrative medicine interventions have been designed to support adaptive coping processes and resiliency after trauma (Garland, Gaylord, & Park, 2009).

Limitations

The data in this study were gathered at one time point. As a result, it is not possible to demonstrate that rape caused lower self-esteem or that rape caused psychological or physical health problems in late-life; indeed, we can only observe the associations among the variables. In cross-sectional studies, one must always consider the problem of directionality. That is, for example, rather than rape resulting in lower self-esteem; it is possible that this problem may have pre-dated the experience of rape – at least for some of the respondents. Such pre-existing difficulties would likely have led to even more negative consequences of the rape.

Additionally, a few measures had psychometric limitations increasing concerns of validity, specifically the one-item self-esteem measure and the self-report of physical health measures. Nonetheless, research has provided considerable validation for the use of one-item self-esteem measures (Robins et al., 2001). Specifically, Robins et al. (2001) reported that the Single-Item Self-Esteem Scale (SISE) and the Rosenberg Self-Esteem Scale (RSE) had strong convergent validity. In regard to the physical health measures, single item, self-report assessments of health clearly have psychometric limitations. Nonetheless, perceived health has been shown to provide an accurate gauge of physical health outcomes (Schmidt & Telch, 1997), to possess good reliability (Pettit, Kline, Gencoz, Gencoz, & Joiner, 2001), to have good predictive validity (Idler & Kasl, 1991), and to have good agreement with physician diagnosis (Kobasa, Maddi, & Courington, 1981).

Moreover, the low number of male participants endorsing rape precluded the inclusion of males in the study. Thus, we could not examine gender differences. This may be an important consideration for future research. Late-life is associated with different hormonal and biological changes in women than men, which may result in differences in late-life reactions to earlier-life trauma.

Clearly, there are many life events that occur during the aging process that likely would affect psychological and health functioning. Measures of role changes, functional losses, and other life stressors were not included in the analyses. Additionally cognitive changes accompanying aging may also shape how the individual processes distress from trauma-related memories (Floyd et al., 2002). It would be beneficial to consider addressing these issues in future research.

Despite these limitations, the current study was comprised of a large representative community sample of older female adults. We used sophisticated modeling techniques to examine the extent to which the negative effects associated with being sexually assaulted earlier in one's life appear to persist into older age. We found that rape was associated with lower self-esteem and with psychological and physical health functioning. Self-esteem was found to partially mediate the association between rape and psychological functioning. It may be the case that older individuals, who have experienced a traumatic event earlier in life, are more vulnerable to challenges associated with aging effecting physical and psychological health. Future research should examine the mechanisms linking rape and psychological and health problems in older adults.

References

Acierno, R., Lawyer, S.R., Rheingold, A., Kilpatrick, D.G., Resnick, H.S., & Saunders, B.E. (2007). Current psychopathology in previously assaulted older adults. *Journal of Interpersonal Violence, 22*(2), 250–258.

Akushevich, I., Kravchenko, J., Ukraintseva, S., Arbeev, K., & Yashin, A.I. (2013). Time trends of incidence of age-associated diseases in the US elderly population: Medicare-based analysis. *Age and Ageing, 42*(4), 494–500. doi:10.1093/ageing/aft032

Ali, T., Dunmore, E., Clark, D., & Ehlers, A. (2002). The role of negative beliefs in posttraumatic stress disorder: A comparison of assault victims and non victims. *Behavioural and Cognitive Psychotherapy, 30*(3), 249–257.

Alloy, L.B., Abramson, L.Y., Whitehouse, W.G., Hogan, M.E., Tashman, N.A., Steinberg, D.L., & Donovan, P. (1999). Depressogenic cognitive styles: Predictive validity, information processing and personality characteristics, and developmental origins. *Behaviour Research and Therapy, 37*(6), 503–531.

Altemus, M., Cloitre, M., & Dhabhar, F.S. (2003). Enhanced cellular immune response in women with PTSD related to childhood abuse. *American Journal of Psychiatry, 160*, 1705–1707.

Amstadter, A., McCauley, J., Ruggiero, K., Resnick, H., & Kilpatrick, D. (2011). Self-rated health in relation to rape and mental health disorders in a national sample of women. *American Journal of Orthopsychiatry, 81*(2), 202–210.

Anderson, C.A., Miller, R.S., Riger, A.L., Dill, J.C., & Sedikides, C. (1994). Behavioral and characterological attributional styles as predictors of depression and loneliness: Review, refinement, and test. *Journal of Personality and Social Psychology, 66*(3), 549–558. doi:10.1037/0022-3514.66.3.549

Babson, K.A., & Feldner, M.T. (2010). Temporal relations between sleep problems and both traumatic event exposure and PTSD: A critical review of the empirical literature. *Journal of Anxiety Disorders, 24*(1), 1–15. doi:http://dx.doi.org/10.1016/j.janxdis.2009.08.002

Bailis, D.S., & Chipperfield, J.G. (2002). Compensating for losses in perceived personal control over health: A role for collective self-esteem in healthy aging. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 57*(6), P531–P539. doi:10.1093/geronb/57.6.P531

Black, M.C., Basile, K.C., Breiding, M.J., Smith, S.G., Walters, M.L., Merrick, M.T., . . . Stevens, M.R. (2011). *The national intimate partner and sexual violence survey (NISVS): 2010 summary report*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.

Blazer, D. (1994). *Depression in late life*. St. Louis, MO: CV. Mosby and Company.

Bonomi, A.E., Thompson, R.S., Anderson, M., Reid, R.J., Carrell, D., Dimer, J.A., & Rivara, F.P. (2006). Intimate partner violence and women's physical, mental, and social functioning. *American Journal of Preventive Medicine, 30*(6), 458–466.

Caci, H., Bayle, F.J., Mattei, V., Dossios, C., Robert, P., & Boyer, P. (2003). How does the Hospital and Anxiety and Depression Scale measure anxiety and depression in healthy subjects?. *Psychiatry Research, 118*(1), 89–99.

Campbell, J.C. (1989). Women's responses to sexual abuse in intimate relationships. *Health Care Women International, 10*(4), 335–346.

Campbell, R., Dworkin, E., & Cabral, G. (2009). An ecological model of the impact of sexual assault on women's mental health. *Trauma, Violence, & Abuse, 10*(3), 225–246. doi:10.1177/1524838009334456

Campbell, R., Sefl, T., & Ahrens, C.E. (2003). The physical health consequences of rape: Assessing survivors' somatic symptoms in a racially diverse population. *Women's Studies Quarterly, 31*(1/2), 90–104.

Campbell, R., Sefl, T., & Ahrens, C.E. (2004). The impact of rape on women's sexual health risk behaviors. *Health Psychology, 23*(1), 67–74. doi:10.1037/0278-6133.23.1.67

Cheng, S.K., & Lam, D.J. (1997). Relationships among life stress, problem solving, self-esteem, and dysphoria in Hong Kong adolescents: Test of a model. *Journal of Social and Clinical Psychology, 16*(3), 343–355.

Cook, J.M. (2001). Post-traumatic stress disorder in older adults. *PTSD Research Quarterly, 12*, 1–7.

Creamer, M., & Parslow, R. (2008). Trauma exposure and posttraumatic stress disorder in the elderly: A community prevalence study. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry, 16*(10), 853–856.

Davis, J.L., Combs-Lane, A.M., & Smith, D.W. (2004). Victimization and health risk behaviors: Implications for prevention programs. In K. Kendall-Tackett & B. Klest (Eds.), *Health consequences of abuse in the family: A clinical guide for evidence-based practice* (pp. 179–195). Washington, DC: American Psychological Association.

Davison, E.H., Pless, A.P., Gugliucci, M.R., King, L.A., King, D.W., Salgado, D.M., . . . Bachrach, P. (2006). Late-life emergence of early-life trauma: The phenomenon of late-onset stress symptomatology among aging combat Veterans. *Research on Aging, 28*, 84–114.

Dietz, P.M., Spitz, A.M., Anda, R.F., Williamson, D.F., McMahon, P.M., Santelli, J.S., & Kendrick, J.S. (1999). Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. *Journal of the American Medical Association, 282*, 1359–1364.

Dobie, D.J., Kivlahan, D.R., Maynard, C., Bush, K.R., Davis, T. M., & Bradley, K.A. (2004). Posttraumatic stress disorder in female veterans: Association with self-reported health problems and functional impairment. *Archives of Internal Medicine, 164*(4), 394–400. doi:10.1001/archinte.164.4.394

Elklit, A., & Christiansen, D.M. (2010). ASD and PTSD in rape victims. *Journal of Interpersonal Violence, 25*(8), 1470–1488. doi:10.1177/0886260509354587

Feiring, C., Taska, L., & Chen, K. (2002). Trying to understand why horrible things happen: Attribution, shame, and symptom development following sexual abuse. *Child Maltreat, 7* (1), 25–39. doi:10.1177/1077559502007001003

Floyd, M., Rice, J., & Black, S. (2002). Recurrence of posttraumatic stress disorder in late life: A cognitive aging perspective. *Journal of Clinical Geropsychology, 8*(4), 303–311. doi:10.1023/a:1019679307628

Ganzel, B., Morris, P., & Wethington, E. (2010). Allostasis and the human brain: Integrating models of stress from the social and life sciences. *Psychological Review, 117*(1), 134–174.

Garland, E., Gaylord, S., & Park, J. (2009). The role of mindfulness in positive reappraisal. *Explore: The Journal of Science and Healing, 5*(1), 37–44. doi:http://dx.doi.org/10.1016/j.explore.2008.10.001

Gibb, B.E. (2002). Childhood maltreatment and negative cognitive styles. A quantitative and qualitative review. *Clinical Psychology Review, 22*(2), 223–246.

Golding, J.M. (1994). Sexual assault history and physical health in randomly selected Los Angeles women. *Health Psychology, 13*, 130–138.

Golding, J.M. (1999). Sexual-assault history and long-term physical health problems: Evidence from clinical and population epidemiology. *Current Directions in Psychological Science, 8*(6), 191–194.

Golding, J.M. (2003). Sexual-assault history and long term physical health problems: Evidence from clinical and population epidemiology. *Directions in Psychological Science, 8*, 191–194.

Golding, J.M., Cooper, M.L., & George, L.K. (1997). Sexual assault history and health perceptions: Seven general population studies. *Health Psychology, 16*, 417–425.

Groer, M., Thomas, S., Evans, G., Helton, S., & Weldon, A. (2006). Inflammatory effects and immune system correlates of rape. *Violence Victims, 21*(6), 796–808.

Gum, A.M., King-Kallimanis, B., & Kohn, R. (2009). Prevalence of mood, anxiety, and substance-abuse disorders for older americans in the national comorbidity survey-replication. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry, 17*(9), 769–781.

Hazzard, A. (1993). Trauma-related beliefs as mediators of sexual abuse impact in adult women survivors. *Journal of Child Sexual Abuse, 2*(3), 55–70. doi:10.1300/J070v02n03_04

Heim, C., & Nemeroff, C.B. (2002). Neurobiology of early life stress: Clinical studies. *Seminar in Clinical Neuropsychiatry, 7*, 147–159.

Heim, C., & Nemeroff, C.B. (2009). Neurobiology of posttraumatic stress disorder. *CNS Spectrums, 14*(1) (Suppl 1), 13–24.

Hillis, S.D., Anda, R.F., Felitti, V.J., Nordenberg, D., & Marchbanks, P.A. (2000). Adverse childhood experiences and sexually transmitted diseases in men and women: A retrospective study. *Pediatrics, 106*, 11.

Hu, L.-T., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55.

Hughes, M.E., Waite, L.J., Hawkley, L.C., & Cacioppo, J.T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging, 26*(6), 655–672.

Idler, E., & Kasl, S. (1991). Health perceptions and survival: Do global evaluations of health status really predict mortality? *Journals of Gerontology: Social Sciences, 46*, S55–S65.

Juster, R.-P., Marin, M.-F., Sindi, S., Nair, N.P.V., Ng, Y.K., Pruessner, J.C., & Lupien, S.J. (2011). Allostatic load associations to acute, 3-year and 6-year prospective depressive symptoms in healthy older adults. *Physiology & Behavior, 104*(2), 360–364. doi:http://dx.doi.org/10.1016/j.physbeh.2011.02.027

Juster, R.P., McEwen, B.S., & Lupien, S.J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience & Biobehavioral Reviews, 35*(1), 2–16. doi:http://dx.doi.org/10.1016/j.neubiorev.2009.10.002

Kendall-Tackett, K.A. (2003). *Treating the lifetime health effects of childhood victimization: A guide for mental health, medical and social service professionals*. Kingston, NJ: Civic Research Institute.

Kendall-Tackett, K.A. (2007). Cardiovascular disease and metabolic syndrome as sequelae of violence against women: A psychoneuroimmunology approach. *Trauma, Violence and Abuse, 8*, 117–126.

Kendall-Tackett, K.A. (2009). Psychological trauma and physical health: A psychoneuroimmunology approach to etiology of negative heatlh effects and possible interventions. *Psychological Trauma, 1*(1), 35–48.

Kendall-Tackett, K.A. (2013). *Treating the lifetime health effects of childhood victimization* (2nd ed.). Kingston, NJ: Civic Research Institute.

Kendall-Tackett, K.A., Cong, Z., & Hale, T.W. (2013). Depression, sleep quality, and maternal well-being in postpartum women with a history of sexual assault: A comparison of breastfeeding, mixed-feeding, and formula-feeding mothers. *Breastfeeding Medicine, 8*(1), 16–22.

Kilpatrick, D.G., Best, C.L., Saunders, B.E., & Veronen, L.J. (1988). Rape in marriage and in dating relationships: How bad Is it for mental health? *Annals of the New York Academy of Sciences, 528*(1), 335–344. doi:10.1111/j.1749-6632.1988.tb50875.x

Kline, R.B. (2005). Details of path analysis structural equation modeling. In R.B. Klein (Ed.), *Principles and practice of structural equation modeling* (2nd ed., pp. 133–135). New York, NY: Guildford.

Kobasa, S., Maddi, S., & Courington, S. (1981). Personality and constitution as mediators in the stress-illness relationship. *Journal of Health and Social Behavior, 22*(4), 368–378.

Kohout, F.J., Berkman, L.F., Evans, D.A., & Cornoni-Huntley, J. (1993). Two shorter forms of the CES-D depression symptoms index. *Journal of Aging and Health, 5*(2), 179–193. doi:10.1177/089826439300500202

Koss, M.P., & Aurelio, J.F. (2004). Cognitive mediation of rape's mental health impact: Constructive replication of a cross-sectional model in longitudinal data. *Psychology of Women Quarterly, 28*(4), 273–286. doi:10.1111/j.1471-6402.2004.00145.

Koss, M.P., & Figueredo, A.J. (2004). Change in cognitive mediators of rape's impact on psychosocial health across 2 years of recovery. *Journal of Consulting and Clinical Psychology, 72*(6), 1063–1072.

Koss, M.P., Goodman, L.A., Browne, A., Fitzgerald, L.F., Keita, G.P., & Russo, N.F. (1994). *No safe haven: male violence against women at home, at work, and in the community*. Washington, DC: American Psychological Association.

Koss, M., Koss, P., & Woodruff, W. (1991). Deleterious effects of criminal victimization on women's health and medical utilization. *Archives of Internal Medicine, 151*(2), 342–347.

Kraaij, V., Garnefski, N., de Wilde, E., Dijkstra, A., Gebhardt, W., Maes, S., & ter Doest, L. (2003). Negative life events and depressive symptoms in late adolescence: Bonding and cognitive coping as vulnerability factors? *Journal of Youth and Adolescence, 32*(3), 185–193. doi:10.1023/a:1022543419747

Krakow, B., Artar, A., Warner, T.D., Melendrez, D., Johnston, L., Hollifield, M., & Koss, M. (2000a). Sleep disorder, depression and suicidality in female sexual assault survivors. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 21*(4), 163–170.

Krakow, B., Hollifield, M., Johnston, L., Koss, M., Schrader, R., Warner, T., & Prince, H. (2001). Imagery rehearsal therapy for chronic nightmares in sexual assault survivors with posttraumatic stress disorder: A randomized controlled trial. *JAMA, 286*(5), 537–545.

Krakow, B., Lowry, C., Germain, A., Gaddy, L., Hollifield, M., Koss, M., & Melendrez, D. (2000b). A retrospective study on improvements in nightmares and post-traumatic stress disorder following treatment for co-morbid sleep-disordered breathing. *Journal of Psychosomatic Research, 49*(5), 291–298.

Krause, N., Shaw, B.A., & Cairney, J. (2004). A descriptive epidemiology of lifetime trauma and the physical health status of older adults. *Psychology and Aging, 19*(4), 637–648.

Kreger, D.W. (1995). Self-esteem, stress, and depression among graduate students. *Psychological Reports, 76*(1), 345–346.

Kuipers, E.J., Thijs, J.C., & Festen, H.P. (1995). The prevalence of Helicobacter pylori in peptic ulcer disease. *Alimentary Pharmacology & Therapeutics, 9*(Suppl 2), 59–69.

Kuwert, P., Klauer, T., Eichhorn, S., Grundke, E., Dudeck, M., Schomerus, G., & Freyberger, H. (2010). Trauma and current posttraumatic stress symptoms in elderly German women who experienced wartime rapes in 1945. *Journal Nervous Mental Disorders, 198*(6), 450–451.

Lapp, L.K., Agbokou, C., & Ferreri, F. (2011). PTSD in the elderly: The interaction between trauma and aging. *International Psychogeriatrics, 23*(6), 858–868. doi:10.1017/S1041610211000366

Leserman, J., Li, Z., Drossman, D.A., Toomey, T.C., Nachman, G., & Glogau, L. (1997). Impact of sexual and physical abuse dimensions on health status: Development of an abuse severity measure. *Psychosomatic Medicine, 59*, 152–160.

Lo, R. (2002). A longitudinal study of perceived level of stress, coping and self-esteem of undergraduate nursing students: An Australian case study. *Journal of Advanced Nursing, 39*(2), 119–126.

Lueger-Schuster, B., Gluck, T., Tran, U., & Zeilinger, E. (2012). Sexual violence by occupational forces during and after World War II: Influence of experiencing and witnessing of sexual violence on current mental health in a sample of elderly Austrians. *International Psychogeriatric, 24*(8), 1354–1358.

McEwen, B.S. (1998). Stress, adaptation, and disease. Allostasis and allostatic load. [Review]. *Annals of the New York Academy of Sciences, 840*, 33–44.

McEwen, B.S. (2002). Sex, stress and the hippocampus: Allostasis, allostatic load and the aging process. [Review]. *Neurobiology of Aging, 23*(5), 921–939.

McEwen, B.S., & Wingfield, J.C. (2003). The concept of allostasis in biology and biomedicine. *Hormones and Behavior, 43* (1), 2–15. doi:http://dx.doi.org/10.1016/S0018-506X(02)00024-7

McFarlane, J., Malecha, A., Watson, K., Gist, J., Batten, E., Hall, I., & Smith, S. (2005). Intimate partner sexual assault against women: Frequency, health consequences, and treatment outcomes. *Obstetrics & Gynecology, 105*(1), 99–108.

Molnar, B., Buka, S., & Kessler, R. (2001). Child sexual abuse and subsequent psychopathology: Results from the National Comorbidity Survey. *American Journal of Public Health, 91* (5), 753–760.

Murphy, S.M., Amick-McMullan, A.E., Kilpatrick, D.G., Haskett, M., Eronen, L.J., Best, C.L., & Saunders, B.E. (1988). Rape victims' self-esteem: A longitudinal analysis. *Journal of Interpersonal Violence, 3*(4), 355–370. doi:10.1177/088626088003004001

Muthén, L.K., & Muthén, B.O. (1998–2010). *Mplus user's guide* (5th ed.). Los Angeles, CA: Muthén & Muthén.

Nishith, P., Mechanic, M.B., & Resick, P.A. (2000). Prior interpersonal trauma: The contribution to current PTSD symptoms in female rape victims. *Journal of Abnormal Psychology, 109*(1), 20–25. doi:10.1037/0021-843x.109.1.20

O'Donovan, A., Neylan, T.C., Metzler, T., & Cohen, B.E. (2012). Lifetime exposure to traumatic psychological stress is associated with elevated inflammation in the Heart and Soul Study. *Brain, Behavior, and Immunity, 26*(4), 642–649. doi:http://dx.doi.org/10.1016/j.bbi.2012.02.003

O'Muircheartaigh, C., Eckman, S., & Smith, S. (2009). Statistical design and estimation for the national social life, health, and aging project. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 64B*(suppl 1), i12–i19. doi:10.1093/geronb/gbp045

Orth, U., Robins, R.W., Trzesniewski, K.H., Maes, J., & Schmitt, M. (2009). Low self-esteem is a risk factor for depressive symptoms from young adulthood to old age. *Journal of Abnormal Psychology, 118*(3), 472–478. doi:10.1037/a0015922

Owens, G.P., Baker, D.G., Kasckow, J., Ciesla, J.A., & Mohamed, S. (2005). Review of assessment and treatment of PTSD among elderly American armed forces veterans. [Review]. *International Journal of Geriatric Psychiatry, 20* (12), 1118–1130.

Packard, C.J., Cavanagh, J., McLean, J.S., McConnachie, A., Messow, C.M., Batty, G.D., & Millar, K. (2012). Interaction of personality traits with social deprivation in determining mental wellbeing and health behaviours. *Zeitschrift für Gesundheitswissenschaften, 34*(4), 615–624. doi:10.1093/pubmed/fds030

Paul, C., Ayis, S., & Ebrahim, S. (2006). Psychological distress, loneliness and disability in old age. *Psychology, Health &Medicine, 11*(2), 221–232.

Pettit, J.W., Kline, J., Gencoz, T., Gencoz, F., & Joiner, T. (2001). Are happier people healthier? The specific role of positive affect in predicting self-reported health symptoms. *Journal of Research in Personality, 35*, 521–536.

Radloff, L. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measures, 1*, 385–401.

Reitzes, D.C., & Mutran, E.J. (2006). Self and health: Factors that encourage self-esteem and functional health. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 61*(1), S44–S51.

Rich-Edwards, J.W., Spiegelman, D., Lividoti Hibert, E.N., Jun, H.-J., Todd, T.J., Kawachi, I., & Wright, R.J. (2010). Abuse in childhood and adolescence as a predictor of type 2 diabetes in adult women. *American Journal of Preventive Medicine, 39*(6), 529–536.

Robins, R.W., Hendin, H.M., & Trzesniewski, K.H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 27*(2), 151–161. doi:10.1177/0146167201272002

Russell, D., Peplau, L.A., & Cutrona, C.E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology, 39*(3), 472–480. doi:10.1037/0022-3514.39.3.472

Russell, D.W. (1996). UCLA Loneliness Scale (version 3): Reliability, validity, and factor structure. *Journal of Personality Assessment, 66*(1), 20–40. doi:10.1207/s15327752jpa6601_2

Sachs-Ericsson, N., Collins, N., Schmidt, B., & Zvolensky, M. (2011). Older adults and smoking: Characteristics, nicotine dependence and prevalence of DSM-IV 12-month disorders. *Aging & Mental Health, 15*(1), 132–141.

Sachs-Ericsson, N., Joiner, T., Plant, E.A., & Blazer, D. (2005). The association of depression to cognitive decline in a community sample of elderly adults. *American Journal of Geriatric Psychiatry*. *13*, 402–408.

Sachs-Ericsson, N., Verona, E., Joiner, T., & Preacher, K.J. (2006). Parental verbal abuse and the mediating role of self-criticism in adult internalizing disorders. *Journal of Affective Disorders, 93*(1–3), 71–78.

Sapolsky, R.M. (2000). Glucocorticoids and hippocampal atrophy in neuropsychiatric disorders. *Archives of General Psychiatry, 57*, 925–935.

Schmidt, N., & Telch, M. (1997). Nonpsychiatric medical comorbidity, health perceptions, and treatment outcome in patients with panic disorder. *Health Psychology, 16*(2), 114–122.

Shiovitz-Ezra, S., Leitsch, S., Graber, J., & Karraker, A. (2009). Quality of life and psychological health indicators in the national social life, health, and aging project. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 64B*(suppl 1), i30–i37. doi:10.1093/geronb/gbn020

Smith, S., Jaszczak, A., Graber, J., Lundeen, K., Leitsch, S., Wargo, E., & O'Muircheartaigh, C. (2009). Instrument development, study design implementation, and survey conduct for the national social life, health, and aging project. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 64B*(suppl 1), i20–i29. doi:10.1093/geronb/gbn013

Solomon, Z., Ginzburg, K. (1999). Aging in the shadow of war. In A. Maercker, M. Schutzwohl, & Z. Solomon (Eds.), *Posttraumatic stress disorder: A lifespan developmental perspective* (pp. 137–154). Seattle, WA: Hogrefe & Huber.

Spataro, J., Mullen, P.E., Burgess, P.M., Wells, D.L., & Moss, S. A. (2004). Impact of child sexual abuse on mental health: Prospective study in males and females. *The British Journal of Psychiatry, 184*(5), 416–421.

Spitzer, C., Koch, B., Grabe, H.J., Ewert, R., Barnow, S., Felix, S.B., & Schäper, C. (2011). Association of airflow limitation with trauma exposure and post-traumatic stress disorder. *European Respiratory Journal, 37*(5), 1068–1075. doi:10.1183/09031936.00028010

Springer, K. (2009). Childhood physical abuse and midlife physical health: Testing a multi-pathway life course model. *Social Science & Medicine, 69*(1), 138–146.

SPSS. (2009). *Statisitical package for social science*. Chicago, IL: Author.

Stein, M.B., & Barrett-Connor, E. (2000). Sexual assault and physical health: Findings from a population-based study of older adults. *Psychosomatic Medicine, 62*(6), 838–843.

Suzman, R. (2009). The national social life, health, and aging project: An introduction. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 64B*(suppl 1), i5–i11. doi:10.1093/geronb/gbp078

Teicher, M.H., & Samson, J.A. (2013). Childhood maltreatment and psychopathology: A case for ecophenotypic variants as clinically and neurobiologically distinct subtypes. *American Journal of Psychiatry, 170*(10), 1114–1133.

Trzesniewski, K., Donnellan, M., Moffitt, T., Robins, R., Poulton, R., & Caspi, A. (2006). Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology, 42*(2), 381–390.

Turner, H.A., & Muller, P.A. (2004). Long-term effects of child corporal punishment on depressive symptoms in young adults: Potential moderators and mediators. *Journal of Family Issues, 25*(6), 761–782.

Turner, R.J., Taylor, J., & Gundy, K.V. (2004). Personal resources and depression in the transition to adulthood: Ethnic comparisons. *Journal of Health and Social Behavior, 45*(1), 34–52.

Welch, J., & Mason, F. (2007). Rape and sexual assault. *BMJ, 334*(7604), 1154–1158. doi:10.1136/bmj.39211.403970.BE

Zigmond, A.S., & Snaith, R.P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica, 67*(6), 361–370. doi:10.1111/j.1600-0447.1983.tb09716.x