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Research report

Moderating effects of resilience on depression in individuals with a history of childhood abuse or trauma exposure

Aliza P. Wingo^a, Glenda Wrenn^b, Tiffany Pelletier^a, Alisa R. Gutman^a, Bekh Bradley^{d,a}, Kerry J. Ressler^{a,c,e,*}^a Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, United States^b Department of Psychiatry, University of Pennsylvania, United States^c Howard Hughes Medical Institute, United States^d Atlanta VA Medical Center, United States^e Yerkes National Primate Research Center, United States

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ABSTRACT

Background: Influences of resilience on the presence and severity of depression following trauma exposure are largely unknown. Hence, we examined effects of resilience on depressive symptom severity in individuals with past childhood abuse and/or other trauma exposure.

Methods: In this cross-sectional study of 792 adults, resilience was measured with the Connor-Davidson Resilience Scale, depression with the Beck Depression Inventory (BDI), childhood abuse with the Childhood Trauma Questionnaire, and other traumas with the Trauma Events Inventory.

Results: Multiple linear regression modeling with depression severity (BDI score) as the outcome yielded 4 factors: *childhood abuse* ($\beta = 2.5, p < 0.0001$), *other trauma* ($\beta = 3.5, p < 0.0001$), *resilience* ($\beta = -0.5, p < 0.0001$), and *other trauma × resilience* interaction term ($\beta = -0.1, p = 0.0021$), all of which were significantly associated with depression severity, even after adjusting for age, sex, race, education, employment, income, marital status, and family psychiatric history. Childhood abuse and trauma exposure contributed to depressive symptom severity while resilience mitigated it.

Conclusions: Resilience moderates depressive symptom severity in individuals exposed to childhood abuse or other traumas both as a main effect and an interaction with trauma exposure. Resilience may be amenable to external manipulation and could present a potential focus for treatments and interventions.

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1. Introduction

Major depression affects 16% of the general population and is one of the ten leading causes of premature death and disability in the United States (Kessler et al., 2003; McKenna et al., 2005). Two important risk factors for depression are

childhood abuse, including sexual, physical, or emotional abuse (Bernet and Stein, 1999; Collishaw et al., 2007; Lizardi et al., 1995; Ritchie et al., 2009), and trauma exposure such as serious transportation accidents, physical or sexual assault, and unexpected or sudden death of a loved one (Alim et al., 2006; Crichlow et al., 2006). However, not everyone with childhood abuse or other trauma exposure experiences psychopathology, underscoring the significance of resilience, which is defined as the ability to adapt well in the face of trauma or adversity (Alim et al., 2008; Collishaw et al., 2007; Feder et al., 2009). Influences of resilience on the presence or severity of depression following trauma exposure are largely unknown. To our knowledge, only three studies on the role of

* Corresponding author. Department of Psychiatry and Behavioral Sciences, Yerkes Research Center, Emory University, 954 Gatewood Drive, Atlanta, GA 30329, United States. Tel.: +1 404 727 7739; fax: +1 404 727 8644.

E-mail address: kressle@emory.edu (K.J. Ressler).

resilience on general psychiatric symptoms have been reported (Alim et al., 2008; Campbell-Sills et al., 2006; Collishaw et al., 2007). One cross-sectional study found that, given similar levels of childhood emotional neglect, individuals with high resilience had fewer general psychiatric symptoms, measured with the Brief Symptom Inventory scale, compared to those with low resilience (Campbell-Sills et al., 2006). The second study followed individuals with a history of childhood sexual or physical abuse for 30 years to assess for the development of adult psychopathology; it found that despite serious abuse history, some people did not develop psychiatric problems during this follow-up period (Collishaw et al., 2007). Likewise, the third cross-sectional study found that despite exposure to traumatic events, some individuals had no lifetime psychiatric disorders (Alim et al., 2008). These studies provide valuable information on the effect of resilience on general psychiatric symptoms. However, a focus on effects of resilience on depression in particular, and considering trauma exposures other than childhood maltreatment is still lacking.

Given this background, we investigated effects of resilience, quantitatively measured with the Connor–Davidson Resilience Scale (Campbell-Sills and Stein, 2007), on depressive symptom severity following childhood abuse and/or other trauma exposures in a highly traumatized, at risk, urban population. We hypothesized that despite the presence of multiple risk factors, resilience would significantly moderate the severity of depressive symptoms.

2. Methods

2.1. Sample, recruitment, and procedure

This was part of a larger study investigating genetic and trauma-related risk factors for PTSD and depression in an urban population of predominantly African Americans (Binder et al., 2008; Bradley et al., 2008). Inclusion criteria included 18 to 75 years of age, understanding English, and able to give informed consent. Members of the research team approached adult patients waiting for their appointments at the primary care or obstetrical–gynecological clinics of Grady Memorial Hospital in Atlanta, GA, to solicit for study participation. The study was approved by the institutional review boards of Emory University School of Medicine and Grady Memorial Hospital.

2.2. Measures

Childhood abuse was assessed retrospectively with the psychometrically validated 28-item Childhood Trauma Questionnaire (CTQ) (Bernstein and Fink, 1998; Bernstein et al., 2003). Scores were extracted for the categories of sexual, physical, and emotional abuse. Based on these scores, we classified each type of abuse as 0 (none/mild level) or 1 (moderate/severe level) following Bernstein and Fink's score ranges for severity (Bernstein and Fink, 1998). We then used the number of types of abuse in the moderate/severe range (0–3) as an index measure of childhood abuse.

Other trauma exposures were assessed retrospectively using the Traumatic Events Inventory (Gillespie et al., 2009; Schwartz et al., 2005). This instrument screens for lifetime

exposure to different categories of trauma, including natural disasters, serious accidents or injuries, sudden life-threatening illness, military combat, physical or sexual assaults. For each category of the instrument, having had the exposure was scored “1” and no exposure “0”. Score ranges from 0 to 10, with higher scores reflecting exposure to more types of trauma. The childhood trauma items in this inventory were excluded to avoid overlap with the information collected with the CTQ.

Resilience was measured with the 10-item, self-rated Connor–Davidson Resilience Scale (CDRISC) (Campbell-Sills and Stein, 2007). The full CDRISC was found to have an unstable structure across two demographically equivalent samples and was thus modified into a 10-item scale with good internal consistency, construct validity, and excellent psychometric properties for efficient measurement of resilience (Campbell-Sills and Stein, 2007). Items were rated on a 5-point Likert scale, ranging from “not true at all” (scored 0) to “true nearly all the time” (scored 4). Score ranges from 0 to 40 with higher score reflecting greater resilience.

Depression was measured with the self-rated, psychometrically validated, 21-item Beck Depression Inventory (BDI), which has a high degree of reliability and validity (Beck et al., 1961). Items were rated on a Likert scale of 0–3; total score ranges from 0 to 63, with higher scores reflecting higher levels of depression. Levels of depression severity are suggested by the following score ranges: $BDI \leq 9$ reflects no depression, $9 < BDI \leq 18$ mild depression, and $BDI \geq 19$ moderate to severe depression (Beck et al., 1961).

2.3. Statistical analyses

Analyses were performed using SAS Software (version 9.2[©] of 2008; SAS Institute, Cary, NC). Sociodemographic variables were characterized with descriptive statistics. Multiple linear regression was performed with BDI score as the outcome variable and childhood abuse, other trauma exposures, and resilience as continuous independent variables, controlling for age, sex, race, education, employment, income, marital status, and family history of psychiatric illnesses. Assumption checking for multiple linear regression was performed using SAS regression diagnostics. Statistical significance required a two-sided *p*-value of <0.05 .

3. Results

A total of 792 adults participated in the study; median age and range was 36 [18–74]; approximately 68% were female; 94% were African American; 11% were married; 69% had an education of high school or below; 32% were employed; and 63% had a monthly income of <1000 (Table 1). Approximately 48% of the participants had no depression ($BDI \leq 9$), 22% had mild depression ($9 < BDI \leq 18$), and 30% had moderate or severe depression ($BDI \geq 19$). Regarding childhood abuse, 62% had experienced no abuse in the moderate/severe range, 20% had one type of sexual, physical, or emotional abuse in the moderate/severe range, 8% had 2 types of abuse, and 9% had 3 types of abuse in the moderate/severe range (Table 1). Regarding other trauma exposures, the sample had a median of 2 types of trauma exposure and a range of [0–8]. Resilience

Table 1
Sociodemographic and clinical characteristics of 792 participants.

Characteristics	n	%
Sex (female)	537	67.8
Race		
African American	735	93.8
Others	49	6.2
Marital status		
Married	83	11.0
Others (single, separated, divorced, widowed)	675	89.0
Education		
High school or below	538	68.6
Some college or technical school	196	25.0
College graduates or graduate school	50	6.4
Employment status		
Employed	251	32.1
Unemployed	532	67.9
Monthly income		
<1000	473	63.1
≤1000 and <2000	178	23.8
≥2000	98	13.1
Childhood abuse		
0 type in moderate/severe	483	62.4
1 type in moderate/severe range	153	19.8
2 types in moderate/severe range	65	8.4
3 types in moderate/severe range	73	9.4
	Median	Range
Age	36	18–74
Childhood abuse	0	0–3
Other trauma exposure	2	0–8
Resilience (CDRISC)	34	0–40
Depression severity (BDI score)	10	0–58

Up to 6% of the participants had some missing values for these variables.

had a median and range of 34 [3–40]. Detailed sociodemographic and clinical characteristics are presented in Table 1.

Multiple linear regression with depression severity (BDI score) as the outcome yielded a significant model of 4 factors: *childhood abuse* ($\beta = 2.5, p < 0.0001$), *other trauma exposures* ($\beta = 3.5, p < 0.0001$), *resilience* ($\beta = -0.5, p < 0.0001$), and the interaction term *other trauma* \times *resilience* ($\beta = -0.1, p = 0.0021$), all of which were significantly associated with BDI score (Table 2). This model explains 34% of the variance of depressive symptom severity (adjusted $R^2 = 0.34$). As expected, childhood abuse and other trauma exposure contributed to depression severity while resilience mitigated it. Notably, resilience interacted with other trauma exposure in moderating depressive symptom severity (Table 2). No interaction between childhood abuse and resilience, or childhood abuse and other trauma exposure was observed. This regression model suggests that an

Table 2
Multiple linear regression model for depressive symptom severity (BDI) ($n = 768$).

Variable (range)	df	β^a	SE ^b of β	p	Adj. R^2
Model	4	–	–	<0.0001	0.34
Childhood abuse (0–3)	1	2.5	0.4	<0.0001	
Other trauma (0–10)	1	3.5	0.7	<0.0001	
Resilience (0–40)	1	–0.5	0.1	<0.0001	
Other trauma \times resilience	1	–0.1	0.0	0.0021	

^a Parameter estimate.

^b Standard error.

increase of 5 points on the CDRISC resilience scale (range 0–40) is associated with a decrease of 2.5 points on the BDI score, while an increase of 1 point on other trauma exposure score (range 1–10) is associated with an increase of 3.5 points on the BDI score; likewise, having one more type of childhood abuse in the moderate/severe range is associated with 2.5 point increase on the BDI score. This model remained true after adjusting for age, sex, race, marital status, education, employment, income, and family history of psychiatric illnesses.

For a visual conceptualization of the interaction between adult trauma and resilience, we divided resilience into 3 categories based on the percentile of the CDRISC score: high resilience was defined as having CDRISC score \geq 75th percentile, medium resilience as having CDRISC score 25th percentile and less than 75th percentile, and low resilience as having CDRISC score \leq 25th percentile. We found that given similar levels of other trauma exposure, the high resilience group had lower BDI scores than the medium or low resilience group, and the medium resilience group had a lower depression severity than the low resilience group (Fig. 1).

4. Discussion

In this cross-sectional study of 792 urban, low-income, highly traumatized, predominantly African Americans, we found that both childhood abuse and other trauma exposures significantly contributed to depressive symptom severity while resilience significantly mitigated it. Moreover, we found that resilience moderated depression severity both as a main effect and an interaction with other trauma exposures. This is the first study, to our knowledge, to report moderating effects of resilience on depressive symptom severity, taking into consideration both childhood abuse and other trauma exposures.

Our results should be interpreted in light of the study limitations, including potential recall bias on the CTQ and TEI

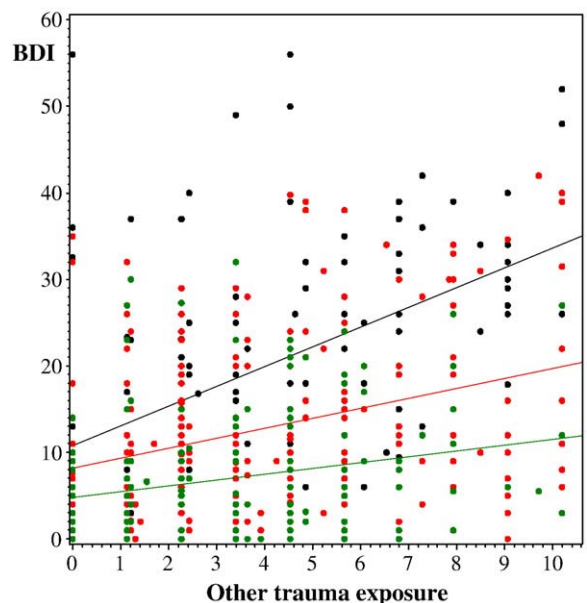


Fig. 1. Interaction between other trauma and resilience on depressive symptom severity.

retrospective rating scales, cross-sectional study design, and possible confounding effect of substance abuse. Future studies with longitudinal assessment of depressive symptoms, recovery, relapse, effects of substance abuse, and social support systems are needed for a fine grained assessment of effects of resilience.

Our findings are particularly informative on at least two levels. One, it suggests that a better understanding of the phenomenology, neural, and molecular basis of resilience is important in achieving a comprehensive understanding of human responses to stress and trauma. Two, protective factors such as resilience may be amenable to external manipulation and could present a potential focus for future treatments and interventions.

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Conflict of interest

No conflict declared.

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