



Published in final edited form as:

*Psychol Trauma*. 2018 September ; 10(5): 491–498. doi:10.1037/tra0000334.

## Predictors of Somatic Symptom Severity: The Role of Cumulative History of Trauma and Adversity in a Diverse Community Sample

**Tamra Burns Loeb,**

University of California, Los Angeles

**Nataria T. Joseph,**

Pepperdine University

**Gail E. Wyatt,**

University of California, Los Angeles

**Muyu Zhang,**

University of California, Los Angeles

**Dorothy Chin,**

University of California, Los Angeles

**April Thames, and**

University of California, Los Angeles

**Yvorn Aswad**

Charles R. Drew University of Medicine and Science, David Geffen School of Medicine at UCLA

### Abstract

**Objective**—Somatic symptoms are often reported among victims of trauma, and place a significant burden on primary care health providers. We examined the relationship between lifetime histories of trauma and adversity, including aspects not previously studied (i.e., perceived discrimination), and somatic symptoms, as well as the mediating role of post-traumatic stress symptoms (PTSS) and depressive symptoms.

**Method**—A multi-ethnic community sample of 500 male and female participants (230 African American and 270 Latino) completed measures of demographic characteristics, the UCLA Lifetime Adversities Screener (LADS), depressive symptoms, PTSS, and somatic symptoms.

**Results**—An ordinary least squares regression analysis controlling for age, gender, and race/ethnicity indicated that higher levels of lifetime adversity and trauma were significantly associated with more severe somatic symptoms,  $b = 6.95, p < .0001$ . Formal mediation tests indicated that there was a significant indirect effect of LADS on somatic symptoms via PTSS and depressive symptoms, indirect effect = 2.64 (95% CI: 1.2–4.1) and 2.19 (95% CI: 1.3–3.3), respectively. Even after PTSS and depressive symptoms were taken into account, the LADS remained significantly associated with somatic symptoms,  $b = 2.13, p < .05$ , suggesting partial mediation.

**Conclusions**—Exposure to traumatic and adverse events (the LADS) was associated with somatic symptom severity. Further, although PTSS and depressive symptoms partially accounted

for the association between the LADS and somatic symptoms, the LADS remained significant, suggesting that both exposure to trauma and adversity and the resultant development of PTSS and depressive symptoms influence the development of somatic symptoms.

### Keywords

somatic symptoms; trauma and adversity; community sample; LADS; PTSS

---

A number of studies have linked histories of trauma and adversity to a variety of physical health outcomes (Irish, Kobayashi & Delahanty, 2010; Nugent, Goldberg & Uddin, 2016; Zinzow et al., 2011). In fact, victims of abuse and trauma may initially present in primary care settings with physical symptoms, placing their treatment firmly in the realm of primary care physicians, rather than mental health clinicians (NCBI Bookshelf, 2014). However, physicians are not trained to routinely assess for the bodily correlates of traumatic experiences. Despite the commonplace presentation of somatic complaints, the etiology of these diverse symptoms is poorly understood (Creed et al., 2012). Symptoms described as somatic in nature may manifest as diffuse pain in varying body systems, commonly including (but not limited to) headache, musculoskeletal pain, pelvic pain, and gastrointestinal dysfunction. High, persistent numbers of somatic symptoms are positively correlated with poor overall physical health status (Creed et al., 2012; Edwards, 2008; Jamieson & Steege, 1997; Jones, Oudenhove, Koloski, Tack, & Talley, 2013; Minen et al., 2015).

The literature describes risk factors for the development of physical symptoms that primary care physicians can identify in order to increase clinical awareness and diagnostic accuracy. Such factors include gender, comorbid mental health symptoms (specifically, anxiety, depression, and post-traumatic stress symptoms (PTSS)), and exposure to adverse and traumatic events (NCBI Bookshelf, 2014). However, studies that examine these variables fail to utilize community samples of underserved men and women who may report severe cumulative histories of trauma. Identifying risk factors relevant to these populations of men and women is critical for prevention and treatment of traumatized patients who may have been historically disenfranchised from the health care system, face disparities in health and mental health care, and may increasingly present (perhaps for the first time) to primary care physicians with bodily complaints (Waldinger, Schulz, Barsky, & Ahern, 2006).

## Predictors of Somatic Symptoms

### Gender

Female gender is often associated with more frequent and severe somatic symptoms in both community and medical samples, even when gynecologic and reproductive symptoms are excluded (Barsky, Peekna, & Borus, 2001; Delisle, Beck, Dobson, Dozois, & Thombs, 2012; Wenzel, Steer, & Beck, 2005). However, not all research consistently reports that being female is predictive of high levels of somatic symptoms (Creed & Barsky, 2004; Creed et al., 2012). Studies vary according to whether they include all bodily symptoms or only those that lack a medical explanation, and whether confounding factors, (including somatic symptoms of depression) are taken into account (Barsky et al., 2001; Wenzel et al., 2005).

However, even in samples of trauma survivors, research indicates that females with histories of trauma tend to report higher rates of somatic symptoms than males with similar histories (McCall-Hosenfeld, Winter, Heeren, & Liebschutz, 2014), suggesting that examinations of predictors of somatic concerns should take gender into account.

### **Comorbid mental health symptoms**

Although there are varying degrees of overlap, studies have shown that up to 75% of patients with depression will present with comorbid somatic symptoms, anxiety, or both, and 57% of patients with anxiety experience comorbid depression or somatic symptoms (Delisle et al., 2012; Lowe et al., 2008). Among individuals with histories of trauma, PTSS is commonly associated with somatic symptoms (Elklit & Christiansen, 2009). The common clustering of symptoms of depression, anxiety, PTSS, and somatic symptoms makes it difficult to parse out any actualized difference between them (Creed & Barsky, 2004). Depression and post-traumatic stress disorder (PTSD) are also more frequently diagnosed in females than males (Gupta, 2013; McLean, Asnaani, Litz, & Hoffman, 2011; Tolin & Foa, 2006). Together these studies point to the need to consider the role of gender and mental health symptoms when investigating severity of somatic symptoms (Delisle et al., 2012).

### **Exposure to adverse and traumatic events**

Studies rarely, if ever, examine cumulative histories of adverse and/or traumatic familial, community, and societal experiences among underrepresented community samples with regard to somatic symptoms. Those that have looked at this relationship have reported associations between exposure to childhood traumas (emotional, sexual, and physical abuse and neglect and interpersonal violence), and elevated somatic symptoms in adulthood (Barsky et al., 2001; Spertus, Yehuda, Wong, Halligan, & Seremetis, 2003). Research has also utilized summed composites of lifetime traumas (including accidents, man-made disasters, natural disasters, combat, seeing or handling dead bodies, crime-related events, sexual or physical assault, and witnessing someone being injured or killed) to predict physical and psychological symptoms in primary care (Spertus et al., 2003) and perceptions of health. However, the mechanisms through which these childhood traumas and adversities increase risk for somatic symptoms in adulthood are not well understood (Waldinger et al., 2006), and samples do not consist of individuals who are not frequent consumers of the health care system, despite carrying disproportionate mental and physical health burdens (Myers, et al., 2015).

Experiences of perceived discrimination have recently received attention as types of stressful events that increase risks for poor mental and physical health, including somatic aches and pains, depressive symptoms, anxiety, PTSD, lower levels of self-reported physical health, and a variety of chronic health conditions, but studies of somatic symptoms typically fail to take experiences of discrimination into account (Borrell, Kiefe, Williams, Diez-Roux, & Gordon-Larsen, 2006; Edwards, 2008; Kessler et al., 2010; Pascoe & Richman, 2009; Williams, Neighbors, & Jackson, 2003). Some ethnic minority groups, including African Americans and Latinos/as, tend to face ongoing adult trauma and chronic adversities, as these experiences are associated with low socioeconomic status (Finch, Kolody, & Vega,

2000; Myers, 2009). However, studies comparing two racial groups tend to be limited to African Americans and Whites (Williams et al., 2014).

According to a recent survey, the majority of U.S. adults (69%) report experiences of discrimination, including day-to-day incidents such as being treated with less courtesy or respect, or being threatened or harassed, while almost half (47%) report major experiences of discrimination, including unfair treatment by police, being unfairly fired or denied a promotion, or receiving unfair health care treatment (APA, 2015; Myers, 2009). Women reported their gender as the reason for day-to-day discrimination significantly more than men. Accounting for these experiences, especially in underrepresented and ethnically diverse samples who are disproportionately impacted by these events, is critical to our understanding of the etiology and maintenance of somatic symptoms, as exposure can result in increased vigilance and behavioral changes which can trigger repeated engagement of the stress response (APA, 2015).

## The Current Study

We used a brief, five-item measure of lifetime histories of trauma and adversity (LADS) to examine the relationship between histories of trauma and adversity and severity of somatic symptoms in adulthood in a community sample of 500 Latino/a and African American men and women. We include aspects of adversity (i.e., perceptions of discrimination) that had not previously received attention in relation to risks for somatic concerns. We will determine the degree of association while controlling for important factors noted in the literature as predictors of somatic concerns, including gender and ethnic group affiliation. Second, we propose to examine whether posttraumatic stress symptoms (PTSS) and depressive symptoms mediate any potential relationship between the LADS and severity of somatic symptoms in this sample. Based on the literature, we hypothesize that greater endorsement of trauma and adversity on the LADS will be associated with more severe somatic concerns. We also hypothesize that PTSS and depressive symptoms will partially, but not completely, mediate this relationship.

## Methods

### Participants

A multi-ethnic sample of 500 participants (n=230 African Americans; 167 men and 63 women), and 270 Latinos participants (n = 50 men and 220 women) were recruited to participate in four studies supported by the NIMH-funded Center for Culture, Trauma and Mental Health Disparities (CCTMHC) (see Myers, et al., 2015 for a description of inclusion and exclusion criteria). Study participants were recruited from a variety of community clinics and CBOs, as well as with flyers and word-of-mouth referrals (see Glover et al., 2010; Rodriguez et al., 2010).

A standard core battery of psychosocial measures was administered to all participants in private sessions, and biological samples were obtained from all Center study participants and processed following standardized procedures. All of the participants were provided with transportation, childcare, and refreshments if needed. Assessments were conducted in a

standardized fashion for all participants. CSA and adult trauma questions were completed via face-to-face interviews due to the sensitivity of the topics. However, the other measures were administered on laptop computers equipped with the Audio Computer-Assisted Self-Interview (ACASI) system. All participants were compensated for their time and received information on mental health and other services. The research was approved by the Institutional Review Board at the University of California, Los Angeles (UCLA) and before being enrolled, all study participants provided written informed consent (Liu et al., 2015).

## Measures

**Potential demographic covariates**—Demographic characteristics were assessed via self-report and included age, gender (male or female), race/ethnicity (Black or African American or Latino/Hispanic), monthly household income in the past year, years of education (highest grade completed), employment (full-time, part-time, not employed), and marital status.

### Predictor

**The UCLA Lifetime Adversities Screener (LADS):** The UCLA LADS is a brief five-item screening tool used to assess history of trauma and adversity in five domains (see Liu et al., 2015). The LADS is a validated, multi-dimensional 5-item measure that results in a weighted lifetime exposure score (Liu et al., 2015). The five items ask participants whether they perceive that they have been discriminated against due to their race, gender, or other marginalized identity during the past month (item weight = .30), whether they have been exposed to a situation in which they feared impending death or serious bodily harm (item weight = .22), whether a past or current partner has physically hurt them (IPV; item weight = .18), whether there has been any hitting or throwing of objects amongst any family members (family violence; item weight = .17), and whether they have ever been penetrated without their consent (sexual abuse; item weight = .13). As conducted in the validation study for the LADS (Liu et al., 2015), responses to these items were summed to create a score between 0 and 1 based on the weights of each item endorsed. An optimal cut of 0.33 has been reported for identification of patients at high risk for mental health problems (Liu et al., 2015). The LADS has demonstrated predictive validity for mental health issues and ease of administration, showing promise as a screener to identify individuals in primary care settings for more extensive evaluation and intervention (see Myers et al., 2015, for more information).

### Mediator variables

**Severity of depression:** Severity of depression was assessed with the 21-item Center for Epidemiological Studies-Depression Scale (CES-D), (Radloff, 1977), with higher scores indicating more severe depression. Three items were removed from the CESD that have overlap with PTSD, so that the two measures were distinct. These items were J5 (concentration), J10 (fear), and J11 (sleep). The alpha for the remaining items was 0.90.

**Post-traumatic stress symptoms:** PTSS were assessed using the Posttraumatic Diagnostic Scale (PDS; Ehrling, Kleim, Clark, Foa, & Ehlers, 2007; Foa, Cashman, Jaycox, & Perry, 1997). The PDS can be used to provide both a PTSD clinical diagnosis based on the criteria

of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association, 1994) as well as a measure of symptom severity. The PDS consists of 17 post-traumatic stress symptoms for which participants rate the frequency, with response options ranging from 0 (not at all or only one time) to 3 (five or more times a week or almost always). Participants responded to these items with the traumatic experience that has been the most bothersome in mind. In the present study, summed responses to the PDS were used to calculate a total score (continuous measure) to assess PTSS. The alpha for this measure was 0.92.

### **Outcome variable**

**Somatic symptoms:** Severity of somatic symptoms was measured using the somatic symptom module of the PHQ, the PHQ-15 (Kroenke, Spitzer, & Williams, 2002), which assesses prevalent somatic symptoms such as headaches, back pain, breathing trouble, and palpitations. Subjects were asked for the last 4 weeks to rate the severity of 13 symptoms as 0 (“not bothered at all”), 1 (“bothered a little”), or 2 (“bothered a lot”). Two additional physical symptoms - feeling tired or having little energy, and trouble sleeping - are contained in both the PHQ-15 somatic symptom module and the PHQ-9 depression module and were excluded from the present study to avoid redundancy with the CESD. The alpha for this sample was 0.83.

### **Statistical Analyses**

Data analyses were conducted in several phases. First, Pearson correlation coefficients were obtained to determine bivariate associations between somatic symptoms and all other variables. Next, gender differences on somatic symptoms and covariates were examined with Chi-Square for categorical variables and T-tests for continuous variables. Next, one linear regression model was fit to estimate the relative contribution of the LADS on somatic symptom severity with age, gender, and race/ethnicity included as covariates and another with potential mediators also taken into account. Finally, to formally evaluate whether PTSS and depressive symptoms are mediators of the association between LADS and somatic symptom severity, we used the INDIRECT procedure for SAS (Preacher & Hayes, 2008). Due to some missing data, the sample size differed between some analytic steps. The analytic sample used for the formal mediation analysis (our primary focus) included only those individuals with complete data for all covariates, the primary predictor, both mediators, and the outcome.

## **Results**

### **Sociodemographic Variables**

The sample was relatively young (mean age African Americans= 42 years ( $SD = 10.2$ ) and Latinos = 33 years ( $SD = 7.3$ )), of lower socioeconomic status (64% reported earning less than \$1,249 dollars per month) and unemployed (68%). A significant portion of the sample reported trauma experiences and adversities in the form of penetrative sexual abuse (63%), perceived discrimination (13.8%), fear that they might be killed or seriously injured (29.84%), family violence (46.39%), and IPV (40.0%). The majority of participants reported more than one type of trauma experiences and adversities (58.4%), while 85 (17.4%)

reported no such experiences, and 121 (24.2%) reported only one type. The mean number of LADS domains endorsed was 1.9 ( $SD = 1.4$ ). Please see Table 1 for descriptive data for all the study variables.

## LADS

Ethnic and gender differences were obtained on the LADS. Men ( $M = .42$ ,  $SD = .25$ ) reported higher scores on the screener than women ( $M = .31$ ,  $SD = .27$ ),  $t(485) = -4.52$ ,  $p < .0001$ , and African Americans ( $M = .44$ ,  $SD = .26$ ) reported higher scores than Latinos in this sample ( $M = .29$ ,  $SD = .26$ ),  $t(485) = 6.37$ ,  $p < .0001$ . Previous research by this team with this sample established that the LADS was significantly related to symptoms of PTSD (Myers et al., 2015). Please see Table 2 for bivariate correlations between LADS, potential mediators, somatic symptoms conducted for the current study. These analyses further established that LADS scores were significantly correlated with PTSS symptoms ( $r(398) = 0.51$ ,  $p < .001$ ), CESD scores ( $r(485) = 0.49$ ,  $p < .001$ ), and somatic symptoms ( $r(485) = 0.38$ ,  $p < .001$ ) and that both PTSS and CESD scores were significantly associated with somatic symptoms, ( $r(408) = 0.53$ ,  $p < .001$  and  $r(498) = 0.56$ ,  $p < .001$ , respectively).

## Regression Models Predicting Somatic Symptoms

An ordinary least squares regression analysis with age, gender, and race/ethnicity treated as control variables and with the LADS as the predictor was run to predict severity of somatic symptoms. Females, compared to males, exhibited significantly greater somatic symptoms,  $b = 2.02$ ,  $F(1, 482) = 17.37$ ,  $p < .0001$ . Further, higher levels of LADS were significantly associated with higher somatic symptoms,  $b = 7.50$ ,  $F(1, 482) = 94.99$ ,  $p < .0001$ . The regression including the mediators indicated that both higher levels of depressive symptoms and higher levels of PTSS symptoms were also significantly related to more somatic symptoms [ $b = .13$ ,  $F(1, 393) = 25.80$ ,  $p < .0001$  and  $b = .13$ ,  $F(1, 393) = 24.37$ ,  $p < .0001$ , respectively] and that both gender and LADS remained significant although magnitude of the impact of LADS was reduced ( $b = 2.13$ ,  $p < .05$ ). Please see Table 3 for the full final regression model. Our mediation analysis (INDIRECT procedure) confirmed a significant indirect effect of LADS on somatic symptoms via both depressive symptoms and PTSS, indirect effect = 2.19 (95% CI: 1.3–3.3) and 2.64 (95% CI: 1.2–4.1), respectively.

## Discussion

Our hypothesis that an index of traumatic and adverse exposures (the LADS) would be associated with somatic symptom severity was supported. Further, although depressive symptoms and PTSS partially accounted for the association between the LADS and somatic symptom severity as we expected, the LADS remained significant, suggesting unique contributions of traumatic and adverse exposures to somatic symptoms in adulthood. These findings suggest that both exposure to trauma and adversity as well as depressive symptoms and PTSS influence the development of severe somatic symptoms. Thus, our findings suggest that symptoms of depression and PTS underlie only some of the negative influence of trauma and adversity on severity of somatic symptoms. This set of findings contributes to the literature in that there is a dearth of studies examining the multiple psychological pathways in the association between lifetime exposure to trauma and adversity and somatic

symptoms in underserved community populations. These studies typically do not assess discrimination as a dimension of adversity, despite the fact that discrimination has been shown to relate to somatic symptoms in various populations, including some studies that controlled for other stressors (e.g., Chen, Szalacha, & Menon, 2014; Landrine, Klonoff, Gibbs, Manning, & Lund, 1995; Sirin, Rogers-Sirin, Cressen, Gupta, Ahmed, & Novoa, 2015). If exposure to trauma and adversity exerts an effect on somatic symptoms independent of depressive symptoms and post-traumatic stress symptoms, then what mechanism might account for this relationship? The literature has shown that these adversities and traumas lead to maladaptive biological changes and unhealthy behaviors (e.g., Cacioppo & Berntson, 2011; Lang et al., 2003; Schreier et al., 2016). For example, the literature suggests that the associations of violence and abuse exposure and PTSD with somatic issues may be driven by physiological changes (Michopoulos, Vester, & Neigh, 2016; Zaba et al., 2015; for a review, see Crofford, 2007). Perhaps psychological trauma has direct and indirect effects somatically, with direct effects exerted through the endocrine and sympathetic nervous systems, and indirect effects mediated by psychological distress. The current study represents a step towards the goal of elucidating the fact that there are multiple trajectories by which trauma and adversity lead to somatic symptoms and that the psychological distress pathway may not tell the entire story.

Our findings also corroborate and extend the current literature with regard to how previous trauma and adversity is construed and assessed. Others have similarly found that exposure to violence and abuse is associated with severity of somatic symptoms (Crofford, 2007; Sansone, Wiederman, Tahir, & Buckner, 2009). However, this is the first study to show that a cumulative index of trauma and adversity that includes discrimination is associated with somatic symptoms in low-income ethnically diverse individuals while also investigating both depressive symptoms and PTSS as mediators of this association. The inclusion of discrimination in explorations of the health impact of adversities and traumas is important, as discrimination is now being conceptualized as a qualitatively distinct stressor that causes serious psychological, behavioral, and physiological reactivity in individuals (Adam et al., 2015; see Pascoe & Richman, 2009 for a meta-analysis). These psychological, behavioral, and physiological reactions to discrimination all could impact the development of bodily concerns or somatic symptoms.

As expected based on the literature, gender was also significantly associated with severity of somatic symptoms in this sample, with women reporting higher severity of somatic symptoms. Our gender findings align with other studies that appropriately account for important psychological covariates as we did (Barsky et al., 2001; Wenzel et al., 2005).

Ethnic differences in somatic symptoms, namely that Asians and Hispanics have higher somatic symptoms, have often been assumed and have been reported in previous studies (e.g. Escobar et al., 1987). However, contemporary studies that control for socioeconomic status and acculturation have not supported this association (e.g. Golding, Aneshensel, & Hough, 1991). Consistent with recent studies, our results suggested no ethnic differences in somatic symptom severity, thus suggesting that other variables, including gender, may be more important predictors of somatic symptoms. However, it is important to note that the gender groups were not equally distributed by ethnicity; the sample contained more men in

the African American group and more women in the Latino group. This could have influenced the ethnic differences in reporting on the LADS.

Our findings support the utility of the LADS as a screener for histories of trauma and adversity. With replication, these findings suggest that primary care providers may utilize this brief screener to aid in conceptualization of patient's presenting concerns and to inform the use of mental health referrals or other interventions that may be useful.

The current study is not without limitations. First, the LADS was not constructed as a measure of the severity of trauma and adversity experiences. Rather, it is intended for use as a screener for mental health issues in health settings. Next, we did not examine the role of anxiety, recent serious illness, or the prevalence of any chronic diseases among participants in the study. The study is not prospective, so we could not address the "reverse-causality" argument (Lewis, Cogburn, & Williams, 2015, p. 413), nor the persistence of somatic symptoms over time. Similarly, we cannot confirm whether PTSS and depressive symptoms prospectively mediate the association between trauma and adversity and somatic symptom severity given that all measures were assessed simultaneously. Further, the perceived discrimination item asked about current experiences of discrimination (i.e., in the past month), while the other items assessed lifetime prevalence of adverse and traumatic experiences. In the future, perceptions of discrimination should be assessed in a range of time frames to determine the frequency of its occurrence; however, its higher factor loading suggests that this is a traumatic experience that should be asked about routinely in studies of trauma and adversities. Finally, although our recruitment methods were extensive, our sample is a convenience sample nonetheless and, thus, cannot be considered representative. For example, the gender and ethnic differences that we saw in LADS scores may be unique to this sample.

Despite limitations, the study makes important contributions. It further substantiates the usefulness of the LADS screener and adds incremental support to the work of this research team that has demonstrated that it is important to include discrimination exposure when considering the cumulative adverse exposures associated with somatic symptoms. With replication in other samples, this work highlights high levels of somatic complaints among individuals who may not access the health care system as well as identifying individuals at risk for presenting to medical settings and mental health services with somatic concerns.

## Acknowledgments

This research was supported by NIMH Grant T32 MH171140. Thanks to Whitney Cale, Louise Datu, and Amber Smith for assistance in preparing this manuscript.

## References

- Adam EK, Heissel JA, Zeiders KH, Richeson JA, Ross EC, Ehrlich KB, ... Eccles JS. Developmental histories of perceived racial discrimination and diurnal cortisol profiles in adulthood: A 20-year prospective study. *Psychoneuroendocrinology*. 2015; 62:279–291. [PubMed: 26352481]
- Aiarzaguena JM, Grandes G, Salazar A, Gaminde I, Sanchez A. The diagnostic challenges presented by patients with medically unexplained symptoms in general practice. *Scand J Prim Health Care*. 2008; 26(2):99–105. DOI: 10.1080/02813430802048662 [PubMed: 18570008]

- Allen VC, Myers HF, Williams JK. Depression among Black bisexual men with early and later life adversities. *Cultur Divers Ethnic Minor Psych*. 2014; 20(1):128–137.
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4. Washington, DC: Author; 1994.
- American Psychological Association. 2015 Stress in America: Report highlights. 2015. retrieved by: <http://www.apa.org/news/press/releases/stress/2015/highlights.aspx>
- Barsky AJ, Peekna HM, Borus JF. Somatic symptom reporting in women and men. *J Gen Intern Med*. 2001; 16(4):266–275. [PubMed: 11318929]
- Borrell LN, Kiefe CI, Williams DR, Diez-Roux AV, Gordon-Larsen P. Self-reported health, perceived racial discrimination, and skin color in African Americans in the CARDIA study. *Social Science & Medicine*. 2006; 63(6):1415–1427. [PubMed: 16750286]
- Cacioppo JT, Berntson GG. The brain, homeostasis, and health: Balancing demands of the internal and external milieu. In: Friedman HS, editor *The Oxford Handbook of Health Psychology*. New York, NY: Oxford University Press; 2011. 121–137.
- Chen AC, Szalacha LA, Menon U. Perceived discrimination and its association with mental health and substance use among Asian American and Pacific Islander undergraduate and graduate students. *Journal of American College Health*. 2014; 62(6):390–398. [PubMed: 24779453]
- Creed HH, Barsky A. A systematic review of the epidemiology of somatisation disorder and hypochondriasis. *Journal of Psychosomatic Research*. 2004; 56(4):391–408. [PubMed: 15094023]
- Creed FH, Davies I, Jackson J, Littlewood A, Chew-Graham C, Tomenson B, ... McBeth J. The epidemiology of multiple somatic symptoms. *Journal of Psychosomatic Research*. 2012; 72(4): 311–317. [PubMed: 22405227]
- Crofford LJ. Violence, stress & somatic syndromes. *Trauma Violence Abuse*. 2007; 8(3):299–313. [PubMed: 17596347]
- Cusack KJ, Frueh BC, Brady KT. Trauma history screening in a community health center. *Psychiatric Services*. 2004; 55(2):157–62. [PubMed: 14762240]
- Delisle VC, Beck AT, Dobson KS, Dozois DJA, Thombs BD. Revisiting gender differences in somatic symptoms of depression: Much ado about nothing? *PLoS ONE*. 2012; 7(2):e32490. [PubMed: 22384260]
- Edwards RR. The association of perceived discrimination with low back pain. *J Behav Med*. 2008; 31(5):379–389. [PubMed: 18581224]
- Ehring T, Kleim B, Clark DM, Foa EB, Ehlers A. Screening for posttraumatic stress disorder: What combination of symptoms predicts best? *J Nerv Ment Dis*. 2007; 195(12):1004–1012. [PubMed: 18091194]
- Elklit A, Christiansen DM. Predictive factors for somatization in a trauma sample. *Clinical Practice and Epidemiology in Mental Health*. 2009; 5:1.
- Escobar JI, Burnam MA, Karno M. Somatization in the community. *Arch Gen Psychiatry*. 1987; 44(8): 713–718. [PubMed: 3498454]
- Finch BK, Kolody B, Vega WA. Perceived discrimination and depression among Mexican-origin adults in California. *Journal of Health and Social Behavior*. 2000; 41:295–313. DOI: 10.2307/2676322 [PubMed: 11011506]
- Foa EB, Cashman L, Jaycox L, Perry K. The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment*. 1997; 9:445–451.
- Glover DA, Loeb TB, Carmona JV, Sciolla A, Zhang M, Myers HF, Wyatt GE. Childhood sexual abuse severity and disclosure predict posttraumatic stress symptoms and biomarkers in ethnic minority women. *Journal of Trauma & Dissociation*. 2010; 11(2):152–173. DOI: 10.1080/15299730903502920 [PubMed: 20373204]
- Glover DA, Williams JK, Kessler KA. Using novel methods to examine stress among HIV-positive African American men who have sex with men and women. *Journal of Behavioral Medicine*. 2012; 36(3):283–294. [PubMed: 22538773]
- Golding JM, Aneshensel CS, Hough RL. Responses to depression scale items among Mexican-Americans and non-Hispanic Whites. *Journal of Clinical Psychology*. 1991; 47(1):61–75. [PubMed: 2026780]

- Gupta MA. Review of somatic symptoms in post-traumatic stress disorder. *Int Rev Psychiatry*. 2013; 25(1):86–99. [PubMed: 23383670]
- Irish L, Kobayashi I, Delahanty DL. Long-term physical health consequences of childhood sexual abuse: A meta-analytic review. *Journal of Pediatric Psychology*. 2010; 35(5):450–461. [PubMed: 20022919]
- Jamieson DJ, Steege JF. The association of sexual abuse with pelvic pain complaints in a primary care population. *American Journal of Obstetrics & Gynecology*. 1997; 177(6):1408–1412. [PubMed: 9423743]
- Jones MP, Oudenhove LV, Koloski N, Tack J, Talley NJ. Early life factors initiate a ‘vicious cycle’ of affective and gastrointestinal symptoms: A longitudinal study. *United European Gastroenterol J*. 2013; 1(5):394–402.
- Kessler RC, McLaughlin KA, Green JG, Gruber MJ, Sampson NA, Zaslavsky AM, Williams DR. Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *The British Journal of Psychiatry*. 2010; 197:378–385. [PubMed: 21037215]
- Kroenke K, Spitzer RL, Williams JBW. The PHQ-15: Validity of a new measure for evaluating the severity of somatic symptoms. *Psychosomatic Medicine*. 2002; 64(2):258–266. [PubMed: 11914441]
- Landrine H, Klonoff EA, Gibbs J, Manning V, Lund M. Physical and psychiatric correlates of gender discrimination: An application of the Schedule of Sexist Events. *Psychology of Women Quarterly*. 1995; 19(4):473–492.
- Lang AJ, Rodgers CS, Laffaye C, Satz LE, Dresselhaus TR, Stein MB. Sexual trauma, posttraumatic stress disorder, and health behavior. *Behavioral Medicine*. 2003; 28(4):150–158. [PubMed: 14663922]
- Lewis TT, Cogburn CD, Williams DR. Self-reported experiences of discrimination and health: Scientific advances, ongoing controversies, and emerging issues. *Annul Rev Clin Psychology*. 2015; 11:407–440.
- Liu H, Prause N, Wyatt GE, Williams JK, Chin D, Davis T, ... Myers HF. Development of a composite trauma exposure risk index. *Psychol Assessment*. 2015; 27(3):965–974.
- Liu J, Mustanski B, Dick D, Bolland J. Risk and protective factors for comorbid internalizing and externalizing problems among economically disadvantaged African American youth. 2016 Manuscript submitted for publication.
- Lowe B, Spitzer RL, Williams JB, Mussel M, Schelberg D, Kroenke K. Depression, anxiety and somatization in primary care: Syndrome overlap and functional impairment. *Gen Hosp Psychiatry*. 2008; 30(3):191–199. [PubMed: 18433651]
- McCall-Hosenfeld J, Winter M, Heeren T, Liebschutz JM. The association of interpersonal trauma with somatic symptom severity in a primary care population with chronic pain: Exploring the role of gender and the mental health sequelae of trauma. *J Psychosom Res*. 2014; 77(3):196–204. [PubMed: 25149029]
- McLean CP, Asnaani A, Litz BT, Hoffman SG. Gender differences in anxiety disorders: Prevalence, course of illness, comorbidity and burden of illness. *J Psychiatr Res*. 2011; 45(8):1027–1035. [PubMed: 21439576]
- Michopoulos V, Vester A, Neigh G. Posttraumatic stress disorder: A metabolic disorder in disguise?. 2016; 284(Part B):220–229.
- Minen MT, De Dhaem OB, Van Diest AK, Powers S, Schwedt TJ, Lipton R, Silbersweig D. Migraine and its psychiatric comorbidities. *Journal of Neurology Neurosurgery & Psychiatry*. 2015; 87(7):1–9.
- Myers HF. Ethnicity- and socio-economic status-related stresses in context: An integrative review and conceptual model. *Journal of Behavioral Medicine*. 2009; 32:9–19. DOI: 10.1007/s10865-008-9181-4 [PubMed: 18989769]
- Myers HF, Wyatt GE, Ullman JB, Loeb TB, Chin D, Prause N, ... Liu H. Cumulative burden of lifetime adversities: Trauma and mental health in low SES African Americans and Latino/as. *Psychological Trauma: Theory Research, Practice & Policy*. 2015; 7(3):243–251.
- Trauma-informed care in behavioral health services. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2014. NCBI Bookshelf: Understanding the impact of trauma.

- North CS, Kawaskaki A, Spitznagel EL, Hong B. The course of PTSD, major depression, substance abuse, and somatization after a natural disaster. *J Nerv Ment Dis.* 2004; 192:823–829. [PubMed: 15583503]
- Nugent NR, Goldberg A, Uddin M. Topical review: The emerging field of epigenetics: Informing models of pediatric trauma and physical health. *Journal of Pediatric Psychology.* 2016; 41:55–64. DOI: 10.1093/jpepsy/jsv018 [PubMed: 25825520]
- Pascoe EA, Richman LS. Perceived discrimination and health: A meta-analytic review. *Psychological Bulletin.* 2009; 135(4):531–554. [PubMed: 19586161]
- Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods.* 2008; 40:879–891. [PubMed: 18697684]
- Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement.* 1977; 1:385–401.
- Rodriguez MA, Valentine J, Ahmed SR, Eisenman DP, Sumner LA, Heilemann &, Liu H. Intimate partner violence and maternal depression during the perinatal period: A longitudinal investigation of Latinas. *Violence Against Women.* 2010; 16(5):543–559. [PubMed: 20388930]
- Sansone RA, Wiederman MW, Tahir NA, Buckner VR. A re-examination of childhood trauma and somatic preoccupation. *International Journal of Psychiatry in Clinical Practice.* 2009; 13(3):227–231.
- Schnurr PP, Green BL. Understanding relationships among trauma, posttraumatic stress disorder, and health outcomes. In: Schnurr PP, Green BL, editors *Trauma and Health: Physical Health Consequences of exposure to extreme stress.* Washington, DC: American Psychological Association; 2004. 247–275.
- Schreier HMC, Enlow MB, Ritz T, Coull BA, Gennings C, Wright RO, Wright RJ. Lifetime exposure to traumatic and other stressful life events and hair cortisol in a multi-racial/ethnic sample of pregnant women. *Stress.* 2016; 19(1):45–52. DOI: 10.3109/10253890.2015.1117447 [PubMed: 26551892]
- Sirin SR, Rogers-Sirin L, Cressen J, Gupta T, Ahmed SF, Novoa AD. Discrimination-related stress effects on the development of internalizing symptoms among Latino adolescents. *Child Development.* 2015; 86(3):709–725. [PubMed: 25676605]
- Spertus IL, Yehuda R, Wong CM, Halligan S, Seremetis SV. Childhood emotional abuse and neglect as predictors of psychological and physical symptoms in women presenting to a primary care practice. *Child Abuse Negl.* 2003; 27(11):247–58.
- Spitzer C, Barnow S, Volzke H, Wallaschofski H, John U, Freyberger HJ, ... Grabe HJ. Association of post-traumatic stress disorder with low-grade elevation of C-reactive protein: Evidence from the general population. *J Psychiatr R.* 2010; 44(1):15–21.
- Tolin DF, Foa EB. Sex differences in trauma and post-traumatic stress disorder: A quantitative review of 25 years of research. *Psychological Bulletin.* 2006; 132(6):959–992. [PubMed: 17073529]
- Tylee A, Gandhi P. The importance of somatic symptoms in depression in primary care. *Primary Care Companion Journal Clinical Psychiatry.* 2005; 7(4):167–176.
- Waldinger RJ, Schulz MS, Barsky AJ, Ahern DK. Mapping the road from childhood trauma to adult somatization: The role of attachment. *Psychosomatic Medicine.* 2006; 68:129–135. [PubMed: 16449423]
- Wenzel A, Steer RA, Beck A. Are there any gender differences in frequency of self-reported somatic symptoms of depression? *Journal of Affective Disorders.* 2005; 89:177–181. [PubMed: 16202455]
- Williams DR, Neighbors HW, Jackson JS. Racial/ethnic discrimination and health: Findings from community studies. *American Journal of Public Health.* 2003; 93(2):200–208. [PubMed: 12554570]
- Wenzel A, Steer RA, Beck AT. Are there any gender differences in frequency of self-reported somatic symptoms of depression? *Journal of Affective Disorders.* 2005; 89(1–3):177–181. [PubMed: 16202455]
- Zaba M, Kirmeyer T, Ionescu I, Wollweber B, Buell DR, Gall-Kleebach DJ, ... Schmidt H. Identification and characterization of HPA-axis reactivity endophenotypes in a cohort of female PTSD patients. *Psychoneuroendocrinology.* 2015; 55:102–115. [PubMed: 25745955]

Zinzow HM, Amstadter AB, McCauley JL, Ruggiero KJ, Resnick HS, Kilpatrick DG. Self-rated health in relation to rape and mental health disorders in a national sample of college women. *Journal of American College Health*. 2011; 59:588–594. DOI: 10.1080/07448481.2010.520175 [PubMed: 21823953]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 1**

## Sociodemographic Characteristics of Study Sample

| Variables                    | Women<br>N (%)  | Men<br>N (%)    | Total         |
|------------------------------|-----------------|-----------------|---------------|
| Race/ethnicity ***           |                 |                 |               |
| Black or African American    | 63 (12.60%)     | 167 (33.40%)    | 230 (46.00%)  |
| Hispanic or Latino/a         | 220 (44.00%)    | 50 (10.00%)     | 270 (54.00%)  |
| Monthly household income *** |                 |                 |               |
| <=1249                       | 104 (24.82%)    | 167 (39.68%)    | 271 (64.68%)  |
| >1249                        | 103 (24.58%)    | 45 (10.74%)     | 148 (35.32%)  |
| Education **                 |                 |                 |               |
| Less than high school        | 102 (20.52%)    | 51 (10.26%)     | 153 (30.78%)  |
| High school or more          | 178 (35.81%)    | 166 (33.40%)    | 344 (69.22%)  |
| Employment                   |                 |                 |               |
| Not working                  | 179 (36.53%)    | 156 (31.84%)    | 335 (68.37%)  |
| Full/part time               | 95 (19.39%)     | 60 (12.24%)     | 155 (31.63%)  |
| Marital Status ***           |                 |                 |               |
| Not married                  | 153 (30.72%)    | 203 (40.76%)    | 356 (71.49%)  |
| Married                      | 129 (25.90%)    | 13 (2.61%)      | 142 (28.51%)  |
|                              | <i>M (SD)</i>   |                 |               |
| Age ***                      | 34.01 (7.570)   | 40.65 (11.04)   | 36.89 (9.80)  |
| LADS ***                     | .3061 (.2743)   | .4152 (.2508)   | 0.35 (0.27)   |
| Depression                   | 15.69 (12.42)   | 16.97 (12.25)   | 16.24 (12.35) |
| PTSS                         | 12.56 (10.78)   | 11.02 (10.79)   | 11.75 (10.8)  |
| Somatic Symptoms **          | 6.3852 (4.6506) | 5.2396 (4.8988) | 5.89 (4.79)   |

\* p&lt;.05

\*\* p&lt;.01

\*\*\* p&lt;.0001.

**Table 2**

Correlations between LADS, Symptoms of Depression, PTSS, and Somatic Symptoms

| Variable                         | 1       | 2       | 3       | 4       |
|----------------------------------|---------|---------|---------|---------|
| 1. LADS <sup>a</sup>             | 1       | 0.49*** | 0.51*** | 0.38*** |
| 2. Depression <sup>b</sup>       | 0.49*** | 1       | 0.68*** | 0.56*** |
| 3. PTSS <sup>c</sup>             | 0.51*** | 0.68*** | 1       | 0.53*** |
| 4. Somatic symptoms <sup>d</sup> | 0.38*** | 0.56*** | 0.53*** | 1       |

\*\*\*  
p<0.0001.

<sup>a</sup>UCLA Lifetime Adversities Screener

<sup>b</sup>CESD

<sup>c</sup>Posttraumatic Diagnostic Scale

<sup>d</sup>PHQ-13

**Table 3**

Final Linear Regression – Effects of LADS on Somatic Symptoms Adjusted for Mental Health Mediators

|                                       | <i>b</i> | <i>SE</i> | <i>F</i> |
|---------------------------------------|----------|-----------|----------|
| Age                                   | .01      | .02       | .33      |
| Male gender                           | -1.98    | .45       | 19.47*** |
| Black or African American (vs Latino) | -.47     | .48       | .94      |
| Depressive symptoms                   | .13      | .03       | 25.80*** |
| Posttraumatic stress symptoms         | .13      | .03       | 24.37*** |
| LADS                                  | 2.13     | .87       | 6.01*    |

\*  
 $p < .050$ .\*\*\*  
 $p < .0001$ .

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript