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Trauma exposure and eating disorders: Results from a United States nationally representative sample

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Abstract

Objective: Sexual assault, child abuse, and combat have been linked to eating disorders (EDs). However, noninterpersonal trauma is relatively understudied, and therefore it is unknown whether noninterpersonal trauma is associated with EDs. Furthermore, most previous studies do not account for multiple trauma exposures, or the relative association of traumatic events with EDs in the same statistical model.

Method: Multinomial regression was used to examine the association of lifetime ED diagnosis (anorexia nervosa [AN], bulimia nervosa [BN], binge eating disorder [BED]) with trauma type (sexual interpersonal, other interpersonal, war/combat, and noninterpersonal) in a nationally representative dataset of US adults in bivariate and multivariable (i.e., with all trauma types) models.

Results: Sexual interpersonal trauma was significantly positively associated with AN and BED in bivariate and multivariable models. In the multivariable model, only BED was found to be equally associated with sexual interpersonal, other interpersonal, and noninterpersonal trauma.

Discussion: These results indicate a strong positive association between sexual trauma and EDs, even when controlling for experiences of other trauma events. Future research should examine longitudinal mediators between trauma and EDs, especially sexual trauma, to identify what factors may explain this relationship.

Public significance statement: Individuals with eating disorders often experience traumatic events but it is unclear whether specific trauma types are more or less common in this population. This study found that only events such as rape and sexual assault are associated with anorexia nervosa, but that most trauma types are associated with binge eating disorder. Therefore, the relationship between trauma and binge eating disorder may function differently than other eating disorders.

KEYWORDS
anorexia nervosa, binge-eating disorder, bulimia nervosa, feeding and eating disorders, psychological trauma, sexual trauma

1 | INTRODUCTION

Traumatic events have been linked to eating pathology, such that exposure to traumatic events has been associated with later eating disorder symptoms (Zelkowitz et al., 2021). Furthermore, exposure to traumatic events may have deleterious effects on severity of eating pathology and eating disorder treatment efficacy. Exposure to traumatic events has been associated with more severe disordered eating (Backholm et al., 2013; Scharff et al., 2021; Tagay et al., 2014) and premature termination from eating disorder treatment (Anderson et al., 1997; Carter et al., 2006; Rodríguez et al., 2005). Therefore, investigating the association of specific trauma events and eating pathology to determine potential mechanisms conferring this greater risk are of paramount importance.

While most research examining traumatic events in relation to eating pathology has focused on sexual assault (Madowitz et al., 2015), childhood abuse (e.g., Afifi et al., 2017; Forrest et al., 2021), and combat exposure (Jacobson et al., 2009), this leaves a range of traumatic experiences (e.g., life-threatening illness, car accident, general physical assault) uninvestigated. Previous research (e.g., Chung & Breslau, 2008; Huang et al., 2017; Thomas et al., 2021) has differentiated trauma events into two broad categories: interpersonal and noninterpersonal trauma. Interpersonal trauma can be defined as assault or abuse that are perpetrated by another person (e.g., sexual assault, physical abuse) as compared to noninterpersonal trauma that are adverse events that do not necessarily involve another person (e.g., accidents, disasters, illness; Forbes et al., 2012; Ford et al., 2011). These two broad trauma classifications have been supported by findings that interpersonal traumas lead to more adverse psychological outcomes as compared to noninterpersonal trauma (Charuvastra & Cloitre, 2008; Kessler et al., 2005; Kilpatrick et al., 2013). The current study will therefore examine both interpersonal and noninterpersonal traumas in their association with eating pathology.

Few previous studies examined the association between noninterpersonal trauma and eating pathology with contradictory results; some have found that only sexual assault was associated with eating pathology in multivariable models (e.g., Gomez et al., 2021) and some have found that other noninterpersonal events were associated with eating pathology in bivariate models (e.g., Lie et al., 2021; Meyer & Stanick, 2018). In addition, studies only rarely examine whether other interpersonal traumas (e.g., physical assault, stalking) were associated with eating pathology. Again, the results are largely mixed such that some find a positive association with disordered eating (e.g., Hazzard et al., 2019) and some do not (e.g., Arditte Hall et al., 2018; Lie et al., 2021; Quilliot et al., 2019). Therefore, the literature examining associations of nonsexual interpersonal and noninterpersonal trauma has found mixed results depending on methods.

In addition, most previous studies rely on the bivariate association between specific traumatic events and eating disorders. While this is informative, a history of multiple trauma events are common (Kilpatrick et al., 2013) and these studies do not examine whether specific trauma experiences are more likely to associated with eating disorders. For example, while combat exposure has been found to be associated with eating pathology (Arditte Hall et al., 2017, 2018), another study found that combat exposure was not associated with eating pathology when accounting for the association between military sexual trauma and eating pathology (Breland et al., 2018). This finding demonstrates the importance of examining trauma experiences in their association with eating disorders, when including other trauma events in the same model. If specific trauma events or classes of events are more likely to be associated with eating disorders, this highlights the importance of early intervention for such trauma events.

It is theoretically feasible that sexual assault alone would be associated with eating pathology. Previous research in childhood sexual assault has found a robust relationship with eating disorder diagnoses in both men and women (Afifi et al., 2017; Micali et al., 2017). Specific mechanisms have been proposed to explain this association include body dissatisfaction and shame (Madowitz et al., 2015). For example, body dissatisfaction has been found to mediate the association between childhood sexual assault and eating disorder symptoms (Preti et al., 2006). Given that victims of sexual assault frequently develop body dissatisfaction post-trauma (Kremer et al., 2013), individuals may seek to alleviate their negative body image by altering their body with disordered eating. Victims of sexual assault also routinely endorse feelings of shame after assault (Feiring & Taska, 2005; Negrao et al., 2005; Sable et al., 2006) and shame has been implicated in the onset of disordered eating (Blythin et al., 2020). These two proposed mechanisms may not occur solely following sexual-based trauma but may be more likely to occur in sexual trauma as compared to other trauma types. Interpersonal traumas such as physical assault can lead to body dissatisfaction (Kremer et al., 2013), but this effect has been less robustly found in the literature and more well-documented among individuals who experience residual injury after physical assault (Weaver & Resick, 2014). Therefore, sexual assault alone may be associated with eating pathology, but it is also possible that interpersonal traumas broadly may be associated with eating pathology through similar purported mechanisms. Therefore, in the current study, sexual interpersonal trauma was separated from other interpersonal trauma for analyses, both for comparison with previous studies (e.g., Breland et al., 2018; Gomez et al., 2021) and for the aforementioned theoretical reasons.

The primary aims of the current study were to: (1) assess the independent association of sexual interpersonal (both childhood and adult), other interpersonal (e.g., physical assault, stalking), war/combat (e.g., active military combat, relief worker), and noninterpersonal (e.g., natural disasters, serious injury/illness) traumas and eating disorder diagnoses and (2) assess the association of the aforementioned trauma types with eating disorder diagnoses when including all trauma types in a single model (i.e., accounting for exposure to other trauma types) to determine which trauma types are more likely to be associated with eating disorders. Based on prior research, we hypothesize that all trauma types will be associated with eating disorders in bivariate models, but only sexual interpersonal trauma will be associated with eating pathology in multivariable models.

2 | METHOD

2.1 | Design

The current study used a publicly available dataset from the National Epidemiologic Survey of Alcohol and Related Conditions-III (NESARC-III; National Institute on Alcohol Abuse and Alcoholism, 2019), a nationally representative sample of 36,309 US noninstitutionalized adults (Grant et al., 2014, 2016). The NESARC-III respondents were selected through multistage probability sampling. Primary, secondary, and tertiary sampling units were counties or groups of contiguous counties, groups of Census-defined blocks, and households, respectively. Black, Asian, and Hispanic household members were oversampled such that, within each household, two respondents were selected. The household response rate was 72%, and the person-level response rate was 84%, for an overall response rate of 60.1% (Grant et al., 2016). Data were adjusted for nonresponse and weighted to represent the civilian US population based on the 2012 American Community Survey.

2.2 | Measures

2.2.1 | Sociodemographic characteristics

Respondents provided sociodemographic information, including age, race/ethnicity, sex assigned at birth, census region, country of birth, sexual orientation, household income, and highest education level achieved. See Table 1 for sociodemographic characteristics by lifetime eating disorder diagnosis.

2.2.2 | Eating disorder diagnoses

Eating disorder diagnoses were given based on interviews conducted using the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-5 (AUDADIS-5; Grant et al., 2011). Interviewers were 970 lay assessors with an average of 5 years of field experience with health-related and other surveys. Given that prior researchers have found errors in the coding of eating disorder diagnoses (Udo & Grilo, 2018), diagnoses were recoded based on the procedures established by Udo and Grilo (2018) for meeting DSM-5 criteria for anorexia nervosa (AN), bulimia nervosa (BN), and binge eating disorder (BED). Since this study examined lifetime diagnoses of an eating disorder, categorization for an eating disorder was based on previous studies (Udo & Grilo, 2018) and the well-established diagnostic "hierarchy" of AN > BN > BED (i.e., lifetime BN excludes those with lifetime AN, lifetime BED excludes those with lifetime AN/BN). Other Specified Feeding and Eating Disorder (OSFED) diagnoses were not examined because the relevant items for assessing these diagnoses were not administered per NESARC protocol (e.g., if participants were never low weight, they were not administered the other items for assessing AN symptoms).

2.2.3 | Trauma exposure

As part of the interview protocol, all participants were asked whether they had experienced 20 specific and potentially traumatizing events. In an effort to facilitate comparison of different types of traumatic events, the events were grouped into four theoretically derived categories ([1] sexual interpersonal; [2] other interpersonal; [3] noninterpersonal; and [4] war/combat).

2.3 | Analysis

Analyses were performed using IBM SPSS Version 28 and accounted for the sample design of the NESARC-III by using the complex sampling with the procedures with the Taylor series Linearization variance estimation method. Weighted frequencies and cross-tabulations were conducted for eating disorder diagnoses and trauma exposure. For all regression analyses, the reference group for each trauma exposure type was no exposure to that trauma type; therefore, trauma groupings are not mutually exclusive. Binary logistic regression was used to calculate if the odds of experiencing each type of trauma was higher in those diagnosed with any eating disorder, with no eating disorder diagnosis as the reference group. Multinomial logistic regression was used to calculate odds ratios, adjusting for the NESARC complex sampling design, to compare the risk of lifetime diagnosis for each type of eating disorder as a function of trauma type. The outcome was lifetime diagnosis of each type of eating disorder; no eating disorder diagnosis was the reference group. For bivariate multinomial model results, each trauma exposure type was entered as an independent variable in four different multinomial logistic regression models. For multivariable multinomial model results, all trauma exposure types were entered as independent variables into the one multinomial logistic regression model. If more than one trauma type was significant in multivariable model, the strength of the association between the trauma type and eating disorder outcome was compared. Point estimates for the difference between parameters were calculated and then the delta method (Greene, 2012, pp. 1083–1084) was used to calculate the standard error of this difference. Z-score was calculated by dividing the point estimate by its standard error. Bonferroni corrections for multiple testing were applied by dividing .05 by the overall number (92) of comparisons. The level of significance was set at .00054. Effect sizes are discussed using Funder and Ozer (Funder & Ozer, 2019)'s metrics of effect size for psychological research which are converted to odds ratios as follows: OR = 1.20 as very small, OR = 1.44 as small, OR = 2.10 as medium, OR = 3.13 as large, and OR = 4.87 as very large.

Potential demographic covariates were reviewed for inclusion based on guidance from prior research, such that confounding variables (i.e., variables that may connote a common cause for both the independent variable and outcome) were controlled for, but collider variables (i.e., variables that are caused by both the independent variable and outcome) and mediator variables were not (see Rohrer, 2018 for further explanation). Sex assigned at birth was included as a

TABLE 1 Lifetime prevalence of DSM-5 eating disorder diagnosis by sociodemographic characteristics

Sociodemographic characteristic	AN		BN		BED		Any ED		No ED diagnosis	
	n	% (SE)	*n*	% (SE)	*n*	% (SE)	*n*	% (SE)	*n*	% (SE)
Age, M (SE)	41.83 (0.96)		39.05 (2.45)		45.26 (1.21)		42.82 (0.83)		46.60 (0.19)	
Total	276	0.8 (0.1)	77	0.2 (0.1)	247	0.7 (0.1)	600	1.7 (0.1)	35,709	98.3 (0.1)
Sex										
Male	23	7.5 (2.2)	11	15.3 (4.9)	62	28.1 (3.6)	96	16.6 (1.9)	15,766	48.6 (0.3)
Female	253	92.5 (2.2)	66	84.7 (4.9)	185	71.9 (3.6)	504	83.4 (1.9)	19,943	51.4 (0.3)
Race or ethnicity										
Non-Hispanic White	206	79.2 (2.8)	42	68.4 (7.0)	160	72.9 (3.5)	408	75.3 (2)	18,786	66 (0.8)
Non-Hispanic Black	17	2.8 (0.7)	12	10.3 (3.7)	33	9.1 (2.2)	62	6.2 (1.0)	7704	11.9 (0.7)
Non-Hispanic American Indian/Alaska Native	8	5.5 (2.3)	2	2.1 (1.5)	2	0.9 (0.7)	12	3.3 (1.2)	499	1.5 (0.1)
Non-Hispanic Asian/Native Hawaiian/ Other Pacific Islander	9	4.1 (1.5)	2	2.3 (1.7)	9	3.9 (1.8)	20	3.8 (1.1)	1781	5.8 (0.5)
Hispanic	36	8.5 (1.5)	19	16.8 (5.3)	43	13.2 (2.9)	98	11.4 (1.5)	6939	14.8 (0.7)
Born in the United States										
Yes	247	91.1 (1.9)	71	94.3 (2.8)	220	89.4 (2.1)	538	90.9 (1.2)	29,358	83.9 (0.5)
No[a]	29	8.9 (1.9)	6	5.7 (2.8)	27	10.6 (2.1)	62	9.1 (1.2)	6342	16.1 (0.5)
Unknown	0	0	0	0	0	0	0	0	9	0 (0.0)
Census Region										
Northeast	39	17.1 (3.3)	11	18.4 (7.0)	22	14.3 (2.7)	72	16.2 (2.2)	5108	18.3 (0.5)
Midwest	57	22.4 (3.4)	15	18.3 (4.9)	63	24.9 (3.3)	135	22.9 (2.3)	7431	21.5 (0.4)
South	88	30.5 (4.1)	20	26.7 (5.4)	84	32.1 (3.5)	192	30.6 (2.4)	14,340	37.2 (0.9)
West	92	30 (4.1)	31	36.6 (6.0)	78	28.7 (3.5)	201	30.4 (2.5)	8830	23.1 (0.9)
Sexual Identity										
Heterosexual or straight	256	92.8 (2.0)	66	87.3 (4.2)	231	94.3 (1.6)	553	92.7 (1.3)	34,091	96 (0.2)
Gay or lesbian	5	1.5 (0.8)	2	3.1 (2.5)	7	3.1 (1.3)	14	2.3 (0.7)	572	1.4 (0.1)
Bisexual	10	4 (1.4)	5	5.9 (2.7)	5	1.4 (0.7)	20	3.2 (0.9)	546	1.3 (0.1)
Not sure	4	1.6 (1.1)	3	3 (2.1)	4	1.2 (0.7)	11	1.6 (0.7)	188	0.5 (0.0)
Unknown	1	0.2 (0.2)	1	0.7 (0.7)	0	0	2	0.2 (0.1)	312	0.8 (0.1)
Education Level										
Less than high school	22	7.7 (1.5)	13	11.7 (3.9)	32	12.3 (2.3)	67	10 (1.2)	5423	13.1 (0.4)
High school or GED	48	15.4 (2.4)	16	20.5 (6.8)	53	23.2 (3.4)	117	19.1 (1.9)	9682	25.9 (0.5)
Some college or higher	206	76.9 (2.9)	48	67.8 (7.2)	162	64.5 (3.9)	416	70.9 (2.1)	20,604	61 (0.8)
Household income level										
<$25,000	75	19.5 (2.5)	26	26.3 (5.8)	92	28.6 (2.8)	193	23.9 (1.8)	12,627	27.4 (0.6)
$25,000–39,999	47	14.1 (2.5)	21	21.6 (4.8)	44	17.4 (2.5)	112	16.3 (1.8)	6736	17.1 (0.3)
$40,000–69,999	59	25.3 (3.0)	12	13.3 (4.2)	57	21.5 (2.9)	128	22.3 (2.1)	7742	22.8 (0.3)
≥$70,000	95	41.1 (3.8)	18	38.8 (8.0)	54	32.6 (4.2)	167	37.5 (2.8)	8604	32.7 (0.6)

Note: All analyses adjusted for complex survey design of the National Epidemiologic Survey of Alcohol and Related Conditions-III study.
Abbreviations: AN, anorexia nervosa; BN, bulimia nervosa; BED, binge eating disorder; ED, eating disorder; M, mean; SE, standard error.
[a]In the eating disorder group, the most common other country of birth was Mexico (*n* = 21). Forty-one participants identified other countries of birth; no one birth country was represented by more than five participants.

covariate, given that men report greater trauma exposure as compared to women (Frans et al., 2005) and women are more often diagnosed with eating disorders than men (Hudson et al., 2007; Udo & Grilo, 2018). Sexual orientation was also included as a covariate as sexual minority individuals are more likely to experience trauma (Roberts et al., 2010) and eating pathology (Calzo et al., 2017; Kamody et al., 2020) as compared to their heterosexual counterparts. Age was included as a covariate because older individuals are more likely to be diagnosed with BED (Mangweth-Matzek & Hoek, 2017) and are more likely to accumulate traumatic experiences as they age (Ogle

TABLE 2 Lifetime trauma exposure prevalence by eating disorder diagnosis

Traumatic event	AN (n = 276)		BN (n = 77)		BED (n = 247)		Any ED (n = 600)		No ED diagnosis (n = 35,709)		ED vs. no ED diagnosis[a]	
	n	% (SE)	n	% (SE)	n	% (SE)	n	% (SE)	n	% (SE)	AOR	95% CI
Any war-related trauma	8	2.0 (0.8)	3	2.2 (1.5)	2	1.4 (1.2)	13	1.8 (0.6)	1272	3.9 (0.2)	0.45	0.22; 0.94
Active military combat	3	1.0 (0.6)	0	0	1	1.1 (1.1)	4	0.9 (0.5)	856	2.7 (0.1)	0.33	0.10; 1.07
Peacekeeper/relief worker	1	0.1 (0.1)	0	0	0	0	1	0.0 (0.0)	158	0.4 (0.0)	0.09	0.01; 0.72
Civilian in war zone/place of terror	4	1.1 (0.6)	3	2.2 (1.5)	0	0	7	0.8 (0.3)	194	0.6 (0.0)	1.38	0.61; 3.15
Refugee	2	0.5 (0.3)	1	0.4 (0.4)	0	0	3	0.3 (0.2)	112	0.4 (0.0)	0.77	0.22; 2.65
Prisoner of war	0	0	0	0	1	0.3 (0.3)	1	0.1 (0.1)	54	0.2 (0.0)	0.68	0.90; 5.04
Any sexual interpersonal trauma	85	34.0 (3.0)	25	24.3 (5.8)	64	27.2 (3.4)	174	30.1 (2.0)	3378	9.1 (0.2)	4.32	3.58; 5.21*
Sexually abused before age 18	68	26.7 (2.8)	19	17.7 (4.6)	52	22.6 (3.2)	139	23.9 (1.8)	2817	7.7 (0.2)	3.80	3.11; 4.64*
Sexually assaulted as an adult	30	11.2 (2.3)	10	9.2 (3.4)	18	6.4 (1.3)	58	9.1 (1.2)	864	2.1 (0.1)	4.59	3.40; 6.19*
Any other nonsexual interpersonal trauma	99	34.2 (3.5)	29	35.6 (6.8)	94	37.8 (3.4)	222	35.8 (2.4)	6627	17.7 (0.3)	2.60	2.12; 3.20*
Physically abused before age 18	22	6.5 (1.4)	9	15.2 (6.4)	29	13.9 (3.0)	60	10.5 (1.6)	1258	3.6 (0.1)	3.17	2.27; 4.43*
Beaten up by spouse/romantic partner	50	18.2 (2.8)	14	14.3 (4.1)	34	10.7 (1.8)	98	14.8 (1.6)	2337	5.6 (0.2)	2.92	2.23; 3.82*
Beaten up by someone else	19	6.1 (1.8)	7	14.0 (6.5)	13	6.4 (1.9)	39	7.2 (1.5)	1523	4.2 (0.1)	1.76	1.14; 2.70
Kidnapped/held hostage	5	2.3 (1.3)	3	2.4 (1.5)	6	2.1 (0.8)	14	2.2 (0.7)	252	0.6 (0.0)	3.78	1.96; 7.31*
Stalked	20	6.6 (1.6)	4	3.8 (2.1)	17	6.5 (1.8)	41	6.2 (1.1)	983	2.4 (0.1)	2.67	1.81; 3.94*
Mugged, held up, threatened with a weapon or assaulted in any other way	21	6.7 (2.0)	3	2.3 (1.5)	21	9.1 (1.8)	45	7.1 (1.3)	2007	5.4 (0.2)	1.34	0.90; 1.98
Any noninterpersonal trauma	195	71.2 (3.1)	55	66.9 (7.1)	200	82.8 (2.8)	450	75.2 (2.1)	21,097	62.2 (0.7)	1.85	1.47; 2.31*
Serious or life-threatening injury	33	10.8 (1.8)	7	7.4 (3.4)	40	16.2 (2.9)	80	12.5 (1.5)	3806	11.2 (0.3)	1.13	0.86; 1.48
Serious or life-threatening illness	44	16.1 (2.7)	13	19.4 (5.4)	44	17.2 (2.7)	101	16.9 (1.7)	4260	13.1 (0.3)	1.35	1.05; 1.74
Saw a dead body or body parts	56	24.4 (3.4)	11	11.7 (4.0)	71	28.8 (3.4)	138	24.5 (2.1)	6253	18.5 (0.4)	1.42	1.13; 1.79
Injured in a terrorist attack	0	0	0	0	2	1.8 (1.3)	2	0.7 (0.5)	158	0.4 (0.0)	1.57	0.36; 6.87
Natural disaster, like flood, fire, earthquake, hurricane	35	13.1 (2.9)	8	9.1 (3.6)	20	7.9 (1.9)	63	10.5 (1.6)	3170	9.6 (0.5)	1.11	0.79; 1.56
Juvenile detention or jail	9	3.3 (1.1)	5	4.1 (2.1)	15	6.4 (1.9)	29	4.6 (1.1)	1196	3.1 (0.1)	1.50	0.92; 2.42
Number of trauma events												
0	86	28.8 (2.5)	26	35.2 (6.0)	63	26.2 (3.3)	175	28.6 (1.7)	18,449	50.5 (0.6)		
1	74	28.1 (3.6)	16	25.4 (6.9)	71	27.6 (3.7)	161	27.6 (2.4)	8572	24.5 (0.3)		
2	44	17.4 (2.7)	15	21.5 (7.3)	54	21.4 (2.9)	113	19.5 (1.9)	4338	12.8 (0.3)		
3	28	11.3 (2.6)	9	6.8 (2.7)	31	12.2 (2.2)	68	11.1 (1.6)	2390	6.7 (0.2)		
4+[b]	44	14.4 (2.4)	11	11.1 (3.3)	28	12.6 (2.7)	83	13.1 (1.6)	1960	5.4 (0.2)		

(Continues)

TABLE 2 (Continued)

Traumatic event	AN (n = 276)		BN (n = 77)		BED (n = 247)		Any ED (n = 600)		No ED diagnosis (n = 35,709)		ED vs. no ED diagnosis[a]	
	n	% (SE)	n	% (SE)	n	% (SE)	n	% (SE)	n	% (SE)	AOR	95% CI
Number of trauma event types												
0	86	28.8 (2.5)	26	35.2 (6.0)	63	26.2 (3.3)	175	28.6 (1.7)	18,449	50.5 (0.6)		
1	93	35.2 (3.7)	22	36.4 (8.1)	92	35.8 (3.9)	207	35.6 (2.6)	11,224	32.7 (0.5)		
2	66	25.3 (3.6)	22	20.9 (5.5)	75	29.2 (3.1)	163	26.3 (2.3)	4861	13.6 (0.3)		
3	30	10.4 (2.3)	7	7.6 (2.9)	17	8.7 (2.5)	54	9.4 (1.4)	1573	4.2 (0.1)		
4	1	0.3 (0.3)	0	0	0	0	1	0.1 (0.1)	37	0.1 (0.0)		

Note: All analyses adjusted for complex survey design of the National Epidemiologic Survey of Alcohol and Related Conditions-III (NESARC) study.

Abbreviations: AN, anorexia nervosa; BN, bulimia nervosa; BED, binge eating disorder; ED, eating disorder; M, mean; SE, standard error.

[a]Odd ratios are the odds of experiencing the specific trauma event for individuals with an eating disorder as compared to individuals without an eating disorder. Reference group for the specific trauma event is no exposure to that specific trauma event.

[b]In the NESARC study design, only four potentially traumatic events are inquired about. Therefore, individuals that may have had four or more trauma events are classified into a single group.

* *p* < .001; significant finding following Bonferroni correction.

et al., 2013). Sex, sexual orientation, and age are included as covariates in bivariate and multivariate models.

3 | RESULTS

3.1 | Prevalence of trauma events by eating disorder diagnosis

In the current sample, 43.8% of individuals diagnosed with an eating disorder and 24.9% of individuals without an eating disorder diagnosis reported more than one traumatic event. In terms of trauma exposure types, 35.8% of individuals diagnosed with an eating disorder and 16.7% of individuals without an eating disorder diagnosis reported trauma of more than one type. The most common type of trauma was noninterpersonal. Approximately 71% of individuals diagnosed with AN, 67% of individuals diagnosed with BN, and 75% of individuals diagnosed with BED had experienced a noninterpersonal trauma. The least common trauma type was war-related. Approximately 2% of individuals diagnosed with AN, 2.2% of individuals diagnosed with BN, and 1.4% of individuals diagnosed with BED had experienced war-related trauma. See Table 2 for full prevalence of traumatic events by eating disorder diagnosis.

3.2 | Association of trauma with eating disorder diagnoses

3.2.1 | Bivariate results

When examining the bivariate association between trauma classes and eating disorder diagnoses, war-related trauma was not significantly associated with lifetime diagnosis of AN (OR = 1.00, *p* = .999), BN (OR = 0.98, *p* = .977), or BED (OR = 0.48, *p* = .378). Sexual interpersonal trauma was significantly associated with higher odds of lifetime diagnosis of AN (OR = 3.23, *p* < .001) and BED (OR = 3.04, *p* < .001), but not BN (OR = 1.97, *p* = .032). Other nonsexual interpersonal trauma was significantly associated with higher odds of lifetime diagnosis of AN (OR = 2.11, *p* < .001) and BED (OR = 2.66, *p* < .001), but not BN (OR = 2.20, *p* = .008). Noninterpersonal trauma was associated with higher odds of lifetime diagnosis of AN (OR = 1.78, *p* = .001) and BED (OR = 2.05, *p* < .001), but not BN (OR = 1.23, *p* = .450). See Table 3 for full results.

3.2.2 | Multivariable results

When including all trauma classes in a single model, sexual interpersonal (OR = 2.64, *p* < .001) was significantly associated with higher odds of AN lifetime diagnosis, but war-related (OR = 0.80, *p* = .618), nonsexual interpersonal (OR = 1.45, *p* = .039), and noninterpersonal (OR = 1.49, *p* = .018) traumas were not. Lifetime BN diagnosis was not associated with any trauma class, including war-related

TABLE 3   Lifetime exposure to potentially traumatizing event by eating disorder

Traumatic event	Bivariate adjusted odds ratios (95% CI)			Multivariable adjusted odds ratios (95% CI)		
	AN	BN	BED	AN	BN	BED
Any war-related trauma	1.00 (0.42, 2.37)	0.98 (0.24, 3.95)	0.48 (0.09, 2.52)	0.80 (0.34, 1.92)	0.86 (0.21, 3.46)	0.38 (0.07, 1.98)
Any sexual interpersonal trauma	3.23 (2.44, 4.27)*	1.97 (1.06, 3.66)	3.04 (2.13, 4.34)*	2.67 (1.95, 3.64)*	1.55 (0.75, 3.21)	2.22 (1.54, 3.22)*,a,b
Any other nonsexual interpersonal trauma	2.11 (1.55, 2.85)*	2.20 (1.23, 3.94)	2.67 (2.00, 3.55)*	1.45 (1.02, 2.06)	1.95 (0.97, 3.94)	1.96 (1.46, 2.62)*,a,c
Any noninterpersonal trauma	1.78 (1.31, 2.42)*	1.23 (0.72, 2.12)	2.05 (1.56, 2.70)*	1.49 (1.07, 2.07)	1.04 (0.56, 1.91)	1.72 (1.30, 2.26)*,b,c

Note: All analyses control for age, sexual identity, and sex assigned at birth, as well as the complex survey design of the National Epidemiologic Survey of Alcohol and Related Conditions-III study. Effect sizes are interpreting using Funder and Ozer (Funder & Ozer, 2019)'s metrics of effect size for psychological research which are converted to odds ratios as follows: OR = 1.20 as very small, OR = 1.44 as small, OR = 2.10 as medium, OR = 3.13 as large, and OR = 4.87 as very large. CI, confidence interval; AN, anorexia nervosa; BN, bulimia nervosa; BED, binge eating disorder.

[a]For individuals with binge eating disorder, there is no significant difference between the odds of experiencing sexual interpersonal trauma and the odds of experiencing nonsexual interpersonal trauma ($z = -0.50$, $p = .618$).

[b]For individuals with binge eating disorder, there is no significant difference between the odds of experiencing sexual interpersonal trauma and the odds of experiencing noninterpersonal trauma ($z = -1.05$, $p = .296$).

[c]For individuals with binge eating disorder, there is no significant difference between the odds of experiencing nonsexual interpersonal trauma and the odds of experiencing noninterpersonal trauma ($z = 0.63$, $p = .531$).

*$p < .001$; significant finding following Bonferroni correction.

(OR = 0.86, $p = .831$), sexual interpersonal (OR = 1.55, $p = .230$), nonsexual interpersonal trauma (OR = 1.95, $p = .062$), and noninterpersonal trauma (OR = 1.04, $p = .903$). Finally, war-related trauma was not associated with lifetime diagnosis of BED (OR = 0.38, $p = .246$), but sexual interpersonal (OR = 2.22, $p < .001$), nonsexual interpersonal (OR = 1.96, $p < .001$), and noninterpersonal trauma were (OR = 1.72, $p < .001$). For BED, the difference in odds ratios was compared, given that more than one trauma type was significant. The difference in odds ratios between sexual interpersonal trauma and nonsexual interpersonal trauma ($z = 1.53$, $p = .125$), sexual interpersonal trauma and noninterpersonal trauma ($z = 1.22$, $p = .223$), and nonsexual interpersonal trauma and noninterpersonal trauma ($z = 0.23$, $p = .821$) was not significant. See Table 3 for full results.

4 | DISCUSSION

The primary aims of the current study were to: (1) assess the bivariate association of four classes of trauma exposure and eating disorder diagnoses and (2) assess the association of these trauma classes with eating disorder diagnoses to account for multiple trauma type exposures. Results indicated that war-related trauma was not associated with any eating disorder diagnosis. Noninterpersonal trauma was associated with diagnosis of AN and BED in bivariate models with a small effect size, but only BED with a small effect size when controlling for other trauma types. Nonsexual interpersonal trauma was associated with diagnosis of AN and BED in bivariate models with a medium effect size, but only BED with a small effect size when controlling for other trauma types. Finally, sexual interpersonal trauma was associated with AN and BED with a large and medium effect size respectively in bivariate models, but not BN. In multivariable models

AN and BED were associated with sexual interpersonal trauma with a medium effect size, but BN was not.

In line with most research (Breland et al., 2018; Gomez et al., 2021; Madowitz et al., 2015), sexual trauma was found have a medium association with eating pathology (controlling for sex, sexual identity, and age), both in bivariate models and within the context of other trauma exposure for AN and BED, though not with BN. Given that prior meta-analyses have found that the association between childhood sexual assault is less robust for AN as compared to BN and BED (Solmi et al., 2021), this finding provides further support that sexual assault is associated with AN diagnosis, but also contradicts previous findings that binge and/or purge-spectrum behaviors may be more likely associated with eating pathology (Caslini et al., 2016; Molendijk et al., 2017). However, the current study had a relatively small sample size of individuals with BN. Further, given our hierarchical classification of eating disorders, the AN category may have included individuals that were also diagnosed with BN or BED at some point during their life. Therefore, the current null findings should be considered tentative. Regarding sexual trauma, Madowitz et al. (2015) hypothesized two potential etiological pathways that may explain the association between sexual assault and eating disorders: (1) body perceptions, including potential mediators such as body dissatisfaction (Preti et al., 2006) and sexual dysfunction (Castellini et al., 2013); and (2) management of psychological difficulties, including potential mediators such as emotion regulation (Burns et al., 2012) and impulsivity (Dworkin et al., 2014). Another potential mediator that might explain this relationship is PTSD as sexual trauma survivors are at higher conditional risk of developing PTSD as compared to other trauma survivors (Hetzel-Riggin & Roby, 2013) and previous studies have found that posttraumatic stress is a significant mediator in the relationship between sexual trauma and eating disorder symptoms

cross-sectionally (Holzer et al., 2008). Future research should examine the association between sexual trauma and eating disorders longitudinally to test the theorized mediation paths.

War-related trauma was not associated with any eating disorder diagnosis, both in bivariate models and accounting for other trauma types. However, caution is warranted in interpreting the current findings due to potential concerns about statistical power given the low unweighted sample size of individuals who both had an eating disorder and war-related trauma. It may be that individuals with eating disorders are less likely to experience war-related trauma, or the NESARC-III dataset may not fully capture the war-related experiences of the general population. Prior research examining eating pathology in veteran populations found that combat trauma was significant when accounting for experiences of sexual assault in men (Arditte Hall et al., 2017) but not in women (Breland et al., 2018). Therefore, future research may seek to replicate the findings of Arditte Hall et al. (2017) and Breland et al. (2018) in a sample with greater exposure to war-related trauma as well as examining perhaps a moderating role of gender.

In the current study, noninterpersonal trauma was found to be associated with diagnosis of AN and BED with a small effect size, controlling for covariates, in bivariate models but was only associated with BED with a small effect size when accounting for other trauma exposures. This contradicts prior work that finds no significant association between noninterpersonal trauma and eating pathology (Gomez et al., 2021). Of note, the Gomez et al. (2021) study examined the association of noninterpersonal trauma (i.e., wreck, crash, accident; serious body-related accident; and life-threatening illness or injury) with an overall measure of eating pathology (Eating Disorder Diagnostic Scale; Stice et al., 2004), accounting for combat exposure and sexual trauma. Given the use of an overall eating pathology measure, diagnosis-specific differences such as those observed in the current study may have been obscured. Indeed, a recent study by Lie et al. (2021) found a significant association between experiences of a life-threatening illness or disease and lifetime diagnosis of AN binge/purge subtype as well as mixed eating disorder history (i.e., a history of AN and BN and/or BED diagnosis). However, Lie et al. (2021) did not account for the experience of multiple trauma types; therefore, it is unknown whether this association would have remained significant after accounting for other trauma types such as sexual assault.

Interestingly, sexual interpersonal, nonsexual interpersonal, and noninterpersonal trauma were associated with BED diagnosis in bivariate models and multivariable models, and with relatively equal association strength (small to medium). This finding is similar to previous studies that have found that any potentially traumatic event is associated with BED (Brewerton, 2007; Brewerton et al., 2014). This may indicate that the etiology of trauma in BED functions differently than AN and BN. A potential mechanism of interest in conferring this association may be overvaluation of shape and weight, which is required for AN or BN diagnosis but not BED (American Psychiatric Association, 2013). However, prior research has suggested that overvaluation of shape and weight is similar between BED and BN

patients (Ahrberg et al., 2011). Future research should examine the association between trauma and BED longitudinally to identify potential mechanisms of interest to explain the observed differences by diagnosis.

There are some important limitations of the current study to note. Given that this study was cross-sectional, no casual conclusions about the association between various trauma types and eating disorder onset can be made. Future research is needed to investigate the prospective association between trauma events and eating disorders, particularly to identify important mediators between trauma and eating pathology. In addition, results regarding war-related trauma should be considered tentative due to the potential low power afforded by the small, unweighted sample size of individuals with both an eating disorder and war-related trauma. Future research should consider replicating the current study with a larger sample size at the cross-section of eating disorders and war-related trauma exposure. Another limitation of note is the potential for underreporting of trauma events. Due to the sensitive nature of trauma, individuals in the current study may not have felt comfortable disclosing said trauma (Andresen & Blais, 2019). Alternatively, research has found that trauma memories are subject to significant recall bias (Hirst et al., 2015) which may also lead to underreporting. Therefore, trauma in the current study may be a lower estimate of actual exposure. A further potential limitation is that the current study was not able to separate exposure to trauma as a child as compared to adult exposure. A robust literature has found a strong relationship between childhood trauma and eating pathology (Caslini et al., 2016; Molendijk et al., 2017; Pignatelli et al., 2017). Prior research has found differences in eating pathology based on timing of trauma exposure (Vidaña et al., 2020) as well as the effect of cumulative trauma over time (Molendijk et al., 2017); therefore, future research should consider disentangling these associations by eating disorder diagnosis. Finally, the sample size for AN and BED were much larger than that of BN. This may have led our analyses to be underpowered to detect effects in the BN group, as compared to the AN and BED groups; therefore, the null results in BN should be considered with caution. Despite these limitations, we consider the current study to be an important addition to the existing literature.

The current study demonstrates a meaningful extension of prior work in multiple ways. First, this study examines similar questions of interest to Breland et al. (2018), Gomez et al. (2021), and Lie et al. (2021) but employs a nationally representative sample of US adults, as compared to samples of predominantly White female veterans, food insecure individuals, and Swedish nationals respectively. Second, the current study builds upon Lie et al. (2021) by including comparisons of trauma exposure in a single model, which is important for determining whether specific types of trauma are more likely to be associated with eating disorders.

The present study has implications for clinical work in the field of eating disorders. Individuals with eating disorders are more likely to have experienced traumatic events that the general population. Therefore, clinicians that work with eating disorders should consider incorporating trauma assessment into their intake evaluations to ascertain an accurate clinical picture and determine whether trauma-

informed care is needed. Given that trauma has been found to predict premature treatment termination (Anderson et al., 1997; Carter et al., 2006; Rodríguez et al., 2005), clinicians should be aware of this possibility and work to adapt treatment to these patients' needs. Conversely, given the higher rate of trauma exposure in eating disorder populations, these individuals may also present to trauma clinics. Clinicians that work in the field of PTSD and trauma should consider assessing for eating pathology.

AUTHOR CONTRIBUTIONS

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CONFLICT OF INTEREST

The authors have no conflict to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from National Institute on Alcohol Abuse and Alcoholism (NIAAA). Restrictions apply to the availability of these data, which were used under license for this study. Data are available at https://www.niaaa.nih.gov/research/nesarc-iii with the permission of the NIAAA.

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