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The associations of earlier trauma exposures and history of mental disorders with PTSD after subsequent traumas

Ronald C. Kessler, PhD[1], **Sergio Aguilar-Gaxiola, MD, PhD**, **Jordi Alonso, MD, PhD**, **Evelyn J. Bromet, PhD**, **Oye Gureje, MD, PhD, FRCPsych**, **Elie G. Karam, MD**, **Karestan C. Koenen, PhD**, **Sing Lee, MB, BS**, **Howard Liu, SM**, **Beth-Ellen Pennell, MA**, **Maria V. Petukhova, PhD**, **Nancy A. Sampson, BA**, **Victoria L. Shahly, PhD**, **Dan J. Stein, FRCPC, PhD**, **Lukoye Atwoli, MD, PhD**, **Guilherme Borges, ScD**, **Brendan Bunting, PhD**, **Giovanni de Girolamo, MD**, **Semyon Gluzman, MD**, **Josep Maria Haro, MD, PhD**, **Hristo Hinkov, MD, PhD**, **Norito Kawakami, MD, DMSc**, **Viviane Kovess-Masfety, MD, PhD**, **Fernando Navarro-Mateu, MD, PhD**, **Jose Posada-Villa, MD**, **Kate M. Scott, PhD**, **Arieh Y. Shalev, MD**, **Margreet ten Have, PhD**, **Yolanda Torres, MPH, DraHC**, **Maria Carmen Viana, MD, PhD**, **Alan M. Zaslavsky, PhD**, and **A writing group of the WHO World Mental Health Survey Collaborators**

Department of Health Care Policy, Harvard Medical School, Boston, Massachusetts, USA (Kessler, Liu, Petukhova, Sampson, Shahly, Zaslavsky); Center for Reducing Health Disparities, UC Davis Health System, Sacramento, California, USA (Aguilar-Gaxiola); Health Services Research Unit, IMIM-Hospital del Mar Research Institute, Parc de Salut Mar; Pompeu Fabra University (UPF); and CIBER en Epidemiología y Salud Pública (CIBERESP), Barcelona, Spain (Alonso); Department of Psychiatry, Stony Brook University School of Medicine, Stony Brook, New York, USA (Bromet); Department of Psychiatry, University College Hospital, Ibadan, Nigeria (Gureje); Department of Psychiatry and Clinical Psychology, St George Hospital University Medical Center, Balamand University, Faculty of Medicine, Beirut, Lebanon; Institute for Development, Research, Advocacy and Applied Care (IDRAAC), Beirut, Lebanon (Karam); Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA (Koenen, Liu); Department of Psychiatry, Chinese University of Hong Kong, Tai Po, Hong Kong (Lee); Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, Michigan, USA (Pennell); Department of Psychiatry and Mental Health, University of Cape Town, Cape Town, Republic of South Africa (Stein, Atwoli); Department of Mental Health, Moi University School of Medicine, Eldoret, Kenya (Atwoli); National Institute of Psychiatry Ramón de la Fuente, Mexico City, Mexico (Borges); School of Psychology, Ulster University, Londonderry, United Kingdom (Bunting); IRCCS St John of God Clinical Research Centre//IRCCS Centro S. Giovanni di Dio Fatebenefratelli, Brescia, Italy (de Girolamo); Ukrainian Psychiatric Association (Gluzman);

[1]Author for correspondence: Ronald C. Kessler, PhD, Department of Health Care Policy, Harvard Medical School, 180 Longwood Avenue, Boston, MA USA 02115; 617-432-3587 (voice); 617-432-3588 (fax); Kessler@hcp.med.harvard.edu.

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Parc Sanitari Sant Joan de Déu, CIBERSAM, Universitat de Barcelona, Barcelona, Spain (Haro); National Center for Public Health and Analyses, Sofia, Bulgaria (Hinkov); Department of Mental Health, School of Public Health, The University of Tokyo, Tokyo, Japan (Kawakami); Ecole des Hautes Etudes en Santé Publique (EHESP), EA 4057 Paris Descartes University, Paris, France (Kovess-Masfety); UDIF-SM, Subdirección General de Planificación, Innovación y Cronicidad, Servicio Murciano de Salud. IMIB-Arrixaca. CIBERESP-Murcia, Murcia, Spain (Navarro-Mateu); Colegio Mayor de Cundinamarca University, Bogota, Colombia (Posada-Villa); Department of Psychological Medicine, University of Otago, Dunedin, Otago, New Zealand (Scott); Department of Psychiatry, NYU Langone Medical Center, New York City, USA (Shalev); Trimbos-Instituut, Netherlands Institute of Mental Health and Addiction, Utrecht, Netherlands (ten Have); Center for Excellence on Research in Mental Health, CES University, Medellin, Colombia (Torres); Department of Social Medicine, Federal University of Espírito Santo, Vitoria, Brazil (Viana)

Abstract

Although earlier trauma exposure is known to predict post-traumatic stress disorder (PTSD) after subsequent traumas, it is unclear if this association is limited to cases where the earlier trauma led to PTSD. Resolution of this uncertainty has important implications for research on pre-trauma vulnerability to PTSD. We examined this issue in the WHO World Mental Health (WMH) Surveys with 34,676 respondents who reported lifetime trauma exposure. One lifetime trauma was selected randomly for each respondent. DSM-IV PTSD due to that trauma was assessed. We reported in a previous paper that four earlier traumas involving interpersonal violence significantly predicted PTSD after subsequent random traumas (OR=1.3–2.5). We also assessed 14 lifetime DSM-IV mood, anxiety, disruptive behavior, and substance disorders prior to random traumas. We show in the current report that only prior anxiety disorders significantly predicted PTSD in a multivariate model (OR=1.5–4.3) and that these disorders interacted significantly with three of the earlier traumas (witnessing atrocities, physical violence victimization, rape). History of witnessing atrocities significantly predicted PTSD after subsequent random traumas only among respondents with prior PTSD (OR=5.6). Histories of physical violence victimization (OR=1.5) and rape after age 17 (OR=17.6) significantly predicted only among respondents with no history of prior anxiety disorders. Although only preliminary due to reliance on retrospective reports, these results suggest that history of anxiety disorders and history of a limited number of earlier traumas might usefully be targeted in future prospective studies as distinct foci of research on individual differences in vulnerability to PTSD after subsequent traumas.

INTRODUCTION

Only a minority of people ever develops post-traumatic stress disorder (PTSD)[1] despite traumas occurring to the vast majority of the population.[2] This suggests that individual differences exist in vulnerability to traumas.[3–5] Increased understanding of these differences could help inform intervention development.[6] In addition, measurement of these differences shortly after trauma exposure could help target high-risk individuals for preventive interventions.[7] Epidemiological research shows that earlier trauma exposure and history of psychopathology are the two strongest pre-trauma predictors PTSD after subsequent traumas.[8] Earlier trauma exposure is particularly interesting because, unlike

psychopathology, earlier traumas are external to the individual and presumably predict future PTSD because (i) exposure to these traumas is influenced by stable vulnerability factors and/or (ii) exposure to these traumas causes biological and/or psychological vulnerabilities to subsequent PTSD. Childhood adversities (CAs) have been of special interest, as they occur early in life and are strongly associated with increased risk of psychopathology throughout the life course.[9, 10] However, it is difficult to tease apart the effects of pre-existing vulnerability factors and intervening biological and psychological processes in studying CAs. There are two reasons for this. First, CAs are strongly associated with parental psychopathology and, by extension, genetic risk.[11] Second, a high proportion of the most severe CAs are associated with child- and adolescent-onset mental disorders and long-term neurobiological and psychological changes due to those disorders that are associated with risk of a range of later disorders.[12]

The effects of earlier traumas not involving CAs on PTSD after subsequent traumas might be easier to study than CAs to the extent that exposure to earlier traumas is more independent than CAs of prior psychopathology and genetic risk. A potential limitation, though, is that some,[13, 14] although not all,[15] epidemiological studies suggest that associations of earlier traumas with PTSD after subsequent traumas are limited to people who developed PTSD due to the earlier traumas. If true, this specification would reintroduce the same complication as in research on CAs. Resolution of this uncertainty could have important implications for future research on the environmental determinants of individual differences in vulnerability to PTSD.[16]

We attempt to take a first step in resolving this uncertainty here by analyzing data from a unique sample of 34,676 respondents who reported lifetime exposure to one or more traumas in the WHO World Mental Health (WMH) Surveys.[7] In a previous report,[17] we showed that four trauma groups/types, all involving interpersonal violence, had significantly elevated relative-odds of predicting DSM-IV PTSD after subsequent traumas. We also showed in that report that these associations did not vary depending on type of subsequent trauma. However, in that earlier report we did not explore the possibility that the associations of these earlier traumas with later PTSD might depend on history of PTSD or other common DSM-IV disorders related to the earlier traumas. We do this in the current report.

METHODS AND MATERIALS

Sample

Data come from 22 community epidemiological surveys in the larger WMH series that assessed lifetime PTSD after *randomly-selected* traumas. By *randomly selected* we mean that one occurrence of one lifetime trauma reported by each respondent was selected at random for retrospective assessment of PTSD. We adjusted for individual differences in number of lifetime trauma exposures by weighting random trauma data a the individual level by the respondent's number of lifetime traumas, generating a weighted sample representative of all trauma occurrences in the population rather than of all individuals in the population. The joint associations of earlier lifetime traumas and history of psychopathology with PTSD after the subsequent random trauma are the focus of the current report

Three of the 22 surveys were in low/lower-middle income countries (Colombia, Peru, Ukraine), seven in upper-middle income countries (Brazil, Bulgaria, Colombia [administered after the previously-mentioned Colombian survey, when the World Bank country income rating had increased], Lebanon, Mexico, Romania, South Africa), and 12 in high income countries (Belgium, France, Germany, Israel, Italy, Japan, Netherlands, New Zealand, Northern Ireland, Spain [separate national and regional surveys], United States) [18] Each survey was based on a multi-stage clustered area probability sample of adult household residents. Three surveys were limited to all urbanized areas in their countries (Colombia, Mexico, Peru), four others to specific Metropolitan areas (Sao Paulo Brazil; Medellin Colombia, Murcia Spain, six cities in Japan), and the remaining 15 represented the full household populations in their countries.

Interviews were administered face-to-face in respondent homes by trained lay interviewers after obtaining informed consent using procedures approved by local Institutional Review Boards.[19] The weighted (by sample size) mean response rate was of 71.3% across surveys (from 45.9% in France to 97.2% in Medellin). The interview was in two parts. Part I, administered to all n=101,454 respondents, assessed core DSM-IV mental disorders. Part II, administered to Part I respondents with core disorders and a probability subsample of other respondents (n=54,600), assessed additional disorders and correlates. Traumas and PTSD were assessed in Part II. The analysis sample considered here includes the 34,676 Part II respondents who reported lifetime trauma exposure. Each Part II respondent was weighted by the inverse of his/her selection probability into Part II, within- household variation in selection probabilities (due to one respondent being selected per household regardless of household size), between-household variation in selection probabilities (due to under-sampling hard-to-reach respondents in the last recruitment phase), and to match the sample with the population on Census geographic/socio-demographic variables. Details about these weights are presented elsewhere.[20]

Measures

Traumas—Twenty-nine trauma types were assessed. These included traumas involving *exposure to organized violence* (e.g., civilian in war zone, relief worker in war zone, refugee), *participation in organized violence* (e.g., combat experience, witnessed atrocities), *physical violence victimization* (e.g., beaten by caregiver as child; beaten by someone else), *sexual violence victimization* (e.g., raped, sexually assaulted, beaten by romantic partner), a*ccidents/injuries* (e.g., natural disaster, automobile accident), and unexpected death of loved one).[2] Age of first exposure was recorded for each trauma type reported.

DSM-IV disorders—Fourteen lifetime DSM-IV disorders were assessed with the fully-structured Composite International Diagnostic Interview (CIDI):[21] two mood disorders (major depressive disorder/dysthymic disorder and broadly-defined bipolar disorder [bipolar I and II and sub-threshold bipolar disorder, defined using criteria described elsewhere]);[22] six anxiety disorders (generalized anxiety disorder, panic disorder and/or agoraphobia, posttraumatic stress disorder, separation anxiety disorder, social phobia, specific phobia); four disruptive behavior disorders (attention-deficit/hyperactivity disorder, conduct disorder, intermittent explosive disorder, oppositional-defiant disorder); and two substance disorders

(alcohol and drug abuse with or without dependence). PTSD was unique in being assessed twice: once for the random trauma and a second time for the lifetime trauma nominated by the respondent as having caused the most distress-impairment. Age-of-onset of each disorder was assessed using probing techniques shown experimentally to improve recall accuracy,[23] allowing us to determine whether respondents had a history of each disorder prior to exposure to the random trauma. DSM-IV organic exclusion and diagnostic hierarchy rules were not used in making diagnoses. As detailed elsewhere,[24] generally good concordance was found between diagnoses based on the CIDI and blinded clinical diagnoses based on SCID reappraisal interviews.[25]

Analysis Methods

Random trauma reports were weighted by the inverse of their within-person probability of selection multiplied by the Part II weight to generate a sample representative of all traumas experienced by all respondents. This composite weight was standardized within surveys to equal the number of respondents reporting lifetime traumas and then pooled across surveys. Logistic regression was used to estimate associations of earlier traumas and random trauma types with subsequent PTSD after random traumas controlling sex, age at random trauma exposure, and survey. This model, the results of which were reported previously,[17] was then expanded in the analyses reported here to evaluate whether temporally prior (to the random trauma) lifetime DSM-IV/CIDI disorders influenced associations of earlier traumas with PTSD after subsequent random traumas. We considered both additive models where prior lifetime disorders were controls and models that included interactions of earlier traumas with lifetime disorders.

Temporal ordering between earlier traumas and lifetime disorders was complex due to many respondents having multiples of both. As a result, the main effects of mental disorders as predictors were explained without attempting to distinguish between mental disorders as risk markers (i.e., temporally primary predictors of both earlier traumas and PTSD after subsequent traumas) versus as mediators (i.e., earlier traumas predicted later mental disorders, which, in turn, predicted PTSD after subsequent random traumas). However, in cases where interactions were found and the association of the earlier trauma with the outcome was significant in the presence of mental disorders, we decomposed the association to determine if the OR associated with the earlier traumas depended on whether the mental disorders occurred before or only after those traumas.

Statistical significance was consistently evaluated using .05-level two-sided design-based tests. The Taylor series method[26] implemented in the SAS software system[27] was used to adjust estimates of standard errors for survey design effects. Logistic regression coefficients and their standard errors were exponentiated to create odds-ratios (ORs) and 95% confidence intervals (CIs). Design-based Wald χ^2 tests were used to evaluate significance of predictor sets.

RESULTS

Associations of DSM-IV/CIDI disorders with PTSD after subsequent random traumas

All 14 prior lifetime DSM-IV/CIDI disorders had increased ORs predicting PTSD after random traumas in bivariate models. (Table 1, Bivariate Model) The highest OR was for prior PTSD (5.7) and the lowest for conduct disorder (1.1). Ten of the 14 bivariate ORs were statistically significant. However, in a multivariate model containing all 14 disorders (Table 1, Model 1.1), only the anxiety disorders remained significant as a set (χ^2_6=112.1, p<.001). The ORs for the 6 individual anxiety disorders differed significantly among themselves (χ^2_5=26.8, p<.001), with 5 of the 6 ORs significant (the exception was panic/agoraphobia) and in the range between 4.3 for PTSD and 1.5 for social phobia.

A global interaction test for number of anxiety disorders was non-significant in an expanded model that included separate coefficients for history of each individually significant anxiety disorder and a count variable. (Model 1.2) The interaction was also non-significant in a revised model that included separate dummy variables for respondents with histories of between 2 and all 5 significant anxiety disorders. (Model 1.3) These results demonstrated clearly that the joint associations of prior anxiety disorders with PTSD after subsequent traumas were additive on a logistic scale (Model 1.4).

Interactions between earlier traumas and history of anxiety disorders

As noted in the introduction, we showed in a previous report that four earlier trauma groups/types, all involving interpersonal violence, predicted DSM-IV PTSD after subsequent random traumas. The first of these earlier traumas was participation in organized violence (OR=1.3; a composite of five trauma types with a combined prevalence of 26.1%, including combat experience; purposefully injuring, torturing, or killing someone; accidentally injuring or killing someone; witnessing serious injury/death or discovering a dead body; and witnessing atrocities). The second was physical violence victimization (OR=1.4; a composite of three trauma types with a combined prevalence of 26.4% that included witnessing physical violence at home as a child; physical abuse by a caregiver as a child; beaten up by someone else). The third and fourth were rape (OR=2.5; 4.5% prevalence) and other sexual assault (OR=1.6; 7.6% prevalence).[17]

Based on the results in Table 1, we investigated how much the gross associations of earlier traumas with PTSD after subsequent random traumas (Table 2, Model 2.1) were due to the anxiety disorders in Model 1.4. We began with an additive model. (Model 2.2) The ORs of all four earlier trauma groups/types became non-significant in that model (OR=1.1–1.6) and those of all five anxiety disorders remained significant with ORs in the range between 4.3 for PTSD and 1.5 for social phobia. We then tested the significance of interactions between earlier traumas and a three-category anxiety disorder profile score: (i) prior PTSD regardless of presence/absence of any other anxiety disorders (2.8% of the sample); (ii) no prior PTSD, but one or more other significant anxiety disorders (16.1% of the sample), and (iii) none of the prior anxiety disorders (81.1% of the sample). These interactions were significant overall (χ^2_8=32.5, p<.001), with significant component interactions for participation in organized violence (χ^2_2=10.1, p=.006) and physical violence victimization (χ^2_2=10.5, p=.005), a near-

significant interaction for rape (χ^2_2=5.8, p=.056), and a non-significant interaction for other sexual assault (χ^2_2=0.2, p=.89).

Subgroup coding of the significant and near-significant interactions showed that the OR of participation in organized violence was significant only among respondents with prior PTSD (OR=2.0) and that the ORs of physical violence victimization and rape were significant only among respondents with no prior anxiety disorders (OR=1.5 for physical violence victimization and 3.4 for rape; Model 2.3). The OR of other sexual assault, in comparison, was non-significant in all three subgroups. Further analyses described next then investigated the significant within-subgroup associations that accounted for the interactions.

Participation in organized violence—As noted above, participation in organized violence was a composite of five trauma types. Disaggregation showed that only one of these five, witnessing atrocities, accounted for the significant subgroup OR of the composite among respondents with a history of prior PTSD. The OR for witnessing atrocities (with or without any of the other four traumas in the composite) predicting PTSD after subsequent random traumas was OR=5.6 (95% CI=1.6–20.3), whereas the OR for one or more of the other four traumas in the composite was OR=0.8 (95% CI=0.4–1.5). We also investigated whether the significant OR for witnessing atrocities among people with a history of prior PTSD varied significantly by whether age at first witnessing atrocities was before or after age-of-onset of PTSD. It did not (χ^2_1=0.0, p=.95), although the number of respondents with a history of both witnessing atrocities and having PTSD prior to the random trauma was small (n=40).

Physical violence victimization—We also noted above that physical violence victimization was a composite of three trauma types. Disaggregation failed to find evidence that these three differed in importance in accounting for the significant subgroup OR of the composite among respondents with no prior anxiety disorders (χ^2_2=2.9, p=.24).

Rape—Although the WMH surveys collected information about circumstances surrounding the rapes selected as random traumas,[28] the only information collected about other rapes was age at first exposure. Disaggregation of the subgroup OR of rape among respondents with no history of anxiety disorder was limited to adult-onset (ages 18+) rapes (OR=17.6, 95% CI=6.6–47.1). The OR associated with childhood-onset (ages 4–17) rapes was not significant (OR=1.5, 95% CI=0.8–2.9). It is noteworthy, though, that this disaggregation is based on an earlier interaction that was only near-significant.

Population distributions

It is instructive to project the above results to the population by dividing the total WMH sample (i.e., including respondents with no history of earlier trauma exposure) into the three subgroups of: (i) individuals with a history of any anxiety disorder that predicted PTSD; (ii) individuals without any such disorder but with exposure to the earlier traumas found to predict PTSD after subsequent traumas (i.e., witnessing atrocities and adult rape victimization); and (iii) other respondents. (Table 3) These three subgroups made up 13.8%, 12.3%, and 73.9% respectively, of the total sample. When we classified each WMH

respondent using this scheme as of 5 years before interview, we found a significantly higher rate of new trauma exposure among respondents in the first (71.9/100 respondents) and second (72.7/100) subgroups than the third (27.5/100) subgroups (χ^2_2=1,359.5, p<.001).

We also saw from the trauma-level sample that conditional PTSD prevalence after random traumas was much higher among respondents in the first (10.6%) than second (3.5%) or third (2.2%) subgroups (χ^2_2=182.0, p<.001). Based on these distributions, we estimated that approximately 57.9% of PTSD cases occur among people in the first subgroup, 17.4% in the second, and 24.7% in the third subgroup. We also estimated that 7.6 new cases of PTSD would be found per 100 respondents by following respondents in the first subgroup over a period of 5 years compared to 2.6/100 in the second and 0.6/100 in the third subgroup. The roughly 2-fold higher number of PTSD cases in the first than second subgroup is due entirely to higher PTSD risk after trauma exposure. The nearly 4-fold higher number of cases in the second than third subgroup, in comparison, is due to a combination of a substantially higher rate of trauma exposure and a significantly higher PTSD risk after trauma exposure.

DISCUSSION

The main advantage of the WMH design over previous studies in examining the associations of earlier traumas with PTSD after subsequent traumas is its large size, which allows more fine-grained assessments of intervening and interactive associations than previous studies. The WMH surveys were limited, though, by being cross-sectional, raising the possibility of biased recall about history of earlier traumas. Other limitations were that comorbid physical disorders and treatments were not taken into consideration and diagnoses of mental disorders were made with fully-structured interviews rather than semi-structured clinical interviews.

Within the context of these limitations, our finding that numerous mental disorders had significant gross associations with PTSD after subsequent traumas is broadly consistent with previous research.[8, 29, 30] Although no previous study examined the full range of mental disorders considered here, prospective studies of pre-trauma biological and psychological vulnerabilities are indirectly consistent with our finding that anxiety disorders are the most important class of prior disorders in predicting subsequent PTSD.[3, 30, 31] More direct evaluation of this variation is needed in future prospective studies, though, possibly in conjunction with an investigation of the unanticipated finding in Table 3 that prior anxiety disorders were associated with increased risk of subsequent trauma exposure and the possibility that this pattern is due to stress-generating effects of anxiety disorders.

Our finding that history of exposure to traumas involving interpersonal violence is associated with significantly elevated risk of PTSD after subsequent traumas is also consistent with previous research.[8, 29] However, previous research was more equivocal on whether earlier traumas are important only when they result in PTSD. Breslau et al.[14] first documented this specification in a prospective epidemiological sample of young adults, documenting that the significant association of a dichotomous measure of baseline trauma history with increased PTSD risk after subsequent traumas was limited to respondents with a

baseline history of PTSD. Cougle et al.,[15] in a larger prospective study of adolescent assaultive violence (physical or sexual) subsequently showed that respondents with a baseline history assaultive violence victimization without PTSD were significantly more likely than others to develop PTSD after a subsequent trauma. Breslau and Peterson[13] then reported a failure to replicate this specification in a cross-sectional community epidemiological survey that, like the WMH surveys, assessed PTSD separately for each respondent's most upsetting lifetime trauma and a randomly selected lifetime trauma. However, trauma history was defined in the Breslau-Peterson sample only in terms of most upsetting lifetime trauma, resulting in some respondents classified as having a history of only nonviolent trauma exposure actually being exposed to assaultive violence.

It is somewhat surprising given the potential importance of this specification that no subsequent studies carried out more definitive investigations. If the association of trauma history with PTSD after subsequent traumas is due entirely to the mediating effects of PTSD caused by earlier traumas, then trauma history cannot be considered an environmental risk factor for future PTSD. On the other hand, if history of at least some trauma types in the absence of history of mental disorder reliably predicts PTSD after subsequent traumas, individuals with a history of exposure to these earlier traumas could be targeted for intensive baseline evaluation and prospective study of premorbid modifiable biological and psychological vulnerabilities to PTSD in future prospective studies of trauma victims.

Our results provide the first evidence that at least two earlier traumas -- physical violence victimization and, more provisionally (due to the total-sample p value only being near-significant), adult rape -- are associated with PTSD after subsequent traumas among people who did not have anxiety disorders either before or after the earlier traumas. Although only provisional because they are based on cross-sectional data, these results raise the possibility that investigators designing future prospective studies might profit from over-sampling baseline respondents who had these earlier traumas but did not have a history of anxiety disorders for purposes of enriching prospective analyses of vulnerability factors for subsequent PTSD. Why these individuals might be at elevated risk of subsequent PTSD is unclear, but a number of suggestions exist in the literature about developmental, psychosocial, and neurobiological factors that could either be risk factors for exposure to or consequences of these earlier traumas.[3, 6, 30] We showed that a meaningful proportion of the population falls into this subgroup, making over-sampling feasible to enrich investigation of vulnerabilities that are independent of prior anxiety disorders. Replicating results regarding predictive associations of biological and psychological vulnerabilities in such an enriched over-sample could help evaluate the independence of presumed causal factors from earlier mental disorders in a way that substantially improves on more standard approaches of using multivariate methods to control for such potential confounders.[31]

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Group Information

The WHO World Mental Health Survey collaborators are Sergio Aguilar-Gaxiola, MD, PhD, Ali Al-Hamzawi, MD, Mohammed Salih Al-Kaisy, MD, Jordi Alonso, MD, PhD, Laura Helena Andrade, MD, PhD, Corina Benjet, PhD, Guilherme Borges, ScD, Evelyn J. Bromet, PhD, Ronny Bruffaerts, PhD, Brendan Bunting, PhD, Jose Miguel Caldas de Almeida, MD, PhD, Graça Cardoso, MD, PhD, Somnath Chatterji, MD, Alfredo H. Cia, MD, Louisa Degenhardt, PhD, Koen Demyttenaere, MD, PhD, John Fayyad, MD, Silvia Florescu, MD, PhD, Giovanni de Girolamo, MD, Oye Gureje, MD, DSc, FRCPsych, Josep Maria Haro, MD, PhD, Yanling He, MD, Hristo Hinkov, MD, PhD, Chi-yi Hu, MD, PhD, Yueqin Huang, MD, MPH, PhD, Peter de Jonge, PhD, Aimee Nasser Karam, PhD, Elie G. Karam, MD, Norito Kawakami, MD, DMSc, Ronald C. Kessler, PhD, Andrzej Kiejna, MD, PhD, Viviane Kovess-Masfety, MD, PhD, Sing Lee, MB, BS, Jean-Pierre Lepine, MD, Daphna Levinson, PhD, John McGrath, MD, PhD, Maria Elena Medina-Mora, PhD, Jacek Moskalewicz, PhD, Fernando Navarro-Mateu, MD, PhD, Beth-Ellen Pennell, MA, Marina Piazza, MPH, ScD, Jose Posada-Villa, MD, Kate M. Scott, PhD, Tim Slade, PhD, Juan Carlos Stagnaro, MD, PhD, Dan J. Stein, FRCPC, PhD, Margreet ten Have, PhD, Yolanda Torres, MPH, Dra.HC, Maria Carmen Viana, MD, PhD, Harvey Whiteford, MBBS, PhD, David R. Williams, MPH, PhD, Bogdan Wojtyniak, ScD.

Table 1

The associations of prior lifetime (to random trauma exposure) DSM-IV/CIDI disorder history with PTSD after random traumas (n = 34,676)[1]

	Prevalence of prior disorders		Associations of prior lifetime disorders with PTSD after random traumas													
			Bivariate associations			Model 1.1[2]			Model 1.2[3]			Model 1.3[4]			Model 1.4[5]		
	%	(SE)	OR	(95% CI)	*p*	OR	(95% CI)	*p*	OR	(95% CI)	*p*	OR	(95% CI)	*p*	OR	(95% CI)	*p*
I. Mood disorders																	
MDD or dysthymia disorder	9.0	(0.3)	2.3	(1.7–3.1)	<.001	1.3	(0.9–1.7)	.13									
Bipolar disorder	1.8	(0.2)	1.7	(0.9–3.3)	.10	0.8	(0.5–1.4)	.47									
Any mood	10.0	(0.4)	2.1	(1.6–2.8)	<.001												
χ^2_3						2.6	--	.27									
χ^2_2						1.8	--	.18									
II. Anxiety disorders																	
Agor/panic	3.7	(0.3)	1.8	(1.2–2.9)	.008	1.0	(0.7–1.4)	.92	1.0	--	--	1.0	--	--		--	--
GAD	3.5	(0.2)	4.1	(2.3–7.2)	<.001	2.8	(1.4–5.4)	.002	3.4	(1.5–7.5)	.003	3.3	(1.5–7.5)	.004	3.0	(1.6–5.5)	<.001
PTSD	2.8	(0.2)	5.7	(3.8–8.6)	<.001	4.3	(2.8–6.6)	<.001	4.9	(2.8–8.4)	<.001	4.8	(2.7–8.5)	<.001	4.3	(2.8–6.6)	<.001
Social phobia	6.2	(0.3)	2.5	(1.9–3.2)	<.001	1.5	(1.1–2.0)	.008	1.8	(1.1–2.8)	.02	1.8	(1.1–2.8)	.02	1.5	(1.1–2.1)	.005
Specific phobia	9.9	(0.4)	2.6	(2.0–3.4)	<.001	1.9	(1.4–2.5)	<.001	2.1	(1.4–3.0)	<.001	2.1	(1.4–3.0)	<.001	1.9	(1.4–2.5)	<.001
SAD	3.3	(0.2)	3.0	(2.0–4.5)	<.001	2.1	(1.5–3.1)	<.001	2.5	(1.5–4.3)	<.001	2.6	(1.5–4.4)	<.001	2.3	(1.5–3.3)	<.001
Number[6]	20.3	(0.6)	2.3	(1.9–2.6)	<.001				0.9	(0.6–1.2)	.48						
$\chi^2_{6/5}$						112.1	--	<.001	35.8		<.001	33.4	--	<.001	130.7	--	<.001
$\chi^2_{5/4}$						26.8	--	<.001	17.4		.002	16.0	--	.003	16.9	--	.002
Exactly 1	13.8	(0.5)	2.5	(1.6–3.7)	<.001												
Exactly 2	3.6	(0.2)	4.8	(3.2–7.3)	<.001							0.8	(0.4–1.6)	.53			
Exactly 3	1.2	(0.1)	9.7	(5.5–17.1)	<.001							0.6	(0.2–1.9)	.38			
Exactly 4	0.2	(0.0)	50.8	(19.8–130.5)	<.001							1.1	(0.2–5.7)	.94			
Exactly 5	0.0	(0.0)	48.5	(3.0–774.2)	.006							0.3	(0.0–10.0)	.54			
χ^2_4			63.8		<.001							2.2	--	.70			
III. Disruptive behavioral disorders																	
ADHD	2.2	(0.2)	2.4	(1.5–3.8)	<.001	1.7	(1.0–3.0)	.04									

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Associations of prior lifetime disorders with PTSD after random traumas

	Prevalence of prior disorders		Bivariate associations			Model 1.1[2]			Model 1.2[3]			Model 1.3[4]			Model 1.4[5]		
	%	(SE)	OR	(95% CI)	*p*	OR	(95% CI)	*p*	OR	(95% CI)	*p*	OR	(95% CI)	*p*	OR	(95% CI)	*p*
Conduct	2.1	(0.2)	1.1	(0.6–2.0)	.67	0.6	(0.3–1.1)	.10									
IED	2.8	(0.3)	1.4	(0.8–2.3)	.25	0.8	(0.5–1.4)	.51									
ODD	2.6	(0.2)	1.6	(0.9–3.1)	.14	0.9	(0.5–1.7)	.77									
Number	7.0	(0.4)	1.3	(1.1–1.6)	.02												
χ^2_4						5.3	--	.25									
χ^2_3						5.3	--	.15									
IV. Substance disorders																	
Alcohol	8.0	(0.4)	1.5	(1.0–2.3)	.03	1.0	(0.6–1.5)	.93									
Drug	3.2	(0.2)	1.9	(1.1–3.3)	.02	1.3	(0.7–2.3)	.35									
Any	8.9	(0.5)	1.5	(1.1–2.2)	.02												
χ^2_2						1.0	--	.62									
χ^2_1						0.5	--	.49									
χ^2_{14}						136.8	--	<.001									
χ^2_{13}						60.0	--	<.001									

[1] Each model was estimated using logistic regression with controls for respondent age at random trauma exposure, sex, survey, random trauma type, and earlier traumas.

[2] Model 1.1 estimates the association of prior mental disorders with PTSD after the random trauma.

[3] Model 1.2 retains the significant anxiety disorders from Model 1.1 and includes a continuous variable for the number of anxiety disorders.

[4] Model 1.3 recodes the number of anxiety disorders in Model 1.2 into separate dummy variables for between 2 to 5 anxiety disorders.

[5] Model 1.4 omits the number-of-anxiety-disorders variables that were in Models 1.2 and 1.3.

[6] Coded as a 0–5 continuous variable.

Table 2

Variation in the associations of trauma history with PTSD due to subsequent random traumas depending on history of DSM-IV/CIDI anxiety disorders (n = 34,676)[1]

	History of …												
	Participation in organized violence			Physical violence victimization			Rape victimization			Other sexual assault victimization			
	OR	(95% CI)	*p*	OR	(95% CI)	*p*	OR	(95% CI)	*p*	OR	(95% CI)	*p*	χ^2_4	*p*
Model 2.1 (No anxiety controls)[2]	1.3	(1.1–1.6)	.014	1.4	(1.2–1.7)	<.001	2.5	(1.6–3.8)	<.001	1.6	(1.1–2.3)	.025	63.7	<.001
Model 2.2 (Anxiety controls)[3]	1.1	(0.9–1.3)	.35	1.2	(0.9–1.4)	.18	1.6	(1.0–2.7)	.06	1.2	(0.8–1.9)	.29	7.1	.13
Model 2.3 (Anxiety controls and interactions)[4]														
History of DSM-IV/CIDI PTSD	2.0	(1.2–3.3)	.007	0.7	(0.5–1.1)	.17	1.1	(0.5–2.4)	.72	1.5	(0.7–3.2)	.31	7.8	.10
History of other DSM-IV/CIDI anxiety disorders	1.1	(0.7–1.6)	.70	1.1	(0.8–1.4)	.62	1.2	(0.7–2.1)	.58	1.2	(0.7–2.0)	.55	3.1	.54
No history of DSM-IV/CIDI anxiety disorder	0.7	(0.5–1.0)	.07	1.5	(1.1–1.9)	.005	3.4	(1.6–7.1)	.001	1.3	(0.6–2.4)	.50	42.8	<.001
		χ^2_2 = 10.1 ***p*** =.006			χ^2_2 = 10.5 ***p*** =.005			χ^2_2 = 5.8 ***p*** =.056			χ^2_2 = 0.2 ***p*** =.89			

[1]Each model was estimated using logistic regression with controls for respondent age at random trauma exposure, sex, survey, and random trauma type.

[2]Model 2.1 estimates the association of prior (to the random trauma) lifetime participation in organized violence, physical violence victimization, rape victimization, and other sexual assault victimization with PTSD after the random trauma without controls for any prior (to the random trauma) lifetime mental disorders, including anxiety disorders.

[3]Model 2.2 includes all predictors in Model 2.1 in addition to 5 of the 6 prior (to the random trauma) lifetime anxiety disorders found to be significant, with ORs in the range between 4.3 for PTSD and 1.5 for social phobia (χ^2_5=130.5, p<.001).

[4]Model 2.3 includes all predictors in Model 2.2 and interactions between a 3-category anxiety disorders history profile and the 4 prior (to the random trauma) lifetime traumas. The interaction of the 3-category multivariate anxiety disorders history profile measure (history of DSM-IV/CIDI PTSD with or without other anxiety disorders, history of at least one other DSM-IV/CIDI anxiety disorder without PTSD, and no history of any DSM-IV/CIDI anxiety disorder) with the 4 prior (to the random trauma) lifetime traumas was significant (χ^2_8=32.5, p<.001). The marginal effects of 5 of the 6 prior lifetime anxiety disorders were significant in this model, with ORs in the range between 4.1 for PTSD and 1.7 for social phobia (χ^2_5=120.4, p<.001). The three subgroups had sample sizes of n = 731 (traumas that occurred to respondents with a history of DSM-IV/CIDI PTSD), n = 6,638 (traumas that occurred to respondents with a history of other DSM-IV/CIDI anxiety disorders but not PTSD), and n = 27,307 (traumas that occurred to other respondents).

Table 3

Estimated population distributions of trauma and DSM-IV/CIDI PTSD among WMH respondents (i) with prior PTSD or other anxiety disorders that predict PTSD, (II) with history of traumas that predict PTSD in the absence of anxiety disorders, and (iii) other respondents (n = 54,600)[1].

	Prior PTSD or other anxiety disorders[2]		Earlier traumas but no prior anxiety disorders[3]		All others	
	Est	(se)	Est	(se)	Est	(se)
Proportion of respondents in the sample	13.8%	(0.2)	12.3%	(0.2)	73.9%	(0.3)
Traumas/100 people over 5 years	71.9	(1.5)	72.7	(1.8)	27.5	(0.5)
PTSD prevalence associated with random traumas	10.6	(0.9)	3.5	(0.7)	2.2	(0.2)
Proportion of PTSD cases over 5 years	57.9	(2.9)	17.4	(2.9)	24.7	(2.0)
Number of PTSD cases/100 people over 5 years	7.6	(0.7)	2.6	(0.5)	0.6	(0.0)

[1]The results in the first two rows are based on the total weighted (to be representative of people in the population) Part II WMH sample of individuals (n = 54,600). The results in the third row are based on the weighted (to be representative of all traumas that occur in the population) random trauma sample (n = 34,676). The results in the last two rows are based on jackknife repeated replications simulations using the data in the first three rows.

[2]Limited to prior anxiety disorders found to predict PTSD. See the text for details.

[3]Limited to earlier traumas found to predict subsequent PTSD among respondents without any of the prior anxiety disorders that predict subsequent PTSD. See the text for details.