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A Paradox in Individual versus National Mental Health Vulnerability

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Abstract

In an earlier study countries with greater social and economic resources were found to be characterized by a higher lifetime prevalence of PTSD. Here, we present a similar analysis of national population survey data to examine this vulnerability paradox in relation to other disorders. We predicted the lifetime prevalence of any mental health disorder – i.e. anxiety, mood, substance, and externalizing disorders – in 17 countries based on trauma exposure and country vulnerability data. A substantial amount of variance in all disorder categories, 33% to 54%, could be explained by trauma exposure. Explained variance increased by 5 up to 40 percentage points after adding vulnerability. Higher exposure and lower vulnerability levels are accompanied by a higher prevalence in any mental disorder, with the largest effect size in mood disorders. The interaction between exposure and vulnerability did not explain significant additional variance as it did in PTSD. Since a PTSD diagnosis links psychological, physical and functional symptoms explicitly to trauma exposure, this might mean that populations in less vulnerable countries are more likely to attribute health complaints to exposure. We recommend further replications. Country data can help to better understand the multi-layered mechanisms of resilience and vulnerability in the context of trauma.

Resilience and vulnerability are popular concepts in many contemporary branches of policy, research and practice. Numerous definitions have been formulated, with analyses variously at the levels of individuals, communities, and systems (Olsson, Jerneck, Thoren, Persson, & O'Byrne, 2015). Mental health research typically focuses on the presence or absence of potential individual or public problems, their development through time, and the role of risk and protective factors (Brewin, Andrews, & Valentine, 2000; Bonanno, Brewin, Kaniasty, & La Greca, 2010). Although resilience and vulnerability have been depicted as layered constructs (Cicchetti, 2010; Bryant, 2015), the study of interactions between different levels of analysis is only beginning, and national level aspects are poorly understood.

Of relevance here is that we recently identified a "vulnerability paradox" – a counter-intuitive association between mental health and the resources of countries measured using a broad collection of socio-economic datasets (Dückers, Alisic, & Brewin, 2016). We predicted the lifetime prevalence of posttraumatic stress disorder (PTSD) in different countries using data from the World Risk Index (Welle & Birkmann, 2015) capturing countries' overall cultural and socioeconomic vulnerability to adversity in one index. Although at an individual level the possession of greater resources is protective against PTSD (Brewin, Andrews, & Valentine, 2000), we found that countries with greater wealth and equality, better health care and education, and longer life-expectancy are characterized by a higher lifetime prevalence of PTSD (Dückers et al., 2016). Hereafter we present a similar analysis of national population survey data to verify whether the vulnerability paradox is apparent for other disorders.

Method

Our secondary analysis is based on data derived from a combination of earlier studies, depending heavily on the heritage of the WHO World Mental Health Surveys. Kessler and colleagues presented the lifetime prevalence of any anxiety disorder (AAD: including

agoraphobia, adult separation anxiety disorder, generalized anxiety disorder, panic disorder, PTSD, social phobia, and specific phobia), any mood disorder (AMD: including bipolar disorders, dysthymia, and major depressive disorder), any substance disorder (ASD: including alcohol or drug abuse with or without dependence), and any externalizing disorder (AED: including attention-deficit/hyperactivity disorder, oppositional-defiant disorder, conduct disorder, and intermittent explosive disorder) in the populations of 17 countries based on the WHO CIDI instrument (Kessler, Aguilar-Gaxiola, Alonso, Chatterji, Lee, Ormel, Üstün, Wang et al, 2009; backgrounds, methodology and other findings from the WHO World Mental Health Surveys are described in Kessler & Üstün, 2008). The prevalence data, including the lifetime prevalence of any disorder (AD), are shown in Figure 1.

Lifetime trauma exposure rates were available from another publication. Benjet and colleagues reported the prevalence of trauma exposure associated with collective violence (e.g. being a civilian in a war zone, relief worker in a war zone, refugee), causing or witnessing serious bodily harm to others (e.g. purposely injuring, torturing or killing someone; combat experience), interpersonal violence (e.g. beaten up by a caregiver as a child, witnessed physical fights at home as a child, beaten up by someone other than a romantic partner), intimate partner or sexual violence (e.g. physically assaulted by a romantic partner, raped, sexually assaulted), accidents and injuries (e.g. natural disasters, automobile accidents), unexpected death of a loved one, mugged or threatened with a weapon, and man-made disaster (Benjet, Bromet, Karam, Kessler, McLaughlin, Ruscio, et al., 2016).

Vulnerability data for the 17 countries were taken from the World Risk Report of 2015. The vulnerability of 171 countries was summarized using 23 indicators, divided into three components, and measured using worldwide and publicly accessible data. *Susceptibility* describes a country's structural characteristics and framework conditions that can sustain

harm. For example, indicators involve malnutrition, access to sanitation, income equality and gross domestic product per capita. *Lack of coping capacity* refers to the ability of a country to minimize negative impacts of events and includes indicators such as number of physicians and hospital beds per 10,000 inhabitants and the Corruption Perceptions Index. *Lack of adaptive capacities* refers to conditions supporting long-term, structural change. Example indicators include the adult literacy rate, combined gross school enrolment, forest management, and public and private health expenditure. Country vulnerability scores are presented on a scale, ranging theoretically from 0 (minimum) to 100 (maximum), and can be read as percentage values. More background information on the vulnerability index, its composition and analysis can be found in the World Risk Report (Welle & Birkmann, 2015).

We calculated correlation coefficients and tested three linear regression models with the disorders as dependent variables. In a first model exposure was used as predictor, followed by a second model with exposure and vulnerability, and a third model to test if a country's level of vulnerability moderates the relation between exposure and the disorders. We defined effect sizes as small ($r \geq .1$), medium ($r \geq .3$), large ($r \geq .5$) or very large ($r \geq .7$) (Rosenthal, 1996). All analyses were performed in IBM SPSS Statistics (version 20) and G*Power (version 3.0.10).

Results

After having explored the data for outliers, we excluded the lifetime prevalence of AAD and AED in the United States (31% and 25% respectively). Distributional information for the variables and the correlations between them are shown in Table 1. Trauma exposure correlated significantly and positively with rates of AAD ($r = .57$), AMD ($r = .60$), ASD ($r = .64$), AED ($r = .70$) and AD ($r = .73$), all with a large to very large effect size. In line with the paradox, the correlations between country vulnerability and rates of mental disorders were all

negative in sign. Effect sizes varied from small (AAD and ASD), to medium (AD) and large (AMD). Only the correlation with AMD was significant.

The regression analyses (see Table 2) confirmed that trauma exposure explains a substantial amount of variance in mental health disorders (R^2 ranged from 33% to 54%; model 1). After having added vulnerability in model 2, the level of explained variance increased between 5 up to 40 percentage points. An increase in vulnerability has a significant negative effect on the predicted prevalence for AD (β = -.43) and AMD (β = -.64). The interaction between exposure and vulnerability– that led to a better model in the case of PTSD (Dückers et al., 2016) – did not explain significant additional variance in AAD, AMD, ASD, AED or AD (model 3).

Discussion

In this study we identified another example of the vulnerability paradox and found that higher exposure and lower vulnerability levels were significantly related to a higher AD prevalence, with the effect largely being accounted for by AMD. Inclusion of the interaction between exposure and vulnerability did not improve the explained variance in any of the disorder categories.

Although the disorder prevalence and trauma exposure rates are based on thousands of respondents in each country and the vulnerability index comprises numerous different national datasets that are updated periodically, the low number of countries limits the generalizability of the findings and the statistical power. Nevertheless, the sample size was large enough to confirm a significant negative relationship between vulnerability and AMD, with the correlation of -.56 pointing at a large effect size. The preferred sample size to test a medium effect (r = .3) is 64 cases (with a power of .8 and a significance level of .05, One-Tailed). The small effect size in ASD (r = -.13) would require a considerably larger country

sample. We consider it likely that the associations of vulnerability with other disorders would be significant in a larger sample, although they are apparently less strong, indicating that the manifestation of ASD and AED depends less than AMD – and to a certain extent AAD – on socioeconomic country characteristics.

Earlier we hypothesized that trauma has relatively more impact in a safe, stable, well-resourced, and well-organized environment, where people are more individualistic (see Dückers, Frerks, & Birkmann, 2015) with lower levels of protective social support, have high expectations about their prospects in life, and are susceptible to unanticipated obstacles in long-term goal-realization. Also, we suggested that mental health problems are less stigmatized in less vulnerable countries (Dückers et al., 2016), with the result that individuals are more willing to admit to them.

But there may well be other processes involved in the paradox. Previously we found an interaction between trauma exposure and country vulnerability in predicting the prevalence of PTSD. Unlike other mental disorders, a PTSD diagnosis links psychological, physical and functional symptoms explicitly to a cause, trauma exposure. Disaster researchers have stressed the need for more knowledge about causal attribution as it plays a complicated role in accounting for the health effects of exposure (Yzermans, Van Der Berg, & Dirkzwager, 2009). The findings we presented earlier led us to posit that the interaction effect might be due to populations in less vulnerable countries being more likely to attribute health complaints to exposure. Similar interactions were not found for any of the disorders in the current study, possibly because they are less associated in the public mind with trauma exposure.

We emphasize the need to further investigate and replicate the vulnerability paradox. Also, we recognize the potential problems in working with country datasets. Issues of methodology, language and cultural validity complicate international comparisons (Dückers

et al., 2016). However, in our view the patterns found after combining country data on health problems and socio-economic aspects are intriguing and should contribute to a more comprehensive vulnerability theory. Looking at interactions between phenomena and factors *at* and *between* different levels of analysis, including the national level, may help us to better understand the multi-layered mechanisms of resilience and vulnerability in the context of trauma. It is a promising starting point for hypothesis development and testing.

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Table 1

Distributional Information and Correlations

	Distributional information				Correlations					
	N	**Mean**	**Min-Max**	**IQR**	**EXP**	**VUL**	**AAD**	**AMD**	**ASD**	**AED**
Lifetime EXP (%)	17	69.98	52.50-84.60	17.05	1					
Vulnerability score (0-100)	17	37.54	26.32-67.39	16.45	0.12	1				
Lifetime prevalence AAD (%)	16	13.61	4.80-25.30	8.85	0.57*	-0.22	1			
Lifetime prevalence AMD (%)	17	12.49	3.30-21.40	7.35	0.60*	-0.56*	0.76**	1		
Lifetime prevalence ASD (%)	17	7.61	1.30-15.00	6.75	0.64**	-0.13	0.44	0.59*	1	
Lifetime prevalence AED (%)	13	4.65	0.30-9.60	4.10	0.70**	-0.06	0.68*	0.67*	0.78**	1
Lifetime prevalence AD (%)	17	27.43	12.00-47.40	18.95	0.73***	-0.34	0.88***	0.90***	0.79***	0.88***

Note. N = Number of countries, Min-Max = Minimum and maximum value, IQR = Inter-Quartile Range, EXP = Exposure to trauma, VUL = Vulnerability, AAD = Any anxiety disorder, AMD = Any mood disorder, ASD = Any substance disorder, AED = Any externalizing disorder, AD = Any disorder.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

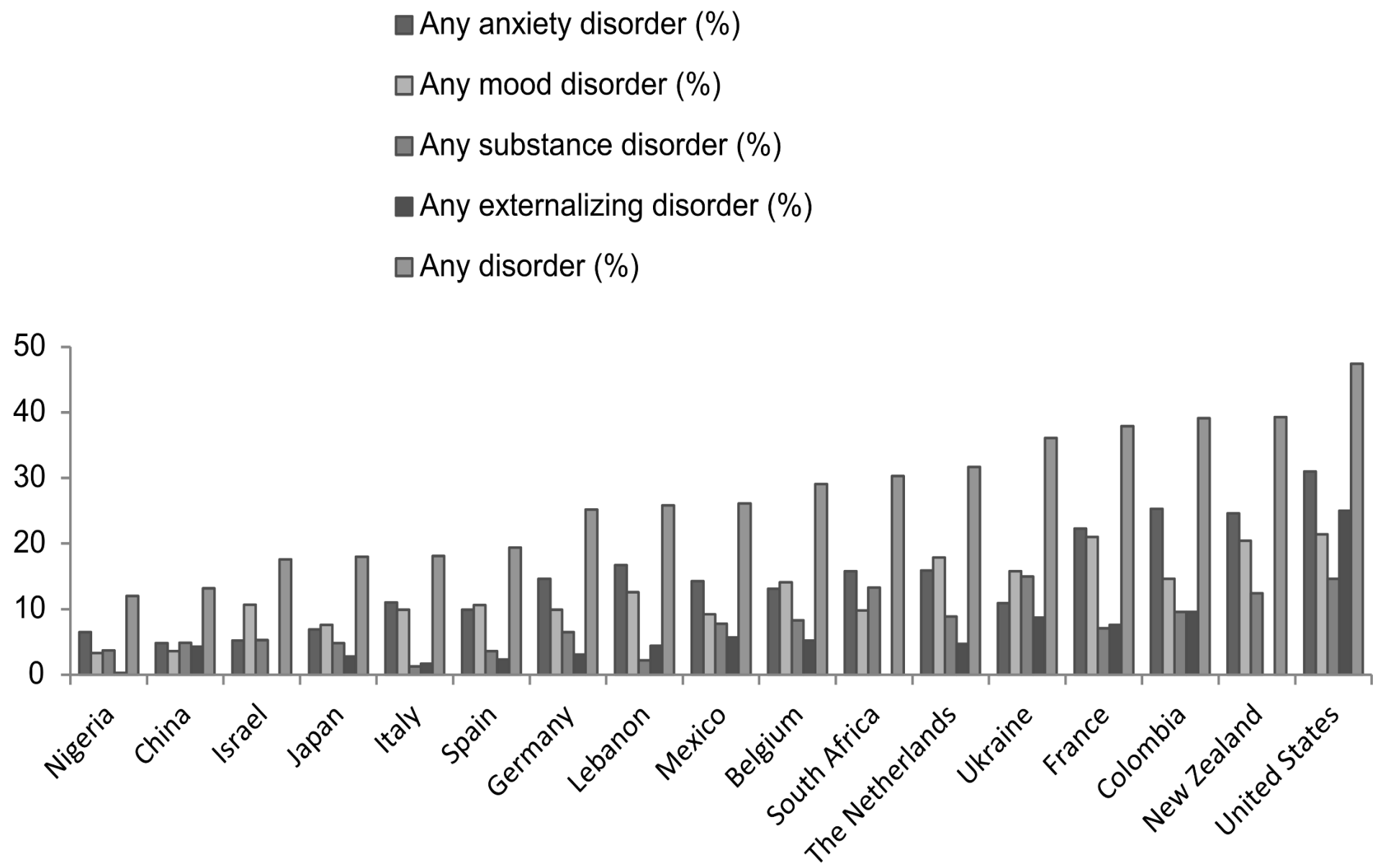
Summary of Regression Analysis for Variables Predicting Lifetime Prevalence in Mental Disorders

		Model 1			**Model 2**			**Model 3**		
		B	*SE*	β	*B*	*SE*	β	*B*	*SE*	B
Lifetime	(constant)	-11.89	9.84	-	-7.24	9.79	-	-4.25	50.25	-
prevalence any	Exposure	0.37	0.14	0.57*	0.41	0.14	0.63*	0.36	0.75	0.56
anxiety	Vulnerability				-0.19	0.12	-0.34	-0.27	1.27	-0.47
disorder (%)	Exposure x Vulnerability							0.00	0.02	0.16
(N = 16)	*R^2 (F for change in R^2)*		.33 (6.86*)			.44 (2.53)			.44 (0.00)	
Lifetime	(constant)	-9.98	7.87	-	-0.91	5.34	-	-20.81	24.82	-
prevalence any	Exposure	0.32	0.11	0.60*	0.36	0.07	0.68***	0.66	0.36	1.22
mood disorder	Vulnerability				-0.32	0.07	-0.64***	0.20	0.64	0.41
(%)	Exposure x Vulnerability							-0.01	0.01	-1.24
(N = 17)	*R^2 (F for change in R^2)*		.36 (8.32*)			.76 (23.25***)			.77 (0.68)	
Lifetime	(constant)	-10.93	5.78	-	-8.61	6.15	-	-43.03	27.65	-
prevalence any	Exposure	0.27	0.08	0.64**	0.28	0.08	0.67**	0.78	0.41	1.89

substance	Vulnerability				-0.08	0.08	-0.21	0.82	0.71	2.14
disorder (%)	Exposure x Vulnerability							-0.01	0.01	-2.79
(N = 17)	*R^2 (F for change in R^2)*		0.41 (10.48**)			0.46 (1.15)			0.52 (1.63)	
Lifetime	(constant)	-7.68	3.84	-	-6.63	3.90	-	-25.46	24.99	-
prevalence any	Exposure	0.18	0.06	0.70**	0.20	0.06	0.76**	0.49	0.38	1.86
externalizing	Vulnerability				-0.06	0.05	-0.25	0.41	0.61	1.78
disorder (%)	Exposure x Vulnerability							-0.01	0.01	-2.55
(N = 13)	*R^2 (F for change in R^2)*		0.49 (10.54**)			0.55 (1.28)			0.58 (0.58)	
Lifetime	(constant)	-23.79	12.36	-	-12.41	10.61	-	-41.59	49.93	-
prevalence any	Exposure	0.73	0.18	0.73**	0.78	0.14	0.79***	1.21	0.73	1.22
disorder (%)	Vulnerability				-0.40	0.13	-0.43**	0.37	1.29	0.39
(N = 17)	Exposure x Vulnerability							-0.01	0.02	-0.98
	R^2 (F for change in R^2)		0.54 (17.51***)			0.72 (9.25**)			0.73 (0.36)	

Note. N = Number of countries.

* $p < .05$. ** $p < .01$. *** $p < .001$.


Any anxiety disorder (%)
Any mood disorder (%)
Any substance disorder (%)
Any externalizing disorder (%)
Any disorder (%)
50
40
30
20
10
0
Nigeria
China
Israel
Japan
Italy
Spain
Germany
Lebanon
Mexico
Belgium
South Africa
The Netherlands
Ukraine
France
Colombia
New Zealand
United States