Federation University ResearchOnline

<https://researchonline.federation.edu.au>

Copyright Notice

© 2017. This manuscript version is made available under the CC-BY-NC-ND 4.0 license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Miloyan, Joseph Bienvenu, O., Brilot, B., & Eaton, W. W. (2018). Adverse life events and the onset of anxiety disorders. *Psychiatry Research*, 259, 488–492.

Which has been published in final form at:
<https://doi.org/10.1016/j.psychres.2017.11.027>

See this record in Federation ResearchOnline at:
<http://researchonline.federation.edu.au/vital/access/HandleResolver/1959.17/163321>

Published in final edited form as:

Psychiatry Res. 2018 January ; 259: 488–492. doi:10.1016/j.psychres.2017.11.027.

Adverse life events and the onset of anxiety disorders

Beyon Miloyan^{a,b,*}, O. Joseph Bienvenu^{a,c}, Ben Brilot^d, William W. Eaton^a

^aDepartment of Mental Health, Bloomberg School of Public Health, The Johns Hopkins University, Baltimore, MD, USA

^bFaculty of Health, Department of Psychology, Federation University Australia, Churchill, Australia

^cDepartment of Psychiatry and Behavioral Sciences, The Johns Hopkins University School of Medicine, Baltimore, MD, USA

^dSchool of Biological Sciences, Plymouth University, Plymouth, UK

Abstract

This study tested the hypothesis that adverse events are associated with increased risk of onset of anxiety disorders. Data from Waves 1 (N = 43,093; 2001–2002) and 2 (N = 34,653; 2004–2005) of the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) were used to assess whether adverse events at baseline are associated with increased risk of anxiety disorder onset over three years of follow up. Sixty-six percent (SE: 1.0) of respondents with an anxiety disorder in the intervening period between Waves 1 and 2 had experienced an adverse life event in the year prior to the Wave 1 interview. In logistic regression models adjusted for sociodemographic and psychiatric characteristics, adverse life events at baseline were associated with anxiety disorder onset within the three-year follow up period. The pattern of association between adverse events and anxiety disorder onset was similar across sub-types, and injury, illness or death of family or close friends consistently had the strongest association with anxiety disorder onset. These findings suggest that adverse life events play a role in the onset of anxiety disorders.

Keywords

Anxiety disorders; Epidemiology; Life events; Stress; Adversity; Onset; Recurrence

1. Introduction

The risk of mental disorders associated with stressful life events has been studied for 50 years. Holmes and Rahe (1967) initially developed a stress scale that assessed for the occurrence of 43 life events in the past year of the respondent's life that were adverse (e.g., death or illness of family or friends; marital dissolution), ambiguous (e.g., changes in work, residence or social life) or positive (e.g., vacation or holiday; outstanding personal achievement). Since then, there has been a well-documented risk for mental disorders due to stressful life events, with most research focusing on depression (Kessler, 1997; Paykel and

*Correspondence to: Federation University, Northways Rd, Churchill, VIC 3842, Australia. b.miloyan@federation.edu.au (B. Miloyan).

Cooper, 1992) and, by definition, post-traumatic stress disorder (Storr et al., 2012). However, the heterogeneity of the items that typically constitute stressful life event scales may compromise the validity and reliability of the test scores, and consequently pose challenges to the identification of underlying mechanisms (Dohrenwend, 2006). Hence, the present analysis focuses exclusively on the presence of adverse life events, defined in Bateson et al.'s (2011) framework as specific events that increase an individual's vulnerability to the occurrence of potential threats.

Anxiety disorders are a possible result of adverse life events, inasmuch as these (a) signal the possibility of future repeated exposure to adversity, (b) reduce one's capacity to cope with potential threats (Bateson et al., 2011), or (c) provide external verification regarding an individual's coping capabilities (Lazarus, 1991) and therefore give a clearer indication of vulnerability (Bateson et al., 2011). From the perspective of the individual, these might register as: 'future adversity now seems more likely to happen'; 'this event has made me more vulnerable to future adversity'; or 'I have realised as a result of this event exactly how vulnerable I am'. The tendency to imagine and fixate on the possibility of experiencing adverse future scenarios is a characteristic feature of anxiety (Miloyan et al., 2014), but it remains unclear to what extent the actual experience of adverse events induces anxiety.

Results of previous studies suggest that stressful life events (comprising both adverse and non-adverse events) are associated with increased risk of anxiety disorder onset (Finlay-Jones and Brown, 1981; Francis et al., 2012; McLaughlin et al., 2010; Taher et al., 2015). Although the results of these studies generally coincide with one another, three of them were based on small, clinical samples and potentially affected by selection bias (Finlay-Jones and Brown, 1981; Francis et al., 2012; Taher et al., 2015). McLaughlin et al. (2010) reported similar results based on the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) sample; however, they assessed the combination of childhood adversity and past-year stressful life events as a risk factor for the presence of any past-year anxiety disorder occurring in the same period. Therefore, the particular impact of adverse life events was not assessed, and the temporal sequence of life events occurring before the onset of the anxiety disorders was not accounted for in their study.

The current analysis uses the two waves of the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) to assess whether adverse life events in the year prior to the baseline interview are associated with increased risk of onset of anxiety disorders in the intervening period before the Wave 2 interview. We first describe the relationship between adverse events and anxiety disorders, overall and by sub-type. We then assess whether the presence and frequency of adverse events in the year prior to the baseline interview is associated with increased risk of anxiety disorder onset by three-year follow-up. Finally, we examine whether the presence of adverse events in the year prior to baseline poses differential risk of first versus recurrent onset of anxiety disorders at follow-up.

2. Method

2.1. Sample

Wave 1 of the NESARC was conducted in a nationally representative sample of 43,093 civilian, non-institutionalized adults, aged 18–98 years, from all 50 U.S. states and the District of Columbia in 2001–2002 (Grant et al., 2003a). Young adults, African-Americans, and Hispanics were purposively oversampled. Face-to-face interviews were conducted by trained lay interviewers using the Alcohol Use Disorder and Associated Disabilities Interview Schedule, DSM-IV version (AUDADIS-IV) (Grant et al., 2003b; Ruan et al., 2008). Wave 2 was conducted in 2004–2005 with 34,653 of the original respondents (Grant and Kaplan, 2005). Of those designated as respondents in Wave 1, 81% completed interviews; of these 86.7% completed interviews at Wave 2, resulting in a cumulative response rate of 70.2%.

2.2. Measures and procedure

Sociodemographic variables included age, sex, education (Bachelor's degree or higher; Associate's degree or some college; completed high school or its equivalent; or did not complete high school); marital status (married or cohabiting; widowed, divorced or separated; never married) and urbanicity of residence (urban or suburban; rural). The AUDADIS-IV examined a total of 12 stressful life events, and whether these occurred in the year prior to the Wave 1 interview. Six of the 12 events queried were conceptualized as adverse events according to the definition in the present study: (i) illness, injury or (ii) death of any family member or close friend, (iii) having been fired or laid off from one's job, (iv) having separated from a steady relationship or divorced from marriage, (v) having experienced a major financial crisis including bankruptcy or inability to pay bills on time, or (vi) having been (or having a family member who was) the victim of a crime. Among the other six items five were excluded for not being necessarily adverse (moving; changing jobs; seeking employment; trouble with boss or co-worker; trouble with neighbour), and one for lack of specificity (having had, or having a family member who had, trouble with police, arrested, or in jail). The last one is non-specific in that being convicted of a crime could be associated with a lack of anxiety (Marks and Nesse, 1994).

Anxiety disorder diagnoses over the lifetime prior to the Wave 1 interview, and in the intervening period prior to the Wave 2 interview were obtained using the AUDADIS-IV, and included Panic Disorder (with or without Agoraphobia), Social Phobia, Specific Phobia and Generalized Anxiety Disorder. The AUDADIS-IV has fair-to-moderate reliability for lifetime (kappa: 0.42–0.48) and 12-month (kappa: 0.41–0.52) anxiety disorder diagnoses (Grant et al., 2003b). Respondents who screened positive for anxiety disorder in the intervening period before the Wave 2 interview, and who had not met diagnostic criteria for anxiety disorder in the year prior to the Wave 1 interview constituted those with anxiety disorder *onset*. Among those with anxiety disorder onset, those who had reported a lifetime history of anxiety disorder over the lifetime prior to the Wave 1 interview, excluding in the year prior to the interview, were defined as having *recurrent onset*. Those who had not reported a lifetime history of anxiety disorder prior to the Wave 1 interview were defined as

having *first onset*. Psychiatric control variables included lifetime diagnoses of mood and substance use disorders.

2.3. Analyses

Probability weights were used to adjust for oversampling, attrition and non-response in all analyses. We estimated the proportion of respondents who reported adverse events in the year prior to the Wave 1 interview, and the percentage of those respondents with anxiety disorder onset by the Wave 2 interview. Logistic regression analyses controlling for age, sex, education, marital status, urbanicity, mood and substance use disorders, and anxiety disorders (excluding in the past-year) at Wave 1 were performed to assess the association of any past-year adverse event at Wave 1 with anxiety disorder onset in the intervening years prior to the Wave 2 interview. In a second model, we replaced the binary measure of adverse events (presence vs. absence) with a frequency measure. We then estimated the frequency and weighted proportion of respondents with first and recurrent onsets of anxiety disorders at Wave 2, followed by logistic regression analyses to assess the association of any past-year adverse event with first and recurrent onsets of anxiety disorder, after adjusting for the aforementioned covariates. We tested the interaction of the risk of first versus recurrent onset of anxiety disorder associated with baseline adverse events by calculating a relative odds ratio. All analyses were performed using Stata 12.0/SE.

3. Results

Fifty-seven percent (SE: 0.6) of respondents experienced at least one adverse event in the year prior to the Wave 1 interview (See Table 1). Fewer than 10% of the overall sample experienced three or more adverse events in this period. The majority of respondents with an onset of any anxiety disorder sub-type in the year prior to the Wave 2 interview had experienced at least one adverse event in the year prior to the Wave 1 interview. After adjusting for sociodemographic and psychiatric variables, having experienced any adverse event in the year prior to the Wave 1 interview (OR: 1.23; 95% CI: 1.11–1.35) was associated with any anxiety disorder in the year prior to the Wave 2 interview (See Table 2). We then substituted the binary variable indicating the presence or absence of adverse life events with a variable indicating the frequency of adverse events, which was also associated with increased risk of anxiety disorder onset at follow up (OR: 1.11; 95% CI: 1.07–1.16).

The total prevalence of recurrent onset (relapse) of any anxiety disorder (1.3%; SE: 0.07) was much lower than the total prevalence of first onset (10.7%; SE: 0.2), and this pattern held across all anxiety sub-types (see Table 3). We observed a higher risk of recurrent versus first onset for anxiety disorders, as indicated by the positive coefficient for lifetime history of anxiety disorder at baseline in all of the analyses. In analyses adjusted for sociodemographic and psychiatric characteristics, adverse events were associated with increased risk of first but not recurrent onset of any anxiety disorder (see Table 4). However, the interaction of these estimates (Relative OR: 1.09; 95% CI: 0.84–1.41) suggested that there was no difference in the risk of first versus recurrent onset attributable to adverse events in the year prior to the baseline interview.

It should not be assumed that adverse events preceded anxiety disorders. Therefore, we assessed whether a lifetime diagnosis of anxiety disorder (excluding 12-month) at baseline was associated with increased risk of experiencing an adverse event at follow-up. Those with a past-year diagnosis of anxiety disorders were excluded because approximately two-thirds of these cases co-occurred with adverse events in the same year, and three years may be an insufficient length of time for the adverse event to completely resolve. We did not observe an association between lifetime anxiety measured at baseline and adverse events measured at follow-up (OR: 0.99; 95% CI: 0.90–1.10).

4. Discussion

The results of this study support the hypothesis that adverse life events are associated with increased risk of onset of anxiety disorders. Descriptive analyses indicated that there were differences in the proportion of respondents with anxiety disorder onset by Wave 2 based on the nature of the adverse event at Wave 1. However, for each adverse event, a similar proportion of respondents met criteria for all anxiety sub-types, and there was no difference between the risks of first versus recurrent onset at follow-up due to adverse events at baseline. The discussion is structured on four points.

First, the present study restricted the inclusion of life events to those that were considered adverse. Thus, many of the stressful events that are typically queried in other studies, such as those associated with positive or changing life circumstances, were excluded from the present analysis. This theoretical approach to distinguishing adverse life events from other types of stressful life events avoids problems with creating stress sum scores based on the combination of a heterogeneous group of items (Dohrenwend, 2006). However, a disadvantage of this approach is that the present research differs in this important respect from previous studies.

Second, most cases of anxiety disorder onset in this study were preceded by adverse events. This finding is consistent with the results of a signal detection approach that predicts that life circumstances that enhance vulnerability to potential threats induce anxiety (Bateson et al., 2011). From this perspective, adverse events play a causal role in inducing states of anxiety inasmuch as such events serve to increase vulnerability in one or more ways, and as such are associated with increased risk of anxiety disorder onset. For example, having experienced a recent financial crisis would leave participants vulnerable to a variety of potential situations (e.g., insufficient funds to cover necessary automobile repairs). The death of a family member or a close friend, or the dissolution of a steady relationship or a marriage can lead to anxiety about what the consequences of this change in circumstances might entail (e.g., lack of social support or material resources). These findings have practical implications in that individuals who undergo intervention may often have adverse life events underlying their clinical presentation, and the extent to which such events (or their implications) remain unresolved at the time of treatment may undermine those efforts.

Third, prior work has sought to explain associations between stressful life events and depression (Kessler, 1997), and more recently anxiety (McLaughlin et al., 2010) and substance use disorders (Keyes et al., 2011). It remains unclear whether the association

between stressful life events and mental disorder is accounted for by trait-specific mechanisms (e.g., anxiety or low mood), given the broad associations observed with mental disorders (Boden et al., 2014; Kendler et al., 1999; Lloyd and Turner, 2008; Slopen et al., 2011). Indeed, Gilman et al. (2013) reported that various classes of stressful life events at baseline are associated with higher risk of onset of major depressive disorder at follow-up in the NESARC sample. It could be that adversity has a direct influence on the emergence and time-course of some classes of mental disorder symptoms that in turn cause others to arise. For example, it might be that an initial wave of affective symptoms give way to substance use problems (Khantzian, 1985). A more general possibility is that adverse events directly elicit negative emotional states, and that inasmuch as these situations persist, people are likelier to meet criteria for a number of common mental disorders. These observations raise important questions about the relationship between mental disorders and adverse life events. For example, there may be dispositional traits (e.g., rumination, worry) that predispose individuals to both respond more poorly to adverse events and develop mental disorders (Ruscio et al., 2015).

A fourth point pertains to first and recurrent onset of anxiety disorders. Apparently in contrast to previous work suggesting that a history of anxiety disorder may signal poor coping ability (Lazarus, 1991), the finding that there were many more cases of first versus recurrent onset suggest that those with a history of anxiety disorder may frequently learn to cope with adverse events from prior experience. Nonetheless, we did find that the risk of recurrent onset was higher than the risk of first incident onset, and that a lifetime history of major depression posed almost three times the risk of recurrent relative to first onset. It is possible that the subset of the population that experiences recurrent onset may have higher dispositional anxiety or experience chronic life adversities that we were unable to investigate.

This is the first population-based study to directly assess the relationship between adverse life events and the onset of anxiety disorder in terms of anxiety sub-types and first and recurrent onset. The study had several limitations. The first limitation pertains to the low reliability of the anxiety disorder diagnoses in the AUDADIS-IV. The second pertains to the nature of the adverse life events assessed. Different events may be more or less adverse, and the combination of adverse events into one variable may have led to a loss of information. For example, we treated having been fired or laid off from one's job as a vulnerability-inducing event; however, this may not be true for individuals who take advantage of unemployment benefits or are wealthy. Similarly, we did not count some stressful life events as being necessarily adverse, for example due to a lack of objectivity or specificity (see Methods section for omitted items). Second, we could not rule out that those with anxiety disorder onset are also likelier to report experiencing adversity, for example, on account of pessimistic interpretation biases (Mathews et al., 1997). Third, despite the large sample size of the NESARC, there were few cases of recurrent onset, leading to a relatively imprecise estimate. Relatedly, the high frequency of first onset of Specific Phobias is at odds with population data suggesting that the first incidence of phobias occurs most frequently early in life (Beesdo et al., 2010; Eaton et al., 2012). It might generally be the case that recall errors or biases for past episodes of anxiety led to the misclassification of many cases of recurrent onset as cases of first onset (Moffitt et al., 2010; Takayanagi et al., 2014). Those with

anxiety disorders at Waves 1 and 2 were not counted as cases of recurrent onset as these were conceptualized as cases of persistence; this exclusion criterion may have also contributed to the large discrepancy between prevalence estimates of first and recurrent onsets.

Overall, these results support and extend the findings of previous studies in clinical samples (Finlay-Jones and Brown, 1981; Francis et al., 2012; Taher et al., 2015). Although our study did not include some important events that were measured in other studies (Francis et al., 2012; Taher et al., 2015) because these were not captured by the AUDADIS, the overall result of our study is compatible with previous work. We would like to see the findings of the analyses on anxiety disorder sub-types and on the risk of first and recurrent onset reassessed in different samples. Finally, more extensive longitudinal studies with frequent follow-ups that can minimize recall biases for adverse events and episodes of anxiety would improve our confidence in causal attributions.

Acknowledgements

This work was supported by the Johns Hopkins Epidemiology and Biostatistics of Aging Training Program of the National Institute on Aging (NIA) under award number T32AG000247. Dr. Eaton's work was supported by NIA grant R01AG052445.

References

- Bateson M, Brilot B, Nettle D, 2011 Anxiety: an evolutionary approach. *Can. J. Psychiatry* 56, 707–715. [PubMed: 22152639]
- Beesdo K, Pine DS, Lieb R, Wittchen H-U, 2010 Incidence and risk patterns of anxiety and depressive disorders and categorization of generalized anxiety disorder. *Arch. Gen. Psychiatry* 67, 47–57. 10.1001/archgenpsychiatry.2009.177. [PubMed: 20048222]
- Boden JM, Fergusson DM, Horwood LJ, 2014 Associations between exposure to stressful life events and alcohol use disorder in a longitudinal birth cohort studied to age 30. *Drug Alcohol Depend.* 142, 154–160. [PubMed: 25001278]
- Dohrenwend BP, 2006 Inventorying stressful life events as risk factors for psychopathology: toward resolution of the problem of intracategory variability. *Psychol. Bull.* 132, 477–495. 10.1037/0033-2909.132.3.477. [PubMed: 16719570]
- Eaton WW, Alexandre P, Kessler RC, Martins SS, Mortensen PB, Rebok GW, Storr CL, Roth K, 2012 The population dynamics of mental disorders In: Eaton WW (Ed.), *Public Mental Health*. Oxford University Press, New York.
- Finlay-Jones R, Brown GW, 1981 Types of stressful life event and the onset of anxiety and depressive disorders. *Psychol. Med.* 11, 803–815. [PubMed: 7323236]
- Francis JL, Moitra E, Dyck I, Keller MB, 2012 The impact of stressful life events on relapse of generalized anxiety disorder. *Depress. Anxiety* 29, 386–391. [PubMed: 22431499]
- Gilman SE, Trinh N-H, Smoller JW, Fava M, Murphy JM, Breslau J, 2013 Psychosocial stressors and the prognosis of major depression: a test of Axis IV. *Psychol. Med.* 43, 303–316. 10.1017/S0033291712001080. [PubMed: 22640506]
- Grant B, Kaplan K, Shepard J, Moore T, 2003a Source and Accuracy Statement for Wave 1 of the 2001–2002 National Epidemiological Survey on Alcohol and Related Conditions. National Institute on Alcohol Abuse and Alcoholism, Bethesda, MD.
- Grant B, Kaplan KD, 2005 Source and Accuracy Statement for the 2004–2005 wave 2 National Epidemiological Survey on Alcohol and Related Conditions. National Institute on Alcohol Abuse and Alcoholism, Bethesda, MD.
- Grant BF, Dawson DA, Stinson FS, Chou PS, Kay W, Pickering R, 2003b The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): reliability of alcohol

- consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. *Drug Alcohol Depend.* 71, 7–16. [PubMed: 12821201]
- Holmes TH, Rahe RH, 1967 The social readjustment rating scale. *J. Psychosom. Res.* 11, 213–218. [PubMed: 6059863]
- Kendler KS, Karkowski LM, Prescott CA, 1999 Causal relationship between stressful life events and the onset of major depression. *Am. J. Psychiatry* 156, 837–841. 10.1176/ajp.156.6.837. [PubMed: 10360120]
- Kessler RC, 1997 The effects of stressful life events on depression. *Annu. Rev. Psychol.* 48, 191–214. [PubMed: 9046559]
- Keyes KM, Hatzenbuehler ML, Hasin DS, 2011 Stressful life experiences, alcohol consumption, and alcohol use disorders: the epidemiologic evidence for four main types of stressors. *Psychopharmacology* 218, 1–17. 10.1007/s00213-011-2236-1. [PubMed: 21373787]
- Khantzian EJ, 1985 The self-medication hypothesis of addictive disorders: focus on heroin and cocaine dependence. *Am. J. Psychiatry* 142, 1259–1264. 10.1176/ajp.142.11.1259. [PubMed: 3904487]
- Lazarus RS, 1991 Progress on a cognitive-motivational-relational theory of emotion. *Am. Psychol.* 46, 819–834. [PubMed: 1928936]
- Lloyd DA, Turner RJ, 2008 Cumulative lifetime adversities and alcohol dependence in adolescence and young adulthood. *Drug Alcohol Depend.* 93, 217–226. [PubMed: 17980975]
- Marks I fM., Nesse, R.M., 1994 Fear and fitness: an evolutionary analysis of anxiety disorders. *Ethol. Sociobiol.* 15, 247–261. 10.1016/0162-3095(94)90002-7.
- Mathews A, Mackintosh B, Fulcher EP, 1997 Cognitive biases in anxiety and attention to threat. *Trends Cogn. Sci.* 1, 340–345. 10.1016/S1364-6613(97)01092-9. [PubMed: 21223944]
- McLaughlin KA, Conron KJ, Koenen KC, Gilman SE, 2010 Childhood adversity, adult stressful life events, and risk of past-year psychiatric disorder: a test of the stress sensitization hypothesis in a population-based sample of adults. *Psychol. Med.* 40, 1647–1658. [PubMed: 20018126]
- Miloyan B, Pachana NA, Suddendorf T, 2014 The future is here: a review of foresight systems in anxiety and depression. *Cogn. Emot.* 28, 795–810. 10.1080/02699931.2013.863179. [PubMed: 24320101]
- Moffitt TE, Caspi A, Taylor A, Kokaua J, Milne BJ, Polanczyk G, Poulton R, 2010 How common are common mental disorders? Evidence that lifetime prevalence rates are doubled by prospective versus retrospective ascertainment. *Psychol. Med.* 40, 899–909. 10.1017/S0033291709991036. [PubMed: 19719899]
- Paykel ES, Cooper Z, 1992 Life events and social stress In: Paykel ES. (Ed.), *Handbook of Affective Disorders*. Churchill Livingstone, Edinburgh.
- Ruan WJ, Goldstein RB, Chou SP, Smith SM, Saha TD, Pickering RP, Dawson DA, Huang B, Stinson FS, Grant B, 2008 The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): reliability of new psychiatric diagnostic modules and risk factors in a general population sample. *Drug Alcohol Depend* 92, 27–36. 10.1016/j.drugalcdep.2007.06.001. [PubMed: 17706375]
- Ruscio AM, Gentes EL, Jones JD, Hallion LS, Coleman ES, Swendsen J, 2015 Rumination predicts heightened responding to stressful life events in Major Depressive Disorder and Generalized Anxiety Disorder. *J. Abnorm. Psychol* 124, 17–26. 10.1037/abn0000025. [PubMed: 25688429]
- Slopen N, Williams DR, Fitzmaurice GM, Gilman SE, 2011 Sex, stressful life events, and adult onset depression and alcohol dependence: are men and women equally vulnerable? *Soc. Sci. Med* 73, 615–622. [PubMed: 21782304]
- Storr CL, Azur M, Bass JK, Wilcox H, Eaton WW, 2012 Adapting to acute crisis In: *Public Mental Health*. Oxford University Press, New York, pp. 303–347.
- Taher D, Mahmud N, Amin R, 2015 The effect of stressful life events on generalized anxiety disorder. *Eur. Psychiatry* 30, 543 10.1016/S0924-9338(15)30427-2. (Abstracts of the 23rd European Congress of Psychiatry).
- Takayanagi Y, Spira AP, Roth KB, Gallo JJ, Eaton WW, Mojtabai R, 2014 Accuracy of reports of lifetime mental and physical disorders: results from the baltimore epidemiological catchment area study. *JAMA Psychiatry* 71, 273–280. 10.1001/jamapsychiatry.2013.3579. [PubMed: 24402003]

Table 1
Raw frequency and weighted prevalence of adverse events at Wave 1, and by anxiety disorder onset at Wave 2.

Adverse Events	Wave 1			Frequency (% of Anxiety Disorder Onset at Wave 2 Conditional on Adverse Event)									
	frequency	%	se	Panic Disorder (n = 964)	Social Phobia (n = 825)	Specific Phobia (n = 2252)	GAD (n = 1321)	Any Anxiety Disorder (n = 4234)					
Death of family or friend	13,779	31	0.4	386	(40)	262	(32)	787	(35)	467	(35)	1502	(35)
Illness or injury of family or friend	14,981	36	0.5	423	(44)	327	(40)	909	(40)	605	(46)	1751	(41)
Victim of crime	2765	7	0.2	100	(10)	88	(11)	178	(6)	146	(11)	398	(9)
Financial crisis	5037	11	0.3	237	(25)	181	(22)	379	(8)	325	(25)	827	(20)
Fired or laid off	2691	6	0.2	96	(10)	75	(10)	164	(7)	94	(7)	322	(8)
Dissolution of relationship	2790	5	0.1	109	(11)	88	(11)	187	(8)	139	(11)	402	(10)
Any adverse event	24,716	57	0.6	689	(71)	530	(64)	1443	(64)	916	(69)	2811	(66)

Table 2

Odds Ratios (and 95% CIs) of Wave 1 variables as predictors of any past-year anxiety disorder at Wave 2.

	Crude:	Adjusted^a:
Age	0.99 (0.98–0.99)	0.99 (0.98–0.99)
Sex		
Male	Reference	Reference
Female	1.95 (1.80–2.11)	1.84 (1.68–2.01)
Education		
Bachelor's degree	Reference	Reference
Some college	1.36 (1.22–1.50)	1.20 (1.08–1.34)
Completed high school or equivalent	1.24 (1.10–1.39)	1.23 (1.09–1.38)
Less than high school	1.37 (1.18–1.58)	1.43 (1.23–1.66)
Marital status		
Married or cohabiting	Reference	Reference
Widowed, divorced or separated	1.19 (1.07–1.33)	1.07 (0.95–1.20)
Never married	1.34 (1.16–1.45)	1.12 (0.93–1.17)
Urbanicity		
Urban	Reference	Reference
Rural	1.07 (0.95–1.21)	1.11 (0.98–1.26)
Lifetime Mood Disorders		
Negative	Reference	Reference
Positive	2.74 (2.47–3.03)	1.93 (1.72–2.16)
Lifetime Substance Use Disorder		
Negative	Reference	Reference
Positive	1.31 (1.19–1.44)	1.20 (1.08–1.33)
Lifetime Anxiety Disorders		
Negative	Reference	Reference
Positive	2.40 (2.20–2.62)	1.61 (1.47–1.77)
Any Past-Year Adverse Event		
Negative	Reference	Reference
Positive	1.51 (1.38–1.65)	1.23 (1.11–1.35)

^a Adjusted for age, sex, education, marital status, urbanicity, lifetime mood, anxiety and substance disorders.

Table 3

Raw frequency and weighted proportion of first and recurrent onset of anxiety disorders at Wave 2.

	<i>First Onset</i>			<i>Recurrent Onset</i>		
	Frequency	%	se	Frequency	%	se
Panic Disorder	814	2.3	0.1	150	0.2	0.02
Social Phobia	723	1.9	0.1	57	0.1	0.02
Specific Phobia	2075	5.6	0.2	143	0.4	0.03
Generalized Anxiety Disorder	1210	3.4	0.1	111	0.3	0.03
Any Anxiety Disorder	3885	10.7	0.2	500	1.3	0.07

Table 4

Odds Ratios (and 95% CIs) of first and recurrent onset of anxiety disorders at Wave 2.

	<i>First Onset</i>		<i>Recurrent Onset</i>	
	Crude:	Adjusted ^a :	Crude:	Adjusted ^a :
Age	0.99 (0.98–0.99)	0.99 (0.98–0.99)	0.99 (0.99–1.00)	0.99 (0.98–1.00)
Sex				
Male	Reference	Reference	Reference	Reference
Female	1.89 (1.73–2.06)	1.86 (1.69–2.04)	2.53 (1.96–3.25)	2.26 (1.74–2.94)
Education				
Bachelor's degree or higher	Reference	Reference	Reference	Reference
Some college	1.39 (1.25–1.56)	1.25 (1.11–1.39)	1.15 (0.86–1.53)	1.02 (0.76–1.35)
Completed high school or equivalent	1.29 (1.14–1.46)	1.28 (1.13–1.45)	0.99 (0.73–1.34)	1.03 (0.75–1.40)
Less than high school	1.42 (1.22–1.65)	1.48 (1.26–1.72)	1.07 (0.76–1.51)	1.16 (0.82–1.65)
Urbanicity				
Urban	Reference	Reference	Reference	Reference
Rural	1.06 (0.93–1.20)	1.10 (0.96–1.25)	1.25 (0.94–1.64)	1.35 (1.00–1.81)
Marital Status				
Married or cohabiting	Reference	Reference	Reference	Reference
Widowed, divorced or separated	1.20 (1.07–1.35)	1.09 (0.96–1.23)	1.21 (0.92–1.60)	0.90 (0.67–1.20)
Never married	1.35 (1.20–1.52)	1.06 (0.95–1.20)	0.81 (0.61–1.08)	0.67 (0.49–0.93)
Lifetime Mood Disorders				
Negative	Reference	Reference	Reference	Reference
Positive	2.41 (2.16–2.69)	1.97 (1.76–2.22)	7.69 (6.11–9.67)	5.95 (4.69–7.56)
Lifetime Substance Use Disorders				
Negative	Reference	Reference	Reference	Reference
Positive	1.24 (1.12–1.38)	1.20 (1.08–1.34)	2.12 (1.69–2.65)	1.76 (1.40–2.22)
Any Past Year Adverse Life Event				
No	Reference	Reference	Reference	Reference
Yes	1.48 (1.35–1.63)	1.26 (1.14–1.39)	1.75 (1.38–2.23)	1.16 (0.91–1.47)

^aAdjusted for age, sex, education, marital status, urbanicity, lifetime mood, anxiety and substance disorders.