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Trends in young adults' mental distress and its association with unemployment: Evidence from the

Behavioral Risk Factor Surveillance System, 1993-2019

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ABSTRACT

Few have examined how employment is linked to trends in mental health among young adults across economic contexts in more recent years. To better understand the burden of non-employment and mental distress in this age group, this study examines the association of short-term (<1 year) and long-term (1+ year) out-of-work status with mental health across three recessions among young men and women ages 18-34. We report sex-stratified estimates of frequent mental distress (FMD), out-of-work status, and their association through adjusted prevalence ratios across 27 cycles of the U.S. Behavioral Risk Factor Surveillance System (1993-2019). We found that FMD increased by 112% in men and 120% in women between 1993-2019, with 55% (men) and 44% (women) of this increase occurring between 2016 and 2019. Short-term (PR men = 1.53, 95%CI 1.46-1.61; PR women = 1.34, 95%CI 1.29-1.40) and long-term (PR men = 1.61, 95%CI 1.51-1.71; PR women = 1.28, 95%CI 1.22-1.34) out-of-work status were each associated with a higher risk of FMD during this period. The magnitude of associations between long-term out-of-work status and FMD significantly varied across cycles, and was strongest after the 1991 recession in men and the 2008 recession in women. Whereas employment represents an important determinant of mental health among young adults, particularly during economic downturns, it did not suffice to explain the rise in mental distress in this age group in more recent years.

KEYWORDS

HIGHLIGHTS

- Frequent mental distress doubled in men and women aged 18-34 between 1993-2019
- Unemployment has been more prevalent and strongly associated with distress in men
- The association of long-term unemployment with distress varied during this period
- Its association was stronger during economic downturns and weaker during upturns

MAIN TEXT

1. INTRODUCTION

Young adulthood is a key period in the development of life-course trajectories of wellbeing and health, and has historically faced less attention from public health compared to other life periods.[1] Whereas young adults are often understood to be in prime physical shape and more resilient than earlier life stages, Western countries have reported worrisome rises in mental distress, psychiatric disorders, and suicide-related outcomes in this age group, particularly among women, compared to other age groups over the past decade.[2–6] In the United States (U.S.), young adults are more likely to report any mental illness, including serious forms causing impairments on daily life, and less likely to seek medical services compared to older age groups.[7] Highlighting the magnitude of changes over time, Twenge et al. (2019) found in the U.S. National Survey on Drug Use and Health between 2005-09 and 2017 that young adults became 63% more likely to report major depressive symptoms, 71% more likely to report serious psychological distress over the past 30 days, and 47% more likely to report suicide thoughts.[3] Whereas studies proposed to explain these increases by changes in sleep quality and use of technological devices and social media over time,[3] others argued that these could be explained by the impacts of the 2008 Great Recession (GR), which disproportionally affected the employment opportunities and work conditions of young adults.[5] This hypothesis is particularly relevant in the U.S. as these impacts have been strongest in countries with limited welfare systems than in those with stronger vocational training and/or redistributive systems.[8]

The experience of non-employment (either as unemployed and looking for work, discouraged and no longer looking, or fully out of the labor market) is a key mechanism through which recessions influence the wellbeing and health of populations, including young adults.[9,10] Studies have also linked experiences of youth non-employment to future careers, fertility intentions, and wellbeing in midlife, demonstrating that a poor start into the labor market is associated with "permanent scars rather than temporary blemishes".[11] The link between employment and mental health is typically understood through financial security and the capacity to fulfill basic psychological needs, exercise personal agency, and maintain a positive social status identity.[12–14] Mechanisms linking unemployment and poor mental health in young adults include the financial strain caused by income loss, difficulty in finding a new job during economic downturns, loss of time structure in the day, loss of their social role as provider, and stigma.[15] Whereas some mechanisms may be most salient among those looking for work, many also apply to young adults

not looking for work and out of the labor market.[16] Mitigating factors include resources such as higher education, tailored coping strategies, and support from family and peers.[15]

The effects of non-employment on mental health are generally strongest among young men from blue-collar backgrounds, and countries with unequal income distributions and weak employment protection systems such as the U.S.[17] Gender differences may have changed in recent decades: whereas men were traditionally more affected by non-employment in keeping with their breadwinner role, differences have declined as more women have entered the labor market and changed their career expectations over time.[18] Differences in the association between "micro-level" non-employment and mental health across "macro-level" non-employment rates also remain unclear: whereas high non-employment rates may reduce stigma, changes in non-employment rates over time tend to have a limited impact on attitudes towards employment.[19] Young adults, however, may be especially likely to report pessimism and suffer from lowered expectations during economic downturns.[20]

A worrisome issue underlying this literature is that the consequences of recessions and non-employment on mental health among young adults may become more pronounced in response to changes in work and family role transitions experienced in more recent decades.[21] Whereas young adults are more likely to participate in higher education today, economic conditions – i.e., higher levels of debt, new precarious forms of employment, lower real incomes, and higher house prices – have worsened for this age group.[21] These have led young adults to further delay or abandon transitions to leave the parents' home, cohabit with partners, and start families of their own.[22] Whereas these changes directly influence young adults' mental health, they may also have lead new generations to be further vulnerable to job loss and prolonged unemployment spells during economic downturns, and further suffer from these setbacks in keeping with their poorer material and social conditions.

Mental health trends in young adults, and the potential role of employment on current levels and long-term cohort trajectories, are likely to be further exacerbated by the advent of the COVID-19 crisis, which has sparked the start of a new economic recession.[23] In the U.S., early economic indicators included the largest one-month increase in unemployment since 1975 and unemployment insurance weekly claims in the Department of Labor's history, surpassing the previous record in May 2009 following the 2008 GR.[24,25] These early estimates also indicated a disproportionate increase in unemployment among young adults.[26]

To better understand trends in mental health among young adults, the role of employment across economic contexts in these trends, and its implications for young adults' wellbeing in the post-COVID future, this study aims to report trends in frequent mental distress, employment, and their associations between 1993 and 2019 using data from the largest U.S. health surveillance dataset, the Behavioral Risk Factor Surveillance System (BRFSS).[27] Whereas public health often defines young adults between ages 18-25, we examine trends in populations aged 18-34 as the transition to adulthood has extended for many beyond the ages of 25-29 in response to the elongated and more complex trajectories that young adults pursue out of education towards stable employment, independent living, and parenthood in more recent decades.[22] Doing so, this study adds to the work of Blanchflower & Oswald (2020), who found in the BRFSS that the prevalence of reporting poor mental health every day among adults increased by 77% between 1993 and 2019, but that this trend was disproportionately driven by increases among White middle-aged adults without college education.[28] The 1993-2019 period oversees three recessions: the end of the 1990-91 recession (oil price spike), the 2001 recession (dot-com bubble), and the 2007-09 Great Recession (subprime mortgage crisis). We hypothesize that: 1) the experience of being out of work is consistently associated with a higher risk of mental distress among young men and women over the past 26 years; 2) the magnitude of associations varies across economic contexts (indicated by "macro-level" non-employment rates), with the greatest associations hypothesized to be found in the years during and following the most recent recession.

2. METHODS

2.1 Data

We used data from 26 annual cross-sectional survey cycles of the BRFSS to capture trends between 1993 and 2019.[27] The BRFSS was designed in 1984 to provide representative estimates of health-related risk behaviors, chronic health conditions, and use of preventive services at the state level on an annual basis.[27] It introduced in 1993 a set of "Health Days" measures designed by the U.S. Center for Disease Control and Prevention to enable the surveillance of trends in health-related quality of life.[29] We did not include participants from Guam and the Virgin Islands as these territories were not systematically sampled during this period. Sample sizes generally increased over the course of the study, and varied for young adults ages 18-34 from 32,274 in 1993 to 68,345 in 2019 (see response rates and sample sizes in Supplementary Table 1).

The BRFSS provides weights to model estimates representative of the U.S. population. Changes in survey methodology over the history of BRFSS influence its representativeness over time. Studies comparing early BRFSS cycles with census data found that adjustments for population size, sex, age, and race/ethnicity did not suffice to limit non-response bias.[30] To account for the rising proportion of households with no landline telephone, declining response rates, and improvements in methodology, BRFSS started in 2011 to include cellular telephone–only households and produce weights using more characteristics including educational attainment, marital status, housing tenure, and telephone ownership.[31]

2.2 Measures

We assessed mental health using *frequent mental distress* (FMD), measured asking "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?". This item was administered each year to the full BRFSS sample, except in 2002 where it was administered to a subset of states and territories (42% of participants). This variable is part of the Healthy Days Core Module created by the U.S. Center for Disease Control and Prevention, which was first implemented in the BRFSS in 1993 and since validated in many populations over time.[29] Following best practices, participants were categorized to be in frequent mental distress (Yes / No) if they reported having poor mental health over at least 14 days during the past 30 days.[32]

Employment status was measured each year asking participants to report their employment status based on eight response options including: employed for wages, self-employed, out of work for 1 year or more, out of work for less than 1 year, homemaker, student, retired, or unable to work. Since we could not distinguish those available and actively looking for work among the "out of work" categories (i.e., those "unemployed"), we categorized participants to be: 1) Employed (for wages or self-employed), 2) Short-term out-of-work (<1 year), 3) Long-term out-of-work (1+ year), or 4) Other (student, homemaker, and unable to work).

Analyses were stratified by year (1993-2019) and gender (Men / Women). We note that gender differences are based on the BRFSS measure of sex (Male / Female), which cannot take into account other gender identities. We controlled for the following covariates identified in other studies:[33] 1) state, 2) age group (18-24 / 25-29 / 30-34), 3) race/ethnicity (White / Black / Hispanic / Other), 4) educational attainment (Less than high school / High school / Some post-secondary education / 4-year degree), 5)

partnership status (Single / Couple / Married / Other), 6) days in poor physical health, including physical illness and injury, over the past month (continuous from 0 to 30).

2.3 Statistical analyses

We first produced annual estimates of the prevalence of FMD and employment categories between 1993 and 2019 in men and women separately. We produced annual prevalence estimates stratified by age group (18-24 / 25-29 / 30-34) in Supplementary Table 2. We then produced annual estimates of the adjusted prevalence ratios (aPR) of FMD in the two out-of-work categories relative to the employed group using sex-stratified multivariate Poisson models.[34] To consider whether the associations between FMD and out-of-work categories varied over time, we tested differences between annual aPRs and the 1993-2019 adjusted pooled estimate using seemingly unrelated estimation (SUEST).[35] We note that controlling by year in the pooled sample adjusts by design for characteristics that do not vary within a year such as annual employment rates. We systematically used the BRFSS survey weight and design variables to produce representative estimates. Whereas we report aPRs in figures to facilitate interpretation, estimates are fully detailed in Supplementary Tables 3-5. Analyses were produced using listwise deletion using Stata 16.[36] Not considering missingness on FMD in 2002, the proportion of cases dropped in analyses across survey cycles averaged 3.8% in men and 3.3% in women. We produced the following sensitivity analyses: 1) we reproduced analyses using a second categorization of the outcome using the mean number of days in poor mental health over the past 30 days on a continuous scale (Supplementary Tables 6-7); 2) we reproduced analyses without controlling for the mean number of days in poor physical health over the past 30 days to mitigate the risk of over-adjustment for physical health; 3) we tested differences in the association of out-of-work categories with FMD in the 1993-2019 pooled sample by age group and race/ethnicity (Supplementary Tables 8-9). These did not impact the main findings.

3. RESULTS

Figure 1 presents the prevalence of frequent mental distress and out-of-work categories among young adult men (Panel A) and women (Panel B) ages 18-34 between 1993 and 2019. During this period, the prevalence of FMD increased in men by 112%, from 6.7% (95%CI 6.0-7.5) to 14.2% (95%CI 13.6-14.8), and in women by 120%, from 8.9% (95%CI 8.3-9.5) to 19.6% (95%CI 18.9-20.4). Estimates are detailed in Supplementary Table 3.

Looking at changes in the progression of FMD over the course of this period: it increased in women but not men from 1993 (M: 6.7%, W: 8.9%) to 2000 (M: 7.4%, W: 11.7%), increased in men but not women from 2000 to 2003 (M: 9.2%, W: 11.8%), was stable in both sexes from 2003 to 2008 (M: 8.5%, W: 11.6%), increased again in both sexes from 2008 to 2012 (M: 10.0%, W: 13.7%), was stable again in both sexes from 2012 to 2015 (M: 10.2%, W: 13.1%), and increased again in both sexes from 2015 to 2019 (M: 14.2%, W: 19.6%). Notably, yearly increases in the prevalence of FMD increased at a much steeper pace between 2015 and 2019, i.e., where it increased by 39% in men and 50% in women, compared with previous years. Looking at differences by age group (Supplementary Table 2), changes over the 27-year period were similar in all age groups, except for recent changes since 2015 which have been particularly steep for women ages 18-24.

The prevalence of short- and long-term out-of-work categories followed consistent patterns in keeping with U.S. economic recessions. Short-term out-of-work status (<1 year) was generally stable between 1993 (M: 4.7%, W: 4.4%) and 2000 (M: 4.1%, W: 4.1%), increased to peak in 2003 (M: 6.8%, W: 5.6%), decreased until 2007 (M: 5.7%, W: 4.4%), increased to peak in 2009 among men (10.9%) and 2011 among women (6.8%), and decreased to stabilize around 2015-16 (M_{2019}: 4.5%, W_{2019}: 4.7%). Long-term out-of-work status (1+ year) slowly decreased in both sexes between 1993 (M: 2.2%, W: 3.1%) and 2000 (M: 1.1%, W: 1.8%), slowly increased in both sexes from 2000 to 2007 (M: 2.0%, W: 2.4%), increased in both sexes from 2007 to peak in 2011 (M: 6.1%, W: 4.4%), and decreased to stabilize from 2015 to 2019 (M_{2019}: 2.3%, W_{2019}: 2.8%). Looking at differences by age group (Supplementary Table 2), the prevalence of out-of-work categories was higher among those ages 18-24 compared to those ages 25-29 and 30-34. Trends over time, however, were similar across age groups.

Please insert Figure 1 somewhere here

The next two figures present the adjusted prevalence ratios (aPR) of FMD for the short-term out of work (Figure 2) and long-term out of work (Figure 3) categories relative to those employed among men (Panel A) and women (Panel B) ages 18-34 between 1993 and 2019. The prevalence of FMD across employment categories is detailed in Supplementary Table 4. The adjusted estimates in Figures 2 and 3 are detailed in Supplementary Table 5. Associations between out-of-work categories and frequent mental distress were significant in all three age groups but slightly lower in the 18-24 age group compared to the 25-29 and 30-34 age groups (Supplementary Table 8).

Among men, the pooled association between being short-term out of work (<1 year) and FMD indicated a 53% (95%CI 1.46-1.61) higher risk of reporting FMD compared to those employed and self-employed. This association varied from a low aPR = 1.20 (95%CI 0.80-1.81) in 2000 to a high aPR = 2.02 (95%CI 1.35-3.01) in 2002. The SUEST joint test of associations did not support the hypothesis that at least one of the associations of being short-term out of work with FMD across yearly cycles was different from the pooled 1993-2019 estimate ($p = .961$). The pooled association between being long-term out of work (1+ year) and FMD indicated a 61% (95%CI 1.51-1.71) higher risk of reporting FMD compared to those employed and self-employed. This association varied from a low aPR = 0.92 (95%CI 0.56-1.51) in 2004 to a high of aPR = 2.74 (95%CI 1.76-4.28) in 1994. The SUEST joint test of associations supported the hypothesis that at least one of the associations of being long-term out of work with FMD across yearly cycles was different from the pooled 1993-2019 estimate ($p = .034$). Compared with the 1993-2019 pooled PR, the association between being long-term out of work and FMD was significantly higher in 1994 ($p = .017$), lower in 2004 ($p = .025$), 2015 ($p = .045$), and 2017 ($p = .009$).

Among women, the pooled association between being short-term out of work (<1 year) and FMD indicated a 34% (95%CI 1.29-1.40) higher risk of reporting FMD compared to those employed and self-employed. This association varied from a low aPR = 0.92 (95%CI 0.72-1.19) in 2000 to a high aPR = 1.73 (95%CI 1.24-2.40) in 1995. The SUEST joint test of associations did not support the hypothesis that at least one of the associations of being short-term out of work with FMD across yearly cycles was different from the pooled 1993-2019 estimate ($p = .245$). The pooled association between being long-term out of work (1+ year) and FMD indicated a 28% (95%CI 1.22-1.34) higher risk of reporting FMD compared to those employed and self-employed. This association varied from a low aPR = 0.86 (95%CI 0.61-1.21) in 2000 to high aPRs of 1.55 (95%CI 1.28-1.86) in 2010 and 1.55 (95%CI 1.32-1.83) in 2011. The SUEST joint test of associations supported the hypothesis that at least one of the associations of being long-term out of work with FMD across yearly cycles was different from the pooled 1993-2019 estimate ($p = .011$). Compared with the 1993-2019 pooled PR, the association between being long-term out of work and FMD was significantly lower in 2000 ($p = .020$) and higher in 2010 ($p = .041$) and 2011 ($p = .016$).

Please insert Figures 2 and 3 somewhere here

4. DISCUSSION

Using data spanning almost three recessions over 26 years, this study aimed to describe long-term trends in mental distress in young adults, explore the association between non-employment and mental distress across different economic contexts, and its potential implications for the changes expected in the wake of the recession triggered by the COVID crisis on this age group. Supporting previous evidence in the U.S. and other countries, those aged 18-34 had in 2019 the highest levels of mental distress compared to the previous 26 years, with one out of seven men and one out of five women frequently reporting poor mental health. Comparing trends in the prevalence of mental distress with changes in the mean days in poor mental health (see Supplementary Material), our findings suggest that changes include increases in both the prevalence and severity of mental distress over time. Finally, highlighting the importance of the mental health crisis today, 55% (men) and 44% (women) of the increase in mental distress over this 26-year period occurred over just four years between 2016 and 2019.

We found that trends in mental health and economic recessions were likely to be aligned over the past 25 years. However, the increase in mental distress over the past four years occurred in a period where there have been relatively high levels of employment. This finding suggests that the short-term effects of "macro-level" employment do not suffice to explain mental health trends in this age group. It may be that the other effects of recessions – increases in precarious forms of work, financial hardship, and incapacity to deal with debt – contribute to a larger extent than employment to mental distress trends in this age group.[37,38] Increases in mental distress in recent years may therefore be consequential to: 1) the longer-term effects of being out of work in the years after the 2008 GR on financial security and family transitions, 2) worsening trends in the work conditions of employed young adults, or 3) changes in other life domains such as sleep quality and use of technological devices and social media proposed by others.[3,39]

Congruent with evidence on this topic, we found that short-term and long-term out-of-work experiences were each associated with a higher risk of mental distress between 1993-2019, with stronger associations observed among men. We also found larger increases in out-of-work status among men during the 2001 and 2008 recessions, supporting the idea that recessions affect the wellbeing of men and women in different ways. Partially supporting our hypothesis regarding variability in associations over time, we found that whereas short-term out-of-work experiences did not show significant variation in its association with mental distress, long-term out-of-work experiences were associated to a higher degree with mental distress around the 2-3 years after the start of recessions, with stronger associations found among men in 1994 (after the 1991 recession) and among women in 2010-11 (after the 2008 recession).

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We also found that being long-term out of work was not associated with mental distress among men in two recent annual cycles characterised by a low "macro-level" unemployment rate, 2015 and 2017. These finding do not support the hypothesis that young adults may suffer less from unemployment following economic downturns and highlight that, whereas unemployment is unlikely to explain the worrisome mental health trends between 2015-19, it is likely to contribute to population levels of mental distress in the years during and following recessions.[19]

Applying these trends to the post-COVID future, we do not expect a deceleration of the rising levels of mental distress in young adults over the next few years. We learned from the GR that the impact of a global crisis is not only immediate but includes lasting effects.[11] The generation who began their transition to adulthood during the GR continue to face its long-term consequences today.[40] The most recent generation is likely to suffer similar, if not worse, effects from this new recession. Public health may contribute to this crisis by prioritizing: 1) understanding of the other mechanisms leading to rising levels of mental distress, 2) developing interventions that alleviate the mental health burden of unemployment among young adults, and 3) advocating for stronger social policies to support young adults from all backgrounds. This call is especially poignant in countries such as the United States that uses less public spending on social welfare benefits and active labor market policies.[41] Whereas evidence of programs tackling the effects of unemployment on mental health remain limited, vocational training programs and strong links between education and employers may buffer the effects of recessions.[21,42,43]

4.1. Limitations

The cross-sectional design implies that our analyses are liable to reverse causality (i.e., mental distress predicting future unemployment) and confounding (e.g., parents' social status predicting unemployment and mental health), preventing us from drawing causal relationships from the associations tested between unemployment and mental distress. In particular, whereas we observed higher effect sizes in years after which there have been high unemployment rates, the causal relationship between economic downturns and the effects of unemployment cannot be confirmed by the study design. Changes in associations between 1993-2019 may be driven by unobserved changes in the characteristics of those out of work or reporting frequent mental distress over time. Changes in associations over time may also differ beyond gender by age group, social background, or race/ethnicity. We note that unemployment includes a variety of activities (transitioning between degrees, volunteering, doing unpaid family work, travelling, contributing to household chores, caregiving). Our study would have therefore been improved by a more precise measure of employment that distinguishes between those looking for work or not, and considers

other periods of exposure (beyond the "one continuous year" cutoff). Our study would also have been improved by the use of other mental health measures consistently measured across time.

In order to maximise our statistical power to detect differences over time, our study did not consider heterogeneity in associations between employment and mental health across more social characteristics, particularly race/ethnicity. We tested differences in associations between ethnic groups in the 1993-2019 pooled sample, and found that associations had been stronger in White (non-Hispanic) women compared with Black and Hispanic women (Supplementary Table 9). Whereas these differences highlight the need to better understand the different returns of employment among young adults across ethnic groups, the findings support our interpretation of the role of employment on population levels of mental distress in the U.S. young adult population over time.

5. CONCLUSION

Whereas it is unlikely to explain trends in mental health in the past few years, employment contributes in nuanced ways to the burden of mental distress among young adults, particularly during economic downturns. The anticipated recession following the COVID-19 crisis is expected to be one of the worst recessions since the 1920s. The unique conditions of this new recession have also led new employment sectors to be hit compared with those traditionally impacted, leading to even more uncertainty about its impact across genders. This is great cause for concern for recent generations of young adults. In keeping with the rising levels of mental distress in this age group, policymakers need to prioritize these connected issues and ensure opportunities for those affected to secure viable employment. Investing in young people is the key to future prosperity.

ETHICAL STATEMENT

No ethical approval was required for this study.

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FIGURE 1

Prevalence of frequent mental distress and out-of-work status among young adults aged 18-34. US BRFSS 1993-2019.
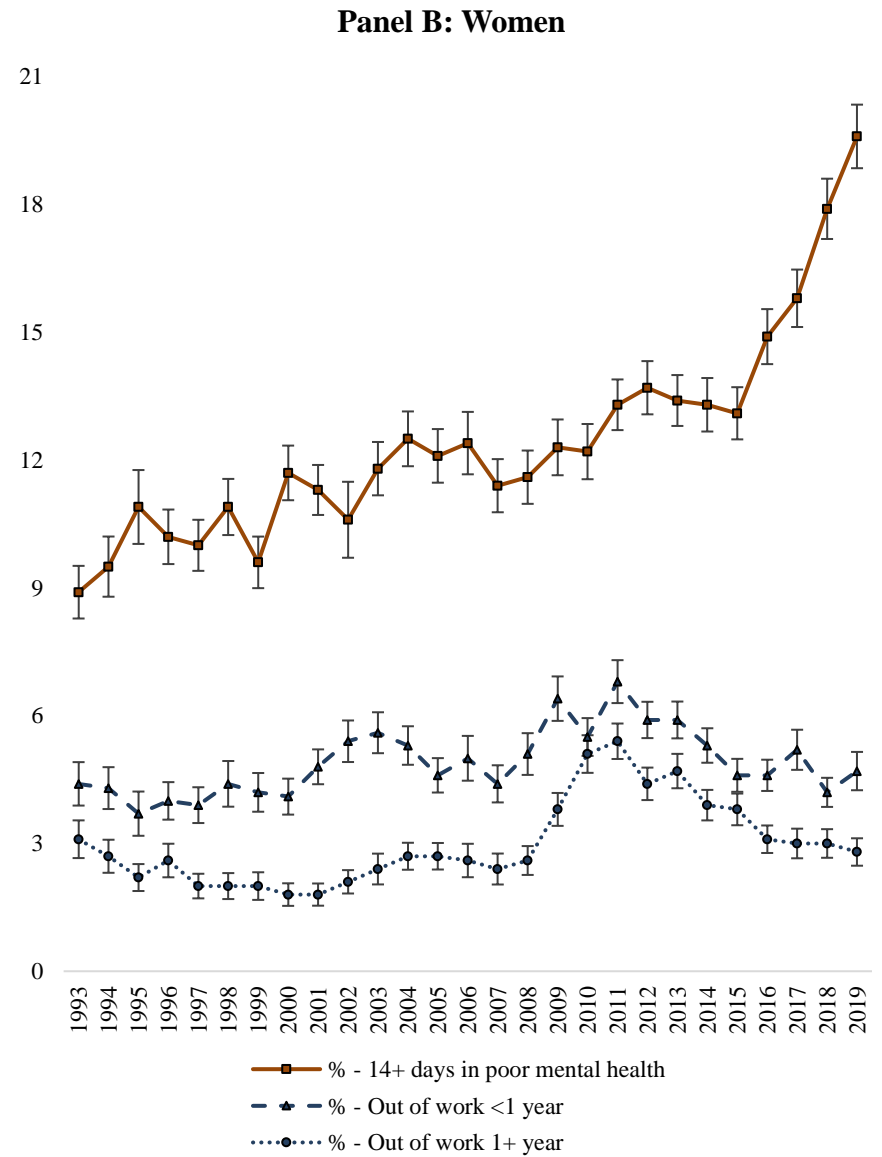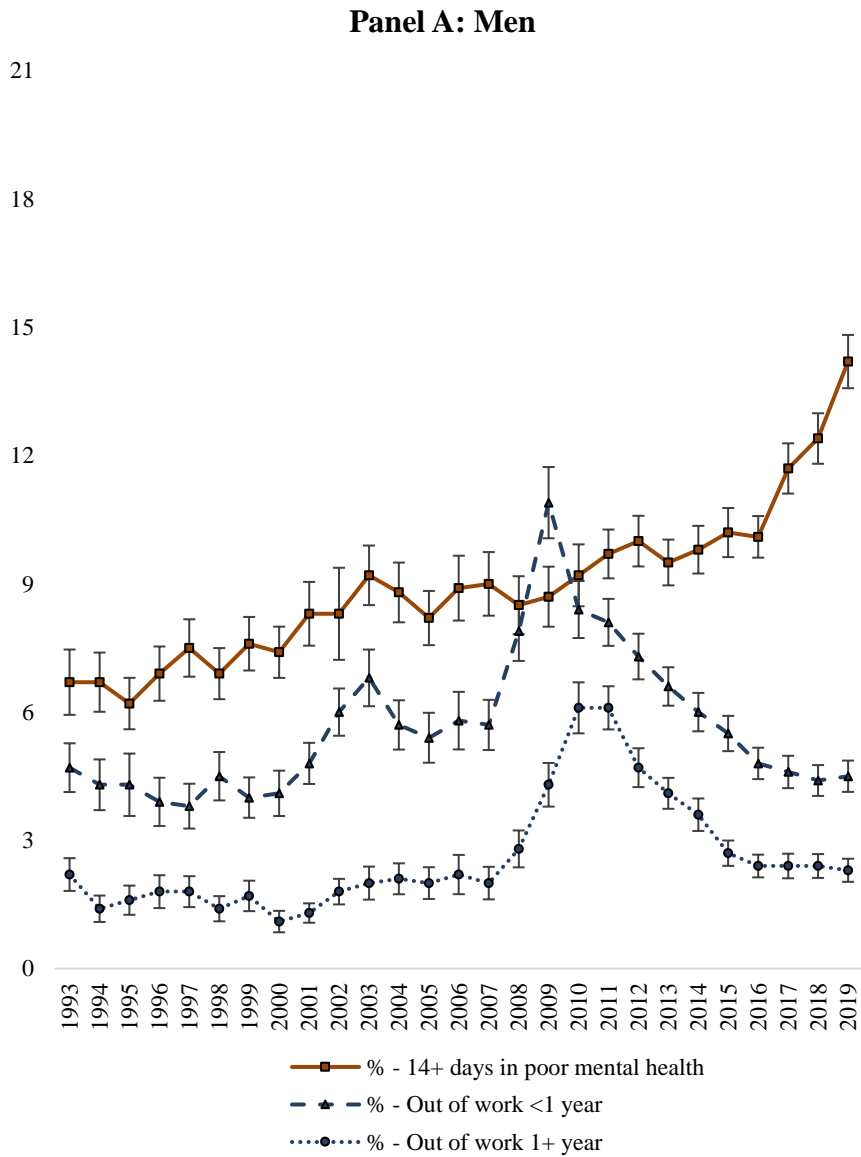
FIGURE 2

Adjusted prevalence ratios of frequent mental distress by short-term out-of-work status (<1 year) among young adults aged 18-34. U.S. BRFSS, 1993-2019.

Panel A: Men   Panel B: Women
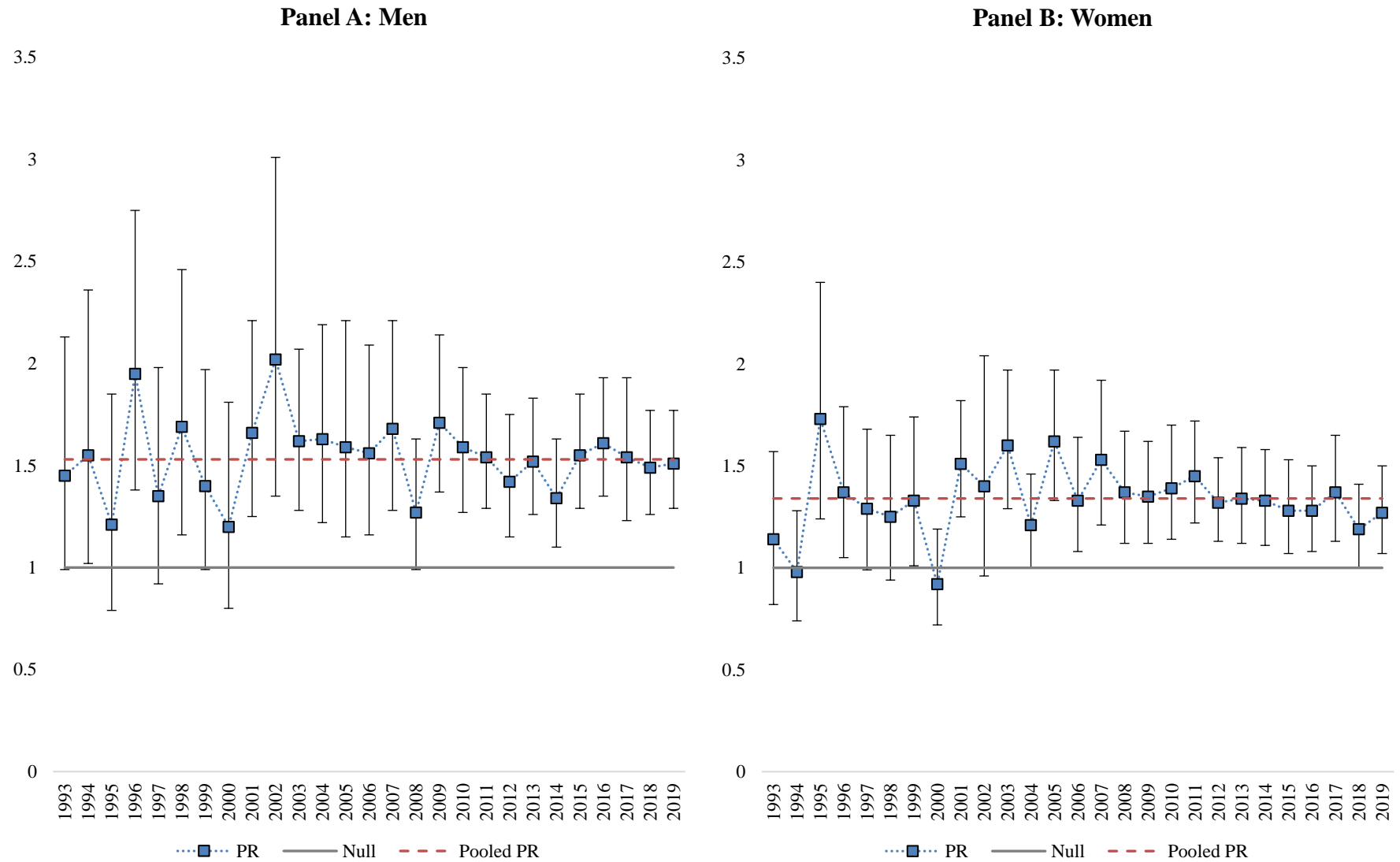
FIGURE 3

Adjusted prevalence ratios of frequent mental distress by long-term out-of-work status (1+ year) among young adults aged 18-34. U.S. BRFSS 1993-2019.

Panel A: Men

Panel B: Women
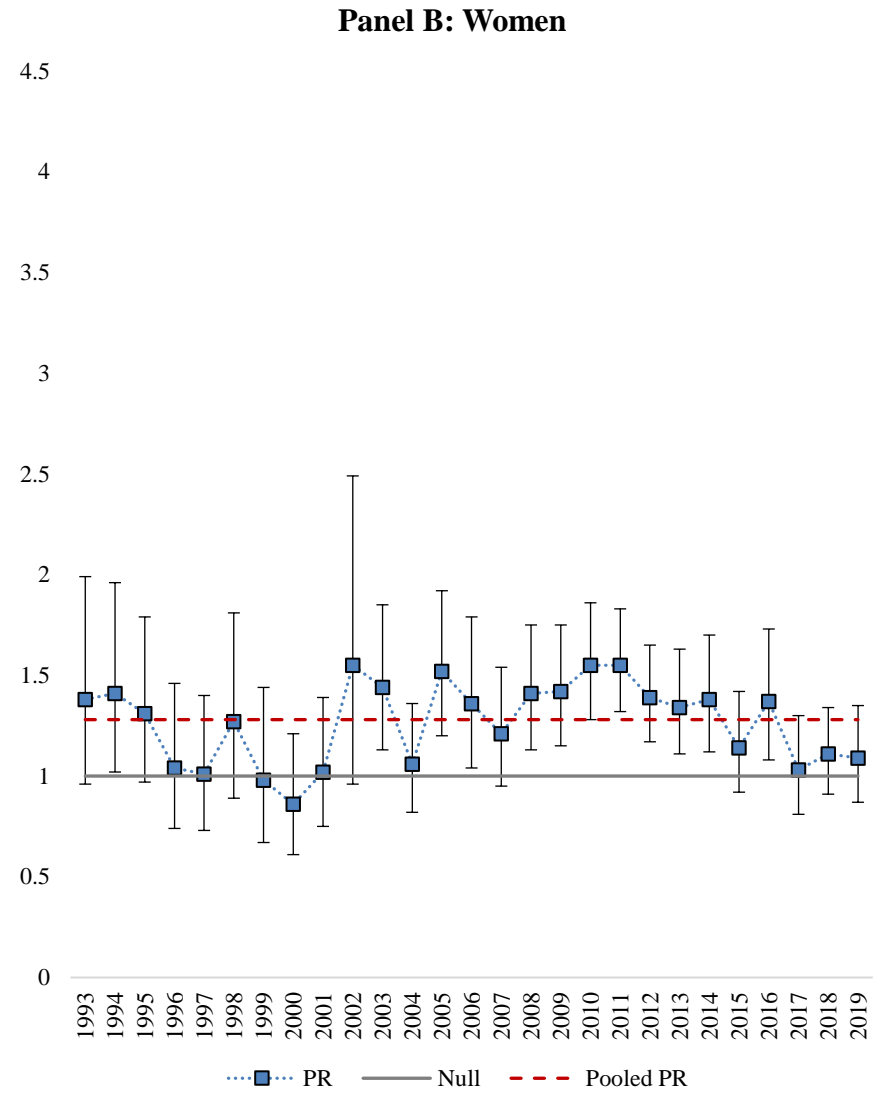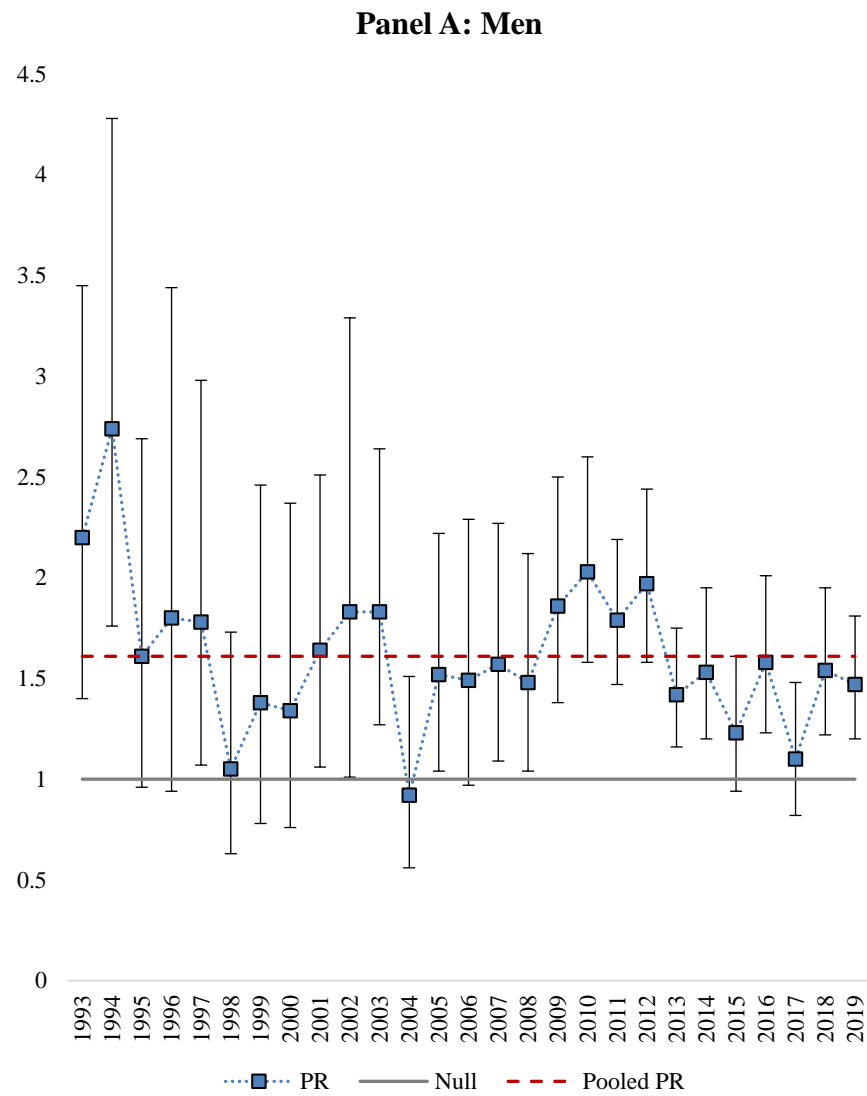
SUPPLEMENTARY MATERIAL

Trends in young adults' mental distress and its association with employment: Evidence from the Behavioral Risk Factor Surveillance System, 1993-2019.

Last updated June 2021

Table of contents

SUPPLEMENTARY TABLE 1
U.S. BRFSS response rate (RR) and sample size of 18-34 year-olds. 1993-2019.

Year	RR (%)	Men	Women
1993	71.4	14,290	17,984
1994	70.0	13,944	18,104
1995	68.4	14,670	18,966
1996	63.2	15,441	20,121
1997	62.1	16,281	21,465
1998	59.2	17,843	23,366
1999	55.2	18,792	24,994
2000	48.9	20,931	28,616
2001	51.1	23,195	31,526
2002	58.3	24,117	33,875
2003	53.2	23,431	34,410
2004	52.7	24,776	37,849
2005	51.1	24,707	39,626
2006	51.4	21,587	34,547
2007	50.6	22,284	37,506
2008	53.3	20,244	32,515
2009	52.5	19,243	30,564
2010	54.6	18,292	28,784
2011	49.7	31,392	40,636
2012	45.2	32,733	39,250
2013	46.4	35,791	40,830
2014	47.0	31,685	35,248
2015	47.2	32,036	34,296
2016	47.1	37,123	37,380
2017	45.9	37,033	35,929
2018	49.9	36,980	35,048
2019	49.4	35,602	32,743

Response rates are based on the median response rate (all age and sex groups combined) across states and territories reported by the BRFSS team between 1993 and 2019. Participants were not included in this study if they were from Guam or the Virgin Island, or if they had missing data on sex.

SUPPLEMENTARY TABLE 2

Frequent mental distress and employment status among 18-34 year-olds, by age group. US BRFSS, 1993-2019.

	Men									Women								
	Frequent mental distress			Out of work < 1 year			Out of work 1+ year			Frequent mental distress			Out of work < 1 year			Out of work 1+ year		
Age	18-24	25-29	30-34	18-24	25-29	30-34	18-24	25-29	30-34	18-24	25-29	30-34	18-24	25-29	30-34	18-24	25-29	30-34
Year	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1993	7.0	6.4	6.7	6.4	3.9	3.4	2.4	1.7	2.3	9.1	9.3	8.3	6.0	4.1	2.9	3.6	2.8	2.7
1994	7.4	6.4	6.0	6.2	3.1	3.1	1.7	0.8	1.6	10.7	8.5	9.1	5.6	3.7	3.3	2.5	3.1	2.7
1995	6.7	6.3	5.7	6.1	3.1	3.3	2.0	1.3	1.2	12.0	10.6	10.1	4.7	2.8	3.4	2.3	2.0	2.2
1996	7.1	6.9	6.8	5.8	2.9	2.7	2.5	1.4	1.4	10.3	9.6	10.6	4.9	3.6	3.4	2.9	2.5	2.3
1997	8.4	7.0	6.9	5.2	3.8	2.3	2.2	1.5	1.4	10.3	9.9	9.8	4.9	3.6	3.2	2.1	1.8	2.1
1998	7.7	7.1	5.8	6.6	3.4	2.9	1.8	1.3	0.9	11.9	10.1	10.4	5.8	3.6	3.3	2.3	1.6	2.2
1999	7.6	8.0	7.2	6.0	3.3	2.1	2.0	1.6	1.2	9.3	10.1	9.6	5.2	4.0	3.1	2.2	2.0	1.8
2000	8.4	7.0	6.4	5.8	4.0	2.1	1.5	0.9	0.8	12.2	12.2	10.6	5.4	3.6	3.0	1.7	1.9	1.8
2001	9.0	8.3	7.5	6.2	4.2	3.6	1.5	1.3	1.1	11.8	10.8	10.9	5.9	4.4	3.7	1.8	1.7	1.9
2002	9.9	8.5	5.8	8.0	5.3	4.1	1.9	1.4	1.8	10.3	10.4	11.1	6.9	4.8	3.8	2.2	2.1	1.9
2003	10.0	8.8	8.3	9.4	5.4	4.5	2.8	1.5	1.2	12.1	12.1	11.2	7.2	4.9	4.1	2.9	1.8	2.5
2004	9.5	8.6	8.2	7.8	4.5	4.1	2.9	1.3	1.7	13.3	12.4	11.7	6.3	5.3	4.0	3.0	2.2	2.6
2005	8.7	8.9	6.8	8.0	4.1	3.0	2.4	1.8	1.7	14.2	11.0	10.3	5.9	4.3	3.1	2.9	2.4	2.7
2006	9.1	9.2	8.3	8.2	5.1	3.1	2.9	1.8	1.4	13.5	12.7	10.8	6.9	4.2	3.2	2.9	2.5	2.2
2007	9.4	9.0	8.5	8.7	4.7	3.1	2.8	1.5	1.6	12.1	11.7	10.6	6.5	4.1	2.7	2.8	2.6	2.0
2008	7.8	10.3	7.9	10.0	7.8	5.2	3.3	3.2	1.9	11.8	11.7	11.4	6.5	4.8	3.7	2.8	3.0	2.2
2009	8.0	9.3	9.1	13.2	10.8	8.1	5.1	4.8	2.9	12.3	13.2	11.7	8.5	6.2	4.5	4.4	4.3	3.0
2010	8.9	10.1	8.8	10.3	10.1	5.1	5.8	7.3	5.5	12.4	12.7	11.6	7.0	5.6	4.2	5.2	5.6	4.6
2011	8.8	11.1	9.9	10.0	7.4	6.1	6.5	6.3	5.5	13.4	12.4	13.8	8.5	6.3	5.1	5.6	5.9	4.8
2012	9.4	9.9	10.9	8.7	7.6	5.1	4.7	5.1	4.4	13.9	13.9	13.4	7.0	6.5	4.1	4.1	4.7	4.7
2013	9.0	10.3	9.5	8.1	6.0	5.0	4.2	4.1	3.9	13.4	14.2	12.9	6.7	5.7	5.0	4.4	4.8	5.2
2014	9.1	10.0	10.6	7.9	5.0	4.3	3.6	3.2	4.0	13.4	13.4	13.2	5.9	5.1	4.5	3.4	4.7	3.9
2015	9.8	10.5	10.7	6.7	5.5	3.9	3.0	2.4	2.6	14.2	12.3	12.5	5.5	4.6	3.4	3.6	4.2	3.7
2016	10.2	10.6	9.4	5.7	4.8	3.6	2.6	2.3	2.3	16.2	14.9	13.4	5.4	4.5	3.6	2.8	3.2	3.3
2017	12.5	11.1	11.2	5.1	4.9	3.7	2.2	2.2	2.8	17.8	14.5	14.2	5.7	5.7	4.2	2.8	3.3	2.8
2018	12.4	12.8	12.0	5.3	4.2	3.5	2.4	2.2	2.7	21.0	16.5	15.3	4.9	4.4	3.2	2.9	3.2	3.1
2019	15.1	14.6	12.6	5.4	4.3	3.6	2.5	2.2	2.3	23.0	19.2	15.8	5.1	4.7	4.3	2.4	3.3	3.0

Estimates weighted using the BRFSS design weight variables.

SUPPLEMENTARY TABLE 3

Frequent mental distress and employment status among 18-34 year-olds. US BRFSS, 1993-2019.

| | Men | | | | | | | | Women | | | | | | | |
| | Mean days of poor mental health | | 14+ days of poor mental health | | Out of work < 1 year | | Out of work 1+ year | | Mean days of poor mental health | | 14+ days of poor mental health | | Out of work < 1 year | | Out of work 1+ year | |
Year	Mean	95%CI	%	95%CI	%	95%CI	%	95%CI	Mean	95%CI	%	95%CI	%	95%CI	%	95%CI
1993	2.7	2.5-2.9	6.7	6.0-7.5	4.7	4.2-5.3	2.2	1.8-2.6	3.8	3.7-4.0	8.9	8.3-9.5	4.4	3.9-5.0	3.1	2.7-3.6
1994	2.7	2.5-2.9	6.7	6.0-7.4	4.3	3.7-4.9	1.4	1.1-1.7	3.9	3.7-4.1	9.5	8.8-10.3	4.3	3.8-4.8	2.7	2.4-3.2
1995	2.6	2.4-2.8	6.2	5.7-6.9	4.3	3.6-5.1	1.6	1.2-1.9	4.1	3.9-4.3	10.9	10.1-11.8	3.7	3.2-4.3	2.2	1.9-2.5
1996	2.6	2.5-2.8	6.9	6.3-7.6	3.9	3.4-4.5	1.8	1.4-2.2	3.9	3.8-4.1	10.2	9.6-10.9	4.0	3.6-4.5	2.6	2.2-3.0
1997	2.8	2.6-3.0	7.5	6.8-8.2	3.8	3.4-4.4	1.8	1.4-2.2	3.9	3.8-4.1	10.0	9.4-10.6	3.9	3.5-4.4	2.0	1.8-2.3
1998	2.8	2.6-2.9	6.9	6.3-7.5	4.5	4.0-5.1	1.4	1.1-1.7	4.2	4.0-4.4	10.9	10.2-11.6	4.4	3.8-4.9	2.0	1.7-2.4
1999	2.9	2.8-3.1	7.6	7.0-8.2	4.0	3.6-4.5	1.7	1.3-2.1	3.8	3.7-4.0	9.6	9.0-10.2	4.2	3.8-4.7	2.0	1.7-2.4
2000	3.0	2.8-3.1	7.4	6.8-8.0	4.1	3.6-4.7	1.1	0.9-1.4	4.4	4.3-4.6	11.7	11.1-12.3	4.1	3.7-4.6	1.8	1.5-2.0
2001	3.2	3.0-3.4	8.3	7.6-9.1	4.8	4.3-5.3	1.3	1.1-1.5	4.4	4.3-4.6	11.3	10.7-11.9	4.8	4.4-5.2	1.8	1.6-2.1
2002	3.2	2.9-3.4	8.3	7.2-9.4	6.0	5.5-6.6	1.8	1.5-2.1	4.2	4.0-4.4	10.6	9.7-11.5	5.4	4.9-5.9	2.1	1.8-2.4
2003	3.4	3.2-3.6	9.2	8.5-9.9	6.8	6.2-7.5	2.0	1.6-2.4	4.5	4.4-4.7	11.8	11.2-12.4	5.6	5.1-6.1	2.4	2.1-2.8
2004	3.3	3.1-3.5	8.8	8.2-9.6	5.7	5.2-6.4	2.1	1.8-2.5	4.6	4.4-4.7	12.5	11.9-13.2	5.3	4.9-5.8	2.7	2.4-3.0
2005	3.1	2.9-3.2	8.2	7.6-8.8	5.4	4.8-6.0	2.0	1.7-2.4	4.4	4.3-4.6	12.1	11.5-12.7	4.6	4.2-5.0	2.7	2.4-3.0
2006	3.3	3.1-3.5	8.9	8.1-9.6	5.8	5.1-6.5	2.2	1.8-2.7	4.6	4.4-4.8	12.4	11.7-13.2	5.0	4.5-5.5	2.6	2.2-3.0
2007	3.3	3.2-3.5	9.0	8.3-9.8	5.7	5.2-6.3	2.0	1.7-2.5	4.3	4.1-4.4	11.4	10.8-12.1	4.4	4.0-4.9	2.4	2.1-2.8
2008	3.2	3.1-3.4	8.5	7.8-9.2	7.9	7.2-8.6	2.8	2.4-3.3	4.4	4.2-4.5	11.6	11.0-12.3	5.1	4.6-5.6	2.6	2.3-3.0
2009	3.2	3.1-3.4	8.7	8.0-9.4	10.9	10.0-11.7	4.3	3.8-4.8	4.5	4.3-4.6	12.3	11.7-13.0	6.4	5.9-6.9	3.8	3.5-4.3
2010	3.4	3.2-3.5	9.2	8.5-9.9	8.4	7.8-9.1	6.1	5.5-6.7	4.4	4.3-4.6	12.2	11.5-12.8	5.5	5.1-6.0	5.1	4.6-5.5
2011	3.6	3.4-3.7	9.7	9.2-10.3	8.1	7.6-8.7	6.1	5.6-6.7	4.8	4.6-4.9	13.3	12.7-13.9	6.8	6.4-7.4	5.4	5.0-5.9
2012	3.7	3.5-3.8	10.0	9.4-10.6	7.3	6.8-7.9	4.7	4.3-5.2	4.9	4.8-5.1	13.7	13.1-14.4	5.9	5.5-6.4	4.4	4.1-4.8
2013	3.4	3.3-3.6	9.5	9.0-10.0	6.6	6.2-7.1	4.1	3.7-4.5	4.8	4.7-5.0	13.4	12.9-14.0	5.9	5.5-6.3	4.7	4.4-5.2
2014	3.5	3.4-3.7	9.8	9.3-10.4	6.0	5.6-6.5	3.6	3.2-4.0	4.7	4.6-4.9	13.3	12.7-14.0	5.3	4.9-5.7	3.9	3.5-4.2
2015	3.7	3.5-3.8	10.2	9.7-10.8	5.5	5.1-5.9	2.7	2.4-3.0	4.7	4.6-4.9	13.1	12.5-13.8	4.6	4.2-5.0	3.8	3.5-4.2
2016	3.7	3.6-3.8	10.1	9.6-10.6	4.8	4.5-5.2	2.4	2.2-2.7	5.2	5.1-5.4	14.9	14.3-15.6	4.6	4.2-5.0	3.1	2.8-3.4
2017	4.2	4.0-4.3	11.7	11.2-12.3	4.6	4.2-5.0	2.4	2.1-2.7	5.5	5.4-5.7	15.8	15.1-16.5	5.2	4.8-5.7	3.0	2.6-3.3
2018	4.4	4.2-4.5	12.4	11.8-13.0	4.4	4.1-4.8	2.4	2.2-2.7	6.0	5.9-6.2	17.9	17.2-18.7	4.2	3.9-4.6	3.0	2.7-3.4
2019	4.9	4.7-5.1	14.2	13.6-14.8	4.5	4.2-4.9	2.3	2.1-2.6	6.6	6.4-6.8	19.6	18.9-20.4	4.7	4.3-5.2	2.8	2.5-3.2

Estimates weighted using the BRFSS design weight variables. CI = Confidence interval.

SUPPLEMENTARY TABLE 4
Prevalence of frequent mental distress among 18-34 year-olds, by employment status. U.S. BRFSS, 1993-2019.

| | Men | | | | | | Women | | | | | |
| | Employed | | Out of work < 1 year | | Out of work 1+ year | | Employed | | Out of work < 1 year | | Out of work 1+ year | |
	%	95%CI	%	95%CI	%	95CI	%	95%CI	%	95%CI	%	95%CI
1993	5.8	5.1-6.7	9.6	6.7-13.6	17.3	11.2-25.6	7.7	7.1-8.4	10.3	7.5-14.0	13.8	9.9-19.1
1994	5.8	5.2-6.6	11.3	7.8-16.2	24.5	15.3-36.8	8.8	8.1-9.7	11.6	8.7-15.2	16.0	10.8-23.1
1995	6.0	5.3-6.6	8.5	5.6-12.9	11.5	7.0-18.4	9.6	8.8-10.4	21.8	14.6-31.4	15.8	11.5-21.4
1996	6.3	5.7-7.0	14.0	10.0-19.1	13.3	6.8-24.3	10.0	9.3-10.9	17.4	13.6-22.1	14.8	10.0-21.3
1997	7.0	6.3-7.7	12.3	8.3-17.8	18.6	11.5-28.6	9.5	8.8-10.2	16.2	12.6-20.6	12.1	8.7-16.7
1998	6.4	5.9-7.1	15.0	10.4-21.1	8.1	4.9-13.0	10.6	9.8-11.4	16.0	12.4-20.3	19.0	13.4-26.3
1999	7.0	6.3-7.6	11.2	8.1-15.3	11.3	6.5-19.1	9.2	8.5-9.9	16.6	12.9-21.1	11.9	8.3-16.8
2000	7.1	6.5-7.7	10.7	7.3-15.3	13.6	7.9-22.4	11.5	10.8-12.3	13.0	10.3-16.2	13.5	9.2-19.3
2001	7.6	6.8-8.5	15.0	11.8-18.9	15.2	9.0-24.3	10.5	9.8-11.2	19.5	16.3-23.0	12.3	9.1-16.4
2002	7.0	5.9-8.2	19.0	13.7-25.8	16.4	9.1-27.7	10.7	9.6-11.9	15.7	10.7-22.4	20.6	12.9-31.3
2003	7.9	7.2-8.6	17.5	13.7-22.1	19.9	13.9-27.6	10.6	9.9-11.4	20.3	16.6-24.5	19.3	14.6-25.1
2004	7.9	7.2-8.7	15.1	11.6-19.4	10.9	6.9-16.7	11.8	11.0-12.7	17.2	14.4-20.4	16.1	12.5-20.4
2005	7.2	6.6-7.9	14.4	10.6-19.3	14.2	9.6-20.6	10.7	10.0-11.4	22.4	18.5-26.8	21.0	16.7-26.1
2006	7.8	7.0-8.6	14.6	10.9-19.2	16.2	10.3-24.5	11.2	10.4-12.2	18.4	15.0-22.5	21.1	16.0-27.3
2007	8.0	7.3-8.9	17.7	13.8-22.5	22.1	15.2-30.9	9.9	9.2-10.6	20.2	16.2-24.8	15.0	11.6-19.2
2008	7.5	6.8-8.2	12.1	9.6-15.1	15.5	11.0-21.4	10.5	9.7-11.3	19.2	15.9-23.0	20.6	16.6-25.2
2009	6.8	6.2-7.5	13.2	10.7-16.1	16.2	12.4-20.9	10.7	9.9-11.5	18.0	15.2-21.2	19.9	16.4-24.1
2010	7.0	6.3-7.8	13.2	10.9-15.9	19.1	15.4-23.4	10.0	9.3-10.8	18.4	15.3-22.0	22.8	19.1-26.9
2011	8.1	7.5-8.7	14.5	12.2-17.2	20.2	16.8-24.2	11.3	10.6-12.1	19.5	16.7-22.8	22.0	18.9-25.4
2012	8.3	7.7-9.0	14.9	12.3-17.9	21.7	17.6-26.5	11.6	10.9-12.3	17.4	14.9-20.1	20.3	17.3-23.6
2013	8.3	7.7-9.0	15.5	13.0-18.3	15.8	13.0-19.1	11.3	10.7-12.1	20.0	17.2-23.2	20.1	16.8-23.8
2014	8.7	8.0-9.3	14.2	11.8-16.9	17.1	13.4-21.6	12.2	11.4-12.9	18.8	15.9-22.0	21.4	17.6-25.8
2015	9.2	8.5-9.8	17.1	14.4-20.3	14.8	11.4-19.0	12.2	11.4-13.0	19.1	16.3-22.3	17.6	14.4-21.4
2016	8.8	8.3-9.3	17.3	14.7-20.3	18.8	15.0-23.3	14.1	13.4-15.0	21.0	18.0-24.3	21.8	17.2-27.2
2017	10.9	10.3-11.6	21.1	17.4-25.3	17.8	13.8-22.6	14.6	13.8-15.5	23.3	19.6-27.5	16.6	13.2-20.7
2018	11.3	10.6-12.0	19.3	16.6-22.4	21.7	17.3-26.8	16.7	15.8-17.5	23.7	20.5-27.3	21.0	17.2-25.4
2019	12.8	12.1-13.5	22.7	19.7-26.1	23.7	19.5-28.6	18.9	18.0-19.9	28.0	24.1-32.3	23.4	19.2-28.3

Estimates weighted using the BRFSS design weight variables. Frequent mental distress is defined as having poor mental health over at least 14 days during the past 30 days.

SUPPLEMENTARY TABLE 5

Associations between out-of-work status and frequent mental distress (relative to those employed in wages and self-employed) among 18-34 year-olds. US BRFSS, 1993-2019.

	Men				Women			
	Out of work < 1 year		Out of work 1+ year		Out of work < 1 year		Out of work 1+ year	
	PR	**95%CI**	**PR**	**95%CI**	**PR**	**95%CI**	**PR**	**95%CI**
1993	1.45	0.99-2.13	**2.20**	**1.40-3.45**	1.14	0.82-1.57	1.38	0.96-1.99
1994	**1.55**	**1.02-2.36**	**2.74**	**1.76-4.28**	0.98	0.74-1.28	**1.41**	**1.02-1.96**
1995	1.21	0.79-1.85	1.61	0.96-2.69	**1.73**	**1.24-2.40**	1.31	0.97-1.79
1996	**1.95**	**1.38-2.75**	1.80	0.94-3.44	**1.37**	**1.05-1.79**	1.04	0.74-1.46
1997	1.35	0.92-1.98	**1.78**	**1.07-2.98**	1.29	0.99-1.68	1.01	0.73-1.40
1998	**1.69**	**1.16-2.46**	1.05	0.63-1.73	1.25	0.94-1.65	1.27	0.89-1.81
1999	1.40	0.99-1.97	1.38	0.78-2.46	**1.33**	**1.01-1.74**	0.98	0.67-1.44
2000	1.20	0.80-1.81	1.34	0.76-2.37	0.92	0.72-1.19	0.86	0.61-1.21
2001	**1.66**	**1.25-2.21**	**1.64**	**1.06-2.51**	**1.51**	**1.25-1.82**	1.02	0.75-1.39
2002	**2.02**	**1.35-3.01**	**1.83**	**1.01-3.29**	1.40	0.96-2.04	1.55	0.96-2.49
2003	**1.62**	**1.28-2.07**	**1.83**	**1.27-2.64**	**1.60**	**1.29-1.97**	**1.44**	**1.13-1.85**
2004	**1.63**	**1.22-2.19**	0.92	0.56-1.51	**1.21**	**1.00-1.46**	1.06	0.82-1.36
2005	**1.59**	**1.15-2.21**	**1.52**	**1.04-2.22**	**1.62**	**1.33-1.97**	**1.52**	**1.20-1.92**
2006	**1.56**	**1.16-2.09**	1.49	0.97-2.29	**1.33**	**1.08-1.64**	**1.36**	**1.04-1.79**
2007	**1.68**	**1.28-2.21**	**1.57**	**1.09-2.27**	**1.53**	**1.21-1.92**	1.21	0.95-1.54
2008	1.27	0.99-1.63	**1.48**	**1.04-2.12**	**1.37**	**1.12-1.67**	**1.41**	**1.13-1.75**
2009	**1.71**	**1.37-2.14**	**1.86**	**1.38-2.50**	**1.35**	**1.12-1.62**	**1.42**	**1.15-1.75**
2010	**1.59**	**1.27-1.98**	**2.03**	**1.58-2.60**	**1.39**	**1.14-1.70**	**1.55**	**1.28-1.86**
2011	**1.54**	**1.29-1.85**	**1.79**	**1.47-2.19**	**1.45**	**1.22-1.72**	**1.55**	**1.32-1.83**
2012	**1.42**	**1.15-1.75**	**1.97**	**1.58-2.44**	**1.32**	**1.13-1.54**	**1.39**	**1.17-1.65**
2013	**1.52**	**1.26-1.83**	**1.42**	**1.16-1.75**	**1.34**	**1.12-1.59**	**1.34**	**1.11-1.63**
2014	**1.34**	**1.10-1.63**	**1.53**	**1.20-1.95**	**1.33**	**1.11-1.58**	**1.38**	**1.12-1.70**
2015	**1.55**	**1.29-1.85**	1.23	0.94-1.61	**1.28**	**1.07-1.53**	1.14	0.92-1.42
2016	**1.61**	**1.35-1.93**	**1.58**	**1.23-2.01**	**1.28**	**1.08-1.50**	**1.37**	**1.08-1.73**
2017	**1.54**	**1.23-1.93**	1.10	0.82-1.48	**1.37**	**1.13-1.65**	1.03	0.81-1.30
2018	**1.49**	**1.26-1.77**	**1.54**	**1.22-1.95**	**1.19**	**1.00-1.41**	1.11	0.91-1.34
2019	**1.51**	**1.29-1.77**	**1.47**	**1.20-1.81**	**1.27**	**1.07-1.50**	1.09	0.87-1.35
Pooled	**1.53**	**1.46-1.61**	**1.61**	**1.51-1.71**	**1.34**	**1.29-1.40**	**1.28**	**1.22-1.34**

Estimates are prevalence ratios (PR) of reporting frequent mental distress from weighted Poisson regression models adjusted for state, age group, race/ethnicity, education, partnership status, and days in poor physical health. Frequent mental distress is defined as having poor mental health over at least 14 days during the past 30 days. The reference category is being employed with wages or self-employed. The estimates for 1993-2019 were produced pooling annual cycles with a year fixed effect. CI = Confidence interval. Estimates weighted using the BRFSS design weight variables. Bolded estimates had 95% confidence intervals excluding a null association (PR = 1).

SUPPLEMENTARY TABLE 6

Associations between out-of-work status and days of poor mental health in past 30 days (relative to those employed in wages and self-employed) among 18-34 year-olds. US BRFSS, 1993-2019.

	Men				Women			
	Out of work < 1 year		Out of work 1+ year		Out of work < 1 year		Out of work 1+ year	
	B	**95%CI**	**B**	**95%CI**	**B**	**95%CI**	**B**	**95%CI**
1993	**1.00**	**0.12, 1.89**	**2.10**	**0.56, 3.63**	0.55	-0.33, 1.43	0.55	-0.60, 1.71
1994	**1.17**	**0.05, 2.30**	**3.89**	**1.47, 6.30**	0.01	-0.82, 0.83	1.14	-0.18, 2.46
1995	0.93	-0.18, 2.04	1.04	-0.54, 2.62	**2.40**	**0.75, 4.04**	0.60	-0.47, 1.67
1996	**1.66**	**0.56, 2.76**	2.30	-0.11, 4.70	**1.21**	**0.15, 2.27**	-0.11	-1.27, 1.06
1997	0.81	-0.15, 1.77	**3.06**	**0.96, 5.17**	0.91	-0.13, 1.94	0.16	-0.88, 1.21
1998	**1.95**	**0.59, 3.30**	-0.21	-1.14, 0.71	0.79	-0.28, 1.87	1.26	-0.32, 2.83
1999	0.79	-0.06, 1.63	0.48	-1.20, 2.15	**1.46**	**0.33, 2.58**	0.10	-1.03, 1.21
2000	0.66	-0.34, 1.65	0.89	-0.83, 2.62	-0.21	-0.97, 0.55	-0.55	-1.74, 0.65
2001	**2.10**	**1.19, 3.02**	0.80	-0.51, 2.12	**1.32**	**0.52, 2.12**	0.77	-0.25, 1.79
2002	**2.95**	**1.36, 4.54**	1.38	-0.85, 3.61	**1.27**	**0.07, 2.47**	1.99	-0.42, 4.41
2003	**1.71**	**0.92, 2.49**	**2.72**	**1.06, 4.39**	**1.97**	**0.94, 3.00**	**1.78**	**0.51, 3.05**
2004	**1.49**	**0.57, 2.42**	-0.10	-1.46, 1.26	**0.98**	**0.19, 1.76**	0.86	-0.18, 1.89
2005	0.97	-0.02, 1.95	0.87	-0.23, 1.97	**2.30**	**1.31, 3.29**	**1.75**	**0.65, 2.84**
2006	**1.91**	**0.85, 2.97**	1.39	-0.45, 3.22	**0.96**	**0.17, 1.76**	**1.50**	**0.15, 2.85**
2007	**1.76**	**0.76, 2.75**	**2.41**	**0.39, 4.43**	**1.54**	**0.68, 2.41**	**1.04**	**0.08, 2.00**
2008	**0.82**	**0.15, 1.50**	**2.12**	**0.70, 3.55**	**1.27**	**0.45, 2.10**	**1.61**	**0.58, 2.65**
2009	**1.69**	**1.01, 2.37**	**1.83**	**0.84, 2.82**	**1.15**	**0.42, 1.88**	**1.18**	**0.25, 2.12**
2010	**1.24**	**0.63, 1.85**	**2.52**	**1.54, 3.50**	**1.22**	**0.39, 2.04**	**1.93**	**1.01, 2.84**
2011	**1.57**	**0.94, 2.20**	**2.47**	**1.62, 3.31**	**1.68**	**0.93, 2.42**	**1.52**	**0.78, 2.27**
2012	**1.25**	**0.51, 2.00**	**2.72**	**1.60, 3.84**	**1.23**	**0.57, 1.89**	**1.46**	**0.69, 2.23**
2013	**1.69**	**1.04, 2.34**	**1.38**	**0.61, 2.16**	**1.47**	**0.75, 2.19**	**1.43**	**0.46, 2.39**
2014	**1.02**	**0.41, 1.63**	**1.29**	**0.41, 2.17**	**1.15**	**0.38, 1.92**	**1.75**	**0.76, 2.75**
2015	**1.77**	**1.06, 2.49**	0.93	-0.01, 1.88	**1.18**	**0.46, 1.91**	0.71	-0.16, 1.58
2016	**1.83**	**1.12, 2.54**	**1.97**	**0.89, 3.05**	**1.22**	**0.39, 2.04**	**1.66**	**0.32, 2.99**
2017	**1.58**	**0.71, 2.45**	0.57	-0.51, 1.65	**1.35**	**0.37, 2.33**	0.19	-0.81, 1.19
2018	**1.58**	**0.83, 2.32**	**2.11**	**0.82, 3.39**	0.77	-0.08, 1.62	0.51	-0.05, 1.48
2019	**2.37**	**1.52, 3.22**	**1.98**	**0.81, 3.14**	**0.97**	**0.04, 1.90**	0.58	-0.65, 1.81
Pooled	**1.50**	**1.33, 1.66**	**1.81**	**1.55, 2.07**	**1.21**	**1.04, 1.39**	**1.06**	**0.85, 1.28**

Estimates are linear betas (B) of differences in days of poor mental health, from weighted linear regression models adjusted for state, age group, race/ethnicity, education, partnership status, and days in poor physical health. The reference category is being employed with wages or self-employed. The estimates for 1993-2019 were produced pooling annual cycles with a year fixed effect. CI = Confidence interval. Estimates weighted using the BRFSS design weight variables. Bolded estimates had 95% confidence intervals excluding a null association (B = 0).

Interpretation:
Men aged 18-34 in 1993 reported on average 2.10 (95%CI 0.56, 3.63) additional days in poor mental health in the past 30 days if they were unemployed for 1+ year compared to those employed for wages or self-employed.

SUPPLEMENTARY TABLE 7
Testing differences between annual and the 1993-2019 pooled estimates among men and women ages 18-34, using seemingly unrelated estimation (SUEST). US BRFSS, 1993-2019.

	Men				Women			
	Out of work < 1 year		Out of work 1+ year		Out of work < 1 year		Out of work 1+ year	
	PR of frequent mental distress	B of days of poor mental health	PR of frequent mental distress	B of days of poor mental health	PR of frequent mental distress	B of days of poor mental health	PR of frequent mental distress	B of days of poor mental health
	p	*p*	*p*	*p*	*p*	*p*	*p*	*p*
1993	.768	.270	.165	.712	.314	.137	.679	.374
1994	.961	.571	**.017**	.088	**.021**	**.004**	.551	.907
1995	.268	.312	.998	.334	.130	.150	.869	.390
1996	.173	.765	.739	.689	.894	.997	.215	**.046**
1997	.510	.157	.692	.238	.756	.556	.149	.091
1998	.597	.497	.087	**< .001**	.594	.427	.968	.805
1999	.590	.093	.589	.102	.933	.651	.152	.075
2000	.229	.086	.520	.283	**.003**	**< .001**	**.020**	**.007**
2001	.558	.178	.940	.125	.203	.781	.129	.550
2002	.164	.064	.664	.696	.832	.928	.424	.441
2003	.636	.586	.490	.277	.098	.139	.342	.264
2004	.666	.996	**.025**	**.005**	.264	.555	.126	.688
2005	.820	.282	.760	.092	.054	**.028**	.146	.217
2006	.917	.435	.717	.642	.916	.534	.654	.520
2007	.498	.599	.905	.555	.268	.448	.627	.954
2008	.128	**.047**	.654	.663	.870	.884	.402	.295
2009	.323	.554	.327	.977	.979	.858	.329	.800
2010	.765	.408	.061	.141	.708	.995	**.041**	.058
2011	.954	.807	.260	.114	.389	.209	**.016**	.210
2012	.446	.511	.059	.095	.339	.970	.833	.301
2013	.926	.547	.230	.270	.952	.477	.624	.440
2014	.164	.125	.676	.241	.908	.870	.477	.157
2015	.912	.439	**.045**	.064	.594	.933	.288	.407
2016	.577	.354	.861	.774	.534	.991	.572	.366
2017	.960	.842	**.009**	**.019**	.850	.766	.053	.072
2018	.729	.830	.715	.636	.131	.276	.114	.230
2019	.847	**.036**	.386	.773	.473	.575	.102	.401
Global	.961	.204	**.034**	**.001**	.245	.076	**.011**	**.040**

Estimates weighted using the BRFSS design weight variables. Estimates are adjusted for year, state, age group, sex, physical health, marital status, education, and race/ethnicity. Bolded estimates are below $p < .05$.

SUPPLEMENTARY TABLE 8

Associations between employment status and frequent mental distress among 18-34 year-olds, by age group. US BRFSS, 1993-2019.

Age	Employment	Men n = 625,662		Women n = 798,722	
		Adjusted marginal probability (%)	Difference in % points from ref. category	Adjusted marginal probability (%)	Difference in % points from ref. category
18-24	Employed	8.87	---	12.61	---
	Unemployed 1+ year	12.49	3.62	14.61	2.00
	Unemployed <1 year	11.94	3.07	15.75	3.14
	Other	7.43	-1.44	11.47	-1.14
25-29	Employed	8.65	---	12.10	---
	Unemployed 1+ year	14.89	6.24	15.43	3.33
	Unemployed <1 year	14.26	5.61	17.15	5.05
	Other	12.27	3.62	13.06	0.96
30-34	Employed	7.84	---	11.35	---
	Unemployed 1+ year	14.44	6.60	16.41	5.06
	Unemployed <1 year	13.85	6.01	16.10	4.75
	Other	13.73	5.89	12.29	0.94

Estimates weighted using the BRFSS design weight variables. Estimates are also adjusted for year, state, sex, physical health, marital status, education, and race/ethnicity. Interaction tests supported significant differences in associations among young men ($p < .001$) and women ($p < .001$).

SUPPLEMENTARY TABLE 9

Associations between employment status and frequent mental distress among 18-34 year-olds, by ethnic background. US BRFSS, 1993-2019.

Ethnicity	Employment	Men n = 625,662		Women n = 798,722	
		Adjusted marginal probability (%)	Difference in p.p. from reference category	Adjusted marginal probability (%)	Difference in p.p. from reference category
White	Employed	8.91	---	12.84	---
	Unemployed 1+ year	14.79	5.88	17.54	4.70
	Unemployed <1 year	14.17	5.26	18.96	6.12
	Other	10.04	1.13	13.40	0.56
Black	Employed	8.32	---	11.16	---
	Unemployed 1+ year	12.07	3.75	14.13	2.97
	Unemployed <1 year	12.06	3.74	13.95	2.79
	Other	8.80	0.48	11.81	0.65
Hispanic	Employed	7.10	---	10.48	---
	Unemployed 1+ year	11.17	4.07	10.96	0.48
	Unemployed <1 year	10.57	3.47	11.08	0.60
	Other	8.08	0.98	8.88	-1.60
Other	Employed	9.02	---	12.24	---
	Unemployed 1+ year	15.05	6.03	16.56	4.32
	Unemployed <1 year	12.51	3.49	16.54	4.30
	Other	7.88	-1.14	11.44	-0.80

Estimates weighted using the BRFSS design weight variables. Estimates are adjusted for year, state, age group, sex, physical health, marital status, and education. Interaction tests supported significant differences in associations among men ($p = .007$) and women ($p < .001$).