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The Generation Gap Revisited: Generational Differences in Mental Health, Maladaptive Coping Behaviors, and Pandemic-Related Concerns During the Initial COVID-19 Pandemic

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Abstract
The purpose of this study was to assess differences in mental health symptoms, pandemic-related concerns, and maladaptive coping behaviors among adults in the United States across generations during the initial period of the COVID-19 pandemic. A social media campaign was used to recruit 2696 U.S. individuals to participate in an online survey in April 2020, assessing various validated psychosocial factors, including major depressive disorder, generalized anxiety disorder (GAD), perceived stress, loneliness, quality of life, and fatigue, along with pandemic-specific concerns and changes in alcohol use and substance use. Participants were grouped based on generation status (Gen Z, Millennial, Gen X, and Baby Boomer) and statistical comparisons were conducted based on demographics, psychosocial factors, pandemic-related concerns, and substance use. During the initial period of the COVID-19 pandemic, the younger cohorts (Gen Z and Millennials) rated significantly worse on mental health indices, including major depression, GAD, perceived stress, loneliness, quality of life, and fatigue. Further, the participants in the Gen Z and Millennial generational groups exhibited greater increase in maladaptive coping with substance use, specifically alcohol use and increased use of sleep aids. Our results indicate that during the initial period of the COVID-19 pandemic, members of the Gen Z and Millennial generational cohorts were considered a psychologically vulnerable population due to their mental health and maladaptive coping behaviors. Improving access to mental health resources during early stages of a pandemic is an emerging public health concern.

Keywords Baby Boomers · Millennials · Gen X · Gen Z · Depression · Anxiety · Alcohol use · COVID-19 pandemic

Introduction

In March 2020, the World Health Organization declared a global pandemic due to an outbreak of the COVID-19 virus (CDC, 2020). To reduce community transmission, the United States (U.S.) enacted broad community mitigation strategies, including nationwide stay-at-home orders for all non-essential workers (Howard et al., 2021; Salari et al., 2020; Xiong et al., 2020). These measures confined millions of individuals to their homes, while creating high-risk work environments for essential workers (U.S. Department of Labor, 2020). Social and psychological consequences associated with these mitigation efforts and the pandemic event itself are critical public health concerns (Bu et al., 2020; Hossain et al., 2020). The psychological distress created by these complex, multi-faceted disruptions quickly eroded mental health and well-being (Park et al., 2021), but these disruptions may not impact all age groups equally as a result of several factors (e.g., risk for disease, existing support systems, financial security, history-graded cohort influences, etc.).

Pandemics and epidemics have been documented as traumatic stressor events that evoke fear, confusion, and uncertainty regarding susceptibility, transmission, and treatment, while contributing to the onset of psychopathology and mental health disorders (Brooks et al., 2020; Wang et al., 2021a, 2021b). Tuberculosis, HIV, and Polio endemics have been linked to acute psychological distress, including symptoms of depression and anxiety (Anjum et al., 2020; Bruno & Frick, 1991). During the COVID-19 pandemic, disruptions

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to day-to-day living negatively impacted individuals' routines, social support networks, and coping resources (WHO, 2020). In addition, some individuals experienced social isolation and loneliness, which are both empirically linked to psychological distress (Ahmed et al., 2020; Ames-Guerrero et al., 2021; Anjum et al., 2020; Cosic et al., 2020; Moghanibashi-Mansourieh, 2020). Furthermore, economic disruptions magnified psychological distress and anxiety (Turchioe et al., 2021). In the U.S., more than 40 million people filed for unemployment as businesses closed while others grappled with layoffs or furloughs (Turchioe et al., 2021; U.S. Department of Labor, 2020). Collectively, these risk factors played a key role as traumatic stressors in developing or exacerbating maladaptive coping behaviors, psychopathology and/or mental health disorders among the U.S. population (Hossain et al., 2020).

Throughout the pandemic, symptoms of psychological dysfunction including increased anxiety, depression, and stress have been reported globally (Hossain et al., 2020; Huang & Zhao, 2020; Salari et al.,; 2020; Wang et al., 2021a, 2021b; Xiong et al., 2020). At the onset of the pandemic in the U.S., Generalized Anxiety Disorder (GAD) and Major Depressive Disorder (MDD) both demonstrated significant increases in prevalence rates among the general population (Cordaro et al., 2021; Uwadiale et al., 2021). Given that older adults are at higher risk for severe COVID-19 infection (e.g., hospitalization or intensive care admission; CDC, 2021), there has been a growing concern regarding this population's psychological vulnerability to mental health symptoms and disorders (Anjum et al., 2020, El-Gabalaway et al., 2021; Turchioe et al., 2021). Research studies have previously implicated chronic health issues as significant stressors affecting mental health in older adults (Luo et al., 2021), and it is important to understand the implications for mental health across different age groups and cohorts during the early stages of the pandemic.

These cascading societal catastrophes related to the pandemic, in addition to the pandemic as a large-scale traumatic event itself, set the stage for collective trauma (Hirschberger, 2018). Yet, research shows that not all generational groups will experience mental health impacts from traumatic stress proportionately (Buffel et al., 2021). The lifespan developmental perspective has been applied to research on stress and coping processes (Baltes, 1987; Baltes et al., 2006; Spiro, 2007). This perspective describes how an individuals' ability to effectively cope with stress is a lifelong process with developmental progression occurring for older adults belonging to the baby boomer cohort, compared to younger age groups belonging to younger cohorts. For example, Baby Boomers grew up in a post-World War II era and managed through wars, political upheaval, natural disasters, and other infectious epidemics (Lind et al., 2021). Therefore, older adults have a lifetime of experience with crises and resilience (Wettstein et al., 2022). Several recent studies have suggested that older adults have been more successful at navigating COVID-19 pandemic mental health concerns and maladaptive coping behaviors than younger age groups (Brotto et al, 2021; Bruine de Bruin, 2021). Older adults' resilience and ability to cope with stressful situations is evidenced in several studies finding increased positive and decreased negative affect in older adults compared with younger adults (Fields et al., 2022; Klaiber et al., 2021). Early in the COVID-19 pandemic, older adults showed less reactivity overall to stressors than younger adults (Klaiber et al., 2021), similar to pre-pandemic findings suggesting older adults are more likely to use coping strategies to manage stressful situations (Charles et al. 2010). Although this work was based on age-related effects, it has been supported by generational cohort comparisons indicating that members of the Boomer generation had better mental health outcomes than Millennial and Gen X groups (Turchioe et al., 2021). It follows then, that although older adults have a higher risk for severe illness, yet, based on developmental processes, younger generational groups will be at higher risk for psychopathology exacerbated by the pandemic (Kiss et al., 2022). Recent research demonstrated that those in middle adulthood, characterized as a time of career and caregiving responsibilities, experienced increased symptoms of depression and sleep issues during the pandemic (Brown & Arigo, 2022). Recently, the U.S. Surgeon General issued an advisory on the pandemic-related mental health crisis unfolding for youth including emerging adults already challenged by foundational developmental tasks (Arnett, 2000; Office of the Surgeon General, 2021). In sum, research is showing disproportionate impacts to mental health, psychopathology, and coping for differing age groups and cohorts, yet few studies have made generational comparisons across groups.

The broad aim of this study is to describe self-reported changes in mental health symptoms and maladaptive substance use behaviors across different generations in the U.S. [i.e., Generation Z (Gen Z): born 1997–2012; Millennials: born 1981–1996; Generation X (Gen X): born 1965–1980; and Baby Boomers: born 1946–1964; PEW Research Center, 2019] during the initial period of the COVID-19 pandemic. Based on the limited literature on generational differences during the COVID-19 pandemic, along with the historical knowledge of Baby Boomers' experiences, it is hypothesized that the older generational groups will have less psychosocial distress and maladaptive coping compared to the younger generations. Identifying these differences will improve understanding of how individuals from different generational groups responded during the initial part of the pandemic, which can inform public health initiatives in future events.

Methods

Participants and Procedure

Participants were recruited through a nationwide Facebook Sponsored Ads campaign between April 14 and April 22, 2020. The advertising posts were placed on random newsfeeds of participants ages 18 and older living in the U.S. During this recruitment period, 4406 individuals clicked on the recruitment post linked to the survey and 2739 of those individuals provided consent and completed the survey in Qualtrics. For the present study, 2696 participants provided their age and were included in the analyses. Participation was voluntary. The mean age of participants in the sample was 47.8 years (SD = 12.9) and 87.8% of the sample were female, and 89.9% were non-Hispanic white. The data were weighted to the total U.S. population based on the 2018 Census Bureau population estimates by age, sex, and race/ethnicity (U.S. Census Bureau, 2018). All participants provided written informed consent to participate in this study. The Institutional Review Board at Texas State University approved the protocol for this study (#7221).

All participants were classified into the generational groups based on their current ages at the time of data collection (PEW Research Center, 2019). Of the 2696 participants included in the present study, those in the Gen Z group were ages 18–23 ($n = 86$; 3.2%; 8.8% with population weights applied), the Millennial group were ages 24–39 years ($n = 693$; 25.7%; 25.9% with population weights applied), the Gen X group were ages 40–55 years (1086; 40.3%; 31.4% with population weights applied), and the Baby Boomer group were 56–74 years ($n = 831$; 30.8%; 33.9% with population weights applied).

Measures

Demographics

Participants reported age, gender identity, race/ethnicity, marital status, children, medical insurance, employment, and education level.

Psychosocial Measures

The Perceived Stress Scale (PSS) The PSS (Cohen et al., 1983) is a 10-item measure using a 5-point Likert scale assessing general life stressors experienced in the past four weeks with responses ranging from *Never* to *Very Often*. An example item is, "How often have you found that you could not cope with all the things you had to do?" Summed scored range between 0 and 40 with higher scores indicating greater perceived stress ($M = 1.94$, SD = 0.37). The α reliability achieved for this sample was 0.90.

The Patient Health Questionnaire (PHQ) The PHQ (Kroenke et al., 2010; Spitzer et al., 1994) is a well-validated measure with multiple subscales that provide provisional diagnoses for major depression (PHQ-9), generalized anxiety disorder (GAD-7), and somatization disorder, SD (PHQ-15). The scoring of these subscales included specific algorithms rather than cut-off scores to determine whether the participants met the criteria for the provisional diagnosis (see Spitzer et al., 1999 for scoring information). For this sample, the α reliability for the PHQ-9 summed score was 0.90 ($M = 1.02$, SD = 0.45) and the α reliability for the GAD-7 summed score was 0.84 ($M = 0.98$, SD = 0.20).

The UCLA Loneliness Scale The UCLA Loneliness Scale (Russell et al., 1978) is a 20-item measure that assesses subjective feelings of social isolation and loneliness using a 4-point Likert scale from *I often feel this way* to *I never feel this way*, with higher summed scores indicating more loneliness ($M = 2.25$, SD = 0.27). An example item from this scale is "How often do you feel left out?" The α reliability achieved for this sample was 0.94.

The World Health Organizational Quality of Life (WHO-QOL-BREF) The WHOQOL Group (1998) developed the WHOQOL-BREF scale which assesses an individual's perception of their quality of life during the past 2 weeks based on four distinct areas: physical health, psychological health, social relationships, and environment. This scale uses 26 items, and the raw scores are transformed to a scale ranging from 0 to 100 with the higher scores indicative of better quality of life (see WHOQOL, INT, 1996 for scoring information). For this sample, the α reliability of the unadjusted composite score is 0.91 ($M = 3.50$, SD = 0.39). For the subscales of the WHOQOL-BREF, the α reliabilities are 0.75 for physical health ($M = 3.76$, SD = 0.45), 0.85 for psychological health ($M = 3.23$, SD = 0.14), 0.73 for social relationships ($M = 3.29$; SD = 0.37), and 0.63 for environmental health ($M = 3.57$, SD = 0.31).

The Interpersonal Reactivity Index (IRI) The IRI (Davis, 1983) is a well-established measure of empathy. For this study, two subscales of the IRI were included: Personal Distress and Empathic Concern, both containing seven items that used a 5-point Likert scale with responses ranging from *Does not describe me well* to *Describes me very well* such that higher summed scores on each scale indicate greater levels of empathy. The Personal Distress subscale measures apprehension and anxiety in stressed settings ($M = 4.17$,

SD = 0.28). The Empathic Concern subscale assesses feelings of sympathy and concern for others considered less fortunate ($M = 2.39$, SD = 0.59). The α reliability achieved for this sample for the Personal Distress subscale was 0.76, and for the Empathic Concern subscale was 0.84.

The Checklist of Individual Strength (CIS) The CIS (Vercoulen et al., 1999) is a 20-item subjective measure of general fatigue. This measure uses a 7-point Likert scale ranging from *Yes, that is true of me* to *No, that is not true of me* for each of the items. The CIS contains four subscales: fatigue, motivation, physical activity, and concentration. An example item from the concentration subscale is, "Thinking requires effort." Higher summed scores on each subscale of the CIS indicate greater levels of fatigue. For this sample, the total summed score ($M = 4.27$, SD = 0.57) achieved an α reliability of 0.94. The fatigue subscale ($M = 4.62$, SD = 0.61) achieved an α reliability of 0.90. The motivation subscale ($M = 3.97$, SD = 0.46) achieved an α reliability of 0.75. The physical activity subscale ($M = 4.03$, SD = 0.20) achieved an α reliability of 0.87. And the concentration subscale ($M = 4.08$, SD = 0.54) achieved an α reliability of 0.89.

Pandemic-Specific Questionnaires (Created Specifically for This Study)

Concerns About Pandemic There were 21 specific concerns about the pandemic developed by the senior author in conjunction with a larger pandemic study. Participants were asked to indicate the degree of their concern from 0 to 10 with higher scores indicating greater concern using a visual analog sliding scale. Examples of concerns listed include: Access to Food; Acquiring COVID (self/household); and Case Counts of COVID Reported. A principal components analysis with a varimax rotation was conducted to reduce the 21 items to 6 components with eigenvalues greater than one, accounting for 68.7% of the cumulative variance. The six components generated included concerns about access to basic needs, infection rates and statistics regarding COVID-19, employment and finances, childcare and schooling of underaged children, caring for or unable to visit elderly parents, and the government's response to the pandemic. The α reliability achieved for each concern factor in this sample are as follows: Access to Basic Needs, $a = .823$ ($M = 4.85$, SD = 2.92); COVID (infections and statistics), $a = .878$ ($M = 6.69$, SD = 2.94); Employment and Finances, $a = .810$ ($M = 4.63$, SD = 3.52); Children, $a = .885$ ($M = 2.64$, SD = 3.39); Elderly Parents, $a = .741$ ($M = 4.99$, SD = 3.80); and Government Response, $a = .872$ ($M = 7.11$, SD = 2.47).

Behavioral and Substance Use Changes Participants were also asked to respond to a series of questions regarding their relative change in behaviors during the initial pandemic stay-at-home recommendations. The general behaviors assessed included sleep, accessing news, alcohol use, marijuana use, anti-anxiety medication use, and sleep aid use. The participants were asked to respond if their behaviors had increased, decreased, or stayed the same from before the pandemic compared to the initial onset of the pandemic (April, 2020).

Statistical Analysis

The data were weighted to the U.S. population using four age strata, two sex strata, and four race/ethnicity strata based on the 2018 U.S. Census Bureau population estimates (2020). Cluster values were assigned to each participant based on the first two digits of the zip code provided which allowed for geographic clustering. Complex Sample Designs were used for analyses adjusting for weighting, strata, and clustering, and linear regression was conducted for comparisons of continuous variables and χ^2 tests of Independence were conducted for categorical comparisons. For analyses of continuous variables, means and standard errors are provided, and for analyses of categorical variables, percentages with 95% confidence intervals are provided. Pairwise deletion was used for random missing data. Post hoc comparisons are conducted by comparing the point estimates to the corresponding confidence intervals. Effect size comparisons are reported as Contingency Coefficients (CC) for categorical comparisons and f^2 for comparisons of continuous variables. Significance levels were set at $p < .05$ for all comparisons. All analyses were conducted using SPSS version 27 (IBM, Chicago, IL).

Results

The demographic comparisons between the four generational groups including post hoc comparisons and effect sizes are presented in Table 1. No significant differences were identified between the comparison groups when assessing gender, race/ethnicity, and education levels (all $p > .05$). A higher proportion of the Gen X group were married compared with Millennial and Gen Z groups ($p < .001$). Gen Xers had a higher proportion of individuals who were divorced/separated/widowed than Millennials ($p < .001$) and a lower proportion of individuals with this marital status compared to Baby Boomers ($p < .001$). As expected, when comparing generations, there were significant differences in households with children under the age of 18, such that the there was a significantly smaller proportion of Baby Boomers households with young children ($p < .001$) and Gen X households had the highest proportion of households with underage children ($p < .001$). Likewise, employment status

Table 1 Demographic comparisons

	Gen Z[a] (18–23)	Millennial[b] (24–39)	Gen X[c] (40–55)	Baby Boomer[d] (56–74)	Significance and effect size
Gender					
Male	49.6 (38.8, 60.4)	44.9 (31.3, 59.3)	45.5 (40.7, 50.3)	45.8 (41.3, 50.4)	$p = .968$
Female	50.4 (39.6, 61.2)	55.0 (40.7, 68.6)	54.5 (49.7, 59.3)	54.2 (49.6, 58.7)	
Race/ethnicity					
White	68.0 (41.9, 86.2)	56.6 (43.5, 68.8)	59.8 (46.6, 71.7)	77.7 (66.1, 86.1)	$p = .155$
Black	8.2 (3.0, 20.2)	15.7 (4.2, 44.3)	8.5 (5.2, 13.5)	11.1 (3.7, 29.0)	
Hispanic	21.1 (8.6, 43.2)	18.8 (7.4, 40.2)	24.1 (12.9, 40.4)	7.1 (3.4, 14.3)	
Other	2.8 (1.1, 6.8)	8.9 (5.0, 15.4)	7.7 (1.8, 27.2)	4.1 (1.6, 9.8)	
Marital status					
Single	94.4 (90.4, 96.8)[b–d]	57.8 (45.5, 69.1)[acd]	29.3 (20.1, 40.7)[ab]	21.0 (10.5, 37.6)[ab]	**$p < .001$; CC = .423**
Married	5.6 (3.2, 9.6)[b–d]	38.1 (26.8, 51.0)[acd]	55.9 (46.6, 64.8)[ab]	54.6 (43.6, 65.2)[ab]	
Divorced/separated/ widow ed	–	4.1 (2.0, 8.1)[cd]	14.8 (9.3, 22.5)[bd]	24.3 (18.8, 30.8)[bc]	
Household					
Children under 18	32.1 (16.4, 53.3)[cd]	33.3 (24.7, 43.3)[cd]	43.8 (36.4, 51.5)[bd]	9.1 (4.4, 17.6)[a–c]	**$p < .001$; CC = .299**
Employment status					
Employed	44.8 (21.8, 70.3)[b–d]	58.7 (45.4, 70.8)[cd]	70.1 (61.5, 77.5)[d]	29.7 (18.2, 44.5)[bc]	**$p < .001$; CC = .422**
Unemployed (COVID-19)	13.6 (5.3, 30.8)	18.0 (11.1, 27.8)[d]	13.4 (8.8, 20.0)	11.9 (8.2, 16.9)	
Unemployed (not COVID-19)	2.8 (1.1, 7.0)[b–d]	16.8 (5.1, 43.3)[ac]	7.7 (5.2, 11.3)[a]	10.6 (3.4, 28.4)[a]	
Other (retired, student)	38.8 (24.3, 55.6)[bc]	6.5 (3.5, 11.9)[ad]	8.8 (6.1, 12.6)[bc]	47.8 (32.9, 63.0)[ad]	
Medical coverage					
Medicare	5.0 (0.9, 22.5)[d]	3.1 (1.0, 8.9)[cd]	5.6 (3.9, 8.1)[d]	44.5 (34.9, 54.5)[a–c]	**$p < .001$; CC = .485**
Via employer	65.9 (56.0, 74.5)[d]	57.5 (46.8, 67.5)[d]	65.2 (54.9, 74.2)[d]	36.2 (25.8, 48.0)[a–c]	
Purchased/ACA	20.0 (10.9, 33.8)[b–d]	10.2 (6.2, 16.5)[a]	10.8 (6.6, 17.1)[a]	7.6 (4.6, 12.3)[a]	
Medicaid	5.7 (1.1, 24.6)[c]	4.8 (2.0, 10.8)[c]	9.4 (5.8, 14.8)[d]	3.3 (1.4, 7.7)[c]	
VA/Tricare/Military	–	1.8 (0.4, 7.6)	2.2 (0.5, 9.3)	4.8 (1.6, 13.6)	
Private pay	3.4 (1.9, 5.9)[bc]	22.6 (10.6, 42.0)[acd]	6.9 (3.7, 12.5)[ab]	3.6 (1.7, 7.4)[bc]	
Education level					
High school or less	17.3 (9.4, 29.6)	12.1 (2.4, 43.9)	7.9 (3.5, 17.0)	5.6 (3.7, 8.4)	$p = .073$
Some college	50.6 (30.9, 70.1)	25.7 (20.0, 32.3)	31.4 (26.3, 36.9)	29.7 (22.5, 38.1)	
4-Year degree	25.5 (13.7, 42.6)	35.0 (23.2, 48.9)	28.4 (23.2, 34.3)	23.5 (17.9, 30.2)	
Graduate/professional	6.6 (1.4, 25.4)	27.3 (19.1, 37.3)	32.3 (24.2, 41.5)	41.2 (33.2, 49.7)	

Comparisons with $p < .05$ are indicated with bold font and effect sizes are provided

Values reported are column percentages and 95% confidence intervals using population weights

Post hoc comparisons use alphabetical superscripts to denote significant group differences. The superscripts for each parameter indicate the specific groups that differed significantly from the designated group, with a = Gen Z, b = Millennial, c = Gen X, and d = Baby Boomer

differed significantly between the generations such that a higher proportion of Baby Boomers were more likely to be retired and a higher proportion of Gen Zers were more likely to be students. When assessing differences in employment status, Millennials reported the highest proportion of unemployment attributed to the pandemic and the highest proportion of unemployment that was not attributed to the pandemic ($p < .001$).

Psychosocial factors were also compared between the four generational groups and are shown in detail, including post hoc comparisons and effect sizes, in Table 2. Overall, individuals in the Gen Z and Millennial groups self-reported more negative outcomes for perceived stress, loneliness, the personal distress empathy subscale of the IRI, and all of the subscales of the CIS, which measure fatigue, motivation, physical activity, and concentration (all $ps < .05$). Most notably, the provisional rates of diagnosis for MDD for individuals in the Gen Z (44.5%) and Millennial (35.8%) groups were significantly greater than participants in the Gen X (19.2%) and Baby Boomer (11.8%) groups, which also exceed the 12-month general prevalence estimate of 10.4% prior to the pandemic (Hasin

Table 2 Psychosocial measures

	Gen Z[a] (18–23)	Millennial[b] (24–39)	Gen X[c] (40–55)	Baby Boomer[d] (56–74)	Significance and effect size
Perceived Stress Scale	23.3 (1.1)[b–d]	20.7 (0.6)[acd]	18.9 (0.4)[abd]	15.0 (0.3)[a–c]	**$p < .001$; $f^2 = .159$**
Mental health % (95% CI)					
Major depressive disorder	44.5 (29.9, 60.1)[b–d]	35.8 (29.5, 42.7)[cd]	19.2 (14.1, 25.6)[abd]	11.8 (9.6, 14.3)[a–c]	**$p < .001$; CC = .229**
Generalized anxiety disorder	30.9 (23.2, 39.9)[cd]	27.9 (20.9, 36.2)[bc]	17.2 (13.3, 21.9)[abd]	8.1 (5.8, 11.2)[a–c]	**$p < .001$; CC = .190**
Somatization disorder	30.4 (16.9, 48.4)[b–d]	18.0 (11.7, 26.7)[d]	14.9 (12.0, 18.4)[ad]	8.7 (5.3, 13.9)[a–c]	**$p = .005$; CC = .148**
UCLA Loneliness Scale	48.8 (1.0)[b–d]	46.1 (0.8)[ac]	44.4 (0.6)[a]	43.8 (1.9)[ab]	**$p = .032$; $f^2 = .016$**
WHO Quality of Life (BREF)					
Physical health	69.2 (2.5)	71.9 (1.3)	74.1 (1.1)	71.1 (1.2)	$p = .107$
Psychological	45.5 (1.5)[b–d]	51.0 (1.5)[acd]	59.6 (1.4)[abd]	65.7 (1.0)[a–c]	**$p < .001$; $f^2 = .113$**
Social relationships	47.9 (3.4)	54.2 (3.1)	57.8 (1.3)	54.4 (4.3)	$p = .067$
Environmental	63.6 (2.5)[d]	64.3 (0.7)[d]	66.1 (2.1)[bd]	71.2 (1.0)[a–c]	**$p = .002$; $f^2 = .035$**
Empathy (IRI)					
Empathic Concern Subscale	27.8 (0.3)	28.1 (0.3)	28.8 (0.4)	28.5 (0.6)	$p = .207$
Personal Distress Subscale	19.7 (0.7)[b–d]	16.8 (0.3)[cd]	15.8 (0.4)[ab]	15.4 (0.3)[ab]	**$p = .017$; $f^2 = .055$**
Checklist of individual strength					
Fatigue Subscale	40.8 (1.2)[cd]	38.8 (0.9)[cd]	33.3 (1.0)[abd]	31.5 (0.6)[ab]	**$p = .001$; $f^2 = .093$**
Concentration Subscale	24.8 (0.5)[b–d]	21.8 (0.7)[acd]	18.3 (17.3)[abd]	15.9 (0.5)[a–c]	**$p < .001$; $f^2 = .163$**
Motivation Subscale	16.7 (0.8)[cd]	16.2 (0.5)[cd]	14.7 (0.4)[ab]	14.9 (0.5)[b]	**$p = .010$; $f^2 = .017$**
Physical Activity Subscale	14.0 (0.4)[b–d]	13.0 (0.3)[acd]	11.3 (0.2)[abd]	12.3 (0.2)[ac]	**$p < .001$; $f^2 = .030$**

Comparisons with $p < .05$ are indicated with bold font and effect sizes are provided

Reported as mean (standard error) or column percentages with 95% confidence interval using population weights

Post hoc comparisons use alphabetical superscripts to denote significant group differences. The superscripts for each parameter indicate the specific groups that differed significantly from the designated group, with a = Gen Z, b = Millennial, c = Gen X, and d = Baby Boomer

Perceived Stress Scale: higher scores = more stress

UCLA Loneliness Scale: higher scores = more lonely

WHOQOL: higher scores = better quality of life

Empathy (IRI) Empathic Concern subscale: higher scores = more empathy for others

Empathy (IRI) Personal Distress: higher scores = more distress when others are distressed

Checklist of Individual Strength: higher scores indicate worse outcomes on each subscale

et al., 2018). Likewise, the 12-month general prevalence rates of GAD in the U.S. ranges between 2 and 4% (Kessler et al., 2005; Robichaud et al., 2019), and the rates of provisional diagnoses of GAD for individuals in the Gen Z (30.9%), Millennial (27.9%), and Gen X (17.2%) groups were significantly higher than those in the Baby Boomer group (8.1%).

When comparing the generations based on their concerns about the pandemic, significant differences were identified in three areas (see Table 3). Millennials and Gen Xers expressed significantly higher rates of concern regarding Employment and Finances ($p = .044$), issues regarding Children ($p = .042$), and issues regarding Elderly Parents ($p = .046$) compared to the Gen Z and Baby Boomer groups. Overall, the highest levels of concerns from all of the generation groups were identified in the following two components: COVID (infected/statistics) and Government's Response.

Lastly, when comparing generational groups, there were significant differences based on behavioral and substance use changes during the initial part of the pandemic (see Table 4). When evaluating changes in sleep behaviors, 40–50% of the individuals in the Gen X, Millennial, and Gen Z groups reported decreases in sleep during the initial pandemic ($p = .010$). There was also a notable significant increase in alcohol use for individuals in the Millennial (52.2%) and Gen Z (48.5%) groups, compared to the Baby Boomer group

Table 3 Concerns about pandemic

Concerns About…	Gen Z[a] (18–23)	Millennial[b] (24–39)	Gen X[c] (40–55)	Baby Boomer[d] (56–74)	Significance and effect size
Access to basic needs	3.6 (0.4)	4.3 (0.1)	4.3 (0.1)	4.2 (0.1)	$p = .459$
COVID (infected/statistics)	6.8 (0.3)	6.5 (0.2)	6.9 (0.3)	6.8 (0.3)	$p = .419$
Employment and finances	4.9 (0.2)[c]	5.6 (0.3)[ad]	5.6 (0.2)[ad]	4.3 (0.4)[a–c]	**$p = .044$; $f^2 = .042$**
Children (childcare, schooling)	1.6 (0.4)[bc]	2.5 (0.3)[a]	2.8 (0.2)[ad]	1.6 (0.4)[bc]	**$p = .042$; $f^2 = .035$**
Elderly parents (caring for, not able to see)	4.1 (0.4)[bc]	5.2 (0.4)[ad]	5.6 (0.2)[ad]	3.8 (0.6)[bc]	**$p = .046$; $f^2 = .051$**
Government's response	6.7 (0.4)	7.0 (0.2)	6.7 (0.2)	6.8 (0.1)	$p = .813$

Comparisons with $p < .05$ are indicated with bold font and effect sizes are provided

Reported as mean (standard error) using population weights

Post hoc comparisons use alphabetical superscripts to denote significant group differences. The superscripts for each parameter indicate the specific groups that differed significantly from the designated group, with a = Gen Z, b = Millennial, c = Gen X, and d = Baby Boomer

Table 4 Changes in behaviors and substance use during initial pandemic protocols

	Gen Z[a] (18–23)	Millennial[b] (24–39)	Gen X[c] (40–55)	Baby Boomer[d] (56–74)	*p* value
Change in amount of sleep					
Stay the same	22.9 (11.9, 39.5)[b–d]	31.5 (25.4, 38.2)[d]	38.2 (29.0, 48.4)[d]	54.0 (44.4, 63.4)[a–c]	**$p = .010$; CC = .194**
Increase	27.1 (12.3, 49.6)[d]	28.2 (21.0, 36.6)[cd]	22.1 (17.4, 27.6)[d]	15.9 (11.7, 21.3)[bc]	
Decrease	50.0 (38.1, 61.9)[b–d]	40.4 (33.3, 48.0)[d]	39.7 (33.3, 46.5)[d]	30.0 (22.8, 38.5)[a–c]	
Change in time accessing news					
Stay the same	15.3 (9.0, 24.7)	18.8 (12.0, 28.3)	26.6 (21.8, 32.0)	29.4 (20.0, 40.9)	$p = .210$
Increase	76.9 (59.0, 88.5)	70.6 (59.9, 79.4)	63.2 (54.3, 71.3)	64.4 (51.9, 75.2)	
Decrease	7.8 (2.3, 23.8)	10.6 (6.1, 17.9)	10.2 (6.2, 16.3)	6.2 (4.2, 9.1)	
Change in alcohol use (only alcohol users)					
Stay the same	31.6 (14.0, 56.8)[cd]	31.3 (22.7, 41.3)[cd]	50.8 (37.2, 64.2)[b]	54.1 (35.3, 71.8)[b]	**$p = .029$; CC = .287**
Increase	48.5 (20.9, 77.1)[d]	52.2 (42.4, 61.9)[d]	38.7 (24.6, 55.1)[bd]	19.3 (12.6, 28.3)[a–c]	
Decrease	19.8 (7.8, 41.9)[c]	16.5 (9.1, 28.1)	10.5 (6.0, 17.7)	26.6 (9.4, 55.8)[c]	
Change in marijuana use (only marijuana users)					
Stay the same	33.3 (19.7, 50.4)	44.4 (22.1, 69.2)	51.5 (41.8, 61.2)	74.0 (56.9, 86.0)	$p = .075$
Increase	57.3 (39.9, 73.0)	48.5 (26.0, 71.6)	44.5 (33.7, 55.9)	20.4 (10.9, 34.8)	
Decrease	9.4 (1.6, 39.6)	7.1 (2.7, 17.6)	3.9 (2.4, 6.3)	5.6 (2.1, 14.4)	
Change in anti-anxiety med use (only anti-anxiety med users)					
Stay the same	65.8 (34.4, 87.6)	37.0 (27.3, 47.9)	61.6 (49.1, 72.7)	72.8 (60.5, 82.3)	$p = .076$
Increase	34.2 (12.4, 65.6)	49.9 (36.1, 63.6)	37.4 (26.1, 50.2)	25.0 (16.2, 36.7)	
Decrease	–	13.1 (2.4, 48.2)	1.0 (0.5, 2.2)	2.2 (0.7, 6.7)	
Change in sleep aid use (only sleep aid users)					
Stay the same	33.5 (12.8, 63.4)[d]	24.1 (14.5, 37.2)[cd]	43.3 (28.1, 59.9)[bd]	68.7 (57.6, 78.0)[a–c]	**$p = .041$; CC = .343**
Increase	63.9 (37.1, 84.2)[cd]	62.9 (41.3, 80.3)[cd]	47.7 (36.0, 59.6)[d]	25.1 (15.3, 38.3)[a–c]	
Decrease	2.5 (0.3, 17.9)[c]	13.1 (2.4, 47.6)	9.1 (3.1, 23.7)	6.2 (2.0, 17.2)	

Comparisons with $p < .05$ are indicated with bold font and effect sizes are provided

Reported as Column percentages and 95% Confidence Intervals provided using population weights

Post hoc comparisons use alphabetical superscripts to denote significant group differences. The superscripts for each parameter indicate the specific groups that differed significantly from the designated group, with a = Gen Z, b = Millennial, c = Gen X, and d = Baby Boomer

(19.3%), with no difference between the Gen X (38.7%) and Baby Boomers (19.3%), for those who indicated prior use of alcohol ($p = .029$). For those who reported sleep aid use, there was a significant difference in the increase in use, with Gen Z (63.9%) and Millennials (62.9%) reporting higher increases during the pandemic compared to the increases reported by the Gen X (47.7%) and Baby Boomer (25.1%) groups ($p = .041$).

Discussion

This study examined how the COVID-19 pandemic impacted general stress levels, mental health, and maladaptive coping, including substance use, among the U.S. population across four distinct generational groups. Following a lifespan developmental perspective on stress and coping, the results of the study affirm previous research on the developmental progression of stress, coping and impacts to mental health (Aldwin, 2011). Given that the study used a cross-sectional research design, it is important to note that interpretation of results potentially reflects both age-related and cohort-based influences which will be further addressed in the discussion. Despite a possible combination of these two developmental influences, interpretation of the results remains noteworthy as more generational groups encounter future traumatic stressor events.

Our results showed that the younger generations (i.e., Millennials and Gen Zers) reported a greater increase in mental health symptoms when compared to Gen Xers and Baby Boomers, even though older adults are considered a higher "at-risk" group for health complications and/or hospitalization for COVID-19 infection. Specifically, we found that Millennials and Gen Zers have higher rates of MDD and GAD. Gen Xers and Baby Boomer groups showed little increase in rates of these disorders. These results are consistent with studies that have found that psychopathology symptoms were generally higher among younger generations compared to older generations (Brotto et al., 2021; Bruine de Bruin, 2021; El-Gabalaway et al., 2021; Twenge et al., 2019). Prior work using an age–period–cohort analysis found that Millennial and Gen Z birth cohort groups have increased rates of psychological distress and suicide-related outcomes compared with Gen X and Boomer groups independent of overall age effects (Twenge et al., 2019). While similar effects were found in our study, the impact of the COVID-19 pandemic on mental health may be due to a combination of age and cohort effects. In general, younger adults experience higher levels of stress and poorer mental health (i.e., anxiety and depressive symptoms), compared to older adults, such as those in the Baby Boomer group and older (American Psychological Association, 2018; Twenge et al., 2019). Alternatively, while older adults (i.e., 65 and older) are dealing with diminishing health and social networks, they characteristically have fewer competing responsibilities and experience more emotional well-being compared to younger adults (Momtaz et al., 2014). In addition, older adults may be less vulnerable to psychopathology symptoms due to normalization of negative events, and resiliency through lived experiences and accumulated wisdom (Birditt et al., 2021; Jeon & Dunkle, 2009). In fact, recent research shows that older adults have been more resilient with managing COVID-19 pandemic mental health concerns and maladaptive coping behaviors than younger age groups (Birditt et al., 2021). Therefore, it is noteworthy regarding the differential impact of traumatic stressor events and potential for collective trauma for differing age groups. As with previous research on stress and coping processes across the lifespan, the older the generational group the more positive outcome for mental health and less susceptibility to psychopathology and maladaptive coping.

Moreover, additional self-reported measures on pandemic concerns revealed similar generational variations. Pandemic concerns included access to basic needs, contracting viral infection, employment and finances, childcare, schooling, caring for aging parents or the inability to visit and monitor aging parents, and the government's response to the pandemic. While several of these concerns align more closely to the life circumstances of specific generational groups (i.e., having children at home), it is important to examine the intensity of the concerns to better understand how the pandemic specifically affected the individuals in different stages of life. Overall, Millennials and Gen Xers had significantly higher concerns about employment and finances, children (childcare and schooling), and caring for or visiting aging parents when compared to Gen Z and Baby Boomer generational groups.

Alcohol consumption varied among generational groups, and the findings indicated that alcohol use increased among Gen Z and Millennial participants relative to Baby Boomers. This is notable since Gen Z, the younger generational cohort known for choosing to abstain from alcohol, showed decreased rates of alcohol use compared to other birth cohorts before the pandemic (Twenge & Park, 2019). While it is difficult to pinpoint if the pattern of change is due age or cohort influences, given the traumatic stressor events associated with the pandemic, the Gen Z cohort group likely used alcohol as an additional coping strategy. Our results could also reflect previous research that demonstrates a developmental trajectory with older adults characteristically having matured out of risk-taking behaviors with age compared to younger adults (Josef et al., 2016). Studies among younger adults identified maladaptive coping as a mediator between alcohol misuse and stress (Metzger et al., 2017; Wang et al., 2021a, 2021b). Consistent with a stress-coping framework, younger generational groups may

use alcohol as a maladaptive coping strategy. The Gen Z birth cohort has been identified as characteristically having poorer mental health compared to other generational groups, which has been attributed to socio-historical cohort effects (American Psychological Association, 2018; Twenge et al., 2019). Considering the pandemic as a traumatic event created additional contextual, psychological stressors contributing to engagement in risky behaviors including drinking as a coping mechanism. Research shows that most individuals replace maladaptive coping strategies with adaptive and problem-focused coping strategies in middle and older adulthood age groups (Al-Bahrani et al., 2013; Diehl et al., 1996). Such patterns of change in coping may be due to traumatic stressors associated with the COVID-19 pandemic (Brotto et al., 2021). Future research studies utilizing cross-sequential designs to examine associations between generational cohort groups with a focus on psychopathology and mental health vary as a function of maladaptive coping would be an important next step.

Last, while sleep problems were a common concern prior to the pandemic, there were significant issues related to sleep disturbance at the onset of the pandemic. The Gen X, Gen Z, and Millennial groups experienced poor quality or insufficient sleep which can impact health and well-being (Clement-Carbonell et al., 2021). There is evidence that the Gen Z group was prone to decreased sleep duration before the pandemic, potentially due to increased time devoted to electronic media use (Twenge et al., 2017). Given the established research on quality sleep and improved mental health, it is important to reframe quality sleep as an integral aspect of supporting mental health, especially at the onset of traumatic stressor events (Scott et al., 2021). Interestingly, while Gen X, Gen Z, and Millennial groups reported issues related to sleep, only Gen Z and Millennial groups showed significant increased use of sleep aids. This suggests that younger generational groups were more inclined to use a sleep aid, while Gen X participants also struggled with sleep yet were less likely to use a sleep aid. Previous research on sleep medication and mental health indicates that individuals meeting 2-week provisional MDD, SD, and GAD diagnoses were more likely to use a sleep aid (Grigsby et al., 2022). Therefore, while it is important for everyone to be screened for sleep issues and/or the use of sleep aids, potential recommendations and interventions may differ across generational groups. It may be particularly prudent to address these issues with the Gen Z group, since these behaviors can be contributing factors to poor mental health outcomes during times of traumatic stress.

Limitations

This study has several limitations. First, a population-based, cross-sectional research design was used to expedite data collection during the initial stages of the pandemic. We were interested in examining the different generational cohort responses to the COVID-19 pandemic as birth cohort identification has become of a focus of popular media and led to an increase in identification with these labels. Since the COVID-19 pandemic has had a relatively unique impact as an immediate and now chronic stressor, it is difficult to definitively separate out the contribution of aging from that of generational cohort effects on mental health and maladaptive coping behaviors related to the pandemic. Furthermore, while cross-sectional research designs allow for timely data collection, the downside to this methodology is separating out age-related changes from socio-historical cohort effects across age groups that can confound results. To avoid such limitations, future research mental health and generational cohorts should use longitudinal or cross-sequential timepoints to better characterize the impacts of the COVID-19 pandemic that are related to age or cohort influences. Second, the demographic makeup of the sample recruited was predominately non-Hispanic White and female. We attempted to ameliorate the lack of generalizability to the U.S. population by employing statistical techniques which included weights and clustering. Next, it is difficult to derive causal relationships between generational differences in mental health outcomes, substance use, and coping strategies, so interpreting associations between variables should be done carefully. Further, because the items assessing substance use behaviors were ordinal (i.e., decreased, increased), it is not possible to quantify the changes in behaviors, which would have provided greater insight to problematic alcohol and substance use. Lastly, data were collected using a targeted ad campaign on social media and may be impacted by selection and response bias. By doing so, there were differences in the comparison group sizes, with the Gen Z group representing 3.2% of the general sample, and 8.8% of the weighted sample. This discrepancy is likely due to only including Gen Zs who were 18 years or older and using Facebook as the recruitment tool. However, the sample was weighted to reflect the total U.S. population based on generational and age estimates to mitigate this limitation. Further, while social media use is highly prevalent among all adult age groups in the U.S., it is possible that older adults who are less likely to use social media or technology may have been more vulnerable during the pandemic (Hajek & König, 2021).

Conclusion

These preliminary findings highlight the importance of conducting future research investigating the implementation of early intervention strategies (e.g., early screening and detection) and access to mental health resources for

younger adults during the initial outbreak of a pandemic. While everyone can be affected by a global pandemic or other traumatic stressor events, developmentally, some will experience a stronger, more salient impact than others. Our results indicate that younger adults belonging to Gen Z were a more psychologically vulnerable population compared to older adults belonging to the baby boomer cohort who demonstrate more resiliency in mental health outcomes (Chen, 2020). Future studies should continue to explore developmental differences in psychopathology and coping behaviors between generational groups to buffer against symptoms of psychopathology. Gen Z and Millennial generations are more likely to seek out mental health resources through social media or online self-tools, so using these online platforms to screen for psychopathology through community-wide programming strategies is key. Despite similarities, even the younger generational cohorts have been found to seek out and interact differently to digital intervention materials related to substance abuse (Ashford et al., 2020; Curtis et al., 2019). Therefore, targeted, developmental-appropriate, prevention–intervention strategies should be implemented at the onset of traumatic stressor events to mitigate, maladaptive psychological antecedents which contribute to psychopathology and mental health disorders.

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