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Suicides Among Youth and Social Environment: Is There Evidence for Correlation, or Merely Ecological Fallacy?

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Abstract

Background The issue of teen suicide has attracted considerable attention in recent years. Nonetheless, little consensus has emerged regarding what societal environmental variables are related to it.

Objectives This study sought to examine long-term correlations between teen suicide and youth technology use, progressive trends in K12 education (increasing emphasis on oppression and conflict), income inequality, fatherlessness, political partisanship and adult suicide.

Methods The current analysis conducted time series designs to test long-term correlations in youth suicide and hypothesized predictors. Year-to-year data sources were included from the CDC (suicide, screen use trends), World Bank (income inequality), PsychINFO/ERIC (education trends), Annie C. Casey Foundation (fatherlessness), and Pew Research Center (political partisanship). Data was included for 2001–2020.

Results Increases in each of the other social environmental issues were associated with increases in suicide among both teen girls and boys at a lag of multiple years. The only exception was for changes in technology use, wherein the introduction of social media appeared to be slightly protective, though at an effect size much lower than the other variables.

Conclusions Teen suicide is one facet of a larger, complicated set of social issues influencing most generations in the United States, adults and youth alike. Considering teen suicide in isolation is unlikely to result in effective policy.

Keywords Teen suicide · Adult suicide · Income inequality · Social stress · Social media

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Introduction

Recent years have seen policymakers, parents, and physicians express concern over the rising number of teen suicides, particularly among teen girls. According to the Centers for Disease Control (CDC) Web-based Injury Statistics Query and Reporting System (WISQARS), suicides among girls aged 15–19 have risen from a per capita rate of 2.68 in 2001 (the first year on record in WISQARS) to 5.13 in 2020, the last year in record as of this writing. This has led to speculation about potential social factors which might explain this rise in suicides among youth, particularly teen girls.

Perhaps few purported causes of this suicide increase have garnered more attention than that rise of social media use. Social media became widely available after the early 2000s, with use increasing over time. Some scholars have directly linked these phenomena, suggesting that increased social media use among teens is directly responsible for teen mental health issues. For instance, Twenge and colleagues claim that a rise in digital media use such as smartphones may have caused a cohort effect (Twenge et al., 2019). This hypothesis has gotten considerable traction, though it suffers from two major issues. First, evidence for a "cohort effect" is limited, with suicides having increased across almost all age groups during the recent decade according to the WISQARS database. Suicides are, in fact, comparatively low among teens and teen girls in particular. As indicated in Fig. 1, suicide rates are highest among mid-twenties American Indian men and middle-aged Caucasian men.

Second, empirical evidence linking social media use to mental health outcomes including suicide proved to be mixed at best. While some studies found small correlations between social media use and suicide, others particularly longitudinal studies did not (Heffer et al., 2019; Jensen et al., 2019; Orben & Przybylski, 2019). Although some experimental studies suggested that avoiding social media was associated with improvements in mental wellness, these were mainly conducted with college students, effect sizes were of trivial, potentially "noise" level magnitude, and usually had obvious demand characteristics (e.g., Alcott et al., 2020). A meta-analysis of such studies found great heterogeneity in results between them but, overall, little consistent evidence for the beneficial effect of reducing social media time

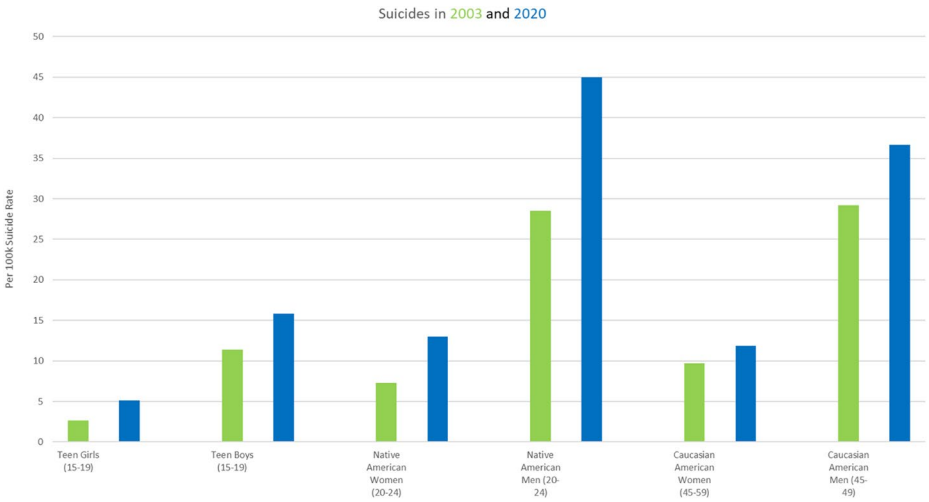

Fig. 1 Suicides among teens, mid-20s american indians and middle-aged caucasian americans

(Ferguson, 2024). Thus, although the social media hypothesis was not an unreasonable one, evidence has not emerged to clearly indicate social media as the main cause of youth suicide. Further, some analyses have suggested that the inflection point in youth mental health came too late, around 2015, for social media to likely be to blame (Rinehart & Barkley, 2023).

If social media is not a primary cause of youth suicide trends, it is less clear what is. It is possible that youth suicide trends may simply follow those of older adults under the concern that suicide may be contagious through families (Chae et al., 2020). Other analyses suggest that suicide is unrelated to social media use trends in a time series design but is associated with income inequality (Padmanathan et al., 2020). A time series design is a kind of correlational analyses in which variables are assessed for their relationship over a given time length. Rather than merely correlating the two variables, deviations from overall time trends are correlated with the assumption that deviations in one trend should predict deviations in the other, potentially at varying time lags. Data are commonly assessed at the societal or community level rather than samples of individuals drawn from a population. Suicidality may also be associated with single-parent households (most typically father-absent) (Cuesta et al., 2021; Fuller-Thompson et al., 2013; Weitoft et al., 2003). Although single-parent family stress may be related to multiple issues, such as increased poverty, some studies suggest the absence of father figures specifically is tied to worse mental health outcomes for youth (Flouri, 2008; Whitley, 2021). Although there is less contemporary data, it is possible that suicide may relate to more general social stress (stress involving economics, or interactions with others) including political partisanship. Some evidence suggests that mental health problems have particularly increased for teens who identify as more liberal (Gimbrone et al., 2022), which has raised speculation that recent progressive/liberal foci on oppression and power conflict may be having a deleterious effect. However, effects were also fairly weak ($\beta = 0.10$) so such an argument may be based more on "noise" than true effects. Nonetheless it is worth considering in time series analysis. At this juncture we have fair data from both individual studies and time series analyses to suggest social media is an unlikely major contributor and some evidence to suggest that income inequality may be associated with suicide rates among adults. However, most other variables are lacking time series analyses to examine longer-term correlations.

Theoretical Background

One means of understanding health related outcomes is through *Fundamental Cause Theory* (Phelan et al., 2010). This approach states that, even as advances in health occur, disparities are maintained as a function of socioeconomic status, with individuals of reduced status less likely to benefit from positive strides in health. Wealthier individuals may draw upon greater resources and employ greater flexibility in dealing with health (or mental health) related stressors. Wealthier individuals may enjoy both more social resources, but also have greater access to healthcare in order to address their concerns. Related to suicide, this may help explain how issues such as fatherlessness, income inequality or even suicides in the family (which reduce resources and increase stress) may impact youth suicide. Family stressors are, of course, complex and seldom due to a single factor. For instance, youth without fathers or who experience parental suicide have fewer family resources to draw on. Single-parent

households may experience many concurrent stressors. For instance, although the absence of father figures may pose specific issues irrespective of income (Flouri, 2008; Whitley, 2021), single-parent families are also more likely to experience poverty and reduced parental attention due to work. As such, a focus on specific issues such as fatherlessness or income inequality should not be taken as assuming that the underlying family systems are not complex with interwoven issues. Issues such as income inequality or political partisanship may put more stress on families. Negative narratives in education may put stress directly on youth. Youth exposed to these issues may have fewer resources, either social or economic, on which to draw for dealing with their mental health issues. Furthermore, mental health issues may be transmitted through stressed families from parents to children. However, it is also interesting to note how mental health issues including suicidal ideation appear to cluster particularly in progressive or liberal youth as compared to conservative youth (Gimbrone et al., 2022), albeit effect sizes appear to be weak and this effect may be overstated in the general public. It may be helpful, thus, to understand suicide also as a function not only of resources but of social capital and integration, wherein group networking can protect individuals from suicide (Kawachi & Berkman, 2014).

The present study intends to examine the variables of changes in technology use, fatherlessness, income inequality, increasing progressive trends in K12 education (particularly trends which support left sociopolitical narratives of oppression, racism, etc. This can be defined as, using a definition provided by several advocates, "…willingness to examine the root causes of disparities and to question why social groups have inequitable lived experiences. [Progressive] teachers are aware of how laws and policies impact their students' lives and integrate intellectual discussions about systemic oppression—in all its forms—into their curriculum and instruction", Caldera et al., 2023), political partisanship, and adult suicide rates as predictors of teen suicide rates. The rationale for the study is that issues of teen suicide are complex and may relate to other social stress issues. For instance, youth well-being may be influenced by the well-being of their parents. This in turn may be influenced by events in larger society. If US adults are experiencing more deaths of despair, or their poor-wellbeing is influencing the well-being of their children, this is important to understand. The purpose of this study was to examine several important social environmental variables in the United States to examine how these may be predictive of teen suicide trends. It is hypothesized that social environment variables related to adult suicide, income inequality, fatherlessness, political polarization and progressive trends in education will be predictive of later rates of youth suicide. Patterns in teen technology use will be considered as a contrast. Time series analyses will be used to examine which factors are most associated with teen suicide in hopes that these will provide policy makers with clearer evidence for which factors may be most useful to consider in reducing teen suicide. The following Hypotheses are tested:

H1 Changes in screen time use as indicated by social media use will be associated with future teen suicide rates.

H2 Income inequality will be associated with future teen suicide rates.

H3 Progressive educational trends will be associated with future teen suicide rates.

H4 Fatherlessness will be associated with future teen suicide rates.

H5 Political partisanship will be associated with future teen suicide rates.

H6 Adult suicide rates will be associated with future teen suicide rates.

These hypotheses are fairly basic but are designed to test the proposition that correlations between predictor variables and outcomes such as teen suicide are often complicated and that unicausal explanations tend to lack nuance or ignore other data that may be just as critical. Of course, each of these hypotheses are unlikely to act independently of the others. For instance, it may likely be the case that issues such as income inequality or political partisanship may primarily impact adults whose mental health issues in turn impact youth. However, this initial set of analyses are designed merely to test the proposition that there are multiple potential theories of youth suicide, at least drawing upon correlational ecological data.

Methods

Primary Outcome Variable

The primary outcome variable for this study is per capita suicides as recorded by the CDC WISQARs system (CDC, 2023). This system is a national, population level database that tracks all fatal and non-fatal injuries and violent deaths in the United States. This system tracks reported suicides over time, from the years 2001 through 2020. Just as homicides are a reliable way to track violent crime, suicides may be a reliable way to track mental health patterns more generally, as they are not reliant on self-report, changing definitions, or trendiness of certain mental health diagnoses. Of course, most people with mental illness don't commit suicide, but suicide is critical outcome in its own right. Suicides among teen boys and girls, 15–19, will be considered separately. The adolescent years 15–19 reflect the adolescent age category in WISQARS and are consistent with the age category that is typically the greatest focus regarding concerns related to suicide increases in the United States as reflected by both news media and policymaker comments.

Predictor Variables

Along with teen suicides, adult suicides 45–49 will also be tracked using WISQARs. Adults in this age range are generally within the age range of parents of teenaged children. WISQARs presents a national database of population-level injuries and deaths.

Income inequality will be examined using the Gini index. Developed by a sociologist of the same name, this system tracks relative distance of a society's most and least wealthy citizens. Gini data is available from the World Bank (World Bank, 2023). This measure tracks the relative distance between poorer and richer individuals in a nation regarding income.

The issue of whether progressive political ideologies are being taught in K12s has been a contentious issue. However, recent data have suggested significant penetration of progressive ideologies into US teaching practices (Kaufman & Goldberg, 2023). However, little

data has tracked trends over time. Note that not all progressive trends are necessarily bad. For instance, emphasizing diversity in a general sense, providing a welcoming environment for historically marginalized groups, increasing coverage of history to consider the history of non-majority populations, etc., can all be positive trends. However, those that are activist focused, particularly those which portray the US and its history in exclusively negative term and which emphasize conflict rather than unity, may have negative outcomes. Part of the concerns is that progressive ideologies hyper-focus on identities and the belief that oppression is widespread, even if data suggests otherwise. Thus, to track progressive ideological trends in education, the PsycINFO database was used to track the use of key title words ""critical race theory" OR racism OR transphobia OR misogyny OR homophobia"" with journals with "education OR educational" in the journal title for each study year. Assessing this helps inform the degree to which themes have become prevalent in education schools, likely influencing the training of the nation's teachers and the instruction young students receive. This approach is used in lieu of a direct database of changes of teaching strategies which is not yet available. However, the method of tracking trends and content analyses in research databases has been used in other areas (e.g., Cascio et al., 2008; Li et al., 2015). By examining these trends in research popular with education professors, this allows us a glimpse into how teachers themselves are being trained.

This is, of course, an oblique method of testing teaching practices, though as education research and training are conducted by the same scholars, it is reasonable to suggest that trends in education research are likely to reflect in teacher training and, thus, teacher practices. To note, considering this issue is not intended as a defense of conservative politics, which also can be contentious, identitarian and aggressive. However, at present, conservative professors are very few at education schools and, as such, unlikely to have as direct an impact on teaching practices as progressive politics.

For fatherlessness, births to unwed mothers as provided by the Annie C. Casey (2023) foundation was used. It is recognized that fatherlessness is a complicated construct and it's not necessarily the case that fathers are always uninvolved when mothers are unwed. Changes in marital structure from officially married to committed cohabitation may explain some data related to unwed mothers. However, US Census data (2024) also suggests that single-parent homes (mainly mothers) remain higher than in previous decades, stabilizing at a historically high rate during the 2000s. It is acknowledged here that this is a complex and often difficult-to-define issue that taps into many social (and emotional issues), including same-sex couples (although rarer, it's possible that *motherlessness* might also be a variable worth considering), conservative versus progressive values, etc. Considering fatherlessness in this analysis should not be assumed as commenting on any of these larger issues. However, this likely functions as a general and easily verifiable tracker of the phenomenon.

Political partisanship was included as an index of the more general social mood. This data was collected from the Pew Research Center and reflects combined net unfavourability ratings of Democrats for Republicans and vice versa. Data was provided directly by Pew on request. This data helps track negative partisan opinions across parties and the degree of political discord in the nation.

Lastly, as indicated, prior analysis has suggested lack of a correlation between social media consumption and teen suicide. Unfortunately, social media use data is only available for years 2013 and on, which limits our ability to analyze the upswing in social media use earlier to this period. One method of addressing this is looking for changes in the association

of technology use more generally with mental health in youth. If, for instance, social media presents a unique problem for youth wellbeing, then associations between technology use and outcomes such as teen depression and suicidal ideation, should increase in years where social media use became available (Vuorre et al., 2021). As such, for this analysis, data from the CDC's Youth Risk Behavior Survey (YRBS) was collected by the state of Florida for the years 2001–2019 were used. Data is collected on odd years. This data includes data for technology use, including computers, as well as three questions related to anhedonia and suicidal ideation. Partial correlations for the association for computer technology use and depression/suicidal ideation were used to examine correlations over time, while controlling for gender.

Design/Analyses

Bivariate correlations between social variables are interesting but, in and of themselves, poor evidence for a meaningful relationship. This is because ecological fallacies can develop between social variables due to chance trends that, in fact, have no relationship with each other. Ecological fallacies are observed correlations in the real world that are due to chance, despite often being remarkably strong. Such spurious correlations, such as the famous correlation between Nicholas Cage movies released each year and swimming pool deaths in the US the same year, remind us that correlations don't equal causation (Vigen, 2015). Given time trends tend to be consistent in a general sense, despite year-to-year fluctuations, time trends tend to highly correlate with each other. Of greater interest is whether year-to-year fluctuations correlate with each other, particularly at time lags which could argue that, at very least, correlations between variables are more reliable. Nonetheless, even with more robust analyses, such data remains correlational and third variables could explain even a robust time trend. As such, time series can improve our confidence in the robustness of a correlation but cannot provide causal explanations. As such, all results here should be regarded as correlational.

Time series analyses can provide more robust evidence for long-term correlations between two social variables. Through time-series analysis, autocorrelations within time series can be removed via pre-whitening, such that residuals within the series can be examined for associative patterns using cross correlations. Analyses as suggested by Schroder and Dixon (2022) were used. The basis of time series design is first to establish the overall trend in each value, then to assess "residuals" which are fluctuations at time points on the trend (similar to the calculation of deviations from a regression line). The assumption is that, if two variables are truly correlated beyond ecological fallacy, not only should the trend lines correlate, but individual time-point deviations should reliably correlate with each other as well, potentially at a time lag (one deviation occurring before another, but in a predictable pattern). These are still bivariate effects (e.g., each time series is run independently, without controls for other time trends). Effect sizes of r=.20 or higher were used as a benchmark for clinically significant effects to reduce the potential for overinterpreting statistical noise (Ferguson, 2009). This clinical cut-off is used for two reasons. First, it has been observed that smaller effect sizes generally have high Type I error due to methodological noise, demand characteristics and common methods bias, even when results are statistically significant. By adopting a higher effect size cut-off, issues with Type I error can be reduced. Second, this

cut-off has been observed as to explain enough variance in outcomes as to warrant clinical attention. This eliminates an overfocus and distraction with trivial results.

It should be noted that that, in order to demonstrate reliable long-trends, a minimum of 30–50 data points is recommended (Schroder & Dixon, 2022). Greater number of data points help to control for autocorrelation, seasonality effects, cyclical behavior in the data, etc. A greater number of observations (possibly as many as 100) may be necessary to reliably detect longer-term lags. However, that data is not available for youth suicide, which dates back only to the early 2000s. Given that the current data involves yearly data, detecting within-year seasonality is not possible. Although time series analysis can determine short-term correlations between data residuals, these should be regarded as correlational, and not indicative of longer-term trends or causality.

Ethical Considerations

Although the current research does not use any identifiable data, the nature of topics related to suicide can be sensitive for many people. Although the data are societal aggregates, they represent real human beings. All analyses are offered with sensitivity to the very real human beings they represent. The research described in this paper was exempt from local IRB as it included no original human participants research.

Results

Social Media (H1)

Changes in patterns of technology use were negatively correlated with both male (-0.392) and female (-0.492) teen suicide, opposite of what would be expected of social media was contributing to teen suicide. The variables for effect sizes for technology use did not have an autocorrelation issue. Thus cross-correlations were used with the raw technology effect size data. For females, social media was associated with reduced suicide concurrently ($r=-.501$) and at, two ($r=-.332$), four ($r=-.420$), and six ($r=-.424$) year lags. For boys, social media was concurrently linked to reduced suicide ($r=-.389$) as well as at 2-year ($r=-.313$), 4-year ($r=-.263$), and 6-year ($r=-.475$) lagged suicides, suggesting social media use may be associated with fewer future suicides for boys.

Income Inequality (H2)

Income inequality correlated with both male (0.535) and female (0.589) teen suicide. In time series analysis, income inequality predicted female suicide concurrently ($r=.690$) and at lags of one ($r=.520$), two ($r=.365$), and three ($r=.297$) years. Income inequality predicted male suicide concurrently ($r=.630$) and at lags of one ($r=.491$), two ($r=.440$), three ($r=.456$) years, and four ($r=.393$) years. These data suggest income inequality is associated with later teen suicide at several year lags. Figure 2 presents the raw correlation between income inequality and teen girl suicide over time. Given that the pattern was similar for boys and girls, only figures for girls are presented in each of these figures.

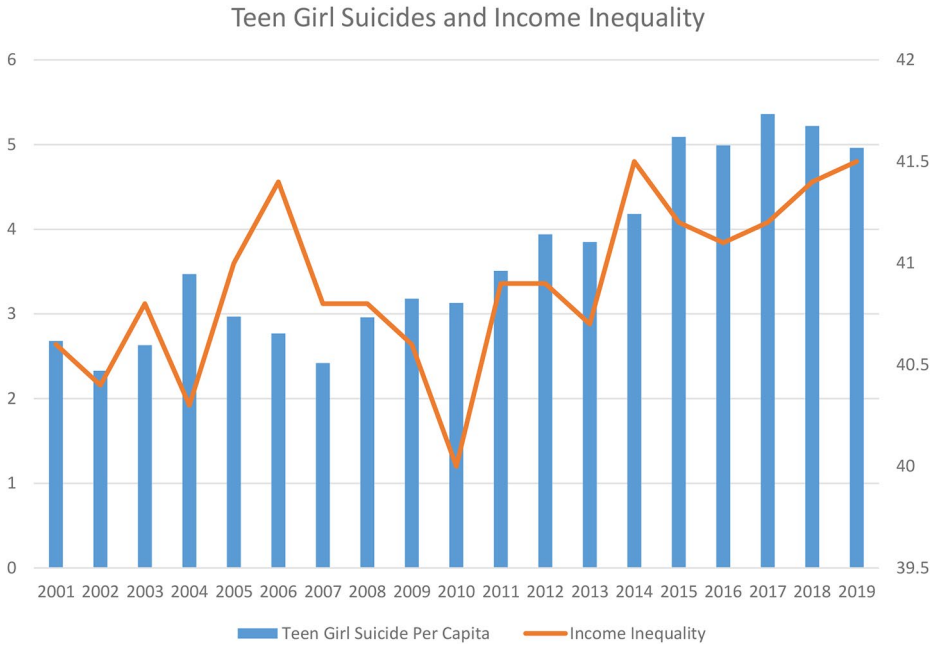

Fig. 2 Correlation between income inequality and teen girl suicide. Note: Left axis represents the per capita teen girl suicide rate. Right axis represents the Gini index of income inequality

Progressive Educational Trends (H3)

For progressive trends in education, these correlated with teen girl suicide (r=.604) as well as teen boy suicide (r=.383) albeit to a much lesser degree. In time series analysis, for teen girls, progressive educational trends were associated with suicide concurrently (r=.692) and at lags of one (r=.634), two (r=.634), three (r=.635), four (r=.577), five (r=.469) and six (r=.343) year lags. For boys, in time series analysis, progressive educational trends was associated with suicide concurrently (r=.447) and at lags of one (r=.513), two (r=.630), three (r=.692) years, four (r=.673), five (r=.542) and six (r=.352) year lags. These data suggest strong associations between progressive educational trends and later suicide in youth. Figure 3 presents the raw correlation between progressive educational trends and teen girl suicide over time.

Fatherlessness (H4)

For births to unwed mothers, this correlated with teen girl suicide (r=.497) as well as teen boy suicide (r=.243) albeit to a much lesser degree. In time series analysis, for teen girls, fatherlessness was associated with suicide concurrently (r=.326) and at lags of one (r=.255), two (r=.232), three (r=.307), four (r=.437), five (r=.510), six (r=.512) seven (r=.488), eight (r=.423) and nine-year (r=.337) lags. For boys, in time series analysis, fatherlessness was not associated with suicide until the lag at three (r=.213) years, then also four (r=.325), five (r=.440) six (r=.489), seven (r=.492), eight (r=.453), nine (r=.416),

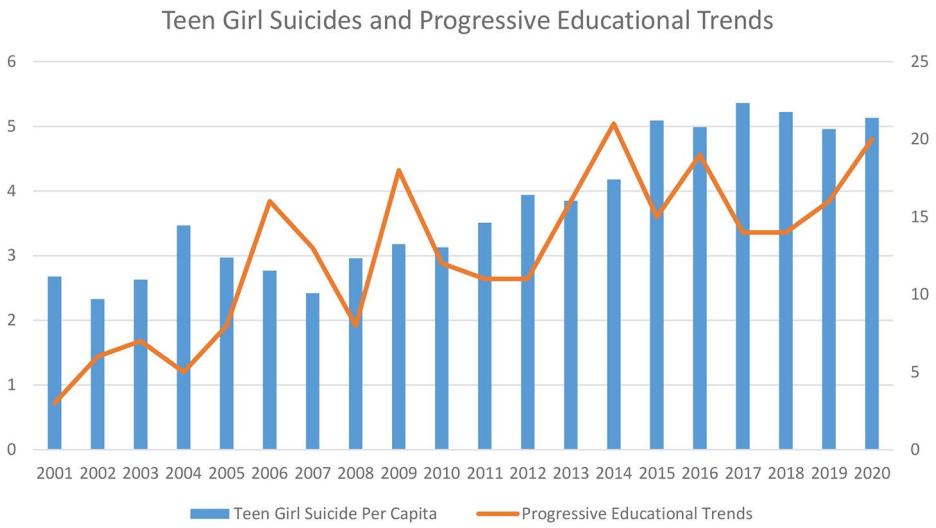

Fig. 3 Correlation between progressive educational trends and teen girl suicide. Note: Left axis represents the per capita teen girl suicide rate. Right axis represents an index of progressive educational trends in education journals

ten (r=.368), and eleven (r=.290) year lags. As such, data for fatherlessness differed from other variables in the sense of tending to have weaker immediate associations, with stronger associations further out in years than other variables. Figure 4 presents the raw correlation between fatherlessness and teen girl suicide over time.

Political Partisanship (H5)

The political partisanship variable appeared to be largely devoid of autocorrelations. Political partisanship correlated with teen girl suicide (r=.826) as well as teen boy suicide (r=.612). Given the lack of autocorrelations, time series analyses were conducted with the original political partisanship variable and teen suicide residuals. In time series analysis, for teen girls, political partisanship was associated with suicide concurrently (r=.834) and at lags of one (r=.564), two (r=.687), three (r=.576), four (r=.546), five (r=.450), and six (r=.335) year lags. For boys, in time series analysis, political partisanship was associated with suicide concurrently (r=.656) and at lags of one (r=.532), two (r=.643), three (r=.572) years, four (r=.565), five (r=.521), six (r=.436) and seven (r=.270) year lags. This data suggests strong associations between political partisanship and later suicide in youth. Figure 5 presents the raw correlation between political partisanship and teen girl suicide over time.

Adult Suicides (H6)

For adult suicides, male and female combined, ages 45–49, these suicides correlated with teen girl (r=.688) and boy (r=.513) suicides. Adult suicides retained partial autocorrelations to two lags and were prewhitened accordingly. In time series analysis, for teen girls, adult suicide was associated with suicide concurrently (r=.640) and at lags of one (r=.691), two (r=.682), three (r=.673), four (r=.643), five (r=.600), six (r=.437), and seven (r=.308) year

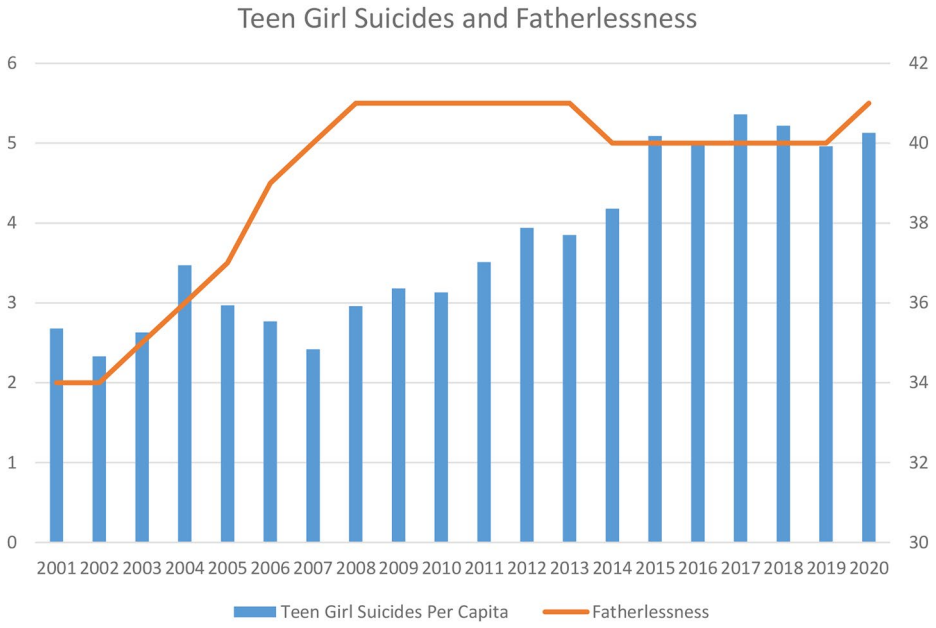

Fig. 4 Correlation between fatherlessness and teen girl suicide. Note: Left axis represents the per capita teen girl suicide rate. Right axis represents the rate of fatherlessness in US births

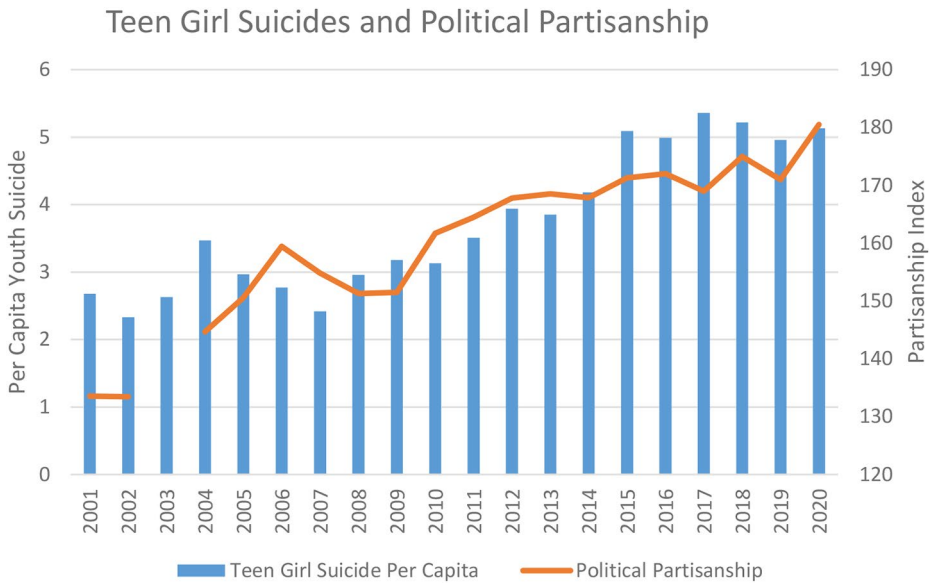

Fig. 5 Correlation between political partisanship and teen girl suicide. Note: Data were not collected for 2003. Left axis represents the per capita teen girl suicide rate. Right axis represents the index of political partisanship

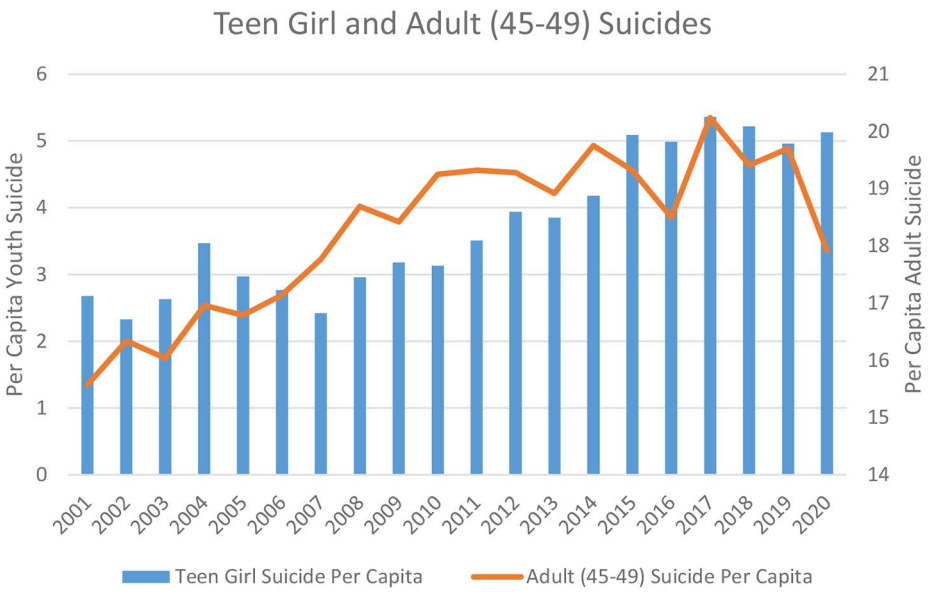

Fig. 6 Correlation between adult suicides (45–49) and teen girl suicides. Note: Left axis represents the per capita teen girl suicide rate. Right axis represents the per capita rate of adult suicides

lags. For boys, in time series analysis, political partisanship was associated with suicide concurrently (r=.518) and at lags of one (r=.616), two (r=.588), three (r=.614) years, four (r=.617), five (r=.593), six (r=.498), seven (r=.411) and eight (r=.311) year lags. This data suggests strong associations between adult suicide and later suicide in youth. Figure 6 presents the raw correlation between adult suicides and teen girl suicide over time.

Multiple Comparisons

One concern that might reasonably arise from conducting several different time series analyses is the possibility of chance findings due to multiple analyses. As the current analyses were conducted using effect size rather than p values, engaging in Bonferroni corrections or other approaches are not helpful. A focus on effect sizes above r=.20 is one method to reduce the potential for spurious findings being overinterpreted. All results discussed here are over that benchmark and, particularly for early lags, are well over this benchmark, suggesting Type I error due to multiple comparisons is an unlikely explanation for these findings.

Discussion

The issue of teen suicide remains at the forefront of parents', policy makers' and healthcare providers' attention. Recent years have seen a particular focus on social media as a putative cause, yet evidence for this belief remains inconsistent. The current research demonstrates that many other social variables are associated with the rise in teen suicide and that these

relationships remain strong even when correcting for autocorrelations, suggesting these correlations are more than ecological fallacies.

Undoubtedly, other societal variables such as increased pressure on students to succeed in K12 including increased extracurricular activities to compete for selective colleges, decreases in unsupervised play, "helicopter" parenting, etc., would likewise follow similar patterns. It is worth noting that the times series analyzed here are independently analyzed, in effect similar to bivariate correlations in that regard. However, it is unlikely that they are truly independent from one another, and likely interact with each other (as well as other variables not examined here) in complicated ways and, indeed may be bidirectional with the outcome. As such, what are we to make of such a miasma?

First, it is an error to consider teen suicide in isolation of other events. Doing so has led to a hyperfocus on social media, but it is unlikely that efforts to reduce social media or other screen time will provide a magic bullet to reducing teen suicide. Indeed, relations between teen and adult suicide are very strong, suggesting that these are occurring in concert with each other, potentially influenced by the same larger social forces, or possibly also influencing one another. Thus, we need to consider suicide more broadly with a larger view. Though suicides among the young are important to understand, the "teen suicide" framing, as if this phenomenon operated independently of suicides among adults, may have led to wasteful distractions. It is critical that policy makers consider suicide and mental health as a broad intergenerational issue. To the extent that policy makers focus on varying age categories in isolation, they are likely to experience a "blind men and the elephant" phenomenon, proposing ad hoc solutions to each age group in isolation, often based on faulty assumptions. Policy makers should generally be wary of "magic bullet" solutions, which rarely work, and see the US mental health crisis as a complex, holistic, multi-generational phenomenon that will require cautious analysis and sophisticated strategizing to address.

Second, several patterns, whether progressive trends in K12 education that emphasize oppression and struggle and negative views of the US, or political partisanship, it appears that a general societal negativity bias (a tendency to focus on negative information and beliefs and ignore positive data) is associated with an increase in suicide. Ironically, the evidence suggests that on most relevant features such as racism, sexism or homophobia in the US, US culture has achieved a remarkable degree of tolerance and egalitarianism that should be celebrated (Charlesworth & Banaji, 2019). However, it is unclear that this positive news is being communicated to students and it is similarly evident from research studies (Kaufman & Goldberg, 2023) that K12 students are being taught messages that are actively hostile to the US and their culture by progressive educators. This is not to imply any bad faith, and undoubtedly the intent is to be honest about the negative aspects of US history which is, indeed, important for students to understand. However, this information on the history of racism and slavery, can be balanced against acknowledgements that, for instance, the US voluntarily ended slavery and segregation, and that brutal slavery was not unique to the US, but existed in almost every culture historically (including, African, Asian and Indigenous cultures) until the 19th century. Put simply, the evidence from this study suggests that we have reached a critical period where negativity bias in history, ethnic studies and other courses may be correlated with negative outcomes in youth, and we should critically reassess how to balance the necessity of being honest about negative aspects of US history with general optimism and pride in the US and its larger history. Approaches to DEI and "anti-racism" in schools that, in fact, increase racial animosity, segregation and racial

shame may be having an unintended backfire effect on student mental health, although more experimental research on this would be welcome.

Of course, not all negativity bias comes from the progressive left, and the conservative right also should be wary of the degree to which it promotes "crisis" views of US politics, discourages compromise and portrays liberals as enemies to be feared and hated. Both sides of the political spectrum should work on how to lower political temperatures. It is unlikely, of course, that the average teen is watching political news acutely, but political partisanship may filter to teens through their families, teachers, peers and, perhaps more weakly, social and news media. Related to this, on policy, policy makers should adopt clear headed approaches to solutions which appear not to work or even be harmful (such as DEI, or portraying every issue as a crisis). Systems such as DEI that do not work should be abandoned, even if it is politically difficult to do so. Policy makers should adopt rigorous standards for examining which educational methods are actually helpful, both in teaching students required learning, but also in promoting patriotism and an optimistic outlook on life. Also, it would be helpful to understand which mental health systems in schools are actually helpful, versus those which may unintentionally promote neuroses. K12 education, in particular, has a history of adopting faddish approaches that ultimately prove not to work (DARE, DEI, various "new" forms of teaching reading and math, grit, self-esteem movement, abstinence-only sex education, social-emotional learning, cellphone bans etc.) Policy makers should demand more rigor in analyses and data before schools adopt any program of pedagogy from schools, particularly those which may influence a child's view of themselves, their family, history or their country.

Third, families may benefit from policies that bring them strength and resources. At this juncture, increases in the rates of fatherlessness, however this is defined, whether merely unwed mothers or completely absentee fathers, should be viewed as an acute problem in need of sound policy goals. Fathers should be encouraged, socially and economically, to remain active in their children's lives. Ideally, two-parent households are desirable, though in cases of estrangement or divorce among parents, fathers should retain equal social status as mothers, except in cases of abuse or domestic assault. To be sure, fatherlessness as a variable is likely tangled with other variables, particularly poverty. It is not the point of this paper to make larger claims of disentangling the effects of greater income versus fathers per se. However, the practical impact of encouraging two-parent families may be similar, whatever the underlying theory of how positive effects are generated. Similarly, income inequality has become an acute problem since the housing crisis of 2008 and the covid19 pandemic. Economic policies which directly benefit poorer citizens, the working classes and middle classes should be a priority for politicians on all sides of the aisle. Policies that encourage fathers to be active in their children's lives, and a restoration of the norm of two-parent families (aside from when abuse is occurring) would likely be of value. Policies that provide for more vigilance in regard to child abuse, including with teen victims, may also help as could public classes for parents to manage their anger and understand how their mental health may influence that of their children.

The current results also contrast with significant concerns among parents, policymakers, and some scholars regarding the impact of social media. In this analysis, changes in youth media use were, if anything, associated with reduced suicide, though these results were weaker than for other factors. At very least, these results question the primary focus placed on social media as an explanation for teen suicide or other mental health concerns.

Individual studies of youth use of social media and mental health have provided mixed results, although recent meta-analyses of such studies suggest effects are statistically undifferentiable from zero (Yang & Feng, 2024). This is likely to be an ongoing debate, but given uncertainty, policy makers should approach it with caution. It appears that such concerns fit more into moral panics over other technology and media than they do true issues of concern.

It is worth noting that the current article considers teen suicide, in part because, just as with homicide as a bellwether of violent crime, suicide statistics may be more reliable than self-report or hospital data on mental health symptoms or attempted suicide. However, as all such phenomena may have occurred in concert, studies that examine these other outcomes would be welcome.

Regarding diversity issues, the current analyses do not break out suicides by racial or ethnic groups. CDC data do suggest that some groups, particularly black Americans, are more resilient to suicide than are other groups. Exploring why this may be helpful toward better understanding why some groups are more resilient than others toward suicide risk.

Limitations

The current data reflect suicide and social issues only for the United States, not other countries. Data on suicide do not necessarily reflect larger non-suicide mental health issues, although these latter may be harder to track reliably over time given shifting definitions, "trendiness" of some diagnoses, reductions in stigma, etc. Although time series analyses reduce the risk of ecological fallacies and can document time lags, the data remain correlational and causal attributions cannot be made. This is particularly true given the limited number of data points available to the present analyses. Without greater observations, reliable observation of lags, seasonality, cycles, etc., can't be documented. As such, this data should be regarded as a more robust way of testing basic correlations beyond Pearson *r*, rather than definitively documenting potentially causal trends. Time series analyses suggest that correlations may be more robust to random correlations but cannot rule out the possibility of third-variable explanations for the trend. It is possible that some suicides may not be reported to the authorities or may be misidentified as accidents. Further, as the years included encompass the years around 2020 during the covid19 epidemic, this presents a unique historical confound that must be considered. Teen suicide patterns appear to have been consistent before and after covid19, but the potential impact of covid19 on this outcome must also be considered, even if not a focus of the current article. Some evidence has suggested an increase in suicide attempts particularly among girls during the covid19 pandemic (Madigan et al., 2023), but more research on this would be helpful. It is worth noting that the current analyses are for the US only and cannot be generalized to other nations. The use of out-of-wedlock births is an imperfect index of fatherlessness. Overall, all births have declined over time, though their proportion of births have increased. Regarding progressive educational trends, it's possible that terms such as race and gender may have altered meanings over time that could influence results. Replication studies with different methods would be worth doing. It is also possible that the PsycINFO database may have its own biases for addressing this issue. Unfortunately, the ERIC database does not allow easy year-to-year searches, but the search terms were replicated with Google Scholar. The pattern of results was similar to PsychINFO (r=.70) suggesting that these results are unlikely to be platform specific.

As further limitations, the current data is US-centric and cannot be applied to other nations or cultures. Furthermore, it does not address the obvious potential confound of the Covid-19 epidemic on mental health and suicide rates across generations.

Conclusions

Teen suicide appears to be one facet of a larger, complex social stress influencing individuals of all generations perhaps without a single root cause. As such, tackling this issue is going to require taking a broader view, understanding teen suicide as part of a larger problem, and an acknowledgement that "magic bullet" approaches (such as school cellphone bans) are likely to fail. A concerted effort to address multiple, interrelated factors that contribute to a more general social stress and pessimism may see more positive outcomes. Put simply, we need to understand what policies and interventions can help current US society develop greater pride in our past and optimism for our future, including both real improvements in economics and family resiliency, but also in social messaging. Suicide patterns likely occur on a sine wave naturally, but sound policy can help us to achieve a reduction in suicide more quickly than might be possible than by simply hoping for the best.

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Declarations

Ethical Approval The research described in this paper was exempt from local IRB as it included no original human participants research.

Conflict of Interest The author has consulted with the free speech group Foundation for Individual Rights in Expression (FIRE) on legal cases related to social media. The author has no funding from nor has done any consultation with social media or other technology companies.

References

Alcott, H., et al. (2020). The welfare effects of social media. *American Economic Review*, *110*, 629–676.

Annie, C., & Casey Foundation (2023). Kids count data center. Retrieved from: https://datacenter.kidscount.org/data/line/7-births-to-unmarried-women?loc=1%26;loct=1#1/any/false/133,38,35,18,17,16,15,14,13,12/asc/any/258

Caldera, A., Bernstein, D., Parker-Hill, K. (2023). The case for woke education. *Education Week.* Retrieved from: https://www.edweek.org/teaching-learning/opinion-the-case-for-woke-education/2023/07

Cascio, W. F., & Aguinis, H. (2008). Research in industrial and organizational psychology from 1963 to 2007: Changes, choices, and trends. *Journal of Applied Psychology*, *93*(5), 1062–1081. https://doi.org/10.1037/0021-9010.93.5.1062. https://doi-org.stetson.idm

CDC (2023). WISQARS. Retrieved from: https://www.cdc.gov/injury/wisqars/index.html

Chae, W., Park, E. C., & Jang, S. I. (2020). Suicidal ideation from parents to their children: An association between parent's suicidal ideation and their children's suicidal ideation in South Korea. *Comprehensive Psychiatry*, *101*. https://doi.org/10.1016/j.comppsych.2020.152181

Charlesworth, T. E. S., & Banaji, M. R. (2019). Patterns of implicit and explicit attitudes: I Long-term change and stability from 2007 to 2016. *Psychological Science*, *30*(2), 174–192. https://doi.org/10.1177/0956797618813087. https://doi-org.stetson.idm

Cuesta, I., Montesó-Curto, P., Metzler Sawin, E., Jiménez-Herrera, M., Puig-Llobet, M., Seabra, P., & Toussaint, L. (2021). Risk factors for teen suicide and bullying: An international integrative review. *International Journal of Nursing Practice*, *27*(3), 1–11. https://doi.org/10.1111/ijn.12930. https://doi-org.stetson.idm

Ferguson, C. J. (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice*, *40*(5), 532–538. https://doi.org/10.1037/a0015808. https://doi-org.stetson.idm.oclc

Ferguson, C. J. (2024). *Do social media experiments prove a link with mental health: A methodological and meta-analytic review*. Psychology of Popular Media.

Flouri, E. (2008). Fathering and adolescents' psychological adjustment: The role of fathers' involvement, residence and biology status. *Child: Care Health and Development*, *34*(2), 152–161. https://doi.org/10.1111/j.1365-2214.2007.00752.x. https://doi.org/stetson.idm.oclc.

Fuller-Thompson, E., Hamelin, G., & Granger, S. (2013). Suicidal ideation in a Population-Based sample of adolescents: Implications for family medicine practice. *International Scholarly Research Notes*. https://doi.org/10.5402/2013/282378

Gimbrone, C., Bates, L. M., Prins, S. J., & Keyes, K. M. (2022). The politics of depression: Diverging trends in internalizing symptoms among US adolescents by political beliefs. *SSM Mental Health*, *2*. https://doi.org.stetson.idm.oclchttps://doi.org/10.1016/j.ssmmh.2021.100043

Heffer, T., Good, M., Daly, O., MacDonell, E., & Willoughby, T. (2019). The longitudinal association between social-media use and depressive symptoms among adolescents and young adults: An empirical reply to Twenge et al (2018). *Clinical Psychological Science*, *7*(3), 462–470. https://doi.org/10.1177/2167702618812727

Jensen, M., George, M. J., Russell, M. R., & Odgers, C. L. (2019). Young adolescents' digital technology use and mental health symptoms: Little evidence of longitudinal or daily linkages. *Clinical Psychological Science*, *7*(6), 1416–1433. https://doi.org/10.1177/2167702619859336

Kaufman, E., & Goldberg, Z. (2023). School choice is not enough: The impact of critical social justice ideology in American education. Manhattan Institute. Retrieved from: https://www.manhattan-institute.org/school-choice-not-enough-impact-of-critical-social-justice-ideology-in-american-education

Kawachi, I., & Berkman, L. (2014). Social capital, social cohesion and health. In I. Kawachi, & L. Berkman (Eds.), *Social epidemiology*. Oxford Academic.

Li, F., Li, M., Guan, P., Ma, S., & Cui, L. (2015). Mapping publication trends and identifying hot spots of research on internet health information seeking behavior: A quantitative and co-word biclustering analysis. *Journal of Medical Internet Research*, *17*(3). https://doi.org/10.2196/jmir.3326. https://doi-org.stetson.idm

Madigan, S., Korczak, D. J., Vaillancourt, T., Racine, N., Hopkins, W. G., Pador, P., Hewitt, J. M. A., AlMousawi, B., McDonald, S., & Neville, R. D. (2023). Comparison of paediatric emergency department visits for attempted suicide, self-harm, and suicidal ideation before and during the COVID-19 pandemic: A systematic review and meta-analysis. *The Lancet Psychiatry*, *10*(5), 342–351. https://doi.org/10.1016/S2215-0366(23)00036-6

Orben, A., & Przybylski, A. K. (2019). Screens, teens, and psychological well-being: Evidence from three time-use-diary studies. *Psychological Science*, *30*(5), 682–696. https://doi.org/10.1177/0956797619830329. https://doi.org/stetson.idm.

Padmanathan, P., Bould, H., Winstone, L., Moran, P., & Gunnell, D. (2020). Social media use, economic recession and income inequality in relation to trends in youth suicide in high-income countries: A time trends analysis. *Journal of Affective Disorders*, *275*, 58–65. https://doi.org/10.1016/j.jad.2020.05.057

Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social conditions as fundamental causes of health inequalities: Theory, evidence, and policy implications. *Journal of Health and Social Behavior*, *51*(1, Suppl), S28–S40. https://doi.org/10.1177/0022146510383498. https://doi-org.stetson.idm

Rinehart, W., & Barkley, T. (2023). Thoughts on what the CDC YRBS data means for social media, teens, and mental health. Retrieved from: https://nowandnext.substack.com/p/thoughts-on-cdc-yrbs-data

Schroder, C., & Dixon, D. (2022). Time series analysis on SPSS. Retrieved from: https://osf.io/qsj7k/download

Twenge, J. M., Cooper, A. B., Joiner, T. E., Duffy, M. E., & Binau, S. G. (2019). Age, period, and cohort trends in mood disorder indicators and suicide-related outcomes in a nationally representative dataset, 2005–2017. *Journal of Abnormal Psychology*, *128*(3), 185–199. https://doi.org/10.1037/abn0000410.supp

US Census (2024). *Living arrangements of children, 1960-Present.* Retrieved from: https://www.census.gov/data/tables/time-series/demo/families/children.html

Vigen, T. (2015). *Spurious Correlations.* Hachette Books.

Vuorre, M., Orben, A., & Przybylski, A. K. (2021). There is no evidence that associations between adolescents' digital technology engagement and mental health problems have increased. *Clinical Psychological Science*, *9*(5), 823–835. https://doi.org/10.1177/2167702621994549. https://doi-org.stetson.idm

Weitoft, G. R., Hjern, A., Haglund, B., & Rosén, M. (2003). Mortality, severe morbidity, and injury in children living with single parents in Sweden: A population-based study. *The Lancet*, *361*(9354), 289–295. https://doi.org/10.1016/S0140-6736(03)12324-0. https://doi.org/stetson.idm.oclc

Whitley, R. (2021). Family ties: Marriage, divorce, and the mental health of men and boys. *Men's issues and Men's mental health* (pp. 207–234). Springer.

World Bank (2023). Retrieved from: https://data.worldbank.org/indicator/SI.POV.GINI?locations=US

Yang, Q., & Feng, Y. (2024). Relationships between social networking site (SNS) use and subjective Well-being----A meta-analysis and meta-analytic structural equation model. *Helyion*. https://doi.org/10.1016/j.heliyon.2024.e32463