



Published in final edited form as:

*Criminology*. 2021 February ; 59(1): 109–136. doi:10.1111/1745-9125.12264.

## The contemporary transformation of american youth: An analysis of change in the prevalence of delinquency, 1991–2015

**Eric P. Baumer,**

Pennsylvania State University, Department of Sociology and Criminology, 201 Oswald Tower, University Park, PA 16802

**Kelsey Cundiff,**

University of Missouri-St. Louis, Department of Criminology and Criminal Justice, 1 University Blvd., St. Louis, MO 63121

**Liying Luo**

Pennsylvania State University, Department of Sociology and Criminology, University Park, PA 16802

### Abstract

Youth involvement in crime has declined substantially over the past few decades, yet the reasons for this trend remain unclear. We advance the literature by examining the role of several potentially important shifts in individual attitudes and behaviors that may help to account for the observed temporal variation in youth delinquency. Our multilevel analysis of repeated cross-sectional data from high school students in the Monitoring the Future (MTF) study indicates that changes in youth offending prevalence were not associated with changes in youth attachment and commitment to school, community involvement, or parental supervision after school. In contrast, the study provides suggestive evidence that the significant reduction in youth offending prevalence observed since the early 1990s was significantly associated with a decrease in unstructured socializing and alcohol consumption and, to a lesser extent, with a decrease in youth preferences for risky activities. Implications for existing theoretical explanations and future research on youth crime trends are discussed.

## 1. INTRODUCTION

It is now well known that youth involvement in violence and property crime has declined since the early 1990s in the United States and many other nations (e.g., Blumstein & Wallman, 2006; Cook & Laub, 1998; Elonheimo, 2014). This reduction in youth crime is evident in police- and public-health statistics (Child Trends, 2015; Kann et al., 2016), surveys of victimization (Lauritsen & Rezey, 2013), and surveys of offending (Berg et al., 2016; Johnson et al., 2017; Keyes et al., 2018). Across multiple sources, the evidence indicates that the decline in youth criminal behavior during the past three decades has been substantial. For example, as shown in Figure 1 the data used in the present research—the Monitoring the Future (MTF) study—shows that the percentage of 8<sup>th</sup> and 10<sup>th</sup> graders who

report having engaged in one more violent or property crimes during the preceding year fell from 49 percent in 1991 to 32 percent in 2015.<sup>1</sup> This 35 percent reduction in youth crime represents a profound behavioral transformation among young people that has significant implications for their future life chances (e.g., Sampson & Laub, 1993) and for public safety (e.g., Zimring, 2007). Yet, it remains puzzling why youth today are much less likely than their counterparts a few decades ago to engage in delinquency (Baumer et al., 2018).

The crime trends literature has pointed to several broad macro- and community-level shifts (e.g., changes in criminal justice responses, immigration levels, economic conditions, and laws governing gun carrying, abortion, and lead content) as instrumental for understanding contemporary changes in crime levels, and a growing body of aggregate-level research has assessed the validity of those arguments (e.g., for reviews, see ; Farrell et al., 2014; Goldberger et al., 2008). This prior work has been important for stimulating debates about why the contemporary crime decline may have occurred, but it is limited in two important ways: (1) it has been largely disconnected from etiological theories of youth offending, and (2) it has largely neglected the possibility that changes in more proximate individual-level attributes may have contributed to the observed reductions (see also Berg et al., 2016). The present study contributes to the literature by explicating how changes in selected individual-level attitudes and behaviors emphasized in prominent etiological theories may have contributed to the contemporary reduction in youth crime and by presenting an exploratory empirical analysis that assesses the role of several such factors.

We begin by summarizing existing theoretical and empirical insights that have emerged from the literature on contemporary crime trends, elaborating the need for considering factors illuminated in classic and contemporary etiological theories of youth offending. Capitalizing on available national-level data from the MTF, we focus on the potential role of changes in commitment and attachment to school, community involvement, parental monitoring, unstructured socializing, alcohol consumption, employment intensity, and preferences for risk-taking. Each of these attributes has been linked theoretically to youth involvement in criminal behavior, but prior research has devoted little attention to whether changes in these over the last several decades can help to account for the noted reductions in youth crime. We explore these issues in the present study by analyzing survey data drawn from 8<sup>th</sup> and 10<sup>th</sup> graders interviewed in the MTF between 1991 and 2015. After describing the data and methods used and summarizing the most important results, we discuss the implications of our findings and outline future research needs.

## 2. THEORETICAL BACKGROUND

The crime trends literature has emphasized many factors as potential sources of the observed reduction in youth (and adult) crime (Blumstein & Wallman, 2000; Goldberger et al., 2008). Among the most often-stated explanations are the considerable growth in prison populations, increases in the number of police and improved efficacy of the strategies they employ,

---

<sup>1</sup>Estimates based on author calculations of responses from more than 200,000 respondents to the MTF from 1991 and 2015. For this illustration, violence is defined as incidents in which youth had gotten into a serious fight in school or at work, taken part in a fight where a group of your friends were against another group, or hurt someone badly enough to need bandages or a doctor, and property crime is defined as incidents in which youth had stolen something of value from others or damaged school property on purpose.

reduced volatility in illicit drug markets, changes in social and environmental laws (i.e., the legality of abortion and regulations on lead-toxins) during the 1970s, the composition of the population (e.g., the proportion who are immigrants), better economic conditions (e.g., reductions in unemployment and increases in consumer sentiment), and a variety of technological innovations (e.g., the increased use of anti-theft devices and other security measures) that may have reduced opportunities for criminal activity or made it more difficult to complete (see Farrell et al., 2014). While the list of possibilities that has emerged appears to be comprehensive on its face, the overarching framework that has guided most research on crime trends is largely divorced from the etiological literature on youth offending.

A rich theoretical and empirical literature on youth offending has identified a variety of individual-level attributes and behaviors as important predictors of offending, and yet studies of crime trends have paid relatively little attention to the possibility that changes in such factors may be important for understanding the reduction in youth crime observed since the early 1990s. Considering the possibility that changes in individual-level behaviors and attitudes may have been relevant to observed reductions in youth offending offers a potential advance for research on crime trends, while also illuminating the utility of etiological theories to increase understanding of important social changes in youth behavior.

Baumer et al. (2018) advance a framework for integrating the study of crime trends more centrally within extant theory and empirical research on the antecedents of youth offending (see also Berg et al., 2016). Drawing on classic and contemporary theoretical overviews (Kornhauser, 1978), they argue that through the lens of etiological theories of crime, the reductions in youth offending observed since the early 1990s should be a function of one or more of the following three processes: (1) increases in the amount of social control to which youth were exposed, (2) decreases in youth exposure to physical or social settings conducive to crime, and/or (3) reductions in criminal propensities and motivations among youth (see also Baumer & Wolff, 2014). We extend the framework presented by Baumer et al. (2018) to illuminate several individual-level factors relevant to these three domains, which may help to account for the reductions in youth offending observed since the early 1990s. We then specify the individual-level attributes that can be assessed with the data used for our study.

## 2.1. Shifts in Youth Exposure to Social Controls

The crime trends literature has emphasized changes in macro-level conditions that are posited to yield shifts in the formal and informal social controls to which people are exposed, including the quantity and quality of policing, imprisonment rates, collective efficacy, and social institutional strength (Blumstein & Wallman, 2006; LaFree, 1998; Roth, 2010; Zimring, 2007). Theories of youth offending recognize the potential relevance of these conditions for constraining behavior, but they emphasize more proximate individual-level attributes as well that have received very little attention within the crime trends literature. Specifically, the etiological literature on delinquency suggest that increases in individual attachment/commitment to, or involvement with, institutions of social control (e.g., families, schools, and communities), increases in the degree to which youth are supervised or monitored within those institutions, and increases in beliefs about the appropriateness of criminal behavior and the risks and costs associated with engaging in

crime also may be relevant to contemporary reductions in youth crime observed over the past several decades. These individual-level factors are posited to constrain participation in criminal activity primarily because they lead youth to associate greater future opportunity costs with involvement in illicit conduct (Hirschi, 1969; Messner & Rosenfeld, 1994).

The existing criminological data infrastructure does not permit a comprehensive assessment of whether there have been notable changes over the past few decades in the perceived risks or costs youth associate with criminal behavior or in their beliefs about the appropriateness of crime. However, the MTF data used for our research includes several other indicators of informal social controls that have been emphasized in theories of youth offending, including youth attachment and commitment to school, youth involvement in their communities, and the extent to which youth are supervised by their parents. Extant research has documented changes in these dimensions of informal social control (e.g., Arnett, 2018; Twenge, 2017) in directions that suggest they could play a role in accounting for the reductions in youth offending observed over the past few decades, but to our knowledge that possibility has not been considered previously. We examine this in the present study.

## 2.2. Shifts in Youth Exposure to Situations and Settings Conducive to Criminal Behavior

Another prominent set of ideas developed in the literature on the contemporary crime decline directs attention to changes in the physical and social settings to which youth are exposed. Two distinct arguments have been emphasized in the crime trends literature, the first of which focuses on changes in macro-level or environmental conditions and the second of which directs attention to shifts in the routine activities of people that alter their exposure to settings in which crime may flourish (Farrell et al., 2014). With respect to the first argument, some scholars have highlighted the importance of modifications to social and physical settings that may have made crime less likely to emerge within those settings. Prominent examples include the stabilization of drug markets (Blumstein & Wallman, 2006), reductions in the value of stolen goods and the presence of cash in illicit markets (Felson, 1998; Wright et al., 2014), the increased use of hot spots policing (Weisburd et al., 2017), and enhancements to security that may have dissuaded people from engaging in illicit activity in certain situations (see Farrell et al., 2011). Regarding the second argument, some scholars have drawn from the routine activities theoretical framework (Cohen & Felson, 1979; Osgood et al., 1996) to suggest that youth crime may have declined over the past few decades because of shifts in lifestyle, technology, and social organization that lessened the extent to which youth selected into or found themselves in potentially “criminogenic” locations or settings (see Baumer & Wolff, 2014). Given our interest in assessing whether changes in individual-level attributes may be relevant to the contemporary decline in youth crime, we focus on this second line of reasoning.

Cohen and Felson (1979) made a persuasive case that increases in levels of property crime and violence during the 1960s and 1970s were due, in part, to shifts in social and technological changes that increasingly relocated routine activities away from the home and into the public sphere. Similarly, over the past three decades, some scholars have suggested the emergence of a counter trend, with social interaction and leisure time increasingly shifting from public places to the home (see Eisner, 2008; Putnam, 2000; Smith, 2011).

Empirically grounded knowledge about the precise mechanisms driving these trends is thin, but there is speculation that more vigilant parental monitoring and a variety of technological innovations (e.g., the development of portable entertainment and gaming systems, the increased use of personal computers, and the rise of the internet and software that facilitated virtual social interactions) are likely sources (Twenge, 2017). Whatever the sources of these changes, routine activities theory predicts that they may have important implications for youth crime trends (Cohen and Felson, 1979).

Applications of routine activities theory to youth offending posit that the way in which youth spend their time, the social settings in which they interact, and their behaviors in those social situations can increase the occurrence of criminal behavior independent of one's general propensity or motivation for crime or the degree to which one has attachments to social institutions (Hoeben & Weerman, 2016; Osgood et al., 1996). Osgood et al. (1996) introduced the concept of "unstructured socializing"—time spent with peers in a context in which there is little oversight from adult authority figures—as a potentially important determinant of the extent to which youth are exposed to settings in which delinquency is likely to flourish. They argued that unstructured socializing among youth increases opportunities and situational pressures for deviance (Osgood et al., 1996). Others have subsequently offered additional theoretical mechanisms through which time spent in situations of unstructured socializing may increase youth involvement in crime, including heightened exposure to deviant peers, greater tolerance for deviance, and substance abuse (Apel & Horney, 2017; Hoeben & Weerman, 2016). Empirical assessments routinely have found a significant positive association between unstructured socializing and youth offending (see Hoeben et al., 2016 for a review). Integrating these theoretical and empirical insights with the literature on crime trends (Baumer et al., 2018) and recent research on changes in youth interactional patterns (Arnett, 2018; Johnson et al., 2017; Twenge & Park, 2019) yields the prediction that the considerable decrease in youth crime since the early 1990s could be due in part to a reduction in unstructured socializing among youth. We explore this, as yet untested, possibility in the present study.

In addition to considering the implications of changes in unstructured socializing, we examine two other shifts in youth behavior that may impact youth exposure to situations and settings conducive to violence and property crime: the potential role of changes in youth employment and youth alcohol consumption. Several scholars have argued that the contemporary reduction in crime rates in the U.S. may be the result of decreases in alcohol consumption (Parker & Cartmill, 1997), and integrating this argument with recent literature on unstructured socializing, alcohol consumption, and youth delinquency suggests that a reduction in youth alcohol consumption could be relevant to the significant decrease in youth offending observed since the early 1990s. Recent theoretical articulations of routine activities theory have emphasized the potential importance of substance use in the context of unstructured socializing (Apel & Horney, 2017; Hoeben et al., 2020), and among youth alcohol use is likely to be especially important in this regard (Bouchard et al., 2018). Individual-level research indicates that unstructured socializing exhibits a significant positive association with alcohol consumption (Osgood et al., 1996; Hoeben et al., 2016; Meldrum & Leimberg, 2018), and there is persuasive evidence that alcohol consumption among youth promotes involvement in both violence and property crime (Carpenter, 2007;

Felson et al., 2008; Felson & Staff, 2010; Popovici et al., 2012; White et al., 2013). Informed by this literature, we consider whether the substantial contemporary reduction in U.S. youth alcohol consumption documented from multiple sources (Chen et al., 2013; Miech et al., 2020; see also Johnson et al., 2017; Twenge, 2017; Twenge & Park, 2019) may be relevant to decreases in youth offending.

Changes in the amount of time youths spend in some “structured” activities, and especially paid employment, also may be relevant to their exposure to settings and situations conducive to violence and property crime. The crime trends literature has highlighted the importance of several broad macroeconomic changes, including growth and contraction in economic production, employment levels, and wages, all of which have been linked to changes in crime rates through multiple mechanisms (e.g., Gould et al., 2002; Rosenfeld et al., 2013). Among these economic conditions, shifts in employment experiences are likely to be most relevant to the daily life of youth, for whom school is the primary vocation and wages are not highly variable. In contrast to the assumed uniformly positive benefits of employment on adult offending, research has revealed that the anticipated effect of employment on youth offending is more nuanced. As Staff and Uggen (2003) note, working part-time at moderate levels (e.g., less than 15–20 hours per week) can be beneficial to teenagers in a variety of ways, and may lessen their involvement in crime for reasons similar to the processes that have been emphasized in research on work and crime among adults. In contrast, there is evidence that youth in “intense work roles,” typically defined as working more than 20 hours per week, are at heightened risk for being exposed to situations and settings in which deviant behavior, including crime, may flourish (Osgood, 1999). Despite attention in prior research to the potential for employment to impact youth offending (e.g., Apel et al., 2007; Staff et al., 2010) and evidence of significant reductions in youth employment in recent decades (Desilver, 2015; Johnson et al., 2017; Staff et al., 2014), it remains unclear whether the latter can help account for the observed reductions in youth offending. We explore that possibility in the present study.

### 2.3. Shifts in Youth Propensities and Motivations for Crime

Most arguments advanced for the contemporary decline in youth offending have emphasized the potential relevance of increases in social control and/or decreases in exposure to physical or social settings conducive to crime (see Baumer et al. 2018 for a review). However, some scholars also have drawn attention to the potential role of decreases in youth criminal propensities, or criminal motivation, as an explanation. Several perspectives on the etiological sources of youth crime highlight differences in propensities and motivations to engage in crime as core explanatory factors, including social learning, strain, and self-control theories (Tittle, 1995). Strain<sup>2</sup> and social learning<sup>3</sup> theories imply plausible

---

<sup>2</sup>Classic and contemporary strain theories highlight a variety of factors that may motivate youth to engage in criminal activity, including exposure to adverse stimuli, the experience of loss, and impediments to goal attainment, all of which may stimulate criminal behavior directly or indirectly by facilitating negative emotions (Agnew, 1992; Merton, 1938). Research that emphasizes the role of economic improvements in stimulating reductions in crime during the 1990s (e.g., LaFree, 1998) implies that declining subjective strain experienced by people may be an important individual-level mechanism, but this hypothesis has not been tested.

<sup>3</sup>Social learning theories emphasize the potential for the images and messages to which youth are exposed to stimulate behavioral patterns that align with those messages, generally predicting increased involvement in criminal behavior among youth who are exposed to a greater extent people and/or messages that support or reinforce such behavior. Drawing from this perspective, scholars



hypotheses about why youth crime rates have declined since the early 1990s, but these ideas have received limited attention in the crime trends literature and, unfortunately, the current individual-level data infrastructure in the United States is not capable of assessing them directly. In contrast, the idea that the substantial decline in youth offending may be the result of parallel reductions in low self-control has figured prominently within the crime trends literature (e.g., Donohue & Levitt, 2001; Nevin, 2007; Reyes, 2007), and the data used for our study can address this possibility in a partial manner.

The capacity for self-control is an important component of criminal propensity (Gottfredson & Hirschi, 1990), and it has been linked consistently to involvement in a variety of youth externalizing behaviors (Franken et al., 2016; Marschall-Lévesque et al., 2013; Moffitt et al., 2011; Pratt & Cullen, 2000). Drawing from this research, some scholars have pointed to the possibility that the reduction in youth offending since the early 1990s may be due to an increase in levels of self-control among youth. Two primary arguments have been emphasized. First, Donahue and Levitt (2001) emphasized the legalization of abortion in the early 1970s as a shift that has produced lower youth crime rates in the 1990s and beyond, in part because of increases in self-control. They offered several reasons for this linkage, but the main one was that legalized abortion in early 1970s reduced child “unwantedness” and increased the efficacy of child-rearing conditions. Donohue and Levitt (2001) did not specify clearly the mechanisms through which an improvement in child-rearing conditions would manifest into less crime 15–20 years later, but extant theory and research on delinquency suggests that increases in self-control would be a key reason (Gottfredson & Hirschi, 1990). Second, Nevin (2007) and Reyes (2007) focused on reductions in lead exposure as an alternative reason for the reductions in crime rates observed since the early 1990s, and their argument also points to increases in self-control. Drawing on research that links high levels of lead in the blood, especially in childhood, to reduced self-control (Lidsky & Schneider, 2003; Needleman, 2004), these scholars suggested that reductions in lead exposure during the 1970s and 1980s yielded lower levels of youth crime throughout the 1990s and beyond in part because less exposure to lead in childhood yielded increased levels of self-control during adolescence and youth adulthood (see Narag et al., 2009; Nevin, 2007).

Despite substantial attention to self-control within criminology and other disciplines, it remains unclear whether levels of self-control among youth have increased since the early 1990s. To our knowledge, existing data sources do not permit a comprehensive exploration of this question. However, the data used for our study permit a partial assessment of this question. Self-control has been measured in a variety of ways, but most scholars emphasize indicators of impulsivity and a sensation-seeking (Burt et al., 2014; Forrest et al., 2019; Gottfredson & Hirschi 1990). We are unable to document changes in impulsivity, but the MTF data used for our study provide information on preferences for risky and dangerous activities, which are commonly used to measure those more prone to sensation-seeking. While the available findings on trends in risk-seeking are inconsistent and sensitive to measurement choices, there is evidence of a considerable decline since the early 1990s in the proportion of youth who exhibit a clear preference for risky and dangerous activities

---

have speculated that the contemporary drop in youth offending may reflect reductions in gang participation among youth or decreases in the extent to which youth are exposed to subcultural contexts that promote criminal involvement (see Travis and Waul, 2002).

(Twenge, 2017). Building on these findings, we evaluate whether changes in youth preferences for risk-seeking are relevant to the observed reductions in youth offending.<sup>4</sup>

### 3. PRESENT STUDY

Criminologists have devoted relatively little attention to the possibility that changes over the past several decades in indicators of youth criminal propensity, attachment and commitment to institutions of social control, and exposure to situations and settings conducive to crime have been relevant to the significant reductions in youth offending that have occurred during this period. We draw from the nation's longest running survey of youth to explore these issues in a partial manner. Specifically, we use the Monitoring the Future (MTF) study to explore whether the observed reduction in youth crime since the early 1990s could be due to increases in school commitment and attachment, community involvement, and parental monitoring, and/or decreases in alcohol consumption, intensive work, sensation-seeking, and unstructured socializing.

### 4. METHODS

#### 4.1. Data

The MTF began in 1976 as a survey of high-school seniors, expanding in 1991 to also include 8<sup>th</sup> and 10<sup>th</sup> grade students. Our analysis focused on 8<sup>th</sup> and 10<sup>th</sup> graders interviewed between 1991 and 2015; we excluded 12<sup>th</sup> graders because their observed trends in offending prevalence and other factors are more likely to be impacted by selection effects related to school drop-out and because some of the key explanatory variables were not available for the 12<sup>th</sup> grade sample. The time frame represented by the study corresponds to the nation-wide reductions in crime that have been documented with other data sources, such as the Uniform Crime Reports (UCR) and the National Crime Victimization Survey (NCVS), and which have been the subject of most research on the contemporary crime drop in America.

The core MTF survey is based on a repeated cross-sectional (RCS) design in which data on attitudes and behaviors are gathered from a nationally representative sample of students from more than 100 public and private schools. Student response rates in the MTF were relatively high (between 80 and 90%) during the study period, with non-response driven primarily by absences (Keyes et al., 2018). All respondents are asked to answer a base set of questions, but respondents are randomly assigned to answer subject-specific questionnaires (see Bachman et al., 2015). Our analysis is based on the universe of respondents who were assigned the main questionnaire used to elicit information about criminal involvement (i.e., "form 2").

---

<sup>4</sup>Evidence from the MTF reported by Johnson et al. (2017) indicates that mean levels of risk-seeking preference among youth has not changed substantially over the past few decades (see also Keyes et al., 2015), but Twenge (2017) shows that the percentage of youth who agree or strongly agree that they prefer risky and dangerous activities has declined significantly since the early 1990s. We expand on Twenge's (2017) operationalization by focusing on trends in strong agreement with preferring risky and dangerous activities, which we believe is more pertinent to the theoretical arguments that link sensation seeking to criminal behavior.



The total number of eligible cases for the analysis was 304,326 (159,631 8<sup>th</sup> graders and 144,695 10<sup>th</sup> graders). Several of the measures included in the study contain a non-trivial amount of missing data, including mother's (11%) and father's (16%) educational attainment, the delinquency items (16–17%), and the measures of sensation-seeking (15–16%). With rare exceptions (e.g., Keyes et al., 2018), multivariable analyses of MTF data and trends have focused on complete case samples (i.e., listwise case deletion), but because that strategy can yield biased parameter estimates (Allison, 2002; Brame & Paternoster, 2003), we conducted our analysis both with the available complete case sample (n=204,621) and a multiply imputed dataset that retained all cases. The results were substantively identical across the two sets of analyses. We report findings in the main body of the article based on the complete case sample (n=204,621), weighted to correct for the multistage sampling employed in the MTF. We do so because this sample is built on fewer technical/imputation assumptions, the sample size is relatively large, and the results are more easily compared to existing analyses of the MTF. Additionally, the analysis we report below is more readily reproduced on the complete case sample.<sup>5</sup> For interested readers, we also include tables in the online supplement that shows the results of our main regression models estimated on the imputed data.<sup>6</sup>

#### 4.2. Measures

The MTF study gathers data from respondents about the frequency of several delinquent activities during the previous twelve months. The response options for frequency are vague, specifying count ranges (e.g., 3 or 4 times, 5 or more times) rather than precise estimates. Because of this measurement imprecision, in our judgment the data are not ideal for assessing trends in mean offending incidence or frequency levels. In light of this, we focus on evaluating trends in offending prevalence, defined as whether youth reported having committed one or more crimes during the prior year. Prior research has shown that changes in offending prevalence are an important component of the reductions in youth offending observed since the early 1990s (Berg et al., 2016). Our dependent variable (youth offending prevalence) combines six items, coded 1 for individuals who in the past year reported to have “gotten into a serious fight in school or at work,” “taken part in a fight where a group of your friends were against another group,” “hurt someone badly enough to need bandages or a doctor,” taken “something of value below \$50,” “taken something of value above \$50,” or “damaged school property on purpose” (respondents who had done none of these were scored 0). The items exhibit good internal reliability ( $\alpha=.75$ ).

To account for compositional sample differences over time in the MTF study that may affect estimated levels of offending prevalence, we include several socio-demographic variables as controls. Respondent grade level is a dichotomous variable coded 1 for 10<sup>th</sup> graders and 0 for 8<sup>th</sup> graders. Race is represented by three dummy variables indicating whether or not the respondent was white (the reference group), black, or some other race.<sup>7</sup> Respondent

<sup>5</sup>High-performance computing resources are necessary to estimate our core multilevel regression models with the imputed dataset. Additionally, some of the post-estimation methods we employ are currently not fully compatible with the analysis of imputed data in widely accessible statistical packages (e.g., R, Stata).

<sup>6</sup>We applied multivariate imputation using chained equations to estimate missing values, with prediction equations customized for the level of measurement of the imputed variables (Raghunathan et al., 2001; van Buuren, 2007). We implemented this approach following conventional guidance about best practices (White et al., 2011), and the final dataset used was based on ten imputations.

sex is a dichotomous variable with “1” representing males. Parent’s education level is used as a proxy for socioeconomic status, coded as the highest level of education attained by the mother or father. Responses range from 1 to 6, with 1 representing grade school and 6 representing graduate school. In addition to these demographic attributes, we control for respondents’ family structure with a dummy variable coded 1 for those who lived in a single parent household and coded 0 for all other household arrangements.

To explore whether changes in informal social controls may account for the observed reductions in youth offending, we include several indicators of school commitment/attachment, parental monitoring, and community involvement that have been employed in prior research based on the MTF (Bryant et al., 2000; Dever et al., 2012). School attachment was measured as an additive scale of two variables that gauge the extent to which respondents in the previous year had positive bonds to their school. The first variable captures how often youth liked school and the second gauges how frequently youth hated school, with both measured on a five-point scale ranging from never to always. We reverse coded the “hated school” item and averaged responses across the two items to create a school attachment scale ( $\alpha=.79$ ), with higher values indicating greater attachment. To capture individual differences in school commitment, we incorporated a dichotomous measure of educational expectations that contrasted youth who indicated that they expected to graduate from a four-year college (coded 1) with youth who expressed lower expectations (coded 0). The extent of parental supervision was measured by the number of hours on average youth spent alone after school, ranging from more than three hours (coded 0) to none (coded 4). We assume that higher values on this measure indicate greater levels of parental supervision. Youth involvement in community affairs was measured with a single item that asks respondents “how often they participate in community affairs or volunteer work,” with responses ranging from 0 (never) to 4 (almost every day).

We include measures of youth involvement in unstructured socializing, employment, and alcohol consumption to capture differences in exposure to settings or conditions that may promote delinquency. Our measure of unstructured socializing is a three-item scale that draws from previous research based on MTF data (Osgood et al., 1996; Staff et al., 2010). Specifically, we created an additive scale of standardized responses about the weekly frequency of three different activities, including riding around for fun (0=never, 4=almost every day), spending time with friends (0=never, 4=almost every day), and going out in the evening (0=less than one, 5 six or seven days) ( $\alpha=.56$ ), with higher values indicating more frequent unstructured socializing. The measure of alcohol consumption represents the number of occasions respondents had alcohol to drink during the previous 30 days, with seven response options that range from 0 (none) to 6 (40 or more). We measure youth involvement in legal work with three dummy variables that contrast those who did not work (the reference group) with those who engaged in intensive employment (working 20 hours or more per week) and moderate employment (working less than 20 hours per week) (see Staff & Uggen, 2003; Staff et al., 2010).

---

<sup>7</sup>Latinos, Asians, and other ethnic minorities are classified as “other race.” The public-use MTF data does not permit a more detailed analysis of race and ethnicity.

Finally, we combine two attitudinal measures of preferences for risky and dangerous activities to gauge individual-level differences in sensation-seeking. These items measure respondents' agreement (1=disagree, 5=agree fully) with the statements "I get a real kick out of doing things that are a little dangerous" and "I like to test myself every now and then by doing something a little risky." These items are relevant to the sensation-seeking component included in many self-control scales (see Burt et al., 2014) and have been shown in prior research to exhibit a strong association with several forms of deviance and delinquency (Staff et al., 2010; Keyes et al., 2015). We created dichotomous indicators for each of the measures, contrasting those who fully agree with the statements to those who do not indicate full agreement. We averaged responses across the two items to create a risk preference scale that ranges from 0 to 1, with higher values indicating a stronger preference for risk taking ( $\alpha=.74$ ).

#### 4.3. Descriptive Features of the Sample

Table 1 presents descriptive statistics for all of the measures included in the study. It reveals some noteworthy details about the MTF sample, pooled over the 25-year period examined. The sample was about evenly split between 10<sup>th</sup> (52.4%) and 8<sup>th</sup> graders (47.6%). The majority of the sample was white (64.16%), and about 21 percent of respondents lived in single parent households. The average parental education level was equivalent to a high school diploma. Table 1 also shows that, overall, 45% of the sample reported having engaged in one or more acts of violence or property crimes in the past year, but as referenced earlier, the MTF shows that youth offending prevalence fell by 35 percent over the period (see Figure 1).

An important issue for our analysis is whether the explanatory variables also exhibited significant change over time in a manner that, from a theoretical standpoint, could have translated into reductions in youth offending prevalence. To explore this, we plotted the year-specific values for these variables and evaluated whether the corresponding trends exhibited significant changes over the period. We summarize key trends in Figure 2, with other more detailed patterns referenced in the text documented in the online supplement.

Figure 2 reveals considerable reductions in the indicators we use to capture changes in exposure to settings or conditions that may promote delinquency (Panels A–C). As others analyses of the MTF data have shown (e.g., Twenge & Park, 2019), alcohol use among youth has declined considerably during the past several decades, a decline that has been documented across multiple data sources as well (Chen et al., 2013). Closer inspection of the data used in our study indicates that this reflects large (i.e., greater than 50 percent) reductions in both the prevalence of drinking at all (i.e., on one or more occasions) and the prevalence of drinking very frequently (i.e., on six or more occasions) in the month preceding the interview (see Figure S1a in the online supplement). Youth involvement in paid work and unstructured socializing also have fallen substantially since the early 1990s (see also Arnett, 2018; Johnson et al., 2017; Staff et al., 2014; Twenge & Park, 2019). The interpretation of the observed decreases in the unstructured socializing scale is not highly intuitive, but in our data this represents a 25 percent decrease in the frequency of going out, a 19 percent decrease in riding around, and a 16 percent decrease in hanging out with friends

see Figure S1b in the online supplement). The MTF shows a comparable decrease in youth sensation-seeking (see also Twenge, 2017). As shown in Panel D of Figure 2, the combined index shows a decrease of 22 percent; this reflects similar reductions in the percentage of youth who indicate fully agreeing that they like doing things that are “a little dangerous” and who like to test themselves by “doing something a little risky” (see Figure S1c in the online supplement). Because alcohol consumption, intensive work, unstructured socializing, and sensation-seeking are theoretically expected to be positively associated with criminal activity among youth, the observed reductions in these factors could be relevant to the decline in youth offending.

Youth involvement in the community increased slightly during the period (Figure 2, Panel E), suggesting that it also could have theoretically contributed to reductions in youth offending. In contrast, educational expectations, school attachment, and parental supervision after school exhibited little change over the period (Figure 2, Panels F–H). We retain these factors in the analysis because of their theoretical relevance to individual differences in youth criminal involvement, but these descriptive patterns suggest they are unlikely to contribute meaningfully to explaining changes in youth offending.

#### 4.4. Analytical Strategy

The purpose of our multivariable analysis is to assess whether changes in the included explanatory variables can help to account for the observed reduction in youth offending prevalence over the study period. Addressing this question with individual-level repeated cross-sectional (RCS) data is a unique feature of the study, as prior studies of crime trends have focused on aggregate-level data sources and analyses, neglecting the potential role of changes in individual-level behaviors and attributes. A variety of methodological approaches have been applied to RCS data (for a review, see Lebo & Weber, 2015), and we considered multiple strategies in the present research. In the main analysis reported below, we describe findings from a series of multilevel logistic regression models in which respondents (level 1) are nested within different survey years (level 2) and standard errors are adjusted for serial correlation at level 2 (see DiPrete & Grusky, 1990). This strategy treats time (i.e., survey years) as random intercepts and offers a flexible framework for analyzing changes in youth offending over time in RCS data.<sup>8</sup>

The multilevel specification we adopt accounts for the presence of serial correlation in youth offending during our study period by incorporating an AR(1) correlation structure between survey years (level 2), which parallels adjustments often made in aggregate-level analyses of crime trends. We estimate two random effects models. The first is a baseline model that incorporates only the individual-level control variables. The baseline model takes the following form:

---

<sup>8</sup>We also implemented an alternative fixed effects specification in which time points (i.e., years) were modeled by incorporating dummy variables for all years except one as the referent category (see Jerit & Barabas 2012; Johnson et al., 2017). This approach yielded substantively identical conclusions, which we show in the online supplement. We prefer the random effects approach because it permits us to evaluate the possibility of significant slope variation over time, which also may contribute to social changes observed in repeated cross-sectional data (see Firebaugh, 1997).

$$\text{logit}(E(Y)) = \mathbf{X}\beta + u, \quad \text{Eq. 1}$$

where  $Y$  denotes the dependent variable vector and  $E(Y)$  denotes its expected value;  $\mathbf{X}$  denotes the fixed effects design matrix for individual-level control variables including grade level, sex, race-ethnicity, family structure, and parental SES;  $\beta$  denotes the fixed effects coefficient vector for the control variables; and  $u$  denotes the random intercept vector for time points  $j$  that has a normal distribution with mean 0 and the standard first-order autoregressive [AR(1)] covariance matrix. The model depicted in equation 1 differs from a standard multilevel regression model in that it relaxes the assumption in the latter that random intercepts  $u_j$ 's are independently distributed to account for correlation among them (see also Xu, 2014). That is, equation 1 is motivated on the basis that the value of the dependent variable at time  $t$  may depend on its prior value at time  $t-1$ .

We used the coefficient estimates from equation 1 to compute predicted probabilities of youth crime prevalence by year, adjusted for differences over time in the control variables. We then expanded the analysis to include the explanatory variables yielding the following specification for model 2:

$$\text{logit}(E(Y)) = \mathbf{X}\beta + \mathbf{Z}\gamma + u, \quad \text{Eq. 2}$$

where  $Y$ ,  $\mathbf{X}$ ,  $\beta$ , and  $u$  are defined as in equation 1;  $\mathbf{Z}$  denotes the fixed effects design matrix for individual-level explanatory variables including indicators of school commitment and attachment, parental monitoring, community involvement, unstructured socializing, alcohol consumption, employment intensity, and sensation-seeking; and  $\gamma$  denotes the fixed effects coefficient vector for the explanatory variables. Model results from equation 2 allow us to compute predicted probabilities of youth crime prevalence for each year. Comparing the resulting trend in predicted youth offending probabilities from equation 2 to the estimated trend in predicted youth offending probabilities from equation 1 yields an estimate of how much the reduction in youth offending since the early 1990s may be due to the explanatory variables.<sup>9</sup>

In the equation for model 2 the coefficients for the explanatory variables are assumed to be fixed over time, but it is theoretically plausible that some of these may exhibit change over time and this variability may be another source of changes in levels of youth offending (Firebaugh, 1997). We assessed this possibility by estimating supplementary models in which the slopes for the explanatory variables were allowed to vary over time. These analyses revealed limited evidence of significant slope variability. Most importantly, the conclusions drawn about the sources of changes in youth offending prevalence were substantively identical to those obtained from the more parsimonious version of equation 2 described above. Thus, we focus on results obtained from models that contained only random intercepts.

<sup>9</sup>We used the R package MASS's `glmmPQL` function with the AR(1) correction option (Venables and Ripley, 2002) to estimate equations 1 and 2. We computed the predicted probabilities by assuming mean values for the control variables and assuming 1991 yearly means for the explanatory variables.

The random effects modeling approach applied here offers a suitable and flexible strategy for addressing our research question, but the estimated coefficients could be biased if our dependent variable—youth offending prevalence—exhibits non-stationarity (Greenberg, 2014). Although statistical tests to detect non-stationarity have limited power when the number of time data points is relatively small, which is the case in our data, we recognize it as a plausible threat to the inferences that can be drawn. Recently developed applications to account for non-stationarity in the context of RCS data (Lebo and Weber, 2015) are not applicable to non-linear models, but as we describe later in the paper, we conducted supplementary analyses that suggest that bias from possible non-stationarity in youth offending is minimal. Of course, this does not rule out other forms of omitted variables bias, so the coefficients presented below should be interpreted as associations rather than causal estimates.

## 5. RESULTS

Table 2 presents the results of the two multilevel random-effects models described above. Model 1 includes only the control variables, while model 2 also considers the proposed explanatory variables. For both models, sampling weights were incorporated to adjust for the multistage sampling strategy employed in the MTF. Model 1 reveals parameter estimates for the control variables that are consistent with previous empirical research on delinquency. Additionally, the results from model 2 show that each of the proposed explanatory variables also exhibits the theoretically expected association with youth offending prevalence. To address our core research question, we used the coefficient estimates presented in models 1 and 2 to compute year-specific predicted probabilities of youth offending prevalence, assuming mean values for the control variables and 1991 values for the explanatory variables. Comparing the resulting predicted probabilities from the two models permits an assessment of the extent to which the explanatory factors were associated with youth offending trends during the study period. Figure 3 summarizes that comparison.

The solid line in Figure 3 shows that, after adjusting for slight differences over time in the composition of the MTF sample (Model 1), the prevalence of youth offending declined by 35.3 percent. More relevant to the study purpose, the dashed line reveals that the estimated reduction in youth offending prevalence would have been notably smaller—23.4 percent—had the explanatory variables remained at their 1991 levels. This evidence suggests that the explanatory variables accounted for slightly more than one-third ( $.346 = [35.3 - 23.4] / 35.3$ ) of the decrease in youth offending prevalence between 1991 and 2015.<sup>10</sup> Further analysis, in which we estimated Model 2 multiple times to examine each of the explanatory variables individually, revealed that reductions in unstructured socializing and alcohol consumption were most instrumental in this regard, with reductions in sensation-seeking and employment intensity playing a smaller role as well. The other factors considered—parental supervision, educational expectations, school attachment, and community involvement—appear to have contributed very little to the observed reductions in youth offending prevalence.<sup>11</sup>

---

<sup>10</sup>As reported in the online supplement Table S1 and Figure S2), substantively identical patterns are observed from single-level logistic regression models that incorporate dummy variables for years.



## 5.1. Supplementary Analyses

The model results reported thus far assume that the mean, variance, and covariances of youth offending prevalence are not dependent on time (i.e., stationarity). This assumption may be questionable in an assessment of youth offending trends across 25 years, which raises concerns that the parameter estimates for the Xs and Zs in equations 1 and 2 could be biased (Greenberg, 2014). Methods have yet to be developed for addressing non-stationarity in nonlinear multilevel RCS models such as ours, but we implemented an alternative approach to our data and research question to assess the robustness of the conclusions we draw from the analysis. Instead of analyzing changes in youth offending prevalence over the full 25-year time frame, we selected data from two sub-periods that represent the beginning and ending points of the series (1991–1995 and 2011–2015), excluding data from the intervening years, and we modeled changes in youth offending prevalence by comparing patterns across these two periods. In this specification, “time” was measured as a binary variable, coded 0 for the early 1990s (1991–1995) and coded 1 for the early 2010s (2011–2015). Collapsing the data in this fashion yields a significant loss in sample size, but it should minimize concerns about non-stationarity while still permitting an assessment of the overarching question of whether the explanatory variables can account for reductions in youth offending prevalence over the past two decades.

Paralleling the analytical approach summarized in Table 2, we estimated two logistic regression models with the reconfigured data, including a baseline model with only the control variables and a second model in which the explanatory variables were considered along with the control variables. In addition to reducing concerns about biases associated with non-stationarity, another advantage of this alternative approach is that it enables a more straightforward assessment of the degree to which the explanatory variables contribute to the observed difference in offending prevalence among youth surveyed in the early 2010s and those surveyed in the early 1990s. The results of this alternative approach are presented in Table 3.

Model 1 of Table 3 shows that, controlling for differences in grade level, demographic composition, family structure, and parental education, the prevalence of youth crime was significantly lower among youth interviewed between 2011 and 2015 than those interviewed between 1991 and 1995. The coefficient for the dummy variable indicating the survey period (1=2011–2015) is statistically significant ( $-.565, p < .05$ ) and implies that youth offending prevalence was substantially lower in the 2011–2015 period than in the 1991–1995 period. In model 2, the coefficient for survey period is considerably smaller ( $-.322, p < .05$ ), suggesting that the explanatory variables played a non-trivial role in the observed reduction in youth offending prevalence over the two periods contrasted but also that a considerable amount of the differences is not explained by the factors considered.

Making a meaningful comparison of the coefficients across models 1 and 2 requires some additional steps to account for the rescaling that occurs with the addition of the explanatory

---

<sup>11</sup>As described in the data and methods section, we also estimated the two multilevel random effects regression models on all sample respondents ( $n=304,326$ ) after applying multiple imputation of missing data. As shown in the online supplement Table S2, the imputed dataset yields patterns and conclusions that closely parallel those reported in Table 2.

variables (Allison, 1999). Following Breen et al. (2013), we estimated the rescaled coefficients to evaluate the degree to which considering the explanatory variables accounts for the observed relationship between survey period and youth offending prevalence.

As we show in Table 4, after adjusting for rescaling, the coefficient for survey period is reduced from  $-.634$  to  $-.322$  when the explanatory variables are considered (see Panel A). Thus, nearly half (49 percent) of the estimated difference in offending prevalence between youth interviewed in the early-to-mid 1990s and those interviewed in the early-to-mid 2010s is accounted for by including the explanatory variables. As displayed in Panel B of Table 4, applying Breen et al.'s (2013) decomposition method reveals that most of this can be attributed to differences between the two groups in alcohol consumption (19.32%) and unstructured socializing (14.19%), with a smaller amount attributed to differences sensation-seeking (5.45%) and moderate employment (4.80%). The other explanatory variables were far less consequential. Overall, the alternative modeling strategy implemented in Tables 3 and 4 yields results for youth offending prevalence that corroborate those produced by the multilevel random-effects models presented in Table 2.<sup>12</sup>

We further extended the study by applying our analysis separately to violence and property crime, the results of which we include in the online supplement. The findings obtained from the regression models estimated (see Tables S3 and S4) reveal a few differences across the two classes of delinquency in the estimates for some of the explanatory variables. For instance, the estimated coefficients for unstructured socializing, moderate employment, and college expectations are larger in the model for violence prevalence. Additionally, in the full models (Table S3), intensive employment is positively associated with violence prevalence and negatively associated with property crime prevalence, but this unexpected finding appears to be fragile, as it does not hold in the alternative specification considered (Table S4). Most pertinent to the present study, the overall patterns observed for the correlates of changes in youth offending prevalence are very similar for violent and property crime (see online Figure S3 and Table S5).

## 6. DISCUSSION

The proportion of 8<sup>th</sup> and 10<sup>th</sup> graders interviewed in the MTF who reported to have engaged in violence or property crime in the preceding year fell substantially—by more than 30 percent—between the early 1990s and mid-2010s. Prior research on this phenomenon has focused heavily on illuminating trends for various geographic areas (e.g., states, metro areas, counties, cities, and neighborhoods) and exploring the potentially important explanatory role of changes in aggregate-level social, economic, and criminal justice conditions. While that focus has proven valuable, the analysis presented in this study offers new insights about the contemporary reduction in youth crime. It does so by drawing on individual-level repeated cross-sectional data to explore whether changes in delinquency among youth since the early

---

<sup>12</sup>As an additional test, we estimated the multivariate decomposition model developed by Powers et al. (2011), which partitions group differences in a nonlinear response outcome into differences in subject attributes on the explanatory variables, and differences in the estimated coefficients. Applying this specification to model 2 of Table 3 revealed that the difference in offending prevalence between those surveyed in the early-to-mid 1990s and early-to-mid 2010s is due almost entirely to differences in attributes on the explanatory variables.

1990s are associated with indicators of youth attachment and commitment to institutions of social control, youth exposure to situations and settings conducive to crime, and youth criminal propensity.

The results suggest that the indicators of informal social control considered were not highly relevant to the youth crime decline in America. Across multiple specifications, the findings show that the reduction in youth offending prevalence observed between 1991 and 2015 was not associated with changes in youth attachment and commitment to school, community involvement, or the degree of parental supervision after school. While these factors were found to be significantly related to delinquent involvement in the theoretically expected manner, they did not change notably over the study period and were therefore not associated with the observed change in delinquency.

It is possible that changes in other dimensions of social control not included in the study would have emerged as more influential in explaining changes in youth delinquency. For example, over this period there is evidence that youth became exposed to increasing levels of physical and virtual surveillance in their schools and communities (Johns Hopkins University Applied Physics Laboratory, 2016; King & Bracy, 2019; Lyon, 2018), which may have suppressed involvement in delinquency. Alternatively, although rates of arrest for school-aged youth declined over the period (OJJDP, 2019), their subjective assessments of the probability of detection and/or being sanctioned by the criminal justice system and other authority figures (e.g., school administrators, parents) may have risen, which in turn could have played an important role in reducing youth delinquency. Finally, although the MTF does not show significant changes in parental monitoring during the study period, some scholars have pointed to an increase in protective parenting practices and risk-averse child socialization during the 1980s and 1990s (Lukianoff & Haidt, 2018). For reasons articulated well in many life-course theories, those changes could have later yielded lower levels of delinquency among those who aged into adolescence during the 1990s and beyond. Building on this idea, Twenge and Park (2019:649–653) have suggested that youth in the 2000s and 2010s may have followed “a slower life strategy” than their predecessors in the 1990s, as the former group reacted to a social control context that strongly emphasized the extensive opportunity costs associated with engaging in risky behaviors. While we are aware of no evidence that the age of onset for delinquency, or the age-crime curve more generally, has shifted meaningfully in recent decades, there is some evidence that the decline in youth alcohol consumption may reflect a delay in the onset of alcohol consumption (e.g., Arnett, 2018; Kerr et al., 2009; Twenge & Park, 2019). Thus, it is possible that changes in early life parenting and socializing practices in the 1980s and 1990s were instrumental to decreases in youth alcohol consumption, which in turn contributed to the observed reductions in youth violence and property crime. Unfortunately, the MTF does not include relevant indicators that would permit us to directly assess these alternative arguments. We encourage future research that explores changes in these other dimensions of social control and that assesses whether they can help us understand changes in youth crime involvement.

The cross-sectional nature of our research design and the omission of potentially important factors mean that we must be cautious in drawing conclusions from the significant associations we observed. With that caveat duly noted, our findings provide some evidence

consistent with perspectives that connect the youth crime decline to decreases in youth exposure to settings and situations conducive to delinquency and, to a lesser extent, to reductions in criminal propensity.<sup>13</sup> Consistent with much prior research, we found a significant positive association between delinquency and one dimension of self-control, sensation-seeking, which we measured with indicators of youth preferences for risky and dangerous activities (Arneklev et al., 1993; Burt et al., 2014; Staff et al., 2010; Keyes et al., 2015). Our results show that sensation-seeking declined considerably among youth, and that this played a small role in the reduction observed in youth offending prevalence.<sup>14</sup> This is consistent with perspectives that emphasize shifts in criminal propensity as an explanation for reductions in youth crime since the early 1990s, though it is important to acknowledge that the overall contribution of the indicator of sensation-seeking considered was relatively small and our study cannot speak to whether factors such as exposure to lead toxins and changes in abortion laws were relevant (Donohue and Levitt; 2001; Nevin, 2007; Reyes, 2007). It would be valuable for criminologists to explore these issues in future research.

Among the individual-level factors we could incorporate in the study, the results suggest that decreases in unstructured socializing and alcohol consumption were most strongly associated with the reduction in youth delinquency. Criminologists have devoted surprisingly little attention to the substantial decreases in unstructured socializing among youth that have occurred over the past few decades. This shift has likely been driven by changes during the period in the presence of computers, internet access, and video games within the home (Child Trends Data Bank, 2015), and in technological enhancements to mobile phones, all of which have offered youth unprecedented in-home entertainment options and have enabled youth to increasingly develop and foster friendships virtually (Lenhart et al., 2015; Twenge, 2017). These changes may be relevant to the reduction in alcohol consumption documented since the early 1990s as well, though research has primarily emphasized changing social norms (Keyes et al., 2012) and more restrictive drinking and driving laws (Carpenter et al., 2007). Whatever their sources, our results show that the decreases in unstructured socializing and alcohol consumption were significantly associated with reductions in youth delinquency between 1991 and 2015. Prior research using a wide variety of methods has provided consistent and persuasive evidence that involvement in unstructured socializing (Osgood et al., 1996; Hoeben and Weerman, 2016) is a significant antecedent to youth crime. Research also consistently finds a significant positive association between alcohol consumption and delinquency (Popovici et al., 2012; White et al., 2013), and though the causal meaning of this association remains open to debate, there is convincing evidence that alcohol consumption increases involvement in property crime and violence (Carpenter et al., 2007; Felson et al., 2008; Ford, 2005; Osgood et al., 1988).

Against this backdrop, we assert that a plausible interpretation of our findings is that, compared to their counterparts in the 1990s, contemporary youth spend much less time

---

<sup>13</sup>Though we also find that youth employment declined considerably during the period, we downplay its potential role here because prior research that has implemented methods better suited at accounting for unobserved heterogeneity suggests that the association between youth employment and delinquency is likely to be spurious (Apel et al., 2007; Paternoster et al., 2003).

<sup>14</sup>These findings comport with results from Cundiff (2020), who reports that a key reason that 18 year-old males interviewed in Pittsburgh Youth Study (PYS) in the late-1990s exhibited much lower levels of delinquency than 18 year-olds males interviewed in the early 1990s was that the former group entered their teen years with a lower propensity for crime.

away from home with peers in contexts that provide limited supervision and plentiful opportunities for deviance, including alcohol consumption, and this is part of the reason why contemporary youth are much less likely to engage in violence and property crime. Arnett (2018) reached a similar conclusion in his recent assessment of descriptive evidence relevant to why American youth may have become much less likely over the past three decades to engage in a variety of risky behaviors. Nonetheless, we caution that before definitive conclusions may be drawn additional research is needed that employs designs suitable for causal inference.<sup>15</sup> Additionally, it is important to acknowledge that some of the forces that may have contributed to reductions in unstructured socializing and alcohol consumption (e.g., widespread access to home computers, the internet, home gaming systems, and smart phones), and by implication, youth delinquency, also have been linked to undesirable personality traits (Konrath et al., 2011; Koslow, 2012; Twenge, 2014) and a variety of adverse health outcomes, including obesity, depression, and suicide ideation and mortality (e.g., Boone et al., 2007; Twenge et al., 2018). Thus, future research should consider the wide-ranging consequences of the substantial social changes youth have experienced and exhibited over the past several decades.

## 7. CONCLUSION

In conclusion, this study makes an important contribution to the criminological literature by illuminating an alternative approach for assessing one of the more important and challenging questions that has emerged within criminology over the past few decades (Why have youth become much less likely to engage in crime?). The results suggest an important role for reductions in unstructured socializing and alcohol consumption, but as we have emphasized the findings that have emerged must be viewed as suggestive rather than definitive because of data limitations. Although we were able to incorporate several theoretically relevant attitudes and behaviors, they collectively account for only about half of the observed reduction in youth delinquency. Many other potentially relevant individual-level (e.g., differences in child rearing, impulsivity, perceived costs and benefits of engaging in crime) and community-level factors (e.g., changes in community-level patterns of imprisonment, policing, drug markets, and economic conditions) could not be incorporated into our analysis of the MTF data. We encourage future research that builds on our study by integrating these and other theoretically relevant explanatory variables and by applying alternative methods to account for unobserved heterogeneity.

We echo Baumer et al. (2018) in calling for criminologist to lean-in to the study of social change and for the U.S. Government or others to invest in new national data collection systems that would support more comprehensive analyses of the sources of current and future changes in crime and related outcomes. As the nation began to grapple this year with the COVID-19 pandemic and sporadic shutdowns that substantially altered the routine activities of many in the population, questions arose about the potential impact on crime and

---

<sup>15</sup>Our analysis cannot rule out the possibility that the observed changes in unstructured socializing, alcohol consumption, and delinquency are each merely the product of unmeasured factors, such as changes in early child socialization or the widespread availability of digital technologies within the home. However, as we note there are persuasive theoretical arguments and considerable evidence in the extant criminological literature that unstructured socializing and alcohol consumption are robust antecedents of delinquency.

victimization patterns. Later in the year, as several police shootings of citizens spurred protests, riots, calls for defunding local police, and changes in police allocation and investigation strategies, many wondered about the potential implications for crime levels. The predominant focus of criminological research on within-person changes in delinquency illuminated that the current data infrastructure for crime in the U.S. is not well-suited to provide timely answers to these questions about short-term changes, and we believe it also revealed a gap in the field's capacity to speak to many of the foundational "across person" social changes that unfolded in 2020.

It will be more challenging to go back in time to locate requisite data that will uncover additional insights about the substantial reductions in youth crime that have occurred since the early 1990s, but we also propose that it may prove worthwhile to reimagine some of the existing multi-cohort (e.g., the Pittsburgh Youth Study and the Denver Youth Study) and multi-generational panel datasets (e.g., the Rochester Youth Development Intergenerational Study and the National Youth Survey Family Study) that have been fielded over the past several decades. These data sources have been used primarily for purposes of understanding within-person changes in delinquency and related outcomes, and collectively they have helped to define much of what we know about the etiology of youth offending. Beyond this, because they may be reconfigured to provide data for similar aged samples of youth across multiple time points, they might yield important additional insights about broader societal changes among youth as well. For example, Berg et al.'s (2016) assessment of data from youngest and oldest cohorts in the PYS documents substantial reductions in crime among 18 year-olds in Pittsburgh during the 1990s and Johnson et al.'s (2015) analysis of intergenerational data from the National Youth Survey reveals substantially higher rates of offending among the original respondents (interviewed in the late 1970s) than their offspring (interviewed during the early 2000s) at the same ages. It would be valuable to expand these assessments to explore the factors that may account for the observed differences, a strategy which also could be pursued with other multi-cohort and multi-generational datasets gathered during the last several decades.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

We acknowledge assistance provided by the Population Research Institute at Penn State University, which is supported by an infrastructure grant by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (P2CHD041025).

## REFERENCES

- Agnew R (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, 30(1), 47–88. 10.1111/j.1745-9125.1992.tb01093.x
- Allison PD (1999). Comparing logit and probit coefficients across groups. *Sociological Methods & Research*, 28, 186–208. 10.1177/0049124199028002003
- Allison PD (2002). *Missing data*. Thousand Oaks, CA: Sage Publishing.



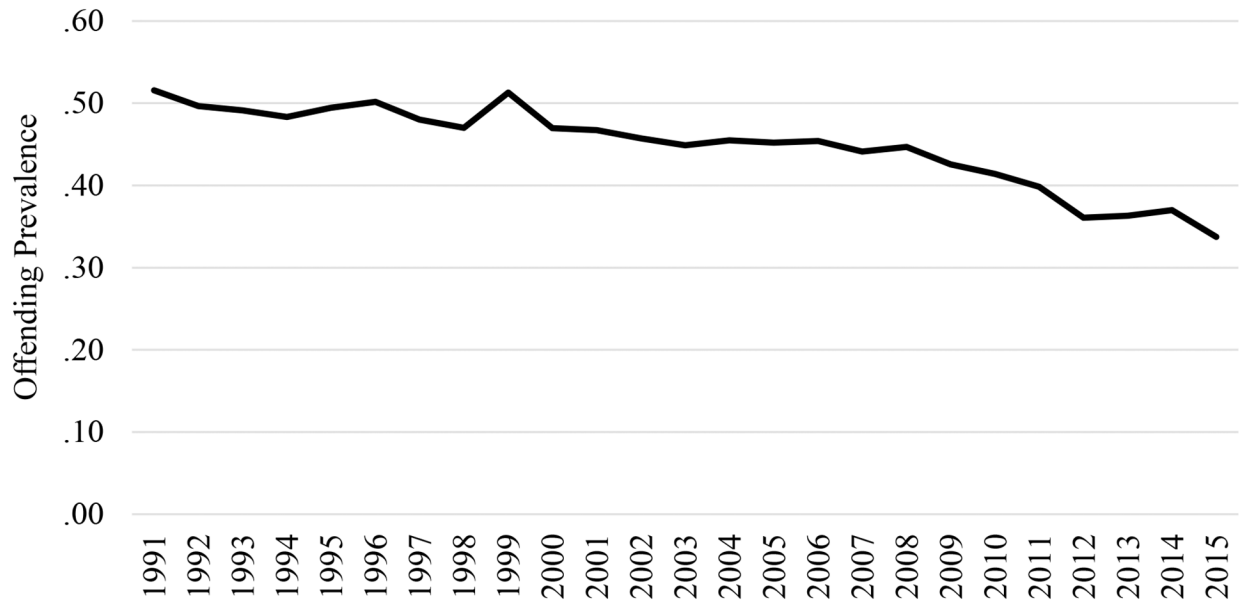
- Apel R, Bushway S, Brame R, Haviland AM, Nagin DS, & Paternoster R (2007). Unpacking the relationship between adolescent employment and antisocial behavior: a matched samples comparison. *Criminology*, 45, 67–97. 10.1111/j.1745-9125.2007.00072.x
- Apel R, & Horney J (2017). How and why does work matter? employment conditions, routine activities, and crime among adult male offenders. *Criminology*, 55(2), 307–343. 10.1111/1745-9125.12134
- Arneklev BJ, Grasmick HG, Tittle CR, Bursik RJ (1993). Low self-control and imprudent behavior. *Journal of Quantitative Criminology*, 9, 225–247. 10.1007/BF01064461
- Arnett JJ (2018). Getting better all the time: Trends in risk behavior among American adolescence since 1990. *Archives of Scientific Psychology*, 6, 87–95. 10.1037/arc0000046
- Bachman JG, Johnston LD, O'Malley PM, Schulenberg JE, & Miech RA (2015). The monitoring the future project after four decades: design and procedures (Monitoring the Future Occasional Paper No. 82). Ann Arbor, MI: Institute for Social Research.
- Baumer EP, Velez MB, & Rosenfeld R (2018). Bringing crime trends back into criminology: a critical assessment of the literature and a blueprint for future inquiry. *Annual Review of Criminology*, 1, 39–61. 10.1146/annurev-criminol-032317-092339
- Baumer EP, & Wolff KT (2014). Evaluating contemporary crime drops in america, new york city, and many other places. *Justice Quarterly*, 31, 5–38. 10.1080/07418825.2012.742127
- Berg MT, Baumer EP, & Rosenfeld R (2016). Dissecting the prevalence and incidence of offending during the crime drop of the 1990s. *Journal of Quantitative Criminology*, 32, 377–396. 10.1007/s10940-016-9289-6
- Blumstein A & Wallman J (2006). *The crime drop in America*, revised edition. New York: Cambridge University Press.
- Boone JE, Gordon-Larsen P, Adair LS, & Popkin BM (2007). Screen time and physical activity during adolescence: Longitudinal effects on obesity in young adulthood. *International Journal of Behavioral Nutrition and Physical Activity*, 4, 26. 10.1186/1479-5868-4-26 [PubMed: 17559668]
- Bouchard M, Gallupe O, Dawson K, & Anamali M (2018). No place like home? availability, opportunity, and substance use in adolescence. *Journal of Youth Studies*, 21(6), 747–764. 10.1080/13676261.2017.1420760
- Brame R, and Paternoster R (2003). Missing data problems in criminological research: Two case studies. *Journal of Quantitative Criminology*, 19, 55–78. 10.1023/A:1022518712229
- Breen R, Karlson KB, & Holm A (2013). Total, direct, and indirect effects in logit and probit models. *Sociological Methods & Research*, 42(2), 164–191. 10.1177/0049124113494572
- Bryant AL, Schulenberg J, Bachman JG, O'Malley PM, & Johnston LD (2000). Understanding the links among school misbehavior, academic achievement, and cigarette use: a national panel study of adolescents. *Prevention Science*, 1(2), 71–87. 10.1023/A:1010038130788 [PubMed: 11521961]
- Burt CH, Sweeten G, & Simons RL (2014). Self-Control through emerging adulthood: instability, multidimensionality, and criminological significance. *Criminology*, 52, 450–487. 10.1111/1745-9125.12045
- Carpenter C (2007). Heavy alcohol use and crime: Evidence from underage drunk-driving laws. *The Journal of Law & Economics*, 50, 539–557. 10.1086/519809
- Carpenter CS, Kloska DD, O'Malley P, & Johnston L (2007). Alcohol control policies and youth alcohol consumption: evidence from 28 years of monitoring the future. *The B.E. Journal of Economic Analysis and Policy*, 7, 1–18. 10.2202/1935-1682.1637
- Chen CM, Yi HY, & Faden VB (2013). Surveillance report #96, trends in underage drinking in the United States, 1991–2011. Washington, DC: National Institute on Alcohol Abuse and Alcoholism.
- Child Trends. (2015). Teen homicide, suicide, and firearm deaths: indicators on children and youth. Child Trends Data Bank. (2015). Home computer access and internet use. Washington, DC: Child Trends.
- Cohen L, & Felson M (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review*, 44, 588–608.
- Cook PJ, & Laub JH (1998). The unprecedented epidemic in youth violence. *Crime and Justice* 24: 27–64. 10.1086/449277

- Cundiff K (2020). Reassessing the 1990's Crime Drop: An Individual Level Approach. [Unpublished doctoral dissertation]. Pennsylvania State University.
- Desilver D (2015). The fading of the teen summer job. Pew Research Center. Washington, DC: Pew Research Foundation.
- Dever BV, Schulenberg JE, Dworkin JB, O'Malley PM, Kloska DD, & Bachman JG (2012). Predicting risk-taking with and without substance use: the effects of parental monitoring, school bonding, and sports participation. *Prevention Science*, 13(6), 605–615. 10.1007/s11121-012-0288-z [PubMed: 22960940]
- DiPrete TA, & Grusky DB (1990). The multilevel analysis of trends with repeated cross-sectional data. *Sociological Methodology*, 20, 337–368. doi:10.2307/271090
- Donohue JJ, & Levitt SD (2001). The impact of legalized abortion on crime. *Quarterly Journal of Economics*, 116, 379–420. 10.1162/00335530151144050
- Eisner M (2008). Modernity strikes back? A historical perspective on the latest increase in interpersonal violence 1960–1990. *International Journal of Conflict and Violence*, 2, 268–316. 10.4119/ijcv-2769
- Elonheimo H (2014). Evidence for the crime drop: Survey findings from two Finnish cities between 1992 and 2013. *Journal of Scandinavian Studies in Criminology and Crime Prevention*, 15, 209–217. 10.1080/14043858.2014.939458
- Farrell G, Tilley N, & Tseloni A (2014). Why the crime drop? *Crime and Justice* 43: 421–490. 10.1086/678081
- Farrell G, Tseloni A, Mailley J, & Tilley N (2011). The crime drop and the security hypothesis. *Journal of Research in Crime and Delinquency* 48: 147–175. 10.1177/0022427810391539
- Felson M (1998) *Crime and everyday life* (2nd ed.). Thousand Oaks, CA: Sage
- Felson RB, & Staff J (2010). The effects of alcohol intoxication on violent versus other offending. *Criminal Justice and Behavior*, 37(12), 1343–1360. 10.1177/0093854810382003
- Felson RB, Teasdale B, & Burchfield K (2008). The influence of being under the influence: alcohol effects on adolescent violence. *Journal of Research in Crime & Delinquency*, 45, 119–141. 10.1177/0022427807313704
- Firebaugh G (1997). *Analyzing repeated surveys*. Thousand Oaks, CA: Sage Publications.
- Ford JA (2005). The connection between heavy drinking and juvenile delinquency during adolescence. *Sociological Spectrum*, 25(6), 629–650. 10.1080/02732170500256609
- Forrest W, Hay C, Widdowson AO, & Rocque M (2019). Development of impulsivity and risk-seeking: implications for the dimensionality and stability of self-control. *Criminology*, 57(3), 512–543. 10.1111/1745-9125.12214
- Franken A, Moffitt TE, Steglich CE, Dijkstra JK, Harakeh Z, & Vollebergh WA (2016). The role of self-control and early adolescents' friendships in the development of externalizing behavior: The SNARE study. *Journal of Youth and Adolescence*, 45(9), 1800–1811. 10.1007/s10964-015-0287-z [PubMed: 25922116]
- Goldberger AS, Rosenfeld R, & Blumstein A (Eds.). (2008). *Understanding crime trends*. Washington, D.C.: National Academies Press.
- Gottfredson MR, & Hirschi T (1990). *A general theory of crime*. Palo Alto, CA: Stanford University Press.
- Gould ED, Weinberg BA, & Mustard DB (2002). Crime rates and local labor market opportunities in the united states: 1979–1997. *Review of Economics and Statistics*, 84, 45–61. 10.1162/003465302317331919
- Greenberg DF (2014). Studying New York City's crime decline: methodological issues. *Justice Quarterly*, 31, 154–188. 10.1080/07418825.2012.752026
- Hirschi T (1969). *Causes of delinquency*. Berkeley, CA: University of California.
- Hoeben EM, Meldrum RC, Walker DA, & Young JTN (2016). The role of peer delinquency and unstructured socializing in explaining delinquency and substance use: A state-of-the-art review. *Journal of Criminal Justice*, 47, 108–122. 10.1016/j.jcrimjus.2016.08.001

- Hoeben EM, Osgood DW, Siennick SE, & Weerman FM (2020). Hanging out with the wrong crowd? The role of unstructured socializing in adolescents' specialization in delinquency and substance use. *Journal of Quantitative Criminology*. 10.1007/s10940-019-09447-4
- Hoeben EM, & Weerman FM (2016). Why is involvement in unstructured socializing related to adolescent delinquency? *Criminology*, 54(2), 242–281. 10.1111/1745-9125.12105
- Jerit J, & Barabas J (2012). Partisan perceptual bias and the information environment. *Journal of Politics*, 74, 672–684. 10.1017/S0022381612000187
- Johns Hopkins University Applied Physics Laboratory. (2016). A comprehensive report on school safety technology. Washington, DC: U.S. Department of Justice, National Institute of Justice.
- Johnson MC, Morris RG, & Menard S (2015). Historical invariance in delinquency causation: a test of equivalent models of delinquency for two generations of adolescents. *Crime & Delinquency*, 61, 1283–1310. 10.1177/0011128712446051
- Johnson MK, Staff J, Patrick M, & Schulenberg J (2017). Adolescent adaptation before, during, and in the aftermath of the great recession in the united states. *International Journal of Psychology*, 52(1), 9–18. 10.1002/ijop.12389
- Kann L, McManus T, Harris WA, Shanklin SL, Flint KH, Hawkins J, ... & Whittle L (2016). Youth risk behavior surveillance—United States, 2015. Washington, DC: U.S. Department of Health and Human Services. 10.15585/mmwr.ss6506a1
- Kerr WC, Greenfield TK, Bond J, Ye Y, & Rehm J (2009). Age-period-cohort modelling of alcohol volume and heavy drinking days in the US National Alcohol Surveys: Divergence in younger and older adult trends. *Addiction*, 104, 27–37. 10.1111/j.1360-0443.2008.02391.x
- Keyes KM, Jager J, Hamilton A, O'Malley PM, Miech R, & Schulenberg JE (2015). National multi-cohort time trends in adolescent risk preference and the relation with substance use and problem behavior from 1976 to 2011. *Drug and Alcohol Dependence*, 155, 267–274. 10.1016/j.drugalcdep.2015.06.031 [PubMed: 26254018]
- Keyes KM, Schulenberg JE, O'Malley PM, Johnston LD, Bachman JG, Li G, & Hasin D (2012). Birth cohort effects on adolescent alcohol use: The influence of social norms from, 1976 to 2007. *Archives of General Psychiatry*, 69, 1304–1313. doi:10.1001/archgenpsychiatry.2012.787 [PubMed: 22868751]
- Keyes KM, Gary DS, Beardslee J, Prins SJ, O'Malley PM, Rutherford C, and Schulenberg J (2018). Joint effects of age, period, and cohort on conduct problems among American adolescents from 1991 through 2015, *American Journal of Epidemiology*, 187, 548–557. 10.1093/aje/kwx268 [PubMed: 28679165]
- King S, & Bracy NL (2019). School security in the post-Columbine era: Trends, consequences, and future directions. *Journal of Contemporary Criminal Justice*, 35, 274–295.
- Konrath SH, O'Brien EH, & Hsing C (2011). Changes in dispositional empathy in American college students over time: A meta-analysis. *Personality and Social Psychology Review*, 15, 180–198. 10.1177/1088868310377395 [PubMed: 20688954]
- Kornhauser R (1978). *Social sources of delinquency: An appraisal of analytic models*. Chicago: University of Chicago Press.
- Koslow S (2012). *Slouching toward adulthood: Observations from the not-so-empty nest*. New York: Viking.
- LaFree G (1998). *Losing legitimacy: Street crime and the decline of institutions in america*. Boulder: Westview.
- Lauritsen J, & Rezey ML (2013). *Measuring the prevalence of crime with the national crime victimization survey*. Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics.
- Lebo MJ, & Weber C (2015). An effective approach to the repeated cross-sectional design. *American Journal of Political Science*, 59(1), 242–258. 10.1111/ajps.12095
- Lenhart A, Smith A, Anderson M, Duggan M, & Perrin A (2015). *Teens, technology, & friendships: Video games, social media, and mobile phones play an integral role in how teens meet and interact with friends*. Washington, DC: Pew Foundation.
- Lidsky TI, & Schneider JS (2003). Lead neurotoxicity in children: Basic mechanisms and clinical correlates. *Brain*, 126(1), 5–19. 10.1093/brain/awg014 [PubMed: 12477693]

- Lukianoff G, & Haidt J (2018). *The coddling of the American mind: How good intentions and bad ideas are setting up a generation for failure*. New York: Penguin Publishing Group.
- Lyon D (2018). *The culture of surveillance: Watching as a way of life*. Cambridge, UK: Polity Press.
- Marschall-Lévesque S, Castellanos-Ryan N, Vitaro F, & Séguin JR (2013). Moderators of the association between peer and target adolescent substance use. *Addictive Behaviors*, 39(1), 48–70. 10.1016/j.addbeh.2013.09.025 [PubMed: 24183303]
- Meich RA, Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE, & Patrick ME (2020). *Monitoring the Future National Survey results on drug use, 1975–2019: Volume I, Secondary School Students*. Ann Arbor: Institute for Social Research, The University of Michigan.
- Meldrum RC, & Leimberg A (2018). Unstructured socializing with peers and risk of substance use: Where does the risk begin? *Journal of Drug Issues*, 48(3), 452–471. 10.1177/0022042618774263
- Merton RK (1938). Social structure and anomie. *American Sociological Review*, 3(5), 672–682.
- Messner S, & Rosenfeld R (1994). *Crime and the American dream*. Belmont, CA: Wadsworth Publishing.
- Moffitt TE, Arseneault L, Belsky D, Dickson N, Hancox RJ, Harrington H, ... & Sears MR (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences*, 108(7), 2693–2698. 10.1073/pnas.1010076108
- Narag RE, Pizarro J, & Gibbs C (2009). Lead exposure and its implications for criminological theory. *Criminal Justice and Behavior*, 36(9), 954–973. 10.1177/0093854809339286
- Needleman H (2004). Lead poisoning. *Annual Review of Medicine*, 55, 209–222. 10.1146/annurev.med.55.091902.103653
- Nevin R (2007). Understanding international crime trends: The legacy of preschool lead exposure. *Environmental Research*, 104, 315–36. 10.1016/j.envres.2007.02.008 [PubMed: 17451672]
- OJJDP. (2019). *Statistical briefing book*. Online. Available: [http://www.ojjdp.gov/ojstatbb/crime/JAR\\_Display.asp?ID=qa05201&selOffenses=1](http://www.ojjdp.gov/ojstatbb/crime/JAR_Display.asp?ID=qa05201&selOffenses=1).
- Osgood DW, Wilson JK, O'Malley PM, Bachman JG, & Johnston LD (1996). Routine activities and individual deviant behavior. *American Sociological Review*, 61, 635–655.
- Osgood DW, Johnston LD, O'Malley PM, & Bachman JG (1988). The generality of deviance in late adolescence and early adulthood. *American Sociological Review*, 53, 81–93.
- Osgood DW (1999). Having the time of their lives: All work and no play? In Booth A, Crouter AC & Shanahan MJ (Eds), *Transitions to adulthood in a changing economy: No work, no family, no future?* (pp. 176–186). Westport, CT: Praeger.
- Parker RN, & Cartmill RS (1997). Alcohol and homicide in the United States 1934–1995— Or one reason why u.s. rates of violence may be going down. *Journal of Criminal Law and Criminology*, 88, 1369.
- Paternoster R, Bushway S, Brame R, Apel R (2003). The effect of teenage employment on delinquency and problem behaviors. *Social Forces* 82: 297–335. 10.1353/sof.2003.0104
- Popovici I, Homer JF, Fang H, & French MT (2012). Alcohol use and crime: Findings from a longitudinal sample of u.s. adolescents and young adults. *Alcoholism: Clinical and Experimental Research*, 36, 532–543. 10.1111/j.1530-0277.2011.01641.x [PubMed: 22168924]
- Powers DA, Yoshioka H, & Yun MS (2011). mvdcmp: Multivariate decomposition for nonlinear response models. *The Stata Journal*, 11, 556–576. 10.1177/1536867X1201100404
- Pratt TC, & Cullen FT (2000). The empirical status of Gottfredson and iHrschi's general theory of crime: a meta-analysis. *Criminology*, 38, 931–964. 10.1111/j.1745-9125.2000.tb00911.x
- Putnam R (2000). *Bowling alone: The collapse and revival of american community*. New York, New York: Simon & Schuster.
- Reyes JW (2007). Environmental policy as social policy? The impact of childhood lead exposure on crime. *The B.E. Journal of Economic Analysis*, 7, 1–51. 10.2202/1935-1682.1796
- Rosenfeld R (2009). Crime is the problem: Homicide, acquisitive crime, and economic conditions. *Journal of Quantitative Criminology*, 25, 287–306. 10.1007/s10940-009-9067-9
- Rosenfeld R, Edberg M, Fang X, & Florence CS (Eds.). (2013). *Economics and youth violence: crime, disadvantage, and community*. New York: NYU Press.
- Roth R (2010). *American homicide*. Cambridge, MA: Harvard University Press.

- Raghunathan TE, Lepkowski JM, Hoewyk JV, & Solenberger P (2001). A multivariate technique for multiply imputing missing values using a sequence of regression models. *Survey Methodology*, 27, 85–95.
- Sampson RJ & Laub JH (1993). *Crime in the making: Pathways and turning points through life*. Cambridge, MA: Harvard University Press.
- Smith C (2011). Polarization, immigration, education: What's behind the dramatic decline in youth employment? Finance and Economics Discussion Series.
- Staff J, Johnson MK, Patrick ME, & Schulenberg JE (2014). The Great Recession and recent employment trends among secondary students in the United States. *Longitudinal and Life Course Studies*, 5, 173. doi: 10.14301/llcs.v5i2.275 [PubMed: 25642296]
- Staff J, Osgood DW, Schulenberg JE, Bachman JG, Messersmith EE (2010). Explaining the relationship between employment and juvenile delinquency. *Criminology*, 48, 1101–1131. 10.1111/j.1745-9125.2010.00213.x [PubMed: 21442045]
- Staff J, Schulenberg JE, & Bachman JG (2010). Adolescent work intensity, school performance, and academic engagement. *Sociology of Education*, 83, 183–200. 10.1177/0038040710374585 [PubMed: 20802795]
- Staff J & Uggen C (2003). The fruits of good work: Early work experiences and adolescent deviance. *Journal of Research in Crime and Delinquency*, 40, 263–290. 10.1177/0022427803253799
- Tittle CR (1995). *Control balance: Toward a general theory of deviance*. New York: Westview Press.
- Twenge JM (2017). *iGen: Why today's super-connected kids are growing up less rebellious, more tolerant, less happy--and completely unprepared for adulthood--and what that means for the rest of us*. New York: Atria Books.
- Twenge JM (2014). *Generation me: Why today's young Americans are more confident, assertive, entitled—and more miserable than ever before*. New York: Simon & Shuster.
- Twenge JM, & Park H (2019). The decline in adult activities among US adolescents, 1976–2016. *Child Development*, 90(2), 638–654. 10.1111/cdev.12930 [PubMed: 28925063]
- Twenge JM, Martin GN, & Campbell WK, (2018). Decreases in psychological well-being among American adolescents after 2012 and links to screen time during the rise of smartphone technology. *Emotion*, 18, 765–780. 10.1037/emo0000403 [PubMed: 29355336]
- van Buuren S (2007). Multiple imputation of discrete and continuous data by fully conditional specification. *Statistical Methods in Medical Research*, 16, 219–242. 10.1177/0962280206074463 [PubMed: 17621469]
- Venables WN, Ripley BD (2002). *Modern applied statistics with S* (4<sup>th</sup> ed.). Springer, New York.
- Weisburd D, Braga AA, Groff ER, & Wooditch A (2017). Can hot spots policing reduce crime in urban areas? An agent-based simulation. *Criminology*, 55(1), 137–173. 10.1111/1745-9125.12131
- White HR, Fite P, Pardini D, Mun EY, & Loeber R (2013). Moderators of the dynamic link between alcohol use and aggressive behavior among adolescent males. *Journal of Abnormal Child Psychology*, 41, 211–222. 10.1007/s10802-012-9673-0 [PubMed: 22911129]
- White IR, Royston P, & Wood AM (2011). Multiple imputation using chained equations: Issues and guidance for practice. *Statistics in Medicine*, 30, 377–399. 10.1002/sim.4067 [PubMed: 21225900]
- Wright R, Tekin E, Topalli V, McClellan C, Dickinson T, & Rosenfeld RR (2014). Less cash, less crime: Evidence from the electronic benefit transfer program. *The Journal of Law and Economics*, 60(2), 361–383. 10.1086/693745
- Xu H (2014). Comparing spatial and multilevel regression models for binary outcomes in neighborhood studies. *Sociological Methodology*, 44(1), 229–272. 10.1177/0081175013490188 [PubMed: 25284905]
- Zimring FE (2007). *The great American crime decline*. New York: Oxford University Press.



**Figure 1.** Prevalence of criminal behavior among 8th and 10th graders, 1991–2015 (n=204,621).

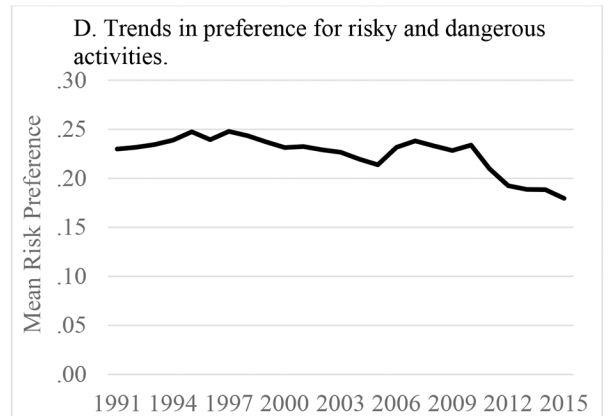
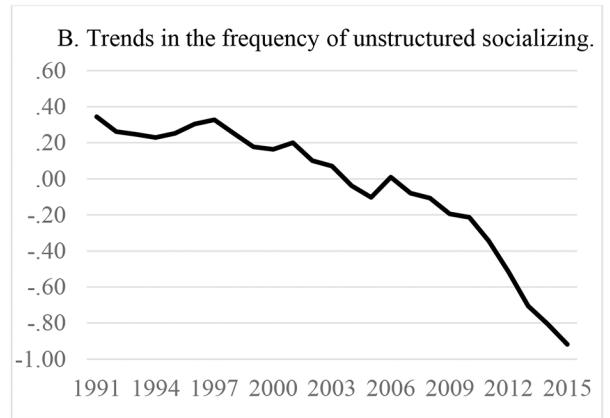
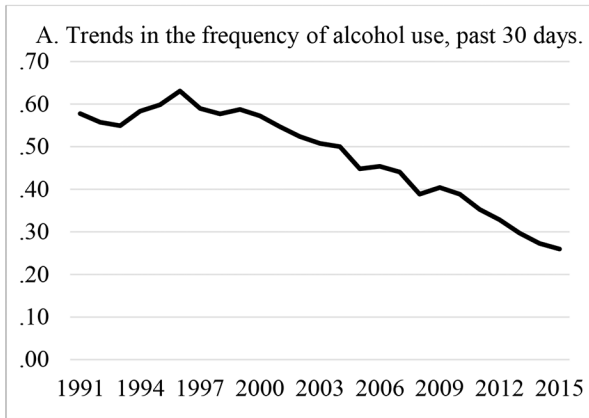


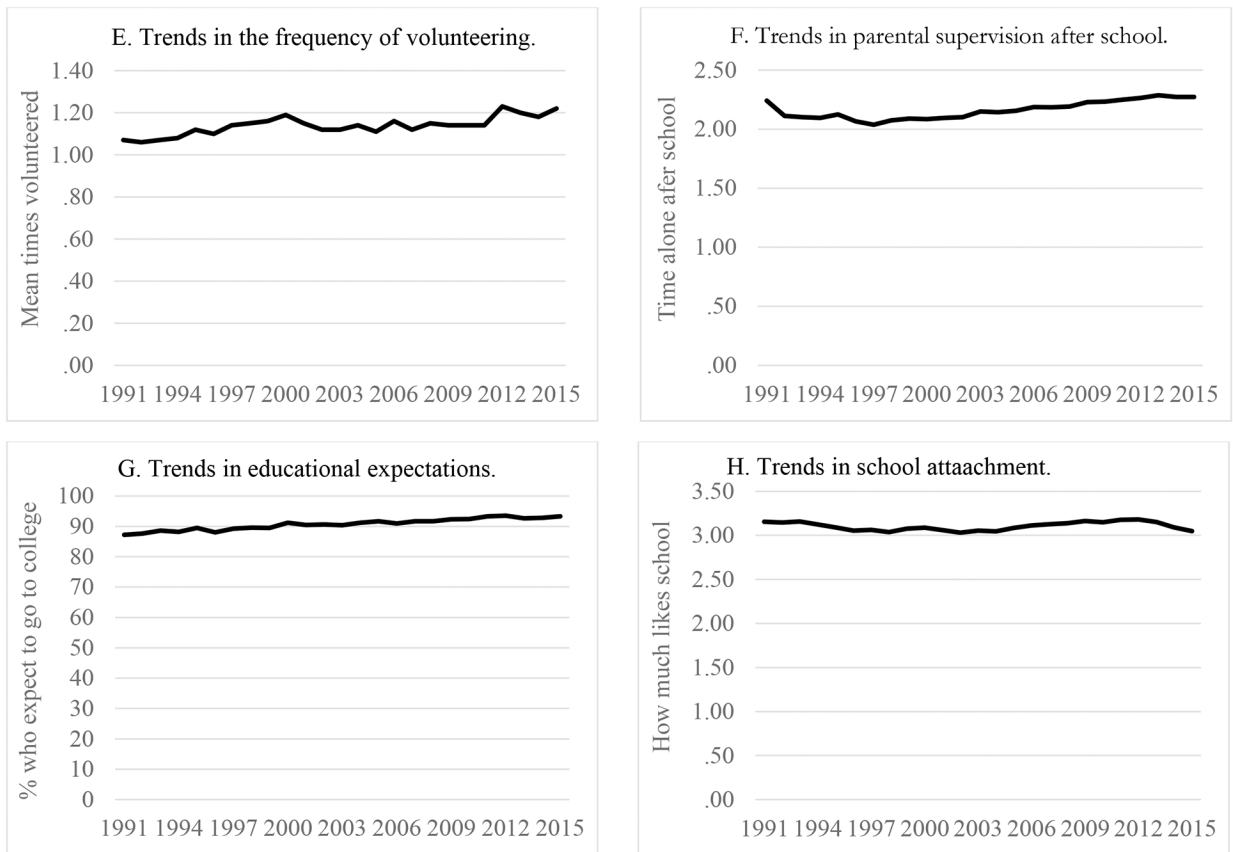
Author Manuscript

Author Manuscript

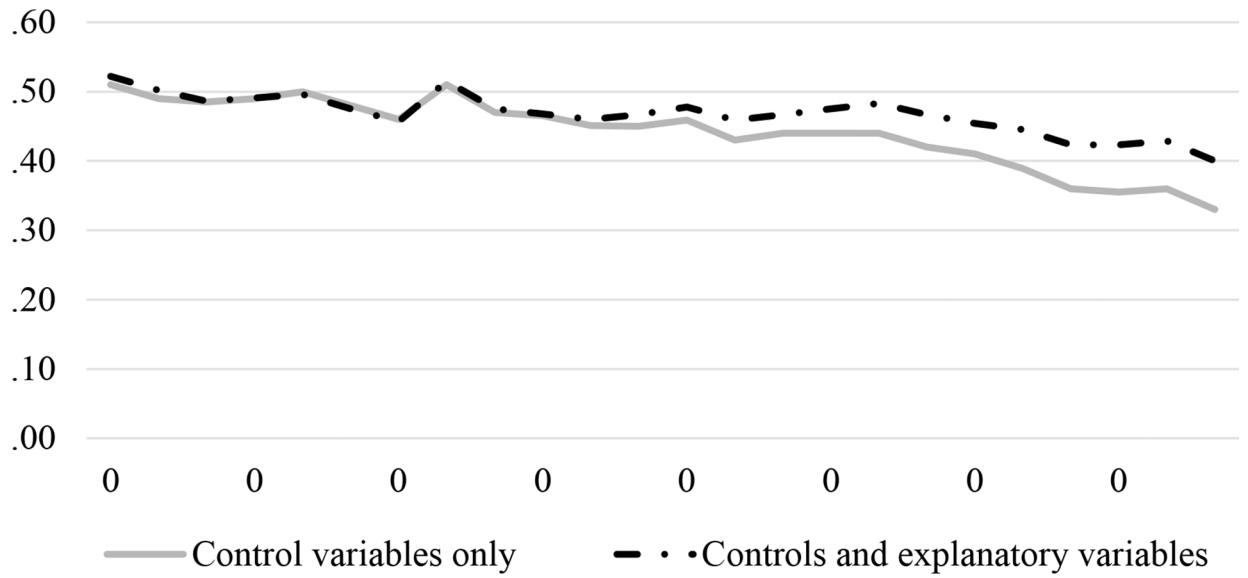
Author Manuscript

Author Manuscript





**Figure 2.** Observed changes in youth attitudes and behaviors, 1991–2015 (N=204,621).



**Figure 3.** Predicted probabilities of youth offending prevalence before and after considering explanatory variables (n=204,621).  
Note: For these predictions, the control variables were set to their sample means and the explanatory variables were held constant at their 1991 mean values.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 1.**

Descriptive statistics (n=204,621)

	Mean	Standard Deviation	Minimum	Maximum
<b>Dependent Variables</b>				
Overall crime prevalence	.455		0	1
<b>Control Variables</b>				
Grade (1=10th)	.525		0	1
Race				
White (reference)	.642		0	1
Black	.097		0	1
Other	.258		0	1
Sex (1=Male)	.469		0	1
Single parent	.205		0	1
Parental education	4.454	1.247	0	6
<b>Explanatory Variables</b>				
Unstructured socializing	.000	2.183	-6.543	3.927
Alcohol frequency	.491	.998	0	6
Youth employment				
No work (reference)	.648		0	1
Moderate work	.310		0	1
Intensive work	.042		0	1
Parental supervision	2.157	1.360	0	4
School attachment	3.106	.948	0	5
College graduation expectation	.904		0	1
Community involvement	1.130	.986	0	4
Sensation seeking	.227	.372	0	1

**Table 2.**

Multilevel random effects regression models of youth offending prevalence (n=204,621).

	<b>Model 1</b>	<b>Model 2</b>
<i>Fixed Effects</i>		
Grade	-.163 *** (.009)	-.377 *** (.010)
Black	.193 *** (.016)	.372 *** (.017)
Other	.224 *** (.011)	.322 *** (.012)
Sex	.504 *** (.009)	.312 *** (.010)
Single parent	.266 *** (.011)	0.100 *** (.012)
Parental education	-.071 *** (.004)	-.017 *** (.004)
Moderate work		.177 *** (.011)
Intensive work		.225 *** (.025)
Unstructured socializing		.104 *** (.002)
Alcohol frequency		.423 *** (.006)
College graduation expectation		-.311 *** (.017)
Community involvement		-.058 *** (.005)
School attachment		-.258 *** (.005)
Parental supervision		-.124 *** (.004)
Sensation seeking		.737 *** (.014)
<i>Random Effects</i>		
Variance (Intercept)	.044	.014

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

**Table 3.**

Logistic regression models of youth offending prevalence for early 1990s and early 2010s subsample (n=90,711)

	<b>Model 1</b>	<b>Model 2</b>
<i>Fixed Effects</i>		
Survey period (1=2011–15, 0=1991–95)	-.565 *** (.002)	-.322 *** (.016)
Grade	-.203 *** (.007)	-.406 *** (.006)
Black	.158 (.109)	.300 *** (.093)
Other	.263 *** (.060)	.348 *** (.093)
Sex	.543 *** (.141)	.360 *** (.089)
Single parent	.271 *** (.041)	.106 *** (.053)
Parental education	-.059 *** (.022)	-.012 (.028)
Moderate work		.189 *** (.025)
Intensive work		.212 *** (.010)
Unstructured socializing		.102 *** (.017)
Alcohol frequency		.441 *** (.004)
College graduation expectation		-.270 *** (.016)
Community involvement		-.054 *** (.013)
School attachment		-.266 *** (.014)
Parental supervision		-.113 *** (.010)
Sensation seeking		.729 *** (.019)
Constant	-.047 (.126)	.812 *** (.187)



\*  
 $p < .05$

\*\*  
 $p < .01$

\*\*\*  
 $p < .001$

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 4.**

Decomposition of estimated association between survey period (early 1990s vs. early 2010s) and the prevalence of youth offending (n=90,711)

<b>A. Rescaled parameter estimates for Survey Period (1=2011–15, 0=1991–95)</b>	
	<b>Coeff/SE</b>
Model 1 (controls only)	-.634*** (.007)
Model 2 (explanatory variables)	-.322*** (.016)
<b>B. KHB decomposition of coefficient reduction for Survey Period</b>	
<b>Explanatory variables</b>	<b>Contribution to Reduction (%)</b>
Moderate work	4.800
Intensive work	.990
Unstructured socializing	19.320
Alcohol frequency	14.190
College graduation expectation	1.840
Community involvement	.750
School attachment	-.840
Parental supervision	2.700
Sensation seeking	5.450