A Common Explanation for the Changing Age Distributions of Suicide and Homicide in the United States, 1930 to 2000

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Abstract

A longstanding debate focuses on whether suicide and homicide rates walk hand in hand or whether they are reciprocally related. Much of the research on this issue investigates whether suicide or homicide predominates in certain geographic areas or whether they trend together over time. We theorize that the degree of social integration and social regulation associated with birth cohorts is negatively related to both of these forms of lethal violence. We develop a common explanation for shifts in the age distributions of homicide and suicide in the United States from 1930 to 2000. In this context, suicide rates and homicide rates walk hand in hand and their parallel movements are associated with two variables linked to social integration and regulation.

Research on suicide and homicide often appears in different venues and within different scholarly traditions. Students and researchers of public health are likely to read *Suicide and Life Threatening Behavior* while sociologists and criminologists interested in homicide are more likely to read the journal *Homicide Studies*. The normative response to suicides and suicide attempts involves mental health treatment while the normative response to homicide involves the criminal justice system. Geographically, rates of suicide tend to be higher in northern states, and rates of homicide tend to be higher in southern states. Black Americans exhibit lower suicide rates than whites, while the rates of homicide deaths for blacks exceed those for whites. Further, the age patterns of homicide and suicide differ – homicide offending and deaths typically peak in the 20- to-29-year-old age range with a strong decrease in rates after that peak. Suicides in the United States, in contrast, historically reached their highest levels among those more than 60 years of age.

Figure 1a illustrates the shifts in the age distributions of homicide and suicide that occurred over the past 70 years, as well as some of the persistent features of these distributions. Throughout this period homicide deaths were concentrated in younger age groups. The age distribution for homicides, however, was relatively more concentrated at younger ages in 2000 than it was in 1930 or in 1965. The shift in the age distribution of suicides from 1930 to 2000 has been dramatic. In 1930 suicide increased almost monotonically with age and the increases in each succeeding age group were generally large. In 1965 suicides increased monotonically until ages 55-59, but the increase in each succeeding age group was less strong than in 1930. Then the suicide rate fell until ages 70-74. By 2000 this pattern of increase was much weaker: the suicide rate rose quickly from the age groups 10-14 to 20-24, increased slightly for ages 25-29, and then dropped slightly. It reached a peak in the age group 40-44 that was not exceeded until ages 75-79.

Direct correspondence to: Robert M. O'Brien: Department of Sociology; 1291 University of Oregon; Eugene, Oregon 97403-1291. E-mail: bobrien@uoregon.edu. Jean Stockard: Department of Planning, Public Policy, and Management; 1209 University of Oregon; Eugene, Oregon 97403-1209. E-mail: jeans@uoregon.edu

Figure 1. Homicide and Suicide Rates by Age Group: 1930, 1965, 2000 (Figure 1a represents the age specific crude rates per 100,000. Figure 1b represents the rates per 100,000 after controlling for the typical age group effect.)

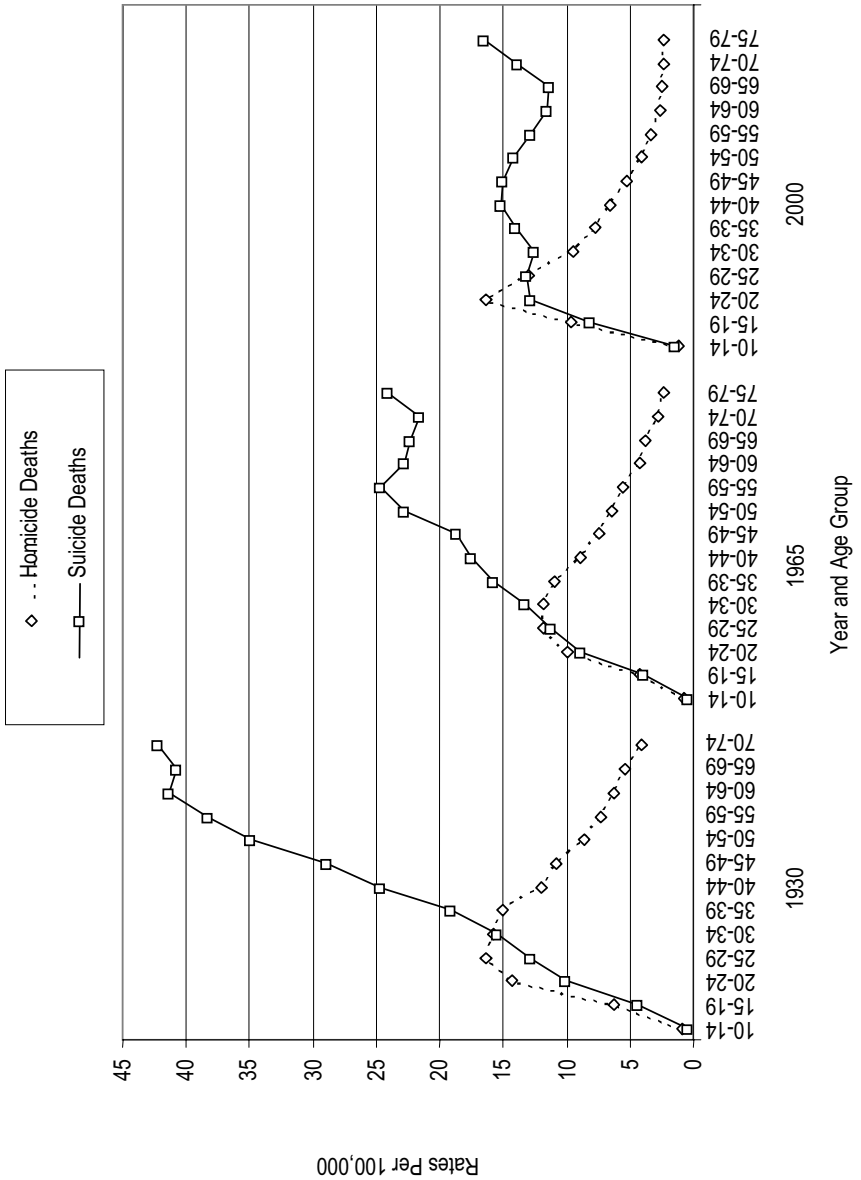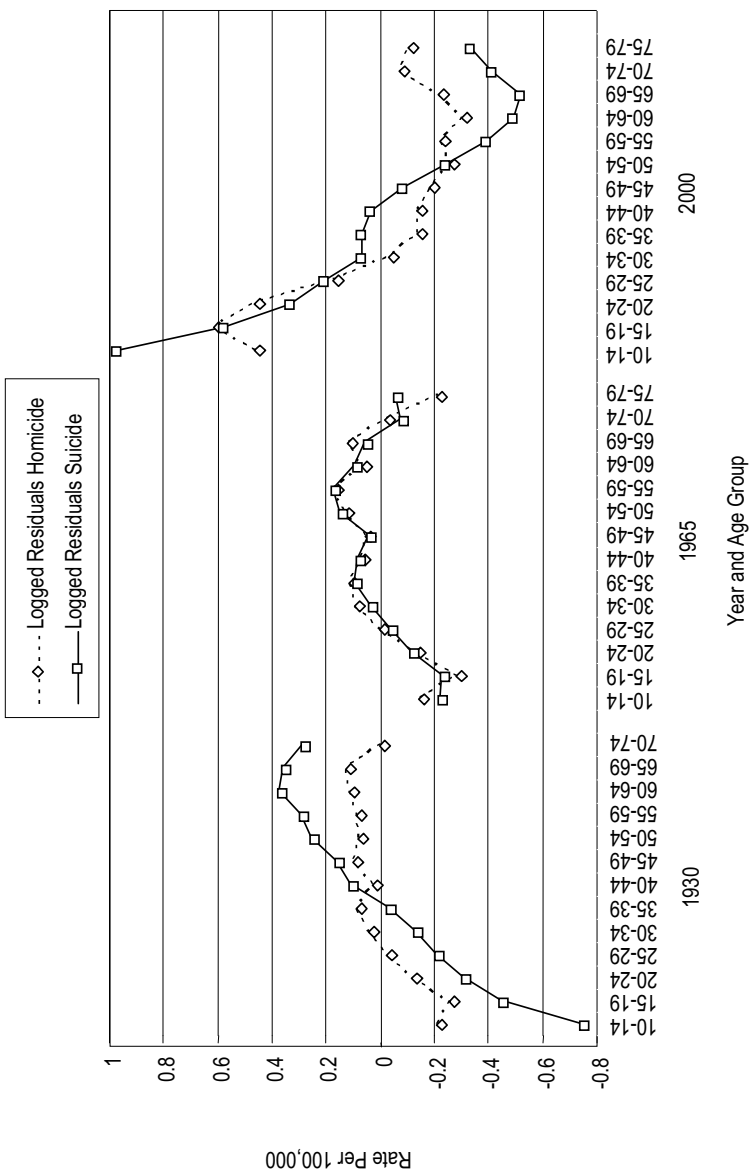Figure 1a. Homicide and Suicide Rates by Age Groups (Crude Rates)

Figure 1b. Homicide and Suicide Residuals after Controlling for Age Group

Despite differences in the relative rates of homicide and suicide based on factors such as race, age and geographic location, much discussion and theorizing posit a connection between suicides and homicides. These discussions range from the writings of theologians and philosophers as early as St. Augustine (c. 426 A.D.) and in academic debates from the writings of the moral statisticians in the early 19th century to the work of Freud and his followers in the early years of the 20th century and to American sociologists in the mid-20th century.

Much work suggests that suicide and homicide are different expressions of the same phenomenon and that similar causal factors influence the total level of lethal violence within a society, although different variables may influence which type of violence is more common. Early explanatory variables included biological characteristics cited by the moral statisticians; forces of aggression cited by the Freudians; and levels of frustration and strength of the superego cited by followers of Freud. More recent sociological work often builds implicitly upon the neo-Freudian assumption that suicide and homicide are related to frustration, but translates this understanding into a macro-level analysis of rates (Unnithan et al., 1994).

Dating from at least the 19th century, however, were claims that suicide and homicide are negatively related (Ferri 1883-84; Morselli 1882 [1879]). The two forms of lethal violence (against the self or against others) were seen as substitutable for one another. Ferri and Morselli argued that this could be seen throughout Europe where homicide rates tended to be higher in the southern areas and suicide rates higher in northern areas. The pattern of higher homicide rates in the South and higher suicide rates in the North (east) is still evident in the United States. Ferri and Morselli also cited time series data for countries in which suicide rates and homicide rates trended in opposite directions. Many years later Henry and Short (1954) found that the correlation between suicide rates and the business cycle was negative while the correlation between homicide rates and the business cycle was positive. A modern literature attempts to explain the inverse relationship between homicide and suicide rates (Unnithan et al 1994).

Our analysis examines whether changes in suicide and homicide rates can be explained by common underlying factors and departs from this earlier work in several important respects. First, instead of focusing on total rates of lethal violence, we examine age-specific rates, thus allowing us to account for changes in the age distribution of lethal violence. Second, to explain changes in the age distribution of lethal violence, we rely on cohort theory and research. Third, rather than using the Freudian and neo-Freudian notions of aggression and frustration, we build on Durkheimian notions of control through social integration and regulation. Durkheimian approaches of various types are widely used by researchers studying both homicides and suicides, and provide an excellent vehicle for uniting the study of these phenomena.

The Durkheimian Perspective

While sociologists are familiar with Durkheim's analysis of suicide, his comments regarding homicide are less well known, in large part because they were made almost in passing in *Suicide*. Nevertheless, scholars of both suicide and homicide have drawn upon the Durkheimian tradition.

In *Suicide*, Durkheim delineated four types of suicide, all revolving around the central concepts of social integration and regulation. He suggested that too much integration or too much regulation can lead to altruistic or fatalistic suicide, respectively. Too little regulation is related to anomic suicide, while too little integration is related to egoistic suicide. Durkheim posited that in modern society the problem is rarely too much integration (altruistic suicide) or too much regulation (fatalistic suicide), but instead, too little integration and too little regulation.

Many researchers and theorists who examine Durkheim's typology of suicides have difficulty differentiating social integration and regulation. Johnson (1965) posits that integration is necessary for regulation, and therefore, there is only one cause of suicide.[1] Gibbs and Martin (1964) argue that integration is the concept most central to Durkheim's theory of suicide. Bearman (1991) states that integration and regulation "walk hand in hand" – meaning that persons who are strongly integrated into society (family, religious groups, work groups) tend to be socially regulated, and those who are not integrated into society tend not to be socially regulated. We follow this tradition by emphasizing the tie between social regulation and social integration and the rates of suicide, as well as homicide, in modern societies.

Although Durkheim theorized that the lack of social integration in modern societies increases the rate of egoistic suicide, he maintained that this same condition is *not* conducive to homicides:

> "Egoistic suicide and homicide, therefore, spring from antagonistic causes, and consequently it is impossible for the one to develop readily where the other flourishes." (Durkheim 1966 [1897], p. 356)

He argues that egoistic suicide is:

> "characterized by a state of depression and apathy produced by exaggerated individuation. The individual no longer cares to live because he no longer cares enough for the only medium which attaches him to reality, that is to say, for society . . . Homicide depends on opposite conditions. It is a violent act inseparable from passion. Now, whenever society is integrated . . . the intensity of collective states of conscience raises the general level of the life of passions." (p. 356)

Durkheim used this argument to explain data indicating that where "homicide is very common, it confers a sort of immunity against suicide" (p. 351). On the other hand, Durkheim suggested that a lack of social regulation (anomy) fosters both increased homicide and suicide (anomic suicide):

> "[T]here exists today, especially in great centers and regions of intense civilization, a certain parallelism between the development of homicide and that of suicide. It is because anomy is in an acute state there." (Durkheim 1966 [1897]: 358)

We do not share Durkheim's view regarding the divergent effects of egoism on suicides and homicides, and we are not alone. Others hypothesize that the lack of social integration (egoism) is positively associated with homicides and other violent crimes. One of the major theoretical traditions within criminology (control theory) cites Durkheimian roots and implies that lower levels of integration are related to higher rates of deviant behavior, including homicide. Advocates of control theory argue that low levels of integration produce ineffective internal and external social controls, which, in turn, promote deviant behaviors (e.g., Hirschi 1969; Gottfredson and Hirschi 1990). Hirschi (1969: 3) in the *Causes of Delinquency* states: "Durkheim's theory is one of the purest examples of control theory." In addition, several authors (see, Hagan and McCarthy 1997) focus on the ways in which social integration promotes the formation of social capital, which in turn deters the likelihood of deviant and criminal behavior.

The connection between lack of regulation and deviance/homicide, which Durkheim does not dispute, has a long tradition in sociology. Merton's classic presentation of strain theory, "Social Structure and Anomie," (Merton 1938) explicitly cites Durkheim. Merton cites a lack of fit in the United States between means of achieving socially valued goals and the inculcation of those goals. In Durkheimian terms, society has failed to regulate the desires and expectations of its members.

Cohort Theory and the Analysis of Lethal Violence

A growing literature on cohort explanations of lethal violence emphasizes three major tenets of cohort theory:

> (1) The "life stage principle" (Elder 1974): suggesting that the experiences of one cohort differ from those of another because they experience different historical events at different ages or developmental periods.

> (2) The "lasting effects principle" (O'Brien, Stockard, and Isaacson 1999): positing that certain events or conditions, such as the size of one's birth cohort, can produce lasting changes in the attitudes and behaviors of cohort members.

> (3) The "confounding principle": pointing to a methodological and conceptual problem that occurs because knowing the period and age group determines cohort membership.

In each period a particular age group corresponds to a particular birth cohort and in the next period the same age group corresponds to a different birth cohort. This suggests that changes in the age distributions of homicide and suicide may be related to the propensities of different cohorts for lethal violence. This is plausible, but in examining the relationship of cohorts to shifts in age distributions across periods, we are confronted with the "confounding principle" noted above. Recent cohort-based explanations of changing rates of lethal violence address this problem, as well as the "life stage" and "lasting effects" principles, by utilizing Age-Period-Cohort-Characteristic (APCC) models that incorporate strong controls for age and period and use cohort-based measures of factors that theoretically generate social integration and regulation (O'Brien, Stockard and Isaacson 1999; Savolainen 2000). The cohort characteristics used are tied to each cohort and their effects on a cohort's propensity to lethal violence are measured across the lifespan of the cohorts. Research provides strong evidence that cohort characteristics are related to age-period-specific rates of suicide deaths, both within the United States and cross-culturally (Stockard and O'Brien 2002a; 2002b), and homicide deaths and offenses within the United States (O'Brien, Stockard and Isaacson 1999; O'Brien and Stockard 2002; Savolainen 2000).

We recognize, as Durkheim did, that marriage, having children, being in a nation at war, etc. are not direct measures of social integration and regulation. Instead they are conditions that may help generate social integration and regulation. One of the two generators of cohort-based social integration and regulation that we examine involves the childhood family structure of the cohort. Durkheim's suggestion that higher rates of disrupted family structures are associated with higher rates of suicide (both egoistic and anomic suicides) is supported by a large modern literature (e.g., Breault 1986; Danigelis and Pope 1979; Stockard and

O'Brien 2002a, 2002b). A similarly large literature documents the relationship of disrupted family patterns to higher levels of deviant and criminal behavior, including homicide. This literature highlights the integrating and regulating effects of the family in terms of monitoring and supervision (Gottfredson and Hirschi 1990), insulation from peer group influence (Warr 2002), and providing needed financial resources for children (McLanahan and Sandefur 1994).

A second cohort characteristic that generates cohort-based social integration and regulation is the relative size of the cohort. Some explanations for the effect of relative cohort size focus on the economic disadvantages that face larger cohorts when they enter a job market crowded with a large number of people seeking entry-level employment (Easterlin 1987). This is followed by delays in marriage and family building, two prominent indicators associated with integration in the Durkheimian tradition. Other explanations emphasize the relationship between increased cohort size and the overloading of the institutions that help produce social integration and regulation – families, schools, organized youth groups (e.g., O'Brien, Stockard and Isaacson 1999; Stockard and O'Brien 2002a) or emphasize the increased influence of peer groups (Warr 2002) – with their distinctive youth culture that is insulated from the influence of older generations.

In part, cohort effects reflect the aggregation of individual effects – the result of more children growing up in larger or single-parent families. Many members of a birth cohort, however, are affected by these characteristics, no matter the size or composition of their families. Using notions of social capital and social closure (Coleman, 1990), we suggest that when cohorts are relatively large, all children, not just those from larger families, experience the reduced ratio of adults to children and lower levels of adult resources within school and community groups. When cohorts have more single-parent families, the networks that tie a teacher to a parent or a parent to one or more parents tend to have less closure and peers become a more important influence on all children, regardless of their family backgrounds.

Factors not specifically tied to cohorts also influence rates of lethal violence. For example, factors associated with different periods affect both suicide and homicide rates. These factors can range from improved emergency responses and emergency care room facilities to the effects of unemployment and recession. Factors associated with age such as church attendance, marrying and parenting are also strongly associated with both homicide and suicide rates. This calls for a method that includes factors directly tied to age and period, and the Age-Period-Cohort-Characteristic model does this by including dummy variables for periods and age-groups.

While the differences have not been especially large in magnitude, some studies find different patterns of influence of cohort characteristics for race-sex-specific groups, especially involving relative cohort size. For example, relative cohort size appears to have a stronger influence on male suicide rates than female rates, but the pattern is reversed (although smaller in magnitude) for homicide rates. A stronger difference appears across the race groups with relative cohort size significantly influencing suicide rates for only whites and homicide rates for only non-whites (O'Brien and Stockard 2002; Stockard and O'Brien 2002a).

Summary and Hypotheses

The Durkheimian tradition and previous literature on cohort effects suggest that cohort-related factors generate social integration and regulation, specifically family structure and relative cohort size. These factors are related in similar ways to changes in the age-period-specific rates of suicide deaths *and* homicide deaths. Specifically, we suggest that *decreases in integration and regulation for cohorts are associated with increased rates of both suicide and homicide for those cohorts (controlling for other relevant variables)*. We test this by examining

two factors that generate lower levels of social integration and regulation within cohorts. This is not a hypothesis about *total rates* of homicide or suicide in societies, but explicitly refers to the *rates of cohorts*.

Most researchers investigate homicide and suicide separately. Certainly, the age distributions of these two phenomena (Figure 1a) are strikingly different. In addition, rates of homicide and suicide are strikingly dissimilar across different segments of the population, with homicides more common among non-whites (as a group) and suicides more common among whites, and both phenomena more common among men than women. In this paper, we examine the association of shifts in the age-period-specific rates of homicide *and* suicide for the total population and race-sex specific subgroups. Because we posit that shifts in the age-period-specific rates of both homicide and suicide are negatively related to shifts in the social integration and regulation of cohorts (after controlling for age and period), we hypothesize that *the residuals in the age-period-specific suicide and homicide rates in a model that only controls for age and period are positively correlated*. If these residuals are positively correlated, it suggests that some common factor or factors, besides age and period, are affecting the cohort's suicide and homicide rates.[2]

To examine whether part of the correlation between these residuals for homicide and suicide can be accounted for by factors that generate cohort-based integration and regulation, we add the cohort family structure indicator and relative cohort size to the model that contains the age and period dummy variables. We hypothesize that *adding these cohort characteristics to the equations for suicides and homicides will reduce the correlation between the residuals*. In all of our analyses, we analyze data on the total population and disaggregated data on four race-sex groups. This provides a "pseudo-replication" and some indication of the generalizability of our results.

On the Use of Homicide Deaths

In Durkheim's era researchers used data on the death of individuals from the vital statistics of nations to examine the relationship of social factors to crime rates. Yet much of the theory relating social integration and regulation to homicide rates involves homicide offenders. In this paper, we use the data on homicide deaths (victims), because it is available broken down by age for the period 1930 to the present. Homicide offender data for the United States (based on those arrested) broken down by age is available only from 1958 to the present.

Researchers, however, consistently find that homicide offenders and victims tend to have similar demographic characteristics in terms of sex, race/ethnicity and age (Cook and Laub 1998; Wolfgang 1958). Given these similarities, it is not surprising that macro-level data on victims and offenders are similar. Cook and Laub (1998) note that trends in the age of both homicide offenders and homicide victims are similar over time for blacks and whites. The rates for both victims and offenders increased dramatically for younger age groups from the mid-1980s to the 1990s (Fox and Zawitz 1998). It is important to note, however, that these distributions are not identical. The age distribution for victims tends to peak at a slightly older age than that for offenders – but the shape of the age distributions are quite similar.[3]

Methodology

We use an Age Period Cohort Characteristic model to analyze the data. The data are grouped in five-year intervals (the data on age-period-specific rates for homicide deaths and suicides are available only for five-year age groupings over much of the time span covered in our

analyses). Typically, in APCC models with five-year age groupings, the periods are spaced five years apart, and the cohorts are based on five-year groupings. Thus, the age groups in any one period do not contain people who were in that age group during another period, and age groups in any one period are based on only a single specified cohort. In our analyses there are 14 age groups (10-14, 15-19,…, 75-79); 15 periods (1930, 1935,…, 2000); and 15 cohorts (beginning with those born between 1915 and 1919 who were 10-14 in 1930 and ending with those born between 1985 and 1989 who were 10-14 in 2000).[4] Our measures of the age-period-specific homicide death rates and suicide rates for the total population and for white males, white females, non-white males and non-white females come from the Annual Vital Health Statistics Reports (U.S. Department of Health, Education and Welfare various years).[5]

Consistent with previous work in this area (O'Brien and Stockard 2002; Stockard and O'Brien 2002a), we use the percentage of the birth cohort born to unwed mothers, which we label as the percentage of non-marital births (NMB), to gauge one important aspect of cohorts' childhood family structure. This measure comes from Vital Statistics of the United States (United States Bureau of the Census 1946, 1990). This is a proxy measure for some important shifts in the family structure of birth cohorts. Our measure of NMB is, for example, highly associated with the estimated percentage of the birth cohort who lived in single-parent families when they were 5 to 9 years old,[6] and those growing up in single-parent families are five times more likely to grow up in poverty (McLanahan and Sandefur 1994). The measure of relative cohort size (RCS) is the percentage of the population ages 15-64 who were 15-19 in the period when the cohort was 15-19 and is computed from data available in the Current Population Surveys: Series P-25 (United States Bureau of the Census, various dates). Both NMB and RCS can, and do, reflect historical shifts such as the Great Depression (associated with a decrease in the relative cohort size of cohorts born in that period) or the unavailability of marriageable men due to imprisonment or war (associated with increases in the percentage of non-marital births for a cohort). Although these two measures are demographic ones, they are certainly not due solely to demographic factors. They provide important measures of theoretically relevant shifts in the characteristics of cohorts that are available over an extended period of time broken down by race. They can reasonably be viewed as generators of social integration and regulation in their own right. Other measures of cohort related social integration and regulation or measures of factors that generate social integration and regulation, whether demographic or historical in nature, would be appropriate for testing our theory. Measures of NMB and RCS were calculated for the total population and for whites and non-whites separately. These characteristics of cohorts are hypothesized to generate lower levels of social integration and regulation within cohorts.

In our regression analyses, we log the age-period-specific death rates and the measures of relative cohort size and non-marital births. This is consistent with our assumption that proportionate increases in each of these independent variables are related to proportionate increases in the rate of lethal violence. This assures, for example, that a 20 percent shift in the age-period-specific homicide rate for those 45-49 is weighted the same as a 20 percent shift for those who are 20-24 (controlling for other variables in the model). This transformation is important, because we are interested in shifts in homicide across all ages and periods and not only those with the highest rates. The coefficients associated with each of these logged independent variables are, thus, interpretable as the percentage change in the rate of lethal violence associated with a percentage change in the cohort characteristic controlling for the other independent variables in the model.

Recognizing the dramatic differences in the age distributions of homicide deaths and suicides, we examine the relationship between suicide and homicide conditioned on both age group and period by regressing the logged measures of the age-period-specific homicide and suicide rates on the age group and period dummy variables. Then we examine the

relationship between the residuals for homicide and suicide. Conceptually, entering age group and period dummy variables into the model predicting homicide (or suicide) allows us to examine the average age curve for each period. We could do this using the coefficients from the age-period model that contained just those dummy variables. The age curves for each period would all have the same shapes (proportionately), but would be higher or lower depending upon the average rates for the particular period.

Central to our claim of a common explanation for *shifts* in the age distributions of both suicide and homicide is our expectation that the residuals for the age-period-specific rates for homicide and suicide are positively correlated after controlling for age and period. Our theory predicts that cohorts lower in social integration and regulation will be more prone to *both* homicide and suicide than predicted on the basis of age and period alone while those higher on social integration and regulation will be less prone to *both* homicide and suicide.

Comparing the line graphs in Figure 1 explicates our strategy and indicates at least one reason why examining the relationship between homicide death rates and suicide rates, without controlling for shifts in the age distribution, is likely to be misleading. As shown in Figure 1a, the age distributions of suicide and homicide rates for the total population differ dramatically with the rates for homicide deaths being relatively higher for young people in comparison to suicides. Figure 1b, based on the same data and years, depicts the residuals for homicide and suicide when the rates are predicted on the basis of age and period.[7] The distributions of these residuals track one another closely, indicating that some other factor(s) are likely affecting both of these variables in a similar manner. The residuals for 2000 show a dramatic pattern with the younger age groups having much higher rates than was typical across the entire data set for both suicides and homicides. We have hypothesized that two characteristics of cohorts (RCS and NMB) are likely to explain part of the relationships depicted in these residuals.

To directly examine these expectations, we analyze the age-period-specific data for suicide and homicide using a Seemingly Unrelated Regression (SUR) model that employs Feasible Generalized Least Squares estimation. The SUR model allows us to run the APCC models for homicide deaths and suicides simultaneously while taking into consideration the potentially correlated residuals produced by the two models. The output from the program provides efficient estimates for the effects of each of the dummy variables and cohort characteristics on the suicide and homicide rates and for the correlation between the residuals for these two models.

The basic APCC model that we use in this SUR framework appears in equation (1), where the dependent variable is either the log of the age-period-specific suicide or homicide rates.

$$ln\ [APSR_{ij}] = \mu + \alpha_i + \pi_j + \rho\ ln(RCS_k) + \nu\ ln(NMB_k) + e_{ij} \quad (1)$$

where μ is the intercept, α_i is the age effect for the ith age group, π_j is the period effect for the jth period, ρ is the regression coefficient for the logged values of RCS, $ln(RCS_k)$ is the logged relative cohort size for the kth cohort, n is the regression coefficient for the logged values of NMB, $ln(NMB_k)$ is the logged percentage of non-marital births for the kth cohort, and e_{ij} is the error term for the ij^{th} observation. We use the youngest age group (10 to14) and the earliest period (1930) as reference groups for the dummy variable sets for age groups and periods. When running models for the total population, white populations, or non-white populations, we use values of RCS and NMB that are based on the corresponding total or race-specific populations.

The APCC model controls for the main effects of age and period by using dummy variables. Controlling for period adjusts for different average logged lethal violence rates (suicide or homicide) in different periods. Controlling for age adjusts for different average

logged lethal violence rates across different age groups. Controlling for period also controls for variables associated with period whose effects are constant across age groups. Thus, to the extent that the effects of medical technology or a particularly warm year are constant across age groups, these effects are controlled for by the inclusion of the period dummy variables. Similar statements may be made about the inclusion of dummy variables for age. Additionally, including the age group *and* period dummy variables in the model controls for the linear effect of cohort year of birth. Because this trend is controlled for, any effect of the cohort characteristics that is linearly related to cohort time of birth is controlled (O'Brien, Stockard and Isaacson 1999).

We first run this model for homicide deaths and suicides separately (for the total population, white males, white females, non-white males and non-white females) without the cohort characteristics and report the correlation between the residuals. We then include RCS and NMB as independent variables. We expect these cohort-related measures will be positively related to both age-period-specific homicide and suicide rates, and, that the inclusion of these two variables will reduce the positive correlation between the residuals. These residuals may still be positively related, since any factors that make cohorts more or less prone to lethal violence and are not included in the model would produce such a result.

Results

Descriptive Results

Table 1: Descriptive Statistics for Age-Period-Specific Homicide Death Rates, Suicide

Variables	Total	White		Non-White	
		Male	Female	Male	Female
Homicide Rate					
Mean	8.88	7.66	2.43	58.60	12.31
SD	5.60	4.92	1.20	40.10	7.81
Range	.50 – 22.42	.36 – 19.89	.22 – 5.42	1.99 – 149.90	.74 – 28.50
Suicide Rate					
Mean	11.76	19.32	6.02	11.80	3.15
SD	5.82	9.92	3.56	6.21	1.48
Range	.28 – 20.70	.41 – 42.95	.10 – 14.01	.20 – 27.66	.10 – 6.82
Non-Marital Birth Rate					
Mean	4.81	2.54		18.76	
SD	3.85	2.32		9.08	
Range	2.10 – 24.5	1.30 –16.94		11.86 – 54.74	
Relative Cohort Size					
Mean	12.87	12.58		14.99	
SD	1.60	1.61		1.80	
Range	10.41 – 15.	10.04 –14.90		12.05 – 18.60	

Rates, Non-Marital Births and Relative Cohort Size

Table 1 presents descriptive statistics for the measures of lethal violence for the total group and each race-sex subgroup and descriptive measures for NMB and RCS for the total group and for each race subgroup. Each of the measures shows substantial variation. For the total population, homicide death rates range from .50 for those 10-14 in 1960 to 22.4 for those 20-24 in 1990; and suicide deaths range from .28 for those 10-14 in 1950 to 20.70 for those 55-59 in 1975. The percentage of non-marital births among the total population ranges from 2.1 to 24.5 and relative cohort size varies from 10.41 to 15.33. Both the average values of NMB and RCS, as well as the measures of their variability, are higher for non-whites than for whites. Patterns of fluctuation for both measures, however, are similar for the race groups over time. Importantly, RCS has a somewhat cyclical time trend: for the cohort born between 1915 and 1919, the total population RCS is 13.89 percent and then drops to 10.80 percent for the 1930-1934 cohort, it then increases to 15.33 percent for the cohort born between 1955 and 1959 and then declines to 10.41 percent for the 1985-89 birth cohort. The total population NMB is 2.10 percent for the cohort born between 1915 and 1919 and nearly doubles to 4.08 percent for the cohort born between 1935 and 1939, it then decreases and does not exceed 4.08 percent until the cohort born between 1955 and 1959 when it reaches 4.82 percent. This is followed by a dramatic increase to 24.54 percent for the cohort born between 1985 and 1989.

Explaining the Joint Distributions of Suicide and Homicide

Table 2 presents results from the SUR models for the total population and for each gender-race (white/non-white) group. The first two sections report the results for suicide and homicide, respectively. These are, in a sense, replications of the research reported in Stockard and O'Brien (2002a) on suicides and O'Brien and Stockard (2002) on homicide deaths; however, (1) our analysis includes data for the period 2000, (2) we log the cohort characteristics as well as the rates of suicide and homicide to specify that proportional changes in these characteristics are associated with proportional changes in suicide and homicide rates, and (3) we use a SUR model which produces more efficient estimates of the regression coefficients given that the residuals from these two equations correlated. These changes result in only minor differences. In Stockard and O'Brien (2002a), for example, the effects of RCS and NMB on suicide rates are positive in all of the models (total, white males, white females, non-white males and non-white females) and are statistically significant in all of the models except for RCS in the models for non-white males and females. This is identical to the results reported in Table 2 for LNRCS and LNNMB. In O'Brien and Stockard (2002) the associations of both cohort characteristics and homicide rates for each of the models are positive and are highly statistically significant except for the effect of RCS in the models for white males and females. In Table 2 the association of LNRCS with homicide death rates is positive for each of the models and is also statistically significant ($p < .05$).[8]

For suicide the R-squares range from .904 to .973 in the models that contain only the age and period dummy variables. When the cohort characteristics are added to the model, the R-squares range from .915 to .988. As with Stockard and O'Brien (2002a) the smallest variance explained is for non-white females. The homicide models have R-squares that range from .943 to .964 for the models that contain the age and period dummy variables and from .966 to .987 for the models that add the cohort characteristics.

With R-squares above .90 for all of these analyses when only the age group and period dummy variables are in the equation, it is reasonable to ask if substantively important variation remains in the residual. The age group and period dummy variables provide a baseline model

Table 2: Seemingly Unrelated Regression Models for Age-Period-Specific Suicide and Homicide Rates (Logged) Regressed on Age and Period Dummy Variables and Logged Values of RCS and NMB

		White		Non-white	
	Total	Male	Female	Male	Female
Suicide Equations					
$R^2_{Insuicide \cdot A,P}$ [a]	.970	.973	.942	.937	.904
$R^2_{Insuicide \cdot A,P,CC}$ [b]	.988	.988	.969	.956	.915
b_{lnrcs}	1.833***	1.252***	1.108***	.583	.430
	(.208)	(.157)	(.258)	(.333)	(.352)
b_{lnnmb}	1.557***	.788***	1.061***	1.979***	1.190**
	(.139)	(.077)	(.127)	(.367)	(.409)
Homicide Equations					
$R^2_{homicide \cdot A,P}$	.962	.964	.959	.943	.946
$R^2_{homicide \cdot A,P,CC}$	.987	.980	.966	.982	.970
b_{lnrcs}	1.426***	.437*	.343*	1.043***	1.038***
	(.121)	(.171)	(.161)	(.209)	(.202)
b_{lnnmb}	1.277***	.627***	.309***	2.829***	1.866***
	(.180)	(.084)	(.079)	(.229)	(.234)
Residual Correlations					
$r_{hom,sui \cdot A,P}$	.779***	.639***	.406***	.554***	.236*
$r_{hom,sui \cdot A,P,CC}$	.504***	.456***	.202*	.215*	.032
N =	119	119	119	118	109

Note: The analyses for the total population and the race-sex specific analyses are based on number of cases with no missing data on either homicide or suicide for the SUR model.
[a] R-squared for the dependent variable regressed on the age and period dummy variables.
[b] R-squared for the dependent variable regressed on the age and period dummy variables and the two cohort characteristics.
*p < .05   **p < .01   *** p < .001

in which the shape of the age distribution is the same (proportional, since the dependent variable is logged) across all periods and the period coefficients move these age distributions "up or down." Thus, for example, the dramatic shifts in the shapes of the age distributions for suicides from 1930 to 2000 in Figure 1a are based on these residuals. The shifts in the age distributions for homicide and suicide are important and have been labeled as epidemics of youth homicide and suicide.

The correlations between the residuals for the age-period-specific rates from the homicide and suicide equations appear in the bottom section of Table 2 For the equations that contain only the age and period dummy variables, the correlations are all positive and statistically significant and, except for non-white females, at least moderately strong. For example, the correlation between the residuals for homicide and suicide for the model based on the total population is .779. These residuals share 61% (= $.779^2$ x 100%) of their variance in common. The shared variances for the race-sex subgroups range from 6 percent for non-white females to 41 percent for white males. In each case these correlations are statistically significant (p < .05). This indicates that shifts in the age distributions of homicide rates and suicide rates moved together from 1930 to 2000 in the United States.[9]

When we add LNRCS and LNNMB to the models (second row in the residual correlations section of Table 2) the correlation between residuals drops to .504 for the total sample. Thus, after including the two cohort characteristics the variance shared by the homicide and suicide residuals is 25% (= .504^2 x 100%). This remains a highly significant amount of shared variance (p < .001). Some of this variance may be due to social integration and regulation inherent in the cohorts that are not captured by (or associated with) LNRCS and LNNMB, or to other common factors that affect both suicides and homicides that are not included in our model. Including the cohort characteristics in the model for the total population reduced the shared variance by 59 percent [=((61 - 25)/61) x 100%]. For each of the analyses of residuals reported in Table 2, the two cohort characteristics explain more than 50 percent of the shared residual variance.

Summary and Discussion

Our results indicate that changes in the age distributions of suicide and homicide rates throughout much of the 20th century in the United States are strongly related. We posit that this relationship is due, at least in part, to the dependence of both forms of lethal violence on the degree of social integration and regulation that characterize cohorts. On theoretical and empirical grounds, we suggest that two characteristics of cohorts, relative cohort size and non-marital births, are negatively related to their degree of social integration and regulation and positively related to the age-period-specific rates of suicide and homicide deaths for the total population and for the rates disaggregated by race and sex.

A careful examination of Figure 1a shows that over time the age distributions of the suicide rates have shifted such that in 2000 there were relatively more suicides committed by younger age groups than in 1930 or 1965. This is also the case for homicides. Using Seemingly Unrelated Regression, we have shown that for the period from 1930 to 2000 these age shifts are related. Further two cohort characteristics can explain much of the communality in these shifts in the age distributions for suicide and homicide rates (more than half of the shared variance in these shifts). The remaining common variance in these shifts may be due to social integration and regulation in these cohorts that is not associated with these two measures, or it may be due to other common factors that affect shifts in these distributions over time.

Theoretical Implications

Durkheim maintained that two conditions prevalent in modern society led to suicides (egoism and anomie), but that one of these conditions (egoism or lack of integration) was negatively related to homicide while the other (anomie or lack of regulation) was positively related to homicide. His hypothesis of the "mixed effects" of integration on suicide and homicide rates is perhaps best viewed in the context of the conflicting research findings of his day. Some researchers claimed that homicide and suicide were reciprocally related (Ferri 1883-84; Morselli 1882 [1879]). If one predominated, the other was reduced. Others claimed that they often grew together (Tarde 1886). This dispute has continued to the present. (For a comprehensive review, see Unnithan, et al. 1994.) Unnithan, et al. (1994) suggest that there are common "forces of production" that produce both suicides and homicide, but there also are "forces of direction" that come into play to make suicide or homicide predominate in terms of growth or in terms of the dominant mode of a particular society or group.

Our hypotheses are limited to the effects of social integration/regulation. We hypothesize that insufficient social integration/regulation is a "force of production" that increases both suicide and homicide. This view differs from Durkheim who saw lack of regulation as a "force

of production" for both suicide and homicide, but viewed a lack of integration as increasing suicide and decreasing homicide in modern societies. Most modern criminologists would agree with our position that a lack of social integration is positively related to homicide rates. That position is based on both theoretical reasoning and empirical evidence.

Policy Implications

Extent of the Problem

Not surprisingly, the level of lethal violence varies greatly by race and sex. We present just one example (albeit a cogent one) of the impact of youthful lethal violence on one subgroup. Using data from 1999, the rate of lethal violence (suicides and homicides) is 130 per 100,000 for African American males in the age range 20-24. This rate is nearly four times higher than the rate for white males of that age. (The rates for African American women and white women are even lower than that for white men). Thus, the loss of life due to lethal violence is particularly staggering among young black males. Even though black males comprised only 7 percent of the population under age 25 in 1999 (U.S. Bureau of the Census various years), they accounted for 30 percent of all deaths due to lethal violence occurring to this age group: 11 percent of the suicides and 44 percent of the homicides (National Center for Health Statistics, 2001). In addition, black men comprise a large proportion of people arrested for homicide, which is a fairly direct result of one form of lethal violence. Such arrests removed over 5,000 people (most of them young males) from black communities in 1999 (Federal Bureau of Investigation, 2000), a loss close to two-thirds the loss derived from lethal deaths for black males (7,865 for black males in all age groups in 1999).

　　Lethal violence and the impact of arrests for homicide cumulate over time. Over a 10-year period the removal of young men from black communities due to lethal violence are permanent, and for homicide arrests and convictions, typically long lasting. Such cumulative losses are especially severe for communities where these effects are concentrated. These losses affect the social structural and institutional foundations of communities through a number of mechanisms including: larger proportions of single-parent families, increased poverty, decreased social capital and generally lower levels of social organization (Wilson 1987). The shift of lethal violence to younger age groups is not confined to the black community; for example, from 1960 to 2000 the rate of lethal violence doubled for white men in the age group 10-24.

Providing for a Common Direction

The current policies directed at suicide and homicide prevention have strikingly different orientations, with suicide prevention plans originating in departments of public health and focusing on mental health diagnoses and treatments, and homicide prevention policies occurring within criminal justice systems and focusing largely on punishment as a deterrent. Our analyses indicate that common factors underlie changes in the age distribution of both suicide and homicide and that these common factors can account for commonalities in changing rates of lethal violence across race-sex groups. If both forms of lethal violence have common roots in variations in social integration and regulation, a sensible approach would deal with these common roots and find ways to promote greater integration and regulation.

　　Focusing on suicide *and* homicide together can help bring issues regarding lethal violence into better focus. First, the true magnitude of the problem may become more apparent with rates that are strikingly high. Second, the problem cannot be easily dismissed as one that belongs to "someone else." Instead, the issue of lethal violence, when seen in its broader format, faces all demographic groups: rich and poor, white and non-white. Third, focusing on the common roots

and the need for greater cohort integration and regulation builds on the findings and policy suggestions of generations of researchers within the fields of both suicidology and criminology.

Needed Policies

We have found that two characteristics of cohorts are highly associated with the dramatic increase in lethal violence among the young and have suggested that cohort size and disrupted families affect the degree of social integration and regulation that cohorts experience. Thus, policies that focus on the provision of alternative sources of social integration and regulation should help decrease the amount of lethal violence experienced by cohorts.

Recent analyses of cohort-related variations in suicide rates throughout a range of modern western countries (Stockard and O'Brien 2002b) show that cohorts characterized by higher levels of RCS and NMB exhibit higher suicide rates. Those analyses, however, indicate that these effects are moderated within societies that provide greater support for families, mothers and children. Such policies can take a variety of formats such as child allowances, higher welfare payments, extensive programs of paid maternity leaves and subsidized child care (Pampel 2001), but the important point is that they provide ways to help families supplement or replace losses in income and supervision and counter the stronger roles of peer groups that result from higher levels of RCS or NMB. Within the criminological literature a number of studies have documented the strong role of social support and relationships, whether they come from employment or family ties, in stemming and even reversing criminal careers (Sampson and Laub 1993). Policies designed to ensure entry-level jobs for those 15-29 should be especially useful in providing support during the crucial young adult periods and in helping to launch young people on supportive career and family trajectories.

Notes

1. Durkheim (1966 [1987]:288) writes "Two factors of suicide, especially, have a peculiar affinity for one another: namely egoism and anomy. We know that they are usually merely two different aspects of one social state; thus it is not surprising that they should be found in the same individual. It is indeed almost inevitable that the egoist should have some tendency to non-regulation; for, since he is detached from society, it has not sufficient hold on him to regulate him."

2. The incidence of homicides followed by suicides is relatively rare in the United States. Stack (1997) reports 245 such incidents out of 16,245 homicides in Chicago. He notes that this percentage of homicides followed by suicides (1.63 percent) is not unusual for studies conducted in the United States, but that in many other "developed" countries the phenomenon is much more common. This low rate of joint occurrences (given the strong shifts in the age distribution shown in Figure 1a) should have little effect on our analyses.

3. Given our method of analysis that controls for age groups this consistent lag in the peak age of homicide victimization compared to homicide offending matters little in terms of the direction and magnitude of our results (compare, O'Brien, Stockard and Isaacson 1999; O'Brien and Stockard 2002).

4. There are other reasons for using 10 to 14 year olds as our youngest age group. Suicides are so infrequent at younger ages that the rates tend to be unstable and zeros are difficult to handle in our analysis (since we log rates). Further, the correspondence between rates of homicide victimization and homicide offending is not good for the very young.

5. Beginning our series in 1930 reflects the time when Vital Statistics data were available from the vast majority of states and the point at which data on non-marital births, one of our measures of cohort characteristics, was first available for the ages included in the analysis. We use non-white rates rather than black rates because non-marital births are not broken down by white and black until the 1970s.

6. Savolainen (2000) obtained Public Use Micro Sample (PUMS) census data on the percentage of those in five-year cohorts who lived in single-parent families when they were ages 5-9 for the years 1910, 1940, 1960, 1980 and 1990 (the only available years). He then estimated the percentage in single-parent families for each year from 1911 through 1939 and from 1941 through 1959, and so on, then aggregated these into estimates for five-year cohorts. The interpolated data were not broken down by race. The correlation of our measure of NMB for the total population with Savolainen's is .98. The correlation between the first differences of those two measures is .90. We acknowledge that we use only one measure of family structure, but it is reassuring that it is highly correlated with the percentage of those in five-year birth cohorts who lived in single parent families when they were ages 5-9. Although the reasons for non-marital births may have varied over time – the percentage of non-marital births for cohorts exhibits a strong relationship to growing up in single-parent families. Our focus is on such aggregate-level relationships.

7. The age and period coefficients were based on the OLS regressions of both homicide deaths and suicide deaths using a data set that includes five-year age groups from 10-14 to 70-74 for the periods 1930 and 1935 and from 10-14 to 75-79 for periods from 1940 to 2000 (1940, 1945, . . . , 2000).

8. In the analyses in Table 2 we treat zeros as missing data because the log of zero is undefined. This resulted in 10 missing cases for non-white females and one missing case for non-white males. We also ran the analysis substituting for the zero values the lowest observed rate for the race-sex group and then taking the log. This did not substantively change the results for the non-white males, but did produce a coefficient for LNNMB in the suicide equation for non-white females that was statistically insignificant (t = .869) and a correlation between the residuals in the model that contained only age and period dummy variables that was positive, but not statistically significant.

9. The results reported in Table 2 are based on the cases for which we have cohort characteristic data. This allows us to compare the ability of the cohort characteristics to explain the relationship between the residuals (based on the same set of cases). When we do not use the cohort characteristics, it is possible to analyze data from each of the age groups for each of the periods, for example, data for each of the age groups in 1930 rather than just the age-period-specific rate for those 10-14 in 1930. For this larger set of data, the correlations between the residuals for homicide rates and suicide (after controlling for age and period) are: total sample, r = .71; white males, r = .82; white females, r = .38; non-white males, r = .20; non-white females, r = .17. Each of these correlations is statistically significant at the .05 level.

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