Age Patterns of Suicide and Homicide Mortality Rates in High-Income Nations*

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Abstract

In most nations, suicide rates tend to increase and homicide victimization rates tend to decrease with age, but the degree of increase and decrease varies over time and across nations. In particular, some nations more than others show a worsening of youth lethal violence relative to older age groups. This age variation across nations and time in both forms of lethal violence may result from (1) the sizes of youth and elderly age groups, and the disadvantages and advantages, respectively, that size brings; (2) family changes that most harm younger, more recent cohorts; and (3) sociopolitical dimensions of equality that smooth the transition to adulthood. Using aggregate data on 18 nations over the period from 1955 to 1994, the analysis examines how these determinants affect measures of suicide and homicide rates among the young relative to older ages. In support of the theoretical arguments, the results show that deviations from the general increase in suicide with age and decrease in homicide with age relate as predicted to measures of demographic, family, and sociopolitical institutions.

Changing Age Patterns of Suicide and Homicide Mortality

Like mortality rates more generally, mortality rates of suicide and homicide (both of which are forms of lethal violence) have well-established relationships with age. In most high income nations, suicide mortality rises steadily with age, while homicide mortality declines after peaking during young adulthood. Also like mortality more generally, these age patterns of suicide and homicide show variability across time and nations (Girard 1993; Steffensmeier & Allan 1994). Yet, among

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high income and low mortality nations, age patterns in lethal violence generally vary more than age patterns of mortality from all causes, and relate more closely to social conditions. Whereas the age trajectory from all causes is heavily weighted by deaths from degenerative disease closely related to physiological and developmental changes during old age, the age trajectories of mortality from suicide and homicide relate less directly to biological resilience (Horiuchi & Wilmoth 1998). Instead, they respond more immediately to social conditions involving group integration and interpersonal conflict, and therefore may vary widely with temporal and national differences in social conditions.

The special nature of age patterns of suicide and homicide raises another issue: they reflect concern about the well-being of younger persons. Although mortality from most diseases has declined and nearly disappeared at younger ages, suicide and homicide rates have remained high or increased. As leading causes of death among otherwise healthy young people, suicide and homicide contribute substantially to the years of life lost before age 65 (Rockett & Smith 1989) and the years of working life lost (Stewart 1997). Concern about levels of youth violence have in fact led public health officials in the U.S. to treat suicide and homicide, especially as they relate to firearm use, as a public health rather than a criminal justice system problem amenable to epidemiological techniques of surveillance, intervention, and prevention (Rockett 1998; Rosenberg, O’Carroll & Powell 1992).

More generally, age patterns of suicide and homicide reflect concern about the declining social well-being of the young relative to the elderly. In addressing debates over generational inequality, Preston (1984) compares the standing of the young and elderly using, among a variety of indicators, trends in suicide and homicide victimization. Lethal violence among the young in the U.S. has risen not only in absolute terms, but also in relative terms or faster than for older age groups. Since suicide rises with age, young people have an advantage in suicide rates, but that advantage has declined in recent decades. Since homicide declines with age, young people have a disadvantage in homicide rates, and that disadvantage has increased in recent decades. This implies an increasing concentration of homicide victimization among the young, and increasing dispersion across age in suicide. Although claims of generational inequality concerning the economic advantages of the elderly have generated much debate (e.g., Hardy & Hazelrigg 1999; Williamson, Watts-Roy & Kingson 1999), age patterns of homicide and suicide can say much about the growing disadvantage of youth relative to other age groups.

A social capital approach that focuses on the structural resources inhering in family relations and social organization may help explain these age-based patterns and trends. O’Brien, Stockard, and Isaacson (1999) suggest that two factors, cohort size and family change, contribute to rising homicide among youth in recent years by reducing their social capital. Large cohort size overloads institutions of social control and stretches family and community resources, and single-parent families have fewer time and income resources to monitor and supervise youth. At least in
the United States, these sources of change affect age and cohort differences in homicide victimization (O'Brien & Stockard 2000) and suicide (Stockard & O'Brien 1999).

Youth lethal violence has increased in other nations as well, but generally not to the same degree as in the U.S. — and perhaps not in response to the same forces. Compared to most European nations, the U.S. exhibits higher levels of poverty and economic inequality (Atkinson, Rainwater & Smeeding 1995), greater age differences in public policy support (Pampel 1994), and a stronger sense of isolation of youth from older age groups (Gartner and Parker 1990). These differences likely translate into variation across nations in the youth disadvantage (i.e., higher rates) in homicide and the youth advantage (i.e., lower rates) in suicide (Girard 1993; Leo, Conferti & Carollo 1997; Pfeiffer 1998; Steffensmeier & Allan 1994).

If, as this reasoning suggests, age patterns or differences in lethal violence vary across time and nations, the key question becomes "how do social conditions promote or discourage the youth disadvantage or advantage?" rather than "are the young disadvantaged or advantaged relative to other age groups?" Yet, few studies address the former question. Many compare time and nation differences in overall levels of suicide and homicide, and many describe the typical age patterns of suicide and homicide, but few examine how age patterns vary across time and nations.

The next section presents theoretical arguments specifying how three factors, each related to generational equality and age differences in behavior, may affect patterns of suicide and homicide mortality: (1) age group size, (2) changes in family roles, and (3) sociopolitical dimensions of equality. The arguments claim that these determinants affect lethal violence among the young more strongly than among older age groups, and therefore lower or raise suicide and homicide of the young relative to the old. The first two factors build on the work of O'Brien, Stockard, and Isaacson (1999), and the third factor adds a comparative component to the arguments. The sections to follow test these arguments by examining empirically how age-based patterns and trends in lethal violence vary across time and nations. Rather than aiming to explain the well-known and often-demonstrated trends and national differences in overall levels of suicide and homicide, or the equally well-known and often-demonstrated age patterns of suicide and homicide, the theory and analyses address how social change and national differences modify the age patterns. They also focus on two related mortality outcomes, suicide and homicide, in order to generalize to the broader concept of lethal violence.
Age Group Size

Easterlin (1987) argues that cohort size contributes to homicide and suicide among the young because members of large cohorts face competition for increasingly scarce resources that harms their education, occupational opportunities, and financial well-being (especially when a large cohort follows a smaller parental cohort that enjoyed a high standard of living). Along with late marriage, low fertility, alienation, and high divorce rates, homicide and suicide rates rise in response to the cohort-driven sense of relative deprivation. Just the opposite occurs for smaller cohorts, whose members enjoy greater economic success, more stable and satisfying family life, and lower suicide and homicide rates. Young adults, suffering most from the loss of family and community controls, experiencing the greatest loss of social capital, and facing the insecurity of their occupational and financial future, should show the harm of cohort size on suicide (Ahlburg and Shapiro 1984) and homicide (O’Brien 1989; O’Brien, Stockard & Isaacs 1999).

At older ages, however, large cohorts sometimes enjoy greater advantages in political expression and economic power than do smaller cohorts because large cohorts have sufficient numbers to influence public policy and garner consumer resources (Preston 1984). Since large cohorts represent potentially powerful voting blocs and purchasing segments, their political and economic problems become social concerns (Uhlenberg 1992). These advantages may contribute to better economic and social well-being of large cohorts relative to smaller cohorts in old age. Ostensibly competing with Easterlin’s argument, this argument actually proves complementary when considering the importance of age (Pampel 1996). As workers age, the salience of work for personal well-being declines, high levels of transfer income become more important, and the advantages of political “voice” grow — all of which increase the benefits of cohort size and produce a negative rather than a positive relationship with suicide and homicide rates.

A combined argument thus explains rising youth lethal violence by focusing on the harmful consequences of large cohort size at young ages and the beneficial consequences of large cohort size at older ages. The rising size of the youth and young adult population from the 1960s to the 1980s that resulted from the baby boom of the 1950s should increase youth suicide and homicide during those years. The rising size of the aged population, in part reflecting birth trends 60 or more years ago and more recently the reduced mortality at older ages, should have the effect of reducing suicide and homicide among the elderly (suicide more than homicide, because, as discussed shortly, homicidal action of the young may victimize the elderly). Together the harm of age group size among the young and the benefit of age group size among the old should increase relative levels of youth lethal violence.
Family Change

Along with cohort size, recent changes in family structure may contribute to the loss of social capital and rise in lethal violence among youth relative to older age groups (O’Brien, Stockard & Isaacson 1999; O’Brien & Stockard 2000; Stockard & O’Brien 1999). Since the 1960s, youth violence has risen in the U.S. (and perhaps other high income nations as well) in part because changes in family structure placed young people in single parent households during a period of industrial transformations, labor market problems among parents from large baby-boom cohorts, and cutbacks in social assistance for families and children (Moore & Tony 1998). Disadvantaged groups located in large cities and subject to the decline of employment opportunities, the exit of middle-class residents crucial to building strong religious and family institutions, and the expansion of gangs and the drug trade, experienced the problems most acutely (Wilson 1987). Rising homicide represents an obvious consequence of such changes, but suicide also appears commonly in deprived parts of cities (Almgren et al. 1998).

In addition, lethal violence may increase even among those from affluent backgrounds. Without exaggerating the ties between youth and adults in earlier times, it appears that the weakening of informal social controls in families and communities (Sampson & Wilson 1995), a culture of violence exhibited in television, films, and music videos, the spread of drug use to middle-class youth, and (in some nations) widening access to lethal weapons have made adolescence more dangerous than ever before (Blumstein 1995). Violence from homicide, although most common among disadvantaged groups, has diffused to higher status groups (Moore & Tony 1998); and suicide has historically occurred more commonly among middle-class groups than disadvantaged groups (Henry & Short 1954; Unnithan et al. 1994).

The potential problems of family changes involving low marriage and high divorce rates stem in part from the greater difficulties of supervision that divorced and single-parents face in dealing with youth (O’Brien, Stockard & Isaacson 1999). They also stem from problems of poverty, inequality, and discrimination that harm disadvantaged families and youth. Both lack of time and income among single parents may make their children’s transition to adulthood more difficult. Weaker social bonds and supervision of youth increase the strain they face in reaching legitimate goals and influence homicide offending and victimization (Sampson & Laub 1995). Similarly, family changes reducing group integration, surveillance, and regulation of young people raise the risks of self-harm and suicide (Chew & McCleary 1994).

The logic underlying these arguments posits that changes in family life and their negative consequences for suicide and homicide most directly affect younger cohorts. Reflecting a decline in social capital, the changes make the transition to autonomous adult roles more complex, turbulent, and drawn out, and make entrance into adulthood less regulated and supervised than in the past. The elderly,
having been raised decades before the recent upturn of divorced and single-parent families, would not face the same harm of family change. Bearing the brunt of recent changes, the young should experience greater increases in suicide and homicide rates.

Dimensions of Sociopolitical Equality

Modern societies have increasingly improved the position of older age groups by providing public and private economic support during the transition to retirement. Although they differ in form and generosity, programs for the aged have become universal among high income nations. However, these nations differ more starkly in the public support of children and youth (Pampel 1994), and these differences may affect conditions for the transition from youth to adulthood. Greater access to responsible family roles, productive work roles, and meaningful community involvement may follow from sociopolitical equality and counter tendencies toward isolation, egocentrism, and immaturity in youth (Steffensmeier & Allan 1994). The end result is to reduce problems of lethal violence among youth relative to older age groups.

Collectivism

One general dimension of sociopolitical equality relates to institutions of social protection (Castles 1993; Esping-Andersen 1990, 1999). At one extreme, collectivist nations with social democratic governments implement universal social programs with generous program benefits as a means to moderate market-generated inequality; at the other extreme, individualist nations with liberal governments reproduce market-based inequality with employment-based coverage and income-based benefits for social programs. As a source of the different strategies of social protection, collectivist nations have institutionalized coalition government, consensus decision-making, and corporatist cooperation among class interests, whereas individualist nations have institutionalized majoritarian government and decision making, and fragmented, pluralist, and specialized interests (Lijphart & Crepaz 1991). Although most closely related to the nature of class relations and cooperation, the dimension of collectivism and individualism may also affect the relations between and isolation of age groups from one another. By moderating the potential isolation of youth from older age groups, collectivism may reduce lethal violence among younger age groups.

First, collectivist institutions may ease the transition of young cohorts into adult roles. By attenuating the link between market performance and sustenance, such institutions may limit the economic problems experienced by younger cohorts entering the labor force. For example, the strong commitment of collectivist nations to full employment can limit the harm of poor job opportunities, wages,
and opportunities for promotion. By keeping unemployment at a minimum, and
guaranteeing jobs for those who desire them, government efforts toward full
employment can moderate some of the difficulties faced on entering into the adult
labor force. Full employment policies may also increase the confidence of workers
that fluctuations in the supply of labor force entrants will not threaten their future
income. For another example, collectivist nations emphasize the universality of
entitlements to benefits, a dimension that is in part independent of the levels of
expenditures. When offered as universal entitlements, welfare programs may allow
workers to qualify for programs without having made wage-based contributions to
the program funds. By easing the incorporation of youth into the adult work force,
and moderating the harm of a poor labor market, these policies can inhibit forces
that raise suicide and homicide among the young relative to older groups.
Collectivism may also benefit older persons, but given the widespread support for
retirees (even in individualist nations such as the U.S.), not to the extent that it
benefits younger age groups.

Second, collectivist institutions may encourage strong ties to encompassing
class groups that are part of societal institutions for collective social protection.
These ties may also reduce age boundaries and age differences in social behavior
in ways that mute the potential for the isolation of youth. This argument builds on
an underlying assumption that when the biological characteristics and social
positions of the young coincide, and when socially-based age distinctions reinforce
the importance of developmental differences, young people find the transition to
adult roles most difficult. Under these conditions, age role differences become well-
defined and generational conflict becomes more common. Age stratification in
turn fosters alienation, reduces social controls, and highlights age differences in
identities and behaviors — including those related to homicide and suicide
victimization. An isolated youth culture is not inevitable, however, as social
conditions can also serve to minimize age-based boundaries. In general, the
egalitarianism of collectivist nations promotes class solidarity that in part transcends
age differences. Equality across classes also reduces the importance of
demographically defined groups, and moderates problems of youth relative to older
groups in suicide and homicide.

Income Equality

Like collectivist institutions, income equality should discourage, according to a
long tradition of research (see Kawachi, Kennedy & Wilkinson 1999, for a recent
example), lethal violence. The greater the income equality, the less the economic
and social exclusion of youth from productive roles, and the less the sense of
disadvantage. Along with reducing suicide and homicide overall, then, equality may
reduce suicide and homicide particularly among youth.
Like collectivism and income equality, welfare state programs may similarly affect age patterns of lethal violence by aiding those not working, and reducing the difficulties of the transition from youth to adult roles. However, two programs that target children and the elderly deserve special attention. Family allowance programs provide benefits to families with children as a means of maintaining the family standard of living in the face of rising expenses for child rearing. Sometimes pronatalist in goals, but more often instruments of equality, family allowance programs exist in all high income nations except the U.S. and offer benefits averaging around five percent of the average wage, and seldom exceeding ten percent (Gauthier 1996; Wennemo 1992). Public pension programs provide benefits to the retired and elderly that help maintain an acceptable standard of living without wage employment and that exceed family allowance benefits by a factor ranging from 5 to 25 (O’Higgins 1988).

The size of family allowance benefits relative to pension benefits rather than absolute spending levels may prove most relevant to the public support received by young people and the elderly. With age equality in spending, family allowances and pensions tend to rise similarly, even if, as during the last few decades, the size of the aged population increases while the fertility rate decreases. With low age equality in spending, pensions tend to rise faster than family allowances, reflecting the growing size, power, and well-being of the aged relative to children. Policies that distribute benefits more equally across age groups, and in particular balance the relatively high level of expenditures for the elderly, can help deal with the problems of youth. They may counter the economic problems of youth, especially in recent years when potential problems of family breakup and child poverty have emerged as most serious. The end result of equalizing public benefits across ages is to moderate relative youth involvement in lethal violence.³

Hypotheses

These arguments specify predictions about both the levels and trends in age differences in lethal violence. The predictions about levels take an additive form, in that the determinants directly influence age differences in lethal violence; the predictions about trends take an interactive form, in that the determinants influence the relationship between time and age differences in lethal violence. The additive hypotheses predict that a large youth population, by flooding labor market supply, should raise the relative youth disadvantage in lethal violence; a large elderly population, because it brings social and political advantages to age groups outside the labor force, should do much the same. The interactive hypotheses, focusing on the determinants of the effects of time, predict that a large youth population and a large aged population will worsen trends in relative youth lethal violence
(i.e., strengthen the effect of time on age differences in lethal violence). Next, family changes, by worsening the time and income demands of parents and reducing their regulative role in the transition of their children into adulthood, should increase relative youth lethal violence (additive) and exacerbate trends in relative youth lethal violence (interactive). Finally, the additive hypotheses predict that collectivism, income equality, and age equality in public spending, by easing the economic and social difficulties of the transition to adulthood, should lower the rates of youth suicide and homicide relative to older age groups. The interactive hypotheses predict that trends equalizing suicide among the young and old, and trends concentrating homicide victimization among the young, will emerge less strongly in the presence of collectivism, income equality, and age equality in spending.

The attention given by the hypotheses to how diverse background factors involving sociopolitical, demographic, and family institutions affect age differences in lethal violence neglects more proximate determinants. Gun availability, drug use, gang conflict, and media violence may more directly influence age patterns of lethal violence and mediate more distant influences. Although particularly relevant to rising homicide in the U.S. during the mid-1980s, these factors offer neither a general explanation that applies to other time periods or nations nor insights into the sources behind the recent trends in guns, drugs, and gangs; O'Brien, Stockard, and Isaacson (1999:1062) accordingly label arguments emphasizing these factors as ad hoc. Our hypotheses focus instead on background rather than on mediating factors, assuming that the mediating factors, even if not central to the theoretical arguments, partially transmit the effects of the background factors. The background factors should emerge as important determinants, even if the intervening mechanisms are not studied directly.

Although the theory and hypotheses about age patterns of lethal violence have implicitly treated suicide and homicide similarly, a crucial and obvious difference exists between the two. Suicide offenders kill themselves, making the age of offenders and victims identical, while homicide offenders kill others, often persons in different age groups. In practice, most interpersonal violence occurs within age groups, but young homicide offenders sometimes direct violence toward older victims. Since problems of youth may result in killing of older persons along with younger persons, age differences in homicide offenders and victims may moderate age differences in homicide victimization. Age patterns and age-based trends for homicide may thus emerge less strongly than for suicide. Similarly, since men often kill women, the homicide results may emerge weaker for women than men (and the low levels of homicide among women may increase the importance of random error and again contribute to weaker results for them than for men).
Methods

DATA

Testing the hypotheses requires age-specific rates of male and female suicide and homicide mortality that vary across diverse nations and time periods. Because aggregate more than individual-level data can best capture variation in lethal violence and sociopolitical, demographic, and family structures, nations and years comprise the appropriate units of analysis. Moreover, use of variation across both nations and years adds substantially to that available from the study of a single nation or a single cross-section of nations.

The sample includes 18 high income nations (with populations above one million), including those of Western Europe (Finland, Sweden, Norway, Denmark, the United Kingdom, Ireland, the Netherlands, Belgium, Germany, Austria, Switzerland, France, and Italy), the United States, Canada, Japan, Australia, and New Zealand. Time-series data for these nations exist for the 40 years from 1955 to 1994. Unlike developing nations, the sample nations have similarly high income levels, mature welfare states, low death rates, and high rates of lethal violence at younger ages relative to other causes of death. Yet, these nations contain much variation in age patterns of homicide and suicide, differ on the dimensions of age composition, family structure, and sociopolitical equality, and have experienced much change in most of these factors during the post-World War II time period.

MORTALITY MEASURES

For these 18 nations and 40 years (i.e., 720 nation-years), the World Health Organization (1996) reports cause-specific mortality data for males and females for seven adult age groups: 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, and 75 and over. The age-specific mortality rates equal the number of deaths from suicide or homicide per 100,000 population of the specified age and sex group. Although the international scheme for classifying causes of death has changed in recent decades, the rules for placing deaths in the suicide and homicide categories have remained relatively constant. The study of high income nations, all of which have instituted reliable death registration systems, also limits problems of measurement error. A more serious problem involves attempts of family members and sympathetic physicians to hide suicide by having these deaths classified officially as due to some other cause (van Poppel and Day 1996). In relation to age differences in suicide, however, bias occurs only when the errors of measurement differ for the young and old. To attribute national or temporal differences in suicide rates among the young relative to the old to error, the undercount of suicides for one age group must not only exceed that for the other, but must do so to varied degrees across
nations and over time. Homicide rates do not involve the potential for measurement error found in suicide rates — comparative measures from the World Health Organization provide accurate figures compared to those reported by criminal justice systems (Bennett & Lynch 1990). However, homicide mortality figures on the age of victims only indirectly reflect information on the age of offenders.

The analysis uses two types of measures of age patterns or differences in lethal violence, one based on a ratio and the other on a slope coefficient. The ratio measure divides rates of those ages 15-24 and undergoing the transition to adulthood by rates of those ages 65-74 and undergoing the transition to retirement. These two age groups maximize the contrast between low and high levels of lethal violence over the life course, but other age groups such as 25-34 and 55-64 may similarly contrast age differences in lethal violence, and may deserve study as well.5

Using these age groups, a simple age ratio of youth to elderly lethal violence rates shows the proportional excess of the former over the latter for each nation and year. However, changing the denominator changes the implicit standard of comparison, can alter the ranking of the ratio values, and makes results dependent on an arbitrary choice. Taking the log of the ratio, however, eliminates the influence of choosing one denominator over the other (i.e., the log of the ratio of youth rates to elderly rates gives the inverse of the log of the ratio of elderly rates to youth rates),6 and eliminates extreme skewness due to positive outliers (such as youth homicide in the U.S.). The measures arbitrarily use elderly rates (plus one to avoid dividing by zero) as the denominator and youth rates (again plus one) as the numerator, with high scores indicating excess youth suicide and homicide and a youth disadvantage.

The slope coefficient measures compute the relationship between age and lethal violence for the seven age groups within each nation and year. Coding each age group to its midpoint, a regression of suicide or homicide on age with seven cases shows the change in mortality for a single year increase in age. The procedure thus gives 720 coefficients (18 nations by 40 years) for each type of lethal violence that can serve as a measure of age differences. Although it lacks the more intuitive meaning of the ratio measure, the slope measure uses figures on all seven adult age groups. According to the unstandardized coefficients from such regressions, the greater the increase in lethal violence with age, the larger the positive coefficient. However, to provide a measure that reflects relative youth disadvantage, and has the same direction of coding as the ratio measures, we multiply the slope by minus one. Thus, a positive slope coefficient reflects a youth disadvantage, and a negative coefficient reflects a youth advantage. The linear measures miss some curvilinearity in the relationship at the oldest and youngest ages, but nonetheless contrast the upward or downward changes that occur with age in suicide and homicide.7

Corresponding to the hypotheses, both measures reflect relative rates of suicide and homicide, or differences in rates across ages. The theoretical arguments claim
that the determinants of lethal violence affect the young more strongly than older age groups, and therefore affect suicide and homicide of the young relative to the old. The relative ratio and slope measures, where one age group serves as a control in measuring the suicide and homicide rates of another age group, capture this comparative component. For example, a rise in youth suicide takes on different meaning depending on changes in other age groups: it could occur more quickly than for older age groups, which would decrease the youth advantage, or it could occur more slowly than for older ages groups, which would increase the youth advantage. Relative rates thus appropriately test the hypotheses by measuring age patterns of lethal violence.

In contrast, use of absolute youth or elderly rates, although valuable for other purposes, would not identify the different consequences of social change for the young and old. To at least some degree, societal changes in the background sources of suicide and homicide will similarly affect mortality rates at all ages, and define a component of mortality that young and old share in common. Analysis of youth or elderly rates alone mixes this shared component with the component unique to the age groups, and therefore does not isolate age differences in lethal violence. Analysis of the relative measures, however, avoids such problems.

To formalize the benefits of relative measures, consider two separate equations for the natural log of youth rates (Y) and elderly rates (E) with one independent variable X that has three sorts of effects: one unique to youth (b_y), one unique to the elderly (b_e), and one shared by both age groups (b_{y,e}):

\[ \ln(Y) = a_y + (b_y + b_{y,e})X + e_y = a_y + b_y^*X + b_{y,e}^*X + e_y \]

\[ \ln(E) = a_e + (b_e + b_{y,e})X + e_e = a_e + b_e^*X + b_{y,e}^*X + e_e. \]

Since the logged ratio of Y to E equals the log of Y minus the log of E,

\[ \ln(Y) - \ln(E) = (a_y - a_e) + (b_y - b_e)^*X + (b_{y,e} - b_{e,e})^*X + (e_y - e_e). \]

The effect common to youth and the elderly, b_{y,e}, drops out, leaving the intercept and slope equal to the difference between the unique effects of youth and the elderly. The relative measure thus controls for forces that affect all age groups similarly, and isolates the effects unique to each age.

**Demographic, Family, and Sociopolitical Measures**

The measures of cohort or age group size equal the proportion of the population ages 15-24 and ages 65-74. The age groups correspond to those used in the ratio measures of lethal violence, and reflect the movement of generations through youth or into old age. As proportions, the measures have a straightforward interpretation: the larger the size of both age groups, the higher the lethal violence should be among the young relative to the old. An alternative measure of relative cohort size used by Easterlin (1987) contrasts youth and parental generations by taking the ratio of
persons ages 15-29 to persons 30-64. Yet, this measure does not correspond to the age groups used in the dependent variable, or relate directly to the contrast between youth and the elderly.

Crude marriage, divorce, and fertility rates available from the United Nations (1996) reflect changes in the family roles of women and men. Relatedly, the female labor force participation rate from the Organization for Economic Cooperation and Development (1996) and the International Labour Office (1998) reflects involvement of women in the paid economy (although it says little about the nature of that involvement). These measures do not distinguish rates by age, and therefore average differences over the life course, but nonetheless reveal substantial variation across nations and years in social trends. Since these variables correlate so closely with one another that identifying unique effects becomes difficult, the models use a scale constructed from the four variables. With the marriage and total fertility rates reversed in the direction of coding so that all measures indicate the decline of traditional family roles, the scale reflects a single factor-analytic dimension and has a reliability of .68. The results to follow using the scale demonstrate greater stability than the results using the four items as separate variables.

Unlike the measures of age structure and family change, the sociopolitical measures are not available for the full sample of 18 nations and 40 years, but the use of multiple indicators should help rectify this weakness. First, a measure of collectivism based on national differences in class-based institutions and policies from Pampel and Gartner (1995) exists for all 18 nations, but does not vary over time. The measure combines five indicators — democratic corporatism, consensus government, leftist rule, decommodification or universalism in policies, and governability — that affect the degree to which nations strive to protect the economic status of its citizens from the risks of the market. The five indicators define an unidimensional scale that has a reliability equal to .89, and offers a useful summary score of national differences. The Scandinavian social democratic nations score highest on the scale, followed by the central European conservative nations and then the English-speaking liberal nations.

Lacking data for earlier decades, the scale must assume stability over time in the rankings. Obvious movement toward expansion, and more recently retrenchment, of welfare state protection has occurred in all nations during the time period of study. Use of a stable measure does not deny that change, but assumes that the relative rankings of nations have changed little. Sweden and Norway no doubt have done more to encourage equality with their policies than Canada or the U.S. throughout the post-World War II period. To the extent that national experiences violate the assumption — that the relative positions of nations change when the measure does not — the estimates will bias downward the effects of the measure.

Second, another stable measure of national differences — income equality — complements the collectivism measure. A Gini index measure of income inequality
comes from Gustafsson and Johansson (1999) for the 14 nations with figures from the Luxembourg Income Study (LIS), and from Deininger and Squire (1996) for nations without LIS data. Few nations have sufficient information on income distributions to create a time series, requiring use of the years in the 1980s for which figures are most complete, and the assumption, as for collectivism, of stable rankings of nations. We subtract the Gini index from 100 to create a measure of income equality that is coded in the same direction as collectivism.

Third, a relative spending measure available for the years from 1959-1994 (International Labour Office 1996) takes the natural log of the ratio of family allowance spending per person age 0-14 to pension spending per person age 65 and over. The log makes the ratio equivalent to its reciprocal, and the use of spending for children in the numerator makes the ratio a measure of age equality in spending. The higher the ratio, the greater the public policy support of children and youth relative to the elderly. Unlike collectivism and income equality, the ratio changes over time within nations as well as varies across nations, but begins in 1959 rather than in 1955.11

Estimation

The analysis pools data by nation and year, taking the nation and year-specific measures of age patterns of male and female suicide and homicide rates as dependent variables. To control for between-nation heterogeneity, the pooled models can include 17 dummy variable terms for the nations. However, when they include an independent variable that does not change over time, as for collectivism or income equality, the models cannot also include nation dummy variables because the nation-specific measures are perfectly collinear with the nation dummy variables.

A problem in estimating parameters for the pooled models stems from violation of the error-term assumptions of ordinary least squares. The errors in the pooled models may reflect serial correlation, heteroscedasticity, and cross-unit correlation. Feasible generalized least squares (FGLS) procedures based on estimates of the error parameters from OLS residuals produce consistent estimates of parameters for pooled models (Judge et al. 1988). Yet, with a small number of cases within panel units relative to a large number of error parameters to estimate, FGLS procedures can introduce substantial randomness. Based on Monte Carlo simulations, Beck and Katz (1995) demonstrate that the most effective strategies for practical research situations limit the number of error parameters to estimate. Following this counsel, we use STATA to estimate (1) coefficients that adjust for a common or pooled first-order serial correlation coefficient, and (2) panel-corrected standard errors that adjust for heteroscedasticity and cross-unit correlations using a procedure recommended by Beck and Katz.12
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TABLE 1: Means for Male and Female Suicide Rates, Homicide Rates, and Measures of Age Patterns in Suicide and Homicide Rates by Time Period and Age Group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Suicide Mortality</th>
<th>Homicide Mortality</th>
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<tbody>
<tr>
<td>Males</td>
<td></td>
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<tr>
<td>1955-59</td>
<td>11.8</td>
<td>44.4</td>
</tr>
<tr>
<td>1960-64</td>
<td>10.9</td>
<td>39.4</td>
</tr>
<tr>
<td>1965-69</td>
<td>10.6</td>
<td>39.5</td>
</tr>
<tr>
<td>1970-74</td>
<td>14.0</td>
<td>39.7</td>
</tr>
<tr>
<td>1975-79</td>
<td>17.6</td>
<td>38.5</td>
</tr>
<tr>
<td>1980-84</td>
<td>18.5</td>
<td>40.3</td>
</tr>
<tr>
<td>1985-89</td>
<td>19.7</td>
<td>38.9</td>
</tr>
<tr>
<td>1990-94</td>
<td>19.7</td>
<td>32.9</td>
</tr>
<tr>
<td>All years</td>
<td>15.4</td>
<td>39.2</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1955-59</td>
<td>5.44</td>
<td>16.9</td>
</tr>
<tr>
<td>1960-64</td>
<td>4.77</td>
<td>15.8</td>
</tr>
<tr>
<td>1965-69</td>
<td>4.37</td>
<td>16.4</td>
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<tr>
<td>1970-74</td>
<td>5.17</td>
<td>17.0</td>
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<tr>
<td>1975-79</td>
<td>5.65</td>
<td>17.7</td>
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<td>1980-84</td>
<td>5.01</td>
<td>17.9</td>
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<tr>
<td>1985-89</td>
<td>5.18</td>
<td>16.8</td>
</tr>
<tr>
<td>1990-94</td>
<td>4.49</td>
<td>13.3</td>
</tr>
<tr>
<td>All years</td>
<td>5.01</td>
<td>16.5</td>
</tr>
</tbody>
</table>

Results

To begin, Figures 1 and 2 graph the age patterns of suicide and homicide rates for males and females when averaged across all nations and years in the sample. As expected, the suicide rate for males in Figure 1 rises steadily from its lowest value among persons ages 15-24 until its peak at the oldest ages. Female suicide in Figure 2 rises earlier in the life course than male suicide, and levels off at ages over 75 when the male suicide rate continues to rise. These results say little about the trends in age-specific suicide rates, but demonstrate across a diverse set of nations and time points that a clear suicide advantage exists among youth relative to older age groups. Homicide rates exhibit the opposite pattern for both males and females: they peak at ages 25-34, then fall until age 75 and older (when the rate levels off for men and
increases slightly for women). Although lower than for the next oldest age group, youth homicide victimization remains high compared to the oldest age groups.

In more quantitative terms, regressing suicide rates on age produces unstandardized and standardized coefficients of .554 and .979 for males and coefficients of .199 and .947 for females. Regressing homicide rates on age produces unstandardized and standardized coefficients of -.029 and -.822 for males and coefficients of -.008 and -.720 for females. The standardized coefficients for homicide emerge weaker than those for suicide because the rise in rates from 15-24 to 25-34 moderates the linear decline. Otherwise, these coefficients reveal the strong positive relationship between age and suicide and the strong negative relationship between age and homicide. They also provide an average around which the nation and year-specific age slopes vary.

*Trends.* To make comparisons over time, and examine how changes may reshape the average age patterns, Table 1 lists suicide and homicide rates for those ages 15-24 and ages 65-74 within eight 5-year time groups. Considering male youth suicide first, the rates fall briefly during the 1960s, increase during the 1970s and
1980s, and level off during the 1990s. For older males, the rates stay steady during the 1960s and 1970s after a drop from the 1950s, then rise slightly during the early 1980s and fall during the 1990s. Despite the fluctuations, however, the elderly male suicide rates end up much lower in the 1990s than in the 1950s. Taking the log of the ratio of youth male suicide to elderly male suicide reveals a declining youth advantage. Since youth suicide remains lower than elderly suicide for the full time span, the logged ratio falls below zero for all years. Still, the negative values move toward zero, thus demonstrating a steady decline in the youth advantage and in age difference in suicide mortality.

For females, the downward trend in the logged suicide ratio emerges less strongly than for males, but also demonstrates the declining youth advantage. The logged ratio of -1.20 in the late 1950s reflects a rate among young women of 5.44 compared to a rate among elderly women of 16.9. By the early 1990s, both the youth and elderly female suicide rates had fallen, but less for the young than the elderly. Consequently, the logged ratio rises to -.865. The gap between young and old remains smaller for females than males, but the trend proves similar to males.
TABLE 2: Correlations between Time and Alternate Measures of Age Patterns of Suicide and Homicide Rates, 18 Nation Means, 1955-1994

<table>
<thead>
<tr>
<th>Age Ratio</th>
<th>Male Logged Suicide Ratio</th>
<th>Male Logged Homicide Ratio</th>
<th>Female Logged Suicide Ratio</th>
<th>Female Logged Homicide Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24 / 65-74</td>
<td>.97</td>
<td>.79</td>
<td>.78</td>
<td>.52</td>
</tr>
<tr>
<td>Slope coefficient</td>
<td>.91</td>
<td>.92</td>
<td>.21</td>
<td>.77</td>
</tr>
<tr>
<td>15-34/ 65-74</td>
<td>.98</td>
<td>.89</td>
<td>.86</td>
<td>.78</td>
</tr>
<tr>
<td>15-24/ 55-74</td>
<td>.97</td>
<td>.62</td>
<td>.83</td>
<td>.22</td>
</tr>
<tr>
<td>15-24/ 65+</td>
<td>.95</td>
<td>.72</td>
<td>.56</td>
<td>.01</td>
</tr>
<tr>
<td>15-34/ 55-74</td>
<td>.98</td>
<td>.81</td>
<td>.90</td>
<td>.62</td>
</tr>
<tr>
<td>15-24/ 15+</td>
<td>.96</td>
<td>.71</td>
<td>.65</td>
<td>.03</td>
</tr>
</tbody>
</table>

(n = 40)

Homicide rates also reveal worsening of the circumstances of the young relative to the old. For males 15-24, homicide rates steadily increase, but especially jump in the 1990s. For older men, the rates rise in the 1970s, but decline in the late 1980s and early 1990s. The positive values for the male logged homicide ratio in the next column reflect excess youth homicide victimization. Initially around zero, the logged ratio rises to a peak in the 1990s, again indicating that young people do increasingly worse. For females, youth homicide rates increase from the late 1950s through the early 1980s, then drop off a bit. Elderly homicide rates peak in the early 1980s, and decline afterward. The logged ratio measure of youth to elderly homicide victimization rises for females, but not to the same extent as for males.

The age slopes show much the same trend as the ratios. For male suicide, the positive slope declines over time as rates for youth increase relative to those for older ages, and the negative of that slope shown in Table 1 moves closer to zero. For female suicide, the trend emerges less clearly than for males or for the logged ratio measure, with change emerging only in the 1990s. For male homicide, the age slope becomes more negative over time as rates for youth increase relative to those for older ages, and the negative of that slope in the table shows a steady increase. The same holds for female homicide.

To summarize the trends in the age patterns, Table 2 uses the data on all 40 years to compute the correlations of the time variable with the year-specific means of the measures of age differences in lethal violence. Reflecting the upward trend, the correlation for the male suicide ratio using the same ages as in Table 1 (i.e., 15-24 / 65-74) equals .97, and the correlation for the male homicide ratio equals .79. The strong positive correlations indicate that when averaged across all nations, youth suicide and homicide rise over time relative to elderly suicide and
TABLE 3: Nation Means for Logged Suicide and Homicide Ratios of Young to Old, and Nation-Specific Correlations between Time and Logged Suicide and Homicide Ratios of Young to Old, 18 Nations, 1955-1994

<table>
<thead>
<tr>
<th>Nation</th>
<th>Logged Ratio Ages 15-24 / 65-74</th>
<th>Time Correlation of Logged Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Norway</td>
<td>-0.704</td>
<td>0.18</td>
</tr>
<tr>
<td>Sweden</td>
<td>-1.04</td>
<td>0.052</td>
</tr>
<tr>
<td>Denmark</td>
<td>-1.27</td>
<td>0.232</td>
</tr>
<tr>
<td>Netherlands</td>
<td>-1.32</td>
<td>0.098</td>
</tr>
<tr>
<td>Austria</td>
<td>-0.963</td>
<td>0.067</td>
</tr>
<tr>
<td>Switzerland</td>
<td>-0.719</td>
<td>0.039</td>
</tr>
<tr>
<td>Finland</td>
<td>-0.705</td>
<td>0.092</td>
</tr>
<tr>
<td>Belgium</td>
<td>-1.55</td>
<td>-0.023</td>
</tr>
<tr>
<td>Germany</td>
<td>-0.873</td>
<td>0.080</td>
</tr>
<tr>
<td>Japan</td>
<td>-0.930</td>
<td>0.073</td>
</tr>
<tr>
<td>Ireland</td>
<td>-0.809</td>
<td>0.167</td>
</tr>
<tr>
<td>Italy</td>
<td>-1.54</td>
<td>0.187</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-1.01</td>
<td>0.440</td>
</tr>
<tr>
<td>New Zealand</td>
<td>-0.695</td>
<td>0.509</td>
</tr>
<tr>
<td>France</td>
<td>-1.57</td>
<td>0.121</td>
</tr>
<tr>
<td>Australia</td>
<td>-0.712</td>
<td>0.262</td>
</tr>
<tr>
<td>Canada</td>
<td>-0.450</td>
<td>0.144</td>
</tr>
<tr>
<td>United States</td>
<td>-0.842</td>
<td>0.912</td>
</tr>
<tr>
<td>All nations</td>
<td>-0.983</td>
<td>0.178</td>
</tr>
</tbody>
</table>

(n = 40 for each nation)

homicide. For the female ratios, the correlations of .78 and .52 for suicide and homicide are lower than for males, but still indicate worsening of youth violence relative to that at older ages. The correlations of time with the age slopes reveal the same trends, except, as just noted, for female suicide, where the correlation falls substantially compared to the correlation for the logged ratio.

As evidence of the validity of the measures, the results in Table 2 appear much the same when including other age groups. In fact, when combining ages 15-24 with ages 25-34 in the numerator of the ratios, the correlations increase and the upward trends appear even stronger. When combining ages 55-64 with ages 65-74 to include those in late middle age with the elderly, or when combining ages 75 or older with ages 65-74 to include all elderly, the trends for males remain strong. Even the proportion ages 15-24 to ages 15 and older give the same results for males.
The correlations for the female suicide ratio remain much the same regardless of the age groups, except when using ages 65 and over in the denominator. The rates for women age 75 and older, a diverse and open-ended age group, add randomness to the ratio. The correlations for the female homicide ratios reveal the most sensitivity to the age categories. When using alternative definitions for the oldest age groups, the correlations of the logged age ratios for female homicide victimization fall substantially. With some exceptions, then, the trends of youth violence to elderly violence hold across alternative age groupings.

National Differences

Age patterns of suicide and homicide mortality differ across nations as well as over time. Table 3 lists the logged ratios of youth to elderly suicide and homicide rates for males and females (but, to save space, not the age slopes). The suicide ratios for males reflect the lower rates for youth, with large negative values indicating a large youth advantage and values near zero indicating a smaller youth advantage. The values range from lows of -1.57 for France and -1.55 for Belgium to highs of -.450 for Canada and -.695 for New Zealand. For females, the suicide ratio is lowest for Belgium and Denmark, and highest for Canada and Ireland. On the surface, youth enjoy a larger suicide advantage in European nations than in English-speaking non-European nations.

The mean male homicide ratios for these nations typically exceed zero because youth victimization rates exceed elderly victimization rates. For the male homicide ratio, the U.S. has by far the largest value, but New Zealand and the United Kingdom follow. The U.S. has youth homicide rates among males around 20 compared to rates around two for the these other two nations, but nonetheless resembles them in the homicide age ratios. In contrast, Switzerland, Finland, and Belgium have negative values, meaning that youth homicide victimization falls below elderly homicide victimization. Their low scores indicate the absence of a violent youth culture. For females, the ratio again appears highest in the U.S., followed by two other English-speaking non-European nations — Australia and Canada. Ireland, Belgium, France, and Japan have negative values.

Nations differ not only in the age patterns of suicide and homicide, but also in the age-based trends in suicide and homicide. The last columns of Table 3 present the correlations between time and the suicide and homicide ratios within each nation. The correlation across all nations for the male suicide ratios in Table 2 point to a shift in the ratio reflecting the decline in youth advantage over time. The trend is similar for most within-nation correlations in Table 3. The male suicide ratio rises most in the United Kingdom, Australia, the United States, and France; it declines in Japan and Germany and rises only slightly in Denmark. Thus, the English-speaking nations generally and most clearly exhibit the declining youth
advantage in suicide. Much the same pattern appears across nations in the trends for females, but many more nations show declines over time for the female ratio. Again, the English-speaking nations generally show greater increases.

For the homicide ratio, relative male and female rates among youth rise most in the United States. Other nations with increases over time in the relative rate of youth homicide victimization include Australia, Canada, Italy, and the United Kingdom (for males) and Australia, Canada, and the Netherlands (for females). Those nations with decreases in relative youth homicide include France and Japan (for males) and Italy and Japan (for females). As for suicide, the English-speaking nations generally show the greatest increases in relative youth homicide.

Some Preliminary Correlations

These nation patterns appear to relate to collectivism. If collectivism affects age patterns, it should lower youth suicide and homicide relative to elderly suicide and homicide, and correlate negatively with the age ratios. The collectivism scale does indeed have negative correlations with the means for each of the 18 nations listed in Table 3. Table 4 presents these correlations: they equal -.12 for the male suicide ratio, -.40 for the female suicide ratio, -.63 for the male homicide ratio,

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Gross Effects&lt;sup&gt;a&lt;/sup&gt; on Logged Age Ratios</th>
<th>Net Effects&lt;sup&gt;b&lt;/sup&gt; on Logged Age Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Percentage 15-24 (b)</td>
<td>.086</td>
<td>.011</td>
</tr>
<tr>
<td>(t) 3.68</td>
<td>.700</td>
<td>3.24</td>
</tr>
<tr>
<td>(B) .268</td>
<td>.039</td>
<td>.233</td>
</tr>
<tr>
<td>Percentage 65-74</td>
<td>.296</td>
<td>.164</td>
</tr>
<tr>
<td>7.68</td>
<td>.570</td>
<td>2.46</td>
</tr>
<tr>
<td>(.623</td>
<td>.404</td>
<td>.187</td>
</tr>
<tr>
<td>Family change index</td>
<td>.515</td>
<td>.230</td>
</tr>
<tr>
<td>13.6</td>
<td>7.12</td>
<td>5.94</td>
</tr>
<tr>
<td>(.688</td>
<td>.358</td>
<td>.316</td>
</tr>
<tr>
<td>Collectivism</td>
<td>-.043</td>
<td>-.149</td>
</tr>
<tr>
<td>-.734</td>
<td>-.542</td>
<td>-.219</td>
</tr>
<tr>
<td>-.076</td>
<td>-.305</td>
<td>-.247</td>
</tr>
<tr>
<td>Income equality</td>
<td>-.009</td>
<td>-.040</td>
</tr>
<tr>
<td>-.704</td>
<td>-.486</td>
<td>-.116</td>
</tr>
<tr>
<td>-.059</td>
<td>-.300</td>
<td>-.115</td>
</tr>
<tr>
<td>Age equality in spending</td>
<td>-.184</td>
<td>-.128</td>
</tr>
<tr>
<td>-.255</td>
<td>-.200</td>
<td>-.077</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 720)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> The gross effects come from five separate models: (1) percent 15-24, and percent 65-74; (2) family change index, (3) collectivism, (4) income equality, and (5) age equality in spending.

<sup>b</sup> The net effects come from one model that includes percent 15-24, percent 65-74, the family change index, and collectivism.
and -.30 for the female homicide ratio. The higher the collectivism score, the lower youth suicide and homicide rates relative to elderly suicide and homicide rates. These correlations partly but not completely result from the special rates in the U.S. With the U.S. deleted, the correlations of -.09, -.54, -.35 and -.08 are sometimes weak, but always negative.

Collectivism also correlates negatively with the national time trends in the ratios (i.e., the time coefficients for each nation in the last columns of Table 3), meaning that more collectivist nations exhibit weaker increases in youth lethal violence. The correlations are not large, however; they range from -.10 for female homicide to -.31 for female suicide. They become even smaller with the U.S. deleted, thus giving less support for claims about national differences in trends than for claims about national differences in levels of age ratios in lethal violence.

Perhaps the age ratios relate more closely to national differences in income equality and spending. The correlations for income equality show small negative relationships for all measures except male homicide (the relationship with female homicide disappears once deleting the U.S.). The correlations are similar to those for collectivism (indeed, collectivism has a correlation of .72 with income equality). Also, like collectivism, income equality shows little consistent relationship with nation-specific trends in youth lethal violence.

Finally, the correlations of age equality in spending again have the expected negative signs. These correlations sometimes emerge larger and sometimes smaller than those for collectivism. However, the spending variable has weak, and often positive relationships with the time trend in relative levels of youth violence. This indicates that age equality in spending sometimes increases youth violence. As with collectivism, the trends over time do not correspond to predictions.

Multivariate Models

To test the hypotheses more completely than the previous analyses, multivariate models can include all determinants, fully use the 720 cases, and make statistical adjustments. Table 5 first examines the separate effects of the variables on the logged age ratios (labeled gross effects in the table heading). Because they represent alternative measures of the national characteristics, collectivism, income inequality, and age inequality in spending should not be included simultaneously in the same equation. The age structure and family variables also correlate highly with one another, and the gross effects show their influence before removing that shared variance. The last columns of Table 5 present net effects from the full multivariate models.

The gross effects of the age structure variables show the predicted positive relationships, except for percentage age 15-24 and homicide. Thus, a large proportion of young people raises their suicide rates relative to those of the elderly;

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Gross Effects* on Slope Coefficients</th>
<th>Net Effects* on Slope Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Percentage 15-24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td>.022</td>
<td>.003</td>
</tr>
<tr>
<td>(t)</td>
<td>3.70</td>
<td>2.35</td>
</tr>
<tr>
<td>(B)</td>
<td>.107</td>
<td>.062</td>
</tr>
<tr>
<td>Percentage 65-74</td>
<td>.118</td>
<td>.012</td>
</tr>
<tr>
<td>10.1</td>
<td>6.35</td>
<td>1.08</td>
</tr>
<tr>
<td>.391</td>
<td>.189</td>
<td>.047</td>
</tr>
<tr>
<td>Family change index</td>
<td>.130</td>
<td>.021</td>
</tr>
<tr>
<td>8.30</td>
<td>10.2</td>
<td>1.95</td>
</tr>
<tr>
<td>.275</td>
<td>.207</td>
<td>.043</td>
</tr>
<tr>
<td>Collectivism</td>
<td>-.059</td>
<td>-.034</td>
</tr>
<tr>
<td>-.165</td>
<td>-.442</td>
<td>-.191</td>
</tr>
<tr>
<td>Income equality</td>
<td>-.009</td>
<td>-.010</td>
</tr>
<tr>
<td>-.989</td>
<td>-9.36</td>
<td>.203</td>
</tr>
<tr>
<td>Age equality in spending</td>
<td>-.027</td>
<td>-.035</td>
</tr>
<tr>
<td>-.990</td>
<td>-7.95</td>
<td>-.661</td>
</tr>
</tbody>
</table>

R² (.058 .255 .036 .198)  (n = 720)

* The gross effects come from five separate models: (1) percentage 15-24, and percentage 65-74; (2) family change index, (3) collectivism, (4) income equality, and (5) age equality in spending.

* The net effects come from one model that includes percentage 15-24, percentage 65-74, the family change index, and collectivism.

Conversely, a large proportion of elderly persons raises relative youth suicide rates or lowers relative rates of elderly persons. The effects of the percent aged disappear or change direction, however, with controls in the combined model. Changes in age structure not only relate closely to changes in family structures, but may also contribute to, or be mediated by, family change. The net effects of percent youth
still raise relative youth suicide, but not homicide — perhaps because youth offenders kill elderly persons as well as those of their own age.

The combined family scale consistently increases youth lethal violence in all models. The effects prove largest for male suicide, but also emerge as the strongest determinant for other outcomes (the standardized coefficients range from .251 to .688). Further, if the four components of the family scale are each added separately to the models, the divorce and female labor force participation rate increase all measures of youth lethal violence. The marriage and total fertility rate (reversed to construct the scale) have the expected negative effects, but not quite as strong as for the divorce and female labor force participation rates. These effects reaffirm the harmful consequences of family change for youth lethal violence.14

Finally, collectivism has the predicted negative effects on all dependent variables, but the coefficient does not reach statistical significance for the male suicide ratio. Income equality has the predicted negative effect for the homicide measures, but not for the suicide measures. Age equality in spending likewise has negative coefficients that reach statistical significance for three of the four dependent variables, with female suicide representing the exception. When significant, the standardized coefficients for these variables reach modest levels ranging from -.134 to -.305.15

In the combined model, collectivism represents national institutional characteristics and has effects at least as large as the gross effects. The other variables, not presented in the combined model in Table 5, have effects similar to those in the gross models. Controls for demographic and family variables do not explain away national differences in age patterns of lethal violence.16 Alternatively, variations in collectivism cannot explain away of the influence of demographic and family variables on age patterns of lethal violence.

Demonstrating the robustness of the results with respect to the measures of age differences, the results in Table 6 for the age slope (again times minus 1 to make the signs of the coefficients consistent with those in Table 5) reveal the same pattern of coefficients. To summarize, age group size and the family structure scale raise the youth relative rates for all but female suicide. Collectivism significantly lowers the measures of youth suicide and homicide relative to the elderly, and income equality and age equality in spending lower the measures of youth homicide relative to the elderly. The combined model continues to show the importance of collectivism, but the close relationships between age group size and the family measure nearly eliminate their net influence.

The results also prove equally strong for alternative measures of age patterns of lethal violence. For example, models predicting the ratio of lethal violence for persons ages 15-34 to persons 55-74 show virtually identical effects to those for models predicting the ratio for persons ages 15-24 to persons 65-74.

The support demonstrated for the hypotheses with all nations continues, albeit less strongly, when deleting the U.S. — an extreme outlier with respect to homicide
in particular, but also with respect to collectivism and age equality in spending. Comparing coefficients in Tables 5 and 6 to those without the U.S. reveals no differences in the significance of the age structure and family variables. However, reflecting the special importance of this nation, the negative effects of collectivism, income equality, and age equality in spending decline in size, sometimes to below significance. Female homicide in particular comes to have little relationship with any of the measures of equality when deleting the U.S. The weaker influence of the equality variables results in part from truncating important variation, but also emphasizes the exceptional nature of social life in the U.S.

A final analysis examines how national context affects trends in age patterns of lethal violence. First, adding product terms of time by each of the political variables shows if the political variables modify the increase over time in relative levels of youth lethal violence. Second, adding product terms of the age group size variables by each of the political variables shows if the political variables modify the effects of demographic changes on relative levels of youth lethal violence. And third, adding product terms of the family variable by each of the political variables shows if the political variables modify the harm of family changes on relative levels of youth lethal violence. To summarize the results of these interaction tests without presenting all the coefficients, and to confirm the correlations in Table 4, few significant coefficients emerge for the product terms. Political context affects the levels of relative youth lethal violence (as specified by the additive hypotheses), but not the trends in relative lethal violence (as specified by the interactive hypotheses). The temporal increase in relative youth lethal violence, and the harm of family and demographic changes on relative youth lethal violence appear to occur similarly across all nations. Consequently, collectivist nations with age equality in spending and income equality have lower rates of youth lethal violence than other nations, but the advantage has not increased over time or with age structure and family changes. Neither divergence nor convergence in age patterns emerges across these nations.

Summary and Conclusions

In contrast to numerous prior studies of national differences and changes in levels of suicide and homicide, this study examines age patterns of lethal violence. Despite invariance in the decline in homicide victimization with age and in the increase in suicide victimization with age, the degree of decline and increase varies across nations and over time. Indeed, recent increases in youth homicide and suicide relative to elderly homicide and suicide in some nations have strengthened the age-based decline in homicide, weakened the age-based increase in suicide, and generated concern about the well-being of the young relative to older age groups.
Rather than assuming universal trends, however, theory and research need to consider what social conditions promote or discourage youth disadvantage.

The theoretical arguments presented here focus on three sets of determinants that relate directly to demographic structure, family change, and sociopolitical equality, and indirectly to age relations, the difficulty of making the transition to adulthood, and age patterns of suicide and homicide mortality. First, large age group size may harm the economic prospects of young cohorts, but improve the well-being of elderly cohorts, and therefore contribute doubly to relative youth lethal violence. Second, by affecting young persons most intensely, changes in work, marriage, divorce, and fertility may increase youth lethal violence relative to that at older ages. Third, collectivist and egalitarian institutions of social protection, income equality, and age equality in public spending may moderate the problems of youth lethal violence through efforts to counteract the potential exclusion of youth from the social, economic, and political activities of older age groups.

The analysis of data on 18 nations over the period from 1955-94 supports an additive version of the theoretical arguments, but not an interactive version. The results show that youth suicide and homicide relative to suicide and homicide at older ages, as measured by both age ratios and age slopes, have increased steadily over time and differ substantially across nations. An increase in the size of the youth population or the elderly population (relative to the total population), and in what we refer to as family change tend to worsen relative youth violence. Measures of collectivism, income equality, and age equality in public spending generally lower the youth disadvantage in homicide and increase the youth advantage in suicide. In demonstrating effects on the levels of relative youth violence, our findings support the additive version of the hypotheses. However, our results do not support the interactive version of the hypotheses, which claims that measures of collectivism, income equality, and age equality in public spending modify the harmful effects of time, age group size, and family change on relative youth lethal violence. Neither divergence nor convergence in age patterns emerges across these nations.

Rather than being the same in modern societies, age patterns of both forms of lethal violence vary with social conditions and reflect the worsening situation of youth relative to older age groups. Although distant from lethal violent outcomes and mediated by more proximate determinants, demographic, family, and political institutions can moderate or exacerbate problems of the transition from youth to adulthood more than they moderate or exacerbate problems of the transition from adulthood to old age. They therefore explain relative levels of youth lethal violence across nations and time, and relate to concerns over inter-generational inequity and the special problems of youth in modern societies. Moreover, the influence appears for two sometimes dissimilar forms of lethal violence. Both suicide and homicide, despite having different age patterns and objects of violent action, react
similarly to the determinants considered in this study, and demonstrate similar trends across nations.

Notes

1. Because the ages of homicide victims and offenders differ, age patterns of homicide victimization can only indirectly address debates over the invariance of age patterns of offending (Hirschi & Gottfredson 1983; Steffensmeier et al. 1989). In indirect terms, a focus on variations in age patterns of offending rejects any claim of strict invariance, but is consistent with a less strict form of the hypothesis that specifies varying levels of the peak in victimization (through offending by those of similar ages) during youth and young adulthood and varying rates of decline afterward.

2. Any number of theories of social strain, conflict, routine activities, cognitive development, differential association, integration, regulation, and self-identity address rising suicide and declining homicide over the life course, but say less about variations in these patterns or about cross-national sources of the variation.

3. These arguments suggest that collectivism, age equality in spending, and income equality lower youth suicide and homicide relative to elderly suicide and homicide by doing more to smooth the difficulties of the transition from youth to adulthood than from adulthood to old age. Since youth homicide exceeds elderly homicide, reducing youth homicide equalizes homicide across ages. Equality more generally promotes equality in homicide across ages. However, since youth suicide falls well below elderly suicide, reducing youth suicide leads to divergence rather than equality in suicide across ages. One might argue instead that if equality in general leads to equality in lethal violence, it should reduce suicide among the elderly rather than the young. This alternative argument deserves testing, but, as it turns out, receives no empirical support.

4. The Eastern European countries also lag well behind the democratic high income nations in standard of living and demographic change. The social and economic environments, and the nature of social protection and government intervention, differ so much from the capitalist democracies as to require separate study. Moreover, the quality and completeness of data for Eastern European nations do not match that of Western Europe.

5. To maximize the contrast across ages, the ratio measure avoids use of middle age groups that fall midway between youth and elderly rates of suicide and homicide. Further, the measure of elderly victimization by lethal violence focuses on ages 65-74. When making comparisons across time and nations, the composition of the oldest age group (75 and older) differs greatly because of changes in life expectancy, health, and disability. In recent years and in nations with high life expectancy, the open-ended category of persons 75 and over will contain substantially more persons age 85 and over than in less recent years and in nations with low life expectancy. Changes in the composition of this oldest and widest ranging age group that affect propensities for suicide and homicide thus bias comparisons involving those 75 and over more than those 65-74.
6. In brief, using the lower rates as the denominator expands the ratio scale compared to using the higher rates as the denominator. To illustrate, a change in the youth to elderly ratio of 1, say from 2/1 to 3/1, translates into a change in the elderly to youth ratio of .167 (from .500 to .333). Because of this change in scale, the correlations of the youth to elderly ratio with the elderly to youth ratio range from -.75 to -.78 when ideally they should all equal -1.00. However, taking the log of the youth to elderly ratios of 2 and 3 gives values of .693 and 1.099, a difference of .406. Taking the log of the elderly to youth ratios of .500 and .333 gives values of -.693 and -1.099 — identical except in sign to the previous values. With either denominator, the outcome measures are equivalent.

7. Although tests reveal some non-linearities in the relationships of age with homicide and suicide rates, use of quadratic coefficients to represent these non-linearities would make the summary measures nearly impossible to interpret. Even if they do not capture all age differences, the linear terms reflect the dominant pattern over the life course and contrast the young and old. For example, if homicide peaks in early adulthood rather than youth, it will dampen, but not eliminate the slope relating age to homicide.

8. The design fails to isolate the unique effects of cohort from those of age and period. Following Easterlin (1987), the analytic strategy used here allows cohort differences to emerge through changes over time in age differences in suicide and homicide. Estimating separate effects of age, period, and cohort, although it would more precisely identify causal mechanisms, raises estimation problems that become particularly intractable with comparative data.

9. Because of the recent rise in unemployment to double digits in some collectivist nations such as Sweden that had for decades kept rates near zero, we later test for the influence of unemployment rates directly along with more general institutional measures.

10. In order from high collectivism to low collectivism, the nation scores equal: Norway (1.677), Sweden (1.508), Denmark (1.169), the Netherlands (1.018), Austria (.834), Switzerland (.711), Finland (.533), Belgium (.228), Germany (.063), Japan (-.323), Ireland (-.548), Italy (-.647), the United Kingdom (-.758), New Zealand (-.826), France (-.843), Australia (-.998), Canada (-1.234), the United States (-1.622).

11. When taken as a percentage of national product, absolute measures of pension spending, family allowance spending, or overall social security spending for medical and maternity care, sickness, occupational injury, pensions, unemployment, family allowances, and social assistance might perform better than relative levels of public support in explaining age differences in lethal violence. In fact, when included in equations to follow, these absolute measures perform poorly, and the analyses focus only on the relative measure.

12. No agreed upon measure of variance explained exists for these sorts of models, and alternative measures can give divergent results. As a rough and simple guide to explanatory power, the tables report the variance explained for equivalent OLS models.

13. As mentioned, we multiply these coefficients by minus 1 to reflect youth disadvantage and make the results for the slope coefficients parallel the results for the logged age ratios.
14. The unemployment rate significantly increases the male suicide and homicide ratios net of measures of sociopolitical equality. However, it has no influence on any of the age ratios with controls for the family variable, and therefore does not change the interpretations of the combined model.

15. The negative effects discount arguments that equality will make the age group suicide ratios more alike by raising youth suicide relative to elderly suicide (or reducing elderly suicide relative to youth suicide). They show instead that measures of equality lower suicide of youth relative to older age groups.

16. Tests for changes over time in the effects of the measures of sociopolitical equality show stability in the negative effects from before the 1980s to after the 1980s.

References


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