EDITORIAL

Sex, race and social role—history and the social determinants of health

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Introduction

Just as sex, drugs and rock and roll were fetishized in the 1960s, so do we now do the same with sex, race and social roles and their impact upon the health of individuals and populations. The result is that we often tend to reify these concepts and use them without exploring their content or their meaning in different contexts. The point I would like to make is that these three important attributes of individuals do not bear a constant relationship to health and disease. Their significance is shaped by the context: historical, socio-economic, cultural and epideimiologic among others. This means that there are no laws that are broadly true and that can be the basis of predictions of future associations between sex, race, and social roles on the one hand and health and disease on the other. This is, I think, the most important lesson history has to teach us.

There are three related lessons that speak to the general position for which I am arguing and that I shall illustrate.

(i) Unlike many chemical and physical reactions, historical processes are not reversible.
(ii) Even relationships that are widely assumed and asserted to be universal are very likely to be historically and culturally specific, although not necessarily unique.
(iii) Social theories have not provided broad principles that have made possible accurate predictions of the health consequences of social change and social policies.

The point I am trying to make will very likely raise the question whether, if what I say is true, can social epidemiology be a science? Or am I one of those post-modernists who denies the possibility of general theories and objective knowledge? I think the answer is that social epidemiology is a science, and I shall try to make the case in my concluding remarks. As to the issue of post-modernism, that is not an accurate description of the position I take. It is true that post-modernists reject what they consider ‘totalizing’ theories, but they also reject the notion that reality is knowable.1 It will become obvious that while I do question the generalizability of theories that purport to explain the relationship of social determinants to health, I do so because I take evidence very seriously. I consider the world to be knowable, however imperfect our knowledge might be. Some examples should make that clear.

Sex

Female and male life expectancies have been observed to diverge as overall life expectancy increases with economic development.2 From a situation in which male life expectancy slightly exceeded, or was the same as, female life expectancy, there has been increasing divergence as life expectancy of females has exceeded that of males.3 The divergence is a concomitant of the epidemiological transition from a high rate of deaths due to infectious diseases to lower rates resulting from man-made and chronic conditions, as well as to both lower fertility and safer deliveries.3,4 This is illustrated in Figure 1, which displays male and female life expectancy in England and Wales from the 17th century to the present. They were essentially the same, with males having a slight advantage, until the late 18th century. Then, as economic expansion began and life expectancy increased, female life expectancy began to grow more rapidly than male and has remained higher ever since.5

The divergence occurred when total life expectancy in England had reached about 40. The same pattern is observed in recent synchronous data, as demonstrated in Figure 2. The difference between male and female life expectancy increases both with increasing income and after total life expectancy reaches about 40.

On the other hand, there are some striking exceptions. Most notably, as Figures 3 and 4 indicate, in the former Soviet Republics women have a much greater advantage in life expectancy than would be expected on the basis of either per capita income or total life expectancy.

Figure 5 demonstrates that as GDP per capita plummeted after 1990, life expectancy of both males and females declined, but males experienced a more severe decline.

Much effort has been devoted to explaining this pattern, and it is not my purpose to try my hand at it save to say that very heavy smoking and drinking by Russian men—patterns that long pre-dated the economic collapse—appears to have made men much more susceptible to the consequences of economic decline than has been true of Russian women, and indeed than has been true elsewhere in the world where economic reversals
have also occurred. For my purpose what these data illustrate is that while there are historical and contemporary regularities, they are not necessarily predictive for, unlike processes studied by physicists, social processes are not reversible. If they were, one would have expected that the gap between male and female life expectancy would have closed as incomes and life expectancy deteriorated. This does not mean that life expectancy is not reversible. Clearly that is not the case. It does mean, however, that there is no one-to-one association between any particular variable, such as income, and mortality differences between men and women such that when income changes, so necessarily must the difference between male and female life expectancy.

Race

I shall deal with ethnicity rather than race. My example comes from the former Yugoslavia and is meant to illustrate the argument that the leading theories of social development in the post-World War II era would have failed to predict what occurred there, as well as in the Soviet Union. The two dominant post-war theories of development and modernization were Marxism and functionalism. While there are important differences between them, they agreed that the process of development leads to the blurring of ethnic and national boundaries. According to functionalists, the process of modernization resulted in the convergence of many diverse traditional societies towards modern industrial society that was broadly similar every place it was found. Modernization was said to be observable at both the institutional and individual levels. The institutional characteristics of modern societies were summarized by Alex Inkeles and David Smith as follows:

Economic modernization included intense application of scientific technology and inanimate sources of energy, high specialization of labor and interdependence of impersonal markets, large-scale financing and concentration of economic decision making, and rising levels of material well-being.

Inkeles and Smith summarized the characteristics of political modernization as: the replacement of a large number of traditional, religious, familial and ethnic political authorities by a single, secular, national political authority; the emergence of new political functions—legal, military, administrative and scientific—which must be managed by new administrative hierarchies chosen on the basis of achievement rather than ascription; and increased participation in politics by social
groups throughout the society, along with the development of new institutions such as political parties and interest groups to organize this participation. And accompanying economic and political modernization are characteristic changes in demographic and epidemiologic patterns: a decline in mortality followed at varying intervals by declining fertility; a change from infectious diseases afflicting mainly children to non-infectious diseases afflicting mainly adults; characteristic changes in the age structure, and so on.\textsuperscript{10}

At the individual level too, common features were found by Inkeles and Smith to differentiate modern from traditional men. They wrote of modern man, for instance:

\begin{quote}
As an informed participant citizen, the modern man identifies with the newer, larger entities of region and state, and takes an interest in public affairs, national and international as well as local, keeps himself informed about major events in the news, and votes or otherwise takes some part in the political process… His independence of traditional sources of authority is manifested in public issues by his following the advice of public officials or trade-union leaders rather than priests and village elders.\textsuperscript{11}
\end{quote}

Indeed, nationalism was believed to be progressive precisely because it resulted in the subordination of parochial loyalties to a larger collectivity, the nation-state. The paradox was, however, that the nation ‘automatically created the counter-nationalism of those whom it now forced into the choice between assimilation and inferiority.’\textsuperscript{12} Counter-nationalism was to emerge not only in the colonies of the overseas empires of various European nations but among the subordinated peoples of Europe itself; among the Basques, the Corsicans, the Irish and among various groups of South Slavs who were to be joined together in what became Yugoslavia, and separated from each other in what has now become the former Yugoslavia.

The story of the creation and collapse of Yugoslavia is too long and too complicated to be told here. It suffices to say that of necessity the Yugoslav regime recognized and legitimated the rights of the constituent nationalities while assuming that at some time in the future all of them would become Yugoslavs rather than Croats, Serbs and Slovenes. However, hyperinflation in the 1980s at once discredited the Communist regime and encouraged the growth of nationalisms as the only available alternative. The result, as we know, was civil war, ethnic cleansing and the break-up of the country.

The impact upon the health of the various South Slav people of these developments has been profound. As shown in Figure 6, the trajectory of life expectancy of people in the different republics converged just as modernization theorists would have predicted, but after the break-up they diverged in a way that would not have been expected.

The point is not to denigrate the attempts by an earlier generation to make sense of the process of social change. The point is, rather, that modernization, which had seemed to be such a juggernaut that it made prediction possible, created a series of reactions that were unforeseen by many perceptive observers. And those reactions have had a profound impact upon the health of the affected populations, both for better (in the case of Slovenia) and for worse (in the case of Serbia). Little wonder, then, that the disintegration of Yugoslavia has been called an example of post-modern politics.\textsuperscript{13}
Social stratification

Despite assertions that ‘Throughout history, socioeconomic status has been linked to health,’ that ‘Life expectancy has always differed according to status in society, with a higher mortality among those of lower social status,’ and that ‘high socioeconomic status has allowed people to live much longer lives—over the centuries and around the world,’ the association between stratification and mortality has not been a universal truth in human history. In the West it appears to have become a pervasive fact of life only in the 19th century, and even then differences in income and wealth could not account for all disparities among strata and classes. Despite some classic 19th century examples—Villerme’s study of Paris; Engels’ description of the working class of Manchester; and Virchow’s description of a typhus epidemic in Silesia—in the past place of residence and cultural differences have often been more significantly associated with mortality than has social status.

To take but a few examples,

(i) Infant and child mortality rates of the offspring of agricultural workers in England in the late 19th and early 20th centuries were similar to those of urban professionals with much higher incomes.
(ii) Even as late as the early 20th century, people of different income and wealth levels living in the same central city neighbourhoods of Holyoke and Northampton, Massachusetts had mortality rates that were indistinguishable from one another.
(iii) Similar effects are observed with respect to infant mortality in England at about the same time.
(iv) In 19th century France male and female life expectancy at age 40 was 29.7 and 28.2, respectively, for men and women of the nobility and bourgeoisie (noblesse, industriel bourgeois) and 30.6 and 31.2, respectively, for men and women among farmers and labourers (fermiers, laboureurs and propriétaires).
(v) In almost 200 comparisons of Jewish and non-Jewish infant mortality rates from Europe and North America from 1819 to 1960s, Jews had higher rates in fewer than 10 instances. The same was true of early childhood mortality. In the instances in which figures were reported by income and social class, Jews continued to have lower mortality rates. For example, in a study in Baltimore in 1915, Jewish immigrants with an income below $650 had lower infant mortality rates than non-Jews with higher incomes. Other studies from the US before 1920 that adjusted for income and occupation, as well as for feeding practices, give similar results. In every instance, Jews had substantially lower infant mortality rates than non-Jews of the same or higher socio-economic status. The same difference has been observed between Jews and non-Jews in Moscow in the 1990s.
(vi) In Sweden in the second half of the 18th century the infants of unskilled foundry workers died at lower rates than those of well-to-do crofters living in rural areas, and in the first half of the 19th century infant mortality was lower ‘among relatively poor crofters than among more well-to-do farmers.’ These differences could not be ascribed to the income or wealth of the groups but seem instead to have been caused by feeding and child-care practices. Similar differences have been noted in other historical studies. All these examples demonstrate that mortality has not always and everywhere followed the social gradient that has been claimed to be universal.

Aaron Antonovsky seems to have been the first to suggest that differences among social strata in mortality were not observable when mortality rates were very high because until the 17th century epidemics killed rich and poor alike. Differences among social strata emerged and widened as economic expansion during the industrial revolution exacerbated inequality, caused an increase in urban population size and density, worsened conditions for the working class, and resulted in medical and sanitary improvements that benefited people unequally. Antonovsky claimed that differences diminished in the late 19th and early 20th centuries as welfare states developed and as total mortality fell.

In addition to the data used by Antonovsky to argue his case, there is more recent evidence that provides some support for, but also complicate, his findings. For example, when the life expectancy of British peers and peerses is compared with that of the population of England and Wales, it does indeed reveal such a pattern, as indicated by Figure 7. The gap between the peerage and the total population began to widen substantially around the mid-18th century and then began to narrow by the end of the 19th century.

However, there is also evidence that does not support the sequence outlined by Antonovsky. In pre-industrial 17th century Geneva there was the expected gradient of mortality from the upper class to the middle class to the working class. Life expectancy at birth for the two sexes combined was 35.9, 24.7 and 18.3 years, respectively.

Also in contrast to Antonovsky’s hypothesis, Robert Woods and Naomi Williams have summarized data from the 14th to the late 19th centuries showing that there were substantial differences in male life expectancy at age 20 among categories of individuals. Some of their data are displayed in Table 1 and show that life expectancy differed among several groups, but the differences were not associated with differences in wealth. Life expectancy at age 20 for men of the gentry was substantially higher than that of dukes and the families of peers from the 16th through the end of the 19th centuries, although the differences had diminished dramatically by the end of the period. Similarly, Scottish advocates had greater life expectancy than British dukes or the families of peers from the early 16th century to the late 18th century.

The point is not that all these variations in mortality are readily explainable. The point, rather, is 2-fold: (i) that some of these differences were the result of differences in exposure to risks, for instance military combat, heavy drinking and living in insalubrious places, and (ii) more broadly, that the association between social stratification and health so widely observed in contemporary studies is very far from being a universal characteristic of the human experience.

Conclusion

I have said there are at least three lessons that may be gleaned from an historical view of the association between
(i) Unlike many chemical and physical reactions, historical processes are not reversible. I have used the changing relationship of male and female life expectancy as an illustration.

(ii) Even relationships that are widely assumed and asserted to be universal are very likely to be historically and culturally specific, although not necessarily unique. I have used examples of the association between social stratification and mortality to illustrate this point.

(iii) Social theories have not provided broad principles that have made possible accurate predictions of the health consequences of social change and social policies. I have used the example of the surprising intensity and consequences of ethnic conflict in Yugoslavia as my illustration.

This means we should be modest in our claims of prognostic prowess. President Harry S. Truman is said to have wished for a one-armed economic adviser because whenever he asked for economic advice, the response was always, ‘On the one hand . . . , and on the other hand . . . .’ He was not alone. The media and policy-makers much prefer to hear from advisors who express strong certainty about the consequences of various actions, certainty that is based upon belief in a theory that can be applied broadly.

We know that prediction is difficult, especially of the future. In the two most quantitative social sciences, economics and demography, the evidence of forecasting success has not been overwhelming.36 No one in the 1960s predicted the dramatic improvements in life expectancy that occurred almost simultaneously in Western Europe and North America beginning in the late 1960s. And among some epidemiologists in the 1970s there were apocalyptic predictions of an epidemic of environmentally induced cancers over the next two or three decades,37 which has

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analyses were discouragingly low. His professor replied by sociologist, that the R-squares he was finding in his various not high. This should not depress us. There is a story told of a deterministic world, the probabilities with which we work are bound to be fruitless?

In respect of the first question, it is useful to distinguish between historical and predictive sciences. David Aberle, an American anthropologist, wrote ‘Anthropology can have few accomplishments as science in the Newtonian style. The Newtonian model, exemplified in the laws of classical mechanics, deals with universal laws of invariant expression that make powerful predictions about a deterministic universe…[T]hose laws deal with reversible phenomena. For example, they would provide prediction and retrodiction in exact reverse if the planets were to reverse direction around the sun.’ Anthropology, he argued, could not be a science in the same way, for it cannot state precise laws with predictive and retrodictive power, and ‘its subject matter includes purpose, motive, meaning, and symbol.’

But predictive and interpretive sciences are not the only options. ‘There are,’ he wrote, ‘the historical sciences,’ such as geology, cosmology, evolutionary biology and linguistics. ‘They have achieved results and respect because their methodological sophistication permitted their practitioners to make significant reconstructions,’ even if they couldn’t predict when an earthquake would occur, or a new species would emerge. Aberle argued that anthropology was one of the historical sciences, and I would argue that this is also true of the other social sciences upon which social epidemiology depends for many of its explanatory frameworks. They have increasingly sophisticated methods that allow them to test hypotheses and seek reconstructions of phenomena in the distant and recent past, and the present. My argument is that the results of such studies, for example concerning sex, race and stratification, are not likely to be the basis for general principles upon which we may base predictions of the future.

Even if we agree that we live in a probabilistic rather than a deterministic world, the probabilities with which we work are not high. This should not depress us. There is a story told of a graduate student who complained to his professor, an eminent sociologist, that the R-squares he was finding in his various analyses were discouragingly low. His professor replied by asking if he would prefer live in a world with very high R-squares.

This does not absolve us of the responsibility of using what we know about the past and the present to make the best possible forecasts of the effects of social change and social policies on the health of populations in the future. But if forecasting is not based upon deductive science, how is it to be done? Here it is useful to distinguish between the cognitive styles associated with hedgehogs and foxes.

In a famous essay, Isaiah Berlin used a fragment from an ancient Greek poem to characterize ‘[O]ne of the deepest differences which divide writers and thinkers, and, it may be, human beings in general.’ That fragment is: ‘The fox knows many things, but the hedgehog knows one big thing.’ He continued,

[T]here exists a great chasm between those, on one side, who relate everything to a single central vision, one system less or more coherent and articulate, in terms of which they understand, think and feel… and, on the other side, those who pursue many ends, often unrelated and even contradictory, connected, if at all, only in some de facto way… The first kind of intellectual and artistic personality belongs to the hedgehogs, the second to the foxes.

Hedgehogs are likely to think of prediction as a deductive exercise, whether based upon functionalism, free market economics or Marxism, whereas foxes are likely to make predictions based upon careful observations of particular cases. And studies of political forecasting indicate that foxes are better forecasters than hedgehogs, precisely because foxes are not committed to an overarching theory but are able to learn from their mistakes and remain open to new information.

In a study of the forecasting accuracy of political experts, Philip Tetlock found that those who were least accurate looked very much like hedgehogs: ‘[T]hinkers who “know one big thing”, aggressively extend the explanatory reach of that one big thing into new domains, display bristly impatience with those who “do not get it”, and express considerable confidence that they are already pretty proficient forecasters, at least in the long term.’ They are people who are likely to ‘trivialize evidence that undercuts their preconceptions and to embrace evidence that reinforces their preconceptions.’

Those who were more accurate ‘look like foxes’:

[T]hinkers who know many small things (tricks of their trade), are skeptical of grand schemes, see explanation and prediction not as deductive exercises but rather as exercises in flexible ‘ad hocery’ that require stitching together diverse sources of information, and are rather indifferent about their own forecasting prowess, and… rather dubious that the cloudlike subject of politics can by the object of a clocklike science.

Foxes have a ‘more balanced style of thinking about the world—a style of thought that elevates no thought above criticism.’

Social epidemiology is more nearly akin to political forecasting than to physics. When considering the associations between sex, race and social roles on the one hand and health and disease on the other, accurate prediction is unlikely to rest upon deductive science and more likely to result from stitching together all that one can know about the context—institutional, cultural, political, epidemiological—in which particular populations live and work. Thus, social epidemiology is scientific as it reconstructs the past and explains the present, but it is not likely to be powerfully predictive. When it is successfully predictive, it is not likely to be
because it is based upon deductions from scientifically valid generalizations that are true across time and place, but because analysts understand more or less intimately the people and places with which they are concerned, and because they can extrapolate sensibly from relevant experiences and groups elsewhere.

Perhaps the most important lesson to be learned from the examples I have given is that social determinants of disease are best understood in particular contexts, not as variables that take on a life of their own. I said at the outset that sex, drugs and rock and roll were fetishized in the 1960s and that we are in danger of doing the same thing with sex, race and social roles 40 years later. Being male or female, rich or poor, Serb or Croat, has different meaning and different consequences for health in different settings. Indeed, they derive their significance from the context, for there is nothing intrinsic in the phenomena themselves that determines their association with health.

To think otherwise is to believe in what, >75 years ago, the British epidemiologist FG Crookshank called ‘word magic.’ He was speaking of the tendency of physicians to pin a label, that is to say a diagnosis, on a condition and thereby give the illusion of understanding all that was wrong with a patient. We engage in the same kind of word magic when we reify sex, race, and social roles. Word magic is often valuable for both physician and patient, for a diagnosis may guide therapy and prognosis and give otherwise mysterious symptoms a label that provides patients and their physicians a sense of control and comfort. But it can also be misleading, both for understanding individual patients and for understanding the social determinants of the health of populations. To achieve that sort of understanding, we must understand the various worlds of the peoples with whose health we are concerned, for it is only within those worlds that the meaning and significance of these labels and their association—or their lack—with health and disease becomes clear.

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References

3. In poor countries during the 20th century as well as historically in Europe, high female mortality in infancy and childhood has often been the result of a preference for male children. And in young adulthood higher female than male mortality has been the result of both high fertility and unsafe deliveries. On the other hand, males have a greater probability of dying in accidents and as a result of violence. Das Gupta M. Life course perspectives on women’s autonomy and health outcomes. Am Anthropol 1995;97:481–91.
5. Note that data are missing from 1800 to 1841, a crucial period in the history of England and Wales.
Period life expectancy estimates for the total population from 1541 to 1871 are from Wrigley EA, Schofield RS. The Decline of Mortality in Europe 1700–2000. London: Edward Arnold, 1981, p. 230. Subsequently, these estimates have been revised in Wrigley EA, Davies RS, Oeppen JE, Schofield RS. English Population History from Family Reconstitution 1580-1837. Cambridge: Cambridge University Press, 1997. I have compared estimates published there (Table A9.1) with those from the first volume. While there are differences, for my purposes they are not significant since both illustrate equally well the point I wish to make in Figure 7: that the life expectancy of the total population diverged from that of peerage in the second half of the 18th century. For the sake of clarity, I have not included both curves in the figure. Period life expectancy figures since 1871 are from the Human Mortality Database, University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany). Available at www.mortality.org or www.humanmortality.de (data downloaded on November 10, 2004).