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Education, learned effectiveness and health[1]

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Education forms a unique dimension of social status with qualities that make it especially important to health. Educational attainment marks social status at the beginning of adulthood, functioning as the main bridge between the status of one generation and the next, and also as the main avenue of upward mobility. It precedes the other achieved social statuses and substantially influences them, including occupation and occupational status, earnings, personal and household income and wealth, and freedom from economic hardship. Education creates desirable outcomes because it trains individuals to acquire, evaluate and use information. It teaches individuals to tap the power of knowledge. As a result, education influences health in ways that are varied, present at all stages of adult life, cumulative, self-amplifying and uniformly positive. Education develops the learned effectiveness that enables self-direction toward any and all values sought, including health.[2]

Introduction

Increasingly successful programs for public, occupational and environmental heath protect all individuals in modern nations, but particularly the persons of lower status who otherwise would be most at risk. Ironically, the success of those programs creates a residual and growing association between status and health mediated by behaviors with a strong and irreducible element of personal choice and self-determination. Societies increasingly face health problems with solutions requiring personal knowledge, choice, effort and effectiveness. This does not imply wayward self-destructiveness as the primary cause of modern health problems. Rather, it implies that too many individuals lack the tools needed to gain effective control of their own lives. Given those tools they would seek health as willingly and effectively as others do. Formal education is the chief institution for developing that effectiveness, particularly for those who have little else in their lives to nurture it.

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This essay introduces and outlines our theory of education, learned effectiveness and health. Readers wanting details of the scientific findings and debates will find them in our related book, along with references to many studies published by us and others (Mirowsky & Ross, 2003). Here we make two broad points. First, socioeconomic differences in health are large and increasing. In the US, a belated recognition of this fact has reawakened interest in the relationship of health to socioeconomic status. Second, education is increasingly the fundamental element of socioeconomic status linking it to health. In the US today, education is more important than income and wealth and more important than occupational category and rank in connecting better health with higher social status. Education improves health because it increases effective agency, enhancing a sense of personal control that encourages and enables a healthy lifestyle. Education's beneficial effects are pervasive, cumulative and self-amplifying, growing across the life course. Of particular importance to social policy, education moderates or eliminates the harm to health of disadvantaged origins. Education develops the capacity to find out what needs to be done and how to do it, and develops habits and skills of self-direction. Together those prove effective when seeking health. They make individuals better at identifying and avoiding risky situations or habits, quicker to exit the risky situations or correct the risky ways, and better able to manage health problems that occur, minimize the damage and return to health as fully and quickly as possible.

Socioeconomic differences in health are large and increasing

Socioeconomic differences in health are large and increasing in the US, as well as in Great Britain, Canada and elsewhere. For decades American health sciences acted as if social status has no great bearing on health. The ascendance of clinical medicine within a culture of individualism probably accounts for that omission. At the heart of it, American culture rejects the class and caste systems that many of our ancestors escaped or overcame. This orientation at times becomes a reluctance to face facts about gradations of advantage, wealth, power, prestige or ability.

The American ideals of equality and individualism may have enhanced the ascendance of clinical medicine, with its ideal of the physician acting as agent scientist on behalf of each patient and seeking to identify a specific disease as the proximate cause of the individual's symptoms and signs. The clinical setting and the physician's role as agent for the individual patient obscures the role of social status in regulating the risk, severity and consequence of disease. A river of disease and disability flows through clinics daily. Realistically, clinical medicine cannot change the social statuses or personal histories that generate the flow.

Medicine's traditional focus on the distinct causes of specific diseases deflects attention from forces that create diseases of many kinds. Over the last half of the twentieth century, chronic disease research forced medical science to think more broadly, despite the institutional and cultural forces focusing medical research and theory on distinctive proximate causes of specific diseases. Researchers were forced to look over their shoulders, back toward more distant causes of many diseases.

Some turned their orientation a full 180 degrees, looking for the origins of that river of disease and disability flowing daily through the clinics. Researchers who head back up that stream rediscover the effect of social status on health.

American sociology, epidemiology and public health said surprisingly little about the effects of social status on health for decades. Partly that's because the effects are so pervasive that socially oriented health scientists take them for granted. Researchers studying the effects of risk factors such as cigarette smoking or obesity or environmental exposure to carcinogens generally find them more common in lower status individuals, households and neighborhoods (Ross, 2000a). To avoid mistaking the effects of other risks associated with low status for the particular one under study, researchers typically make statistical adjustments based on education, occupation or income. There is nothing wrong with this. Indeed, good scientific practice demands it. Unfortunately, the habit of adjusting those effects away may have obscured their powerful implication. Social status affects just about everything that affects health.

Perhaps American health scientists had an additional reason for paying little attention to the effects of social status on health: the unexamined assumption that those effects soon would vanish. During the twentieth century the advanced industrial nations made enormous progress in public health programs that benefit all citizens, especially workers and the poor. Everyone benefits from public supplies of monitored and treated water, the testing and regulating of private wells, public sanitary sewers and sewage treatment, regulation of septic systems, removal of trash and garbage to sanitary landfills or incinerators, rat control, mosquito control, fire control, flood control, safety standards for buildings, environmental and occupational health and safety standards and programs, transportation safety standards and agencies, the regulation of food purity and vitamin content, the evaluation and regulation of product safety, the evaluation and regulation of dangerous medical interventions, programs that mandate or promote vaccination against childhood infectious diseases, and agencies that scan ceaselessly for the outbreaks of epidemics, combating them as early as possible. Health scientists know the value and effectiveness of these systems. Perhaps that knowledge encouraged a complacent assumption that the disparities in health across social strata were fading and soon would vanish.

In the US it took a long while before researchers began to question the disappearance of socioeconomic differences in health. The results were a surprise and a wake-up call. Although mortality rates are going down, the differences in mortality rates across social strata are growing. Figure 1 shows a good example, taken from a study of the odds of surviving from one decennial census to the next over the last half of the twentieth century (Lauderdale, 2001). Each bar represents the correlation between education and survival for women of a particular age at the beginning of the period. (Results for men are similar.) For every 10-year segment of the life course the correlation of education with survival got larger in successive cohorts. In addition, the size of the increase was larger for younger cohorts. Not only did education's correlation with survival grow but the growth appears to have accelerated.

At first the American researchers suspected that the absence of a US national medical care system might explain the growing disparities. When the American

Figure 1. Increases across birth cohorts in the age-specific correlation between education and the odds of surviving another 10 years, for native-born US White women alive in the 1960, 1970 or 1980 Census. Each bar represents the percentage improvement in odds of continued survival for women who went beyond high school compared to those who never finished. Based on analyses by Lauderdale (2001).

scientists turned to the British literature it disabused them of that idea. The Black Report and its offspring showed the same growing socioeconomic disparities in morbidity and mortality in Great Britain as in the US (Black *et al.*, 1982; Bartley *et al.*, 1998). Studies in Canada and Sweden found it too. Clearly, providing basic medical care to all citizens did not avert the trend (Kunst & Mackenbach, 1994; Ross & Mirowsky, 2000).

Perhaps the standard publicly funded care was falling behind powerful new interventions available chiefly outside the system. The Whitehall study cast doubt on that explanation, showing substantial gradients in heart disease morbidity and mortality across status levels in the civil service, despite what seems quite adequate

pay and benefits even at the lowest levels (Marmot & Mustard, 1994). In the US, physicians at Vanderbilt School of Medicine made similar observations. Pincus and Callahan were conducting clinical studies of treatments for rheumatoid arthritis and other debilitating and deadly autoimmune diseases. They noticed large differences in functional decline and survival across education levels of the patients, despite the fact that all of them were treated by teams of doctors following the same research protocols specifying the best-known forms of care. Education was a far better predictor of outcome than a host of clinical and laboratory assessments (Pincus & Callahan, 1985; Callahan & Pincus, 1988). Turning to the literature they found similar patterns for heart disease survival. Indeed, the differences in survival across levels of education far outstripped those between the patients treated with beta-blockers and those given placebos (Pincus *et al.*, 1998). Pincus believes firmly in the value of medical intervention and the desirability of a national health care system. Even so, he argues that some powerful extra-medical force must account for the substantial differences in outcome across levels of education in clinical studies that provide a uniform, high standard of care (Pincus, 1996).

The socioeconomic differentials in health and survival are remarkably large. One way to gauge their size is to compare them to the differentials across age groups. As an example, each additional year of education decreases the expected mortality rate by roughly the same fraction as being a year younger does (see Rogers *et al.*, 2000). A year spent in school takes a year of age off mortality risk. Spend a year longer in school, get a year younger in mortality risk. Subjective health and physical function show even larger benefits. Estimates vary depending on the survey, but show that a year of education improves health and functioning by an amount equivalent to being two to six years younger. In terms of health, function and survival, formal education apparently pays back the time spent and more.

Education as the fundamental element of status linking it to health

In the US today, education is more important than income and wealth and more important than occupational category and rank in connecting better health with higher social status (Reynolds & Ross, 1998; Ross & Mirowsky, 1999; Mirowsky & Ross, 2003). Partly that is because education lies upstream, at the headwaters of achieved social status. That makes any direct benefit to health of income, wealth, occupation and rank also an indirect benefit of education. The health benefits of education include but also exceed those mediated by standing and rank or by income and wealth. Education's connection with health cannot be reduced to its impact on access to advantageous and lucrative positions (Reynolds & Ross, 1998). Indeed, education's health benefits in America today mostly come from its other consequences.

Currently in the US, education is more important than income to health (Mirowsky & Hu, 1996; Mirowsky & Ross, 1998; Ross & Reynolds, 1998). The reasons relate to income's diminishing marginal effect, and to education's role in shaping and moderating that effect. The health benefits of greater income occur

mostly in the bottom third of socioeconomic strata. They essentially disappear in the top third (Mirowsky & Hu, 1996). Economic hardship, in the form of difficulty paying bills and buying food, clothes, medical care or other household necessities, mediates much of lower income's association with poorer health. Some of economic hardship's effect on health reflects the impact of extreme or prolonged material privation. Most of it reflects the behavioral and physiological responses to threatening and dispiriting situations (Mirowsky & Ross, 2003).

Education moderates the effect of low income on economic hardship by improving the ability to manage household resources (Mirowsky & Ross, 1999). The well educated avoid economic hardship better than others when household income is low. For this and similar reasons, education also moderates the association between low income and poor health (Mirowsky & Hu, 1996). For example, Figure 2 shows the correlation between impairment scores and household income in three broad categories of education. Americans with no high school degree show a steep increase in impairment as income levels decline. Those with college degrees show a much flatter slope. Similar patterns occur for subjective health and for the presence and number

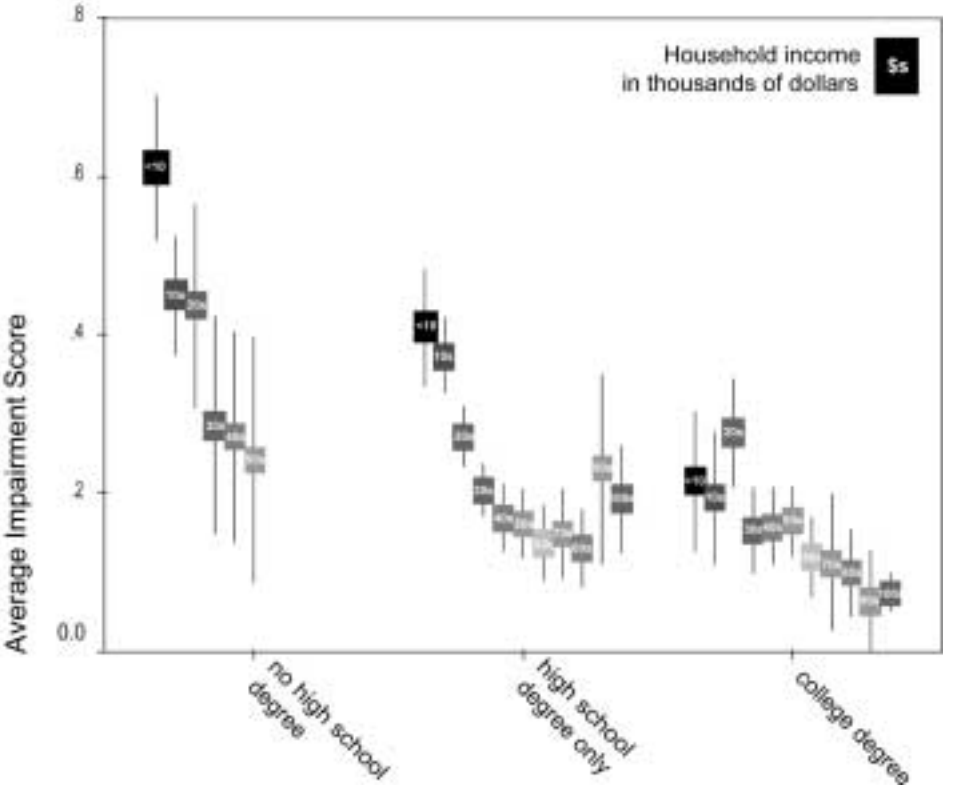

Figure 2. Mean physical impairment scores (and 95% confidence intervals) by level of income within three categories of education.

of serious diagnoses. Education increases the typical level of income, but also softens the health impact of low income. The steep gradient in health across levels of income near the bottom exists in part because the low education that results in low income also makes individuals more susceptible to low income's damaging consequences.

Currently in the US, education also is more important than occupation and occupational status to health (Mirowsky & Ross, 1998, 2003; Reynolds & Ross, 1998; Ross & Mirowsky, 2000). There are three main reasons. The first is the enormous improvement in occupational conditions during the twentieth century. Today's factories and offices create so little risk that, for almost all occupations, the workers face far greater risks to life and health at home and on the way to and from home. The second is that many of the riskiest occupations demand physical activity, thereby producing health benefits that counterbalance the risks. Many also provide opportunity for work that is autonomous and challenging. That last quality brings us to the third reason why education's importance to health now eclipses that of occupation and occupational status: creative work.

Work is physical or mental effort or activity directed toward the production or accomplishment of something. Employment is paid work. Employment almost always trades some degree of freedom for income. In a market economy everyone needs money to get things they require or want and most people must work for the money. The balance in that trade depends as much on the amount of freedom given up, and the burden of the work, as it does on the pay. Often when people think of the burden of work they think of time spent, physical and mental strain endured, risk taken and harm suffered. The true burden lies in the denial of self-expression and the inhibition of autonomous action—the stifling of free will. Humans need to work, and not just because they need the money. Directing physical and mental effort toward production and accomplishment is to humans what running is to horses. Work is so deeply enmeshed in our species' mode of survival that humans do it in the absence of immediate need, like a riderless horse galloping for no reason except the desire to run and the joy of doing it. Humans take pleasure in work, and must do it to be whole, hale and healthy.

So how is it that, for many, 'work' means the things they would not do were it not for the money? The burden of employment results from the loss of independent choice and self-generated action. Education lifts this burden. It minimizes the loss of independence, maximizes the opportunity for creative self-expression and transforms pay from compensation for surrendered freedom to reward for productive accomplishment. Creativity is the production of favorable or useful results in an original and expressive manner. Creative work allows and encourages the individual to do a number of different kinds of things, to do things the individual enjoys, to develop and learn, and to figure out how to solve problems. The more creative a person's work or daily activities the better their health (Mirowsky & Ross, 2003). Currently in the US, adults with full time jobs have more creative activities, and education increases the probability of full time employment. In addition, whether paid or not, the creativity of work and daily activities increases greatly with the level of education.

Education promotes health by developing effectiveness

Education improves health because it increases effective agency, enhancing a sense of personal control that encourages and enables a healthy lifestyle (Mirowsky & Ross, 1998). Human capital is the productive capacity developed, embodied and stocked in human beings themselves. Economists of the 1960s promoted the first revival of Adam Smith's concept of human capital (Becker, 1964). Economic theories and models had long viewed capital as material wealth in the form of money or property that is or can be used to produce more material wealth. The revivalists noted that the growth of wealth in the US and other nations exceeded what could be attributed solely to accumulating monetary and physical capital. They reintroduced Adam Smith's concept of human capital as productive capacity developed, embodied and stored in humans themselves. Levels of formal education act as the most important measure of human capital, in addition to work experience. More recently, economists arguing for a second and broader revival of Smith's concept stress two points (Sen, 1993, 1997, 1999). First, human capital is inalienable. Knowledge and ability cannot be taken away from those who have it. Because of this, rising human capital promotes freedom as well as wealth. Second, the same knowledge and ability that enhances material productivity often discovers other means toward fundamental human ends.

Formal education develops skills and abilities of general value. It develops human capital by helping individuals become more effective. The real skills, abilities and resources developed through education help individuals achieve a variety of personally valued ends, including health. Education makes individuals better at acquiring or creating effective means. An individual who acquires an education can use it to solve a wide range of problems. Some are the problems of productivity that concern employers and economists. Some are problems in which economic prosperity is one of several means toward a more basic end. Health is one of those basic ends. Education encourages and helps individuals to assemble a set of habits and ways that are not necessarily related except as effective means toward health (Mirowsky & Ross, 1998). Education acts as a root cause of good health because it gives people the resources to control and shape their own lives in ways that protect and foster health, regardless of the kinds of health risks faced in their time and place (Ross & Wu, 1995; Ross & Van Willigen, 1997; Mirowsky & Ross, 2003).

Education's health effects are pervasive, cumulative and self-reinforcing

Education's beneficial effects are pervasive, cumulative and self-amplifying (Ross & Wu, 1995, 1996). An individual's learned capabilities remain available at all times and in all situations (Sen, 1997). A person may lose a powerful, prestigious and lucrative position. A person's wealth may vanish in a market reversal. The knowledge, skill, habits and orientations used to acquire that position and wealth remain. The quality of universal constructive presence, combined with cumulative effect, creates much of education's powerful impact. Education's overall, long-term impact can be

enormous even if any one part of it is small in itself and even if the entire gain in benefit is small over the short run. Education does have specific consequences with substantial measurable effects on health, even in the short run. Lower rates of smoking and higher levels of exercise stand out. Nevertheless, the broad range of education's beneficial effects, combined with the accumulation of beneficial effects over time, gives education an overall impact that far exceeds any specific component.

Education's connections to health are so uniformly beneficial that the few seemingly contradictory instances stand out (Ross & Wu, 1995). On closer examination even the apparent exceptions confirm the rule. Often the well-educated balance risks to their overall advantage. For example, well-educated women generally delay parenthood and have few children. The incidence of breast cancer among women increases with longer delay and fewer births (Newcomb & Lantz, 1993). This can make longer education seem counter to women's health. The larger view contradicts that impression. Women's breast cancer case fatality rates decrease with delay and increase with number of births, producing lower breast cancer mortality rates (Neale *et al*., 1986; Newcomb & Lantz, 1993). In addition, the incidence of heart disease among women decreases with delay and increases with number of births (Winkleby *et al*., 1992; Wray *et al*., 1998), and heart disease is a much more common cause of death among women than is breast cancer. In the US, college educated first time mothers have a median age of about 30-years. That age at first birth is close to the optimum associated with the lowest risk of infant mortality and the highest level of mothers' health throughout the rest of life, as measured by subjective health, aches and pains, energy levels, physical impairments, chronic conditions and overall mortality risk (Mirowsky, 2002, 2005).

In another trade-off, the well-educated often have jobs with stressful managerial responsibilities (Ross & Mirowsky, 1992; Ross, 2000b; Mirowsky & Ross, 2003). Other things being equal, that stress erodes health. On the whole, though, other things are not equal. Those same jobs provide greater economic security and opportunity for creative self-expression, thereby reducing stress overall (Mirowsky & Ross, 2003).

Sometimes the well-educated fall victim to what we call the cosmopolitan effect, being among the first exposed to a previously unknown risk, and subsequently leading in recognizing the risk and changing exposure to it. In the US, cigarette smoking and HIV infection are examples. The cosmopolitan effect produces a parabolic time trend in the relationship of education to a novel risk that reveals the nature of education's broad long-run health benefits (Pampel, 2003).

Self-amplification leavens education's varied and cumulative health effects. Some of education's beneficial outcomes have each other as consequences, as when perceived control over one's own life encourages a healthier lifestyle that improves physical function that bolster's the sense of control (Mirowsky & Ross, 1998). Many of education's beneficial consequences act as back-up systems for each other, as when education increases the probable level of household income but also reduces the correlation of low income with trouble paying bills and buying necessities (Mirowsky & Ross, 1999). The growing store of economic, social, psychological and

physical resources helps individuals delay the onset of disease and disability, slow or reverse their progression once present and manage a fuller and better life in their presence (Ross & Wu, 1996).

Resource substitution provides alternative means toward desired ends, making their achievement depend less on any one resource (Ross & Mirowsky, 1989). Individuals with many resources at their disposal suffer less from a loss or deficit than those with few resources would suffer from the same loss or deficit. Education helps individuals acquire more resources quantitatively as in higher wages and incomes, qualitatively as in more stable and fulfilling jobs and marriages, and numerically as in the variety of economic, social and physiological advantages (Ross & Wu, 1995; Ross & Van Willigen, 1997). The health of well-educated individuals depends less on the quantity, quality or presence of any one resource, because the store of others, and the ability to improvise, compensates. Conversely, the health of poorly-educated individuals depends more on the quantity, quality or presence of any one resource, because little else compensates (Ross & Mirowsky, 2004).

To a large extent, resource substitution and structural amplification are positive and negative faces of the same phenomenon. Structural amplification concentrates poor health in a minority of persons with multiple related disadvantages (Ross *et al.*, 2001). Structural amplification exists when the factors that make a situation less damaging also are less common among those in the situation. Corrosive situations and effective traits create structural amplification. In the first case, a difficult situation corrodes the traits or resources that protect individuals against its harmful effects. Resources as varied as accumulated wealth, perceived control, marital commitment, emotional support and cardiorespiratory fitness that protect individuals in difficult situations also get diminished or strained in those situations. In the second case, a stable personal characteristic that makes a situation less damaging also helps individuals to avoid or escape the situation. As a result, the effective trait is relatively uncommon among persons in the situation, amplifying the situation's harmful effect. By not developing effective traits, such as perceived control over one's own life, the poorly educated disproportionately fall into stressful situations such as unemployment, single parenthood, economic hardship or neighborhood disorder, and also suffer worse consequences in those situations (Ross *et al.*, 2001).

Ineffective individuals often move through a cascading sequence of corrosive situations made worse at each step by the predisposing traits and conditions that led into those situations. Imagine a teenage girl from a low-income household who might not have started having sex except that her family only could afford to live in a neighborhood with a lot of unemployed young men hanging out on the streets. Sexual activity probably would not have led her to become an unwed mother if her family was college educated, but none of them had finished high school. Being an unwed mother probably would not have caused her to drop out of school if she was from a middle class family, but she was not. She might have stayed in school if she had been doing well but no one ever taught her good study habits, and home was often too crowded or noisy to think. She might have stayed in school if there was a program for pregnant girls, but the district had no money for it and the principal didn't like the idea of

having pregnant girls around. Being a dropout might not have made her chronically unemployed if she was not an unwed mother, but jobs were hard to find near home and when she had one she missed work a lot. The chronic unemployment might have given her time for exercise, but she was home with her child a lot, mostly watching television for entertainment. She might have exercised more when her child was older, but by that time she had put on a lot of weight, and had aches and pains in her joints too. Besides, she didn't know of any gyms or pools in her neighborhood and the streets and parks didn't look safe. She didn't have any friends who exercised. Most of the women she knew got heavy, so she figured it was normal. The inactivity might not have caused her to have high blood pressure and too much cholesterol and glucose in her blood if she ate more fruits, vegetables and grains, less fat (particularly the saturated kind) and sugar, and fewer calories overall. The serum cholesterol might not have made her coronary artery occlude if she had exercised more. Without that occlusion she would not have shed a thromboembolism when she was served an eviction notice for nonpayment of rent, creating an infarct and fibrillation that she might have survived if she had not been obese, diabetic and out of condition.

Cascading structural amplification creates a grim reality, but one with cause for hope. In theory, the chain can be broken at any step. If the absence of a particular resource magnifies the harm at a specific step, then averting that step or providing that resource may break the chain. Realistically, the most effective strategies probably avoid the risky situations and supply the protective resources at many points (Wray *et al.*, 1998). This underscores the importance of educational attainment as a critical point in the chain, and the importance of formal education as a system for developing abilities with pervasive, cumulative and self-amplifying benefits (Mirowsky & Ross, 2003).

Education moderates or eliminates the harm of disadvantaged origins

A person's own educational attainment typically moderates and sometimes eliminates unhealthy effects of disadvantaged origins. This fact contrasts sharply with many critical views of education. Critical theories often portray formal education as merely transcribing status from one generation to the next (Mirowsky & Ross, 2003). Some portray education as meaningless certification irrelevant to job performance but handy to bigoted employers (Collins, 1979). Some portray it as the browbeating subjugation of lower and working class children alongside sycophantic lauding of children displaying the useless cognitive ornaments of the upper classes (Aronotwitz & Giroux, 1993; Bourdieu, 1977). Some portray it as a phony or irrelevant contest for position that beguiles both winners and losers into accepting the outcomes as due—a spurious manifestation masking the advantages or disadvantages preordained by social (Bowles & Gintis, 1976) or genetic (Herrnstein & Murray, 1994) inheritance. Such views suggest that longer education benefits the advantaged most, and perhaps even harms the disadvantaged. Surveys in the US contradict such ideas. Education makes persons from all social origins better than they would have been otherwise, but improves most the outcomes of persons from disadvantaged families (Reynolds & Ross, 1998).

The improvements in health associated with higher educational attainment are greatest for individuals from low-status backgrounds. Figure 3 shows several instances from our 1995 US data. The panel on the bottom shows a stronger positive correlation between personal education and feeling in control of one's own life for individuals whose parents had no degree than for those whose parents had a high school or higher degree. That pattern contradicts the idea that formal education oppresses individuals from low status backgrounds, stifling their self-determination. The panels in the middle and on top show a similar pattern for subjective health and physical functioning. The improvements associated with higher educational attainment are greater for individuals from low-status backgrounds. Almost all the differences in health associated with status of origin occur among individuals who do not finish high school themselves. For individuals who have high school or college degrees, their parents' education makes little or no difference to health. This illustrates a general principle. A person's own educational attainment overcomes the undesirable effects of disadvantaged origins.

The interaction between personal and parental education creates intergenerational structural amplification. Formal education helps individuals from low-status backgrounds develop effective personal resources. It gives them training they otherwise would not get. Individuals from lower-status backgrounds depend more on their own educational attainments for health and a sense of control over their own lives. The knowledge, skill and resourcefulness developed through formal schooling gives them independence, health and well-being they otherwise would find it extremely difficult to achieve. Individuals from low-status backgrounds depend more on formal education to gain control of their own lives and create good outcomes for themselves, but they tend to get less formal education than individuals from middle- or high-status backgrounds. Together these forces concentrate low education and poor health within a family over multiple generations. Disparaging formal education will not help to correct this problem. Formal education tries to give every child the knowledge, skill and ability that otherwise only those from advantaged backgrounds would enjoy. Any solution to the problem of disadvantaged origins lies in the direction of raising the levels of education in successive generations, particularly for low-status families.

Formal education is not a zero-sum status contest establishing who gets to bite whom, who gets to eat first, and who gets to have sex. It is a system for developing each individual's capacity for self-determination and creative productivity. That we have such a system both reflects and enlarges the great difference between us and other species. We can and regularly do produce better outcomes for everyone by helping individuals gain control of their own lives. Education develops the skills, habits and attitudes that help individuals take control of their own lives. Whenever someone does, everyone gains.

Conclusion

Education helps individuals to become active agents in their own lives. The choices individuals make for themselves increasingly determine health and survival. That

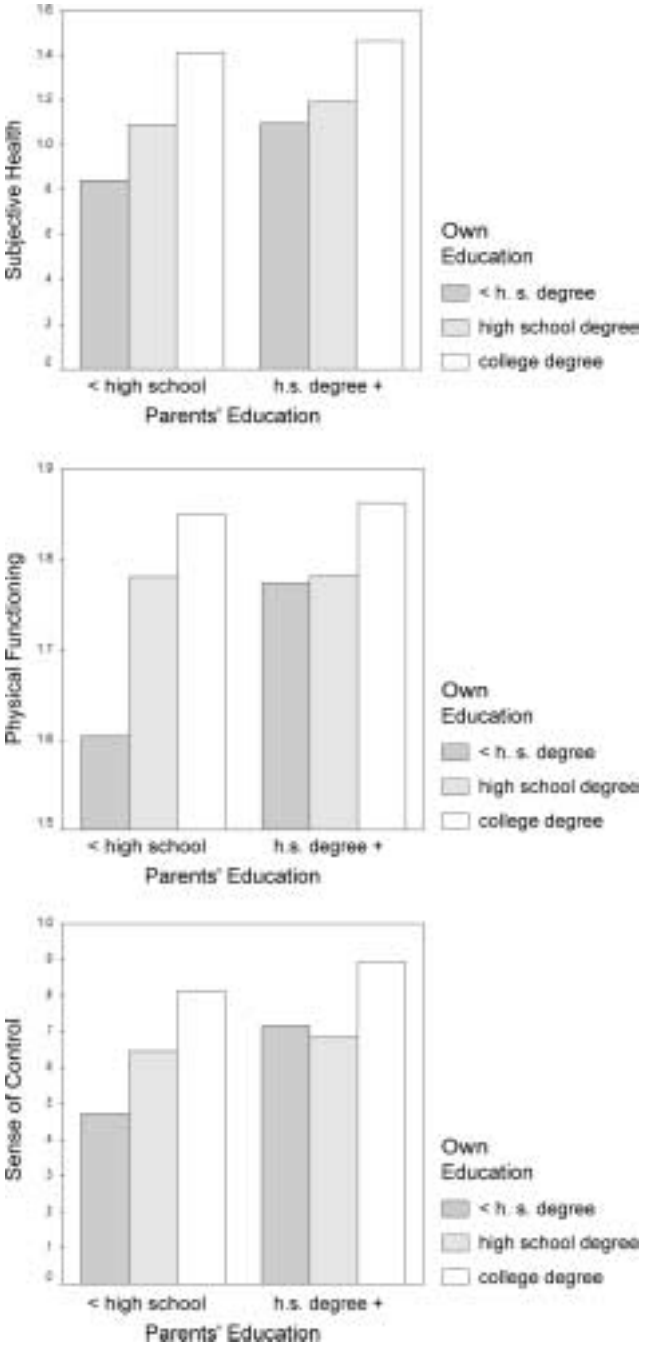

Figure 3. Subjective health, physical functioning and sense of control by education and parents' education, adjusting for age, sex and race.

drives education's increasing importance to health and survival. Education's greatest benefit is that it develops the capacity for resource substitution. It helps individuals to acquire an array of standard resources, making the individual less dependent on any one of them. It develops the capacity to improvise resources—to find or invent new ways to solve problems or achieve goals. Education develops the capacity to find out what needs to be done and how to do it, and develops habits and skills of self-direction. Together those prove effective when seeking health. They make individuals better at identifying and avoiding risky situations or habits, quicker to exit the risky situations or correct the risky ways, and better able to manage health problems that occur, minimize the damage, and return to health as fully and quickly as possible.

So, why does health increase with social status? Not because of the money, much less the authority, but because learned effectiveness creates the ability to achieve something everyone wants: health.

Notes

1. The US National Institute on Aging supported data collection, analysis and writing with grants for two projects: the Aging, Status and Sense of Control (ASOC) survey (R01-AG12393; Mirowsky principal investigator, Ross co-principal), and the project on Education, Resource Substitution, and Health (RO1-AG023380; Ross principal investigator, Mirowsky co-principal). The US National Institute of Mental Health supported data collection, analysis and writing with grants for two projects: the survey of Community, Crime and Health (CCH) (R01-MH51558; Ross principal investigator, Chester Britt co-principal) and the project on Parenthood and Well-Being (R01-MH65643; Mirowsky principal-investigator and Ross co-principal).
2. Mirowsky and Ross (2003) is the source of the material summarized in this report unless otherwise cited.

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John Mirowsky is Professor in Sociology and in the Population Research Center. He studies social aspects of health and well-being, particularly as they develop over the life course. His recent books include *Education, social status, and health*, and the second edition of *Social causes of psychological distress*, both co-authored with Catherine E. Ross and published by Aldine (2003). 'Age at first birth, health, and mortality' will be published in the *Journal of Health and Social Behavior* in 2005.

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