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From the tallest to (one of) the fattest: the enigmatic fate of the American population in the 20th century

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Abstract

Within the course of the 20th century the American population went through a virtual metamorphosis from being the tallest in the world, to being among the most overweight. The American height advantage over Western and Northern Europeans was between 3 and 9 cm in mid-19th century, and Americans tended to be underweight. However, today, the exact opposite is the case as the Dutch, Swedes, and Norwegians are the tallest, and the Danes, British and Germans—even the East-Germans—are also taller, towering over the Americans by as much as 3–7 cm. Americans also have shorter lives. The hypothesis is worth considering that this adverse development is related to the greater social inequality, an inferior health care system, and fewer social safety nets in the United States than in Western and Northern Europe, in spite of higher per capita income. The Western and Northern European welfare states, with cradle to grave health and unemployment insurance currently seems to provide a more propitious environment for the biological standard of living than its US counterpart.

JEL classification: D60; I10; I31; J15; N00; P50

Keywords: Height; Biological standard of living; Welfare state; Anthropometry; Social inequality; Health

Conventional standard of living indicators based on income fail to provide a thorough accounting of factors that contribute meaningfully to the quality of life of the various members of a society. This is particularly the case for such important aspects of welfare as health, life-expectancy, social inequality, security, and entitlements, which are not fully integrated into the above concept (Sen, 1987; Osberg and Sharpe, 2002). Research on

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happiness and the human development index is helpful in generating new perspectives that help overcome the limitations associated with relying on a single indicator (United Nations, 1996, 2000; Frey and Stutzer, 2002). We approach the biological well being of the American population in the 20th century from the perspective afforded by anthropometric indicators in the hope of illuminating socio-economic processes that might otherwise elude even the informed observer (Baten, 2000; Baten and Murray, 2000; Komlos and Baten, 1998; Mielck, 2000; Steckel, 1995). We confine our analysis to physical stature and the body mass index[1] (bmi) in order to document a major transformation in the physical shape (morphology) of the American population in the 20th century.

Physical stature is a useful summary measure of biological well being, inasmuch as it is affected by many socio-economic variables and generally correlates positively with many health outcomes throughout the life course.[2] In general, physical stature is a mirror of how well the human organism itself thrives in its socio-economic and epidemiological environment during childhood and adolescence (Komlos and Cuff, 1998; Komlos and Baten, 1998). In brief, in the absence of offsetting forces, height generally increases in good times and contracts with economic adversity. It is affected by the state of medical technology, the access to health care, the cost of medical services, the quality of perinatal care, the attitude toward preventive medicine, the virulence of the disease environment, and the degree of pollution. Social status is usually an important determinant of height, insofar as income effects are substantial and persistent, and better-educated parents have superior consumption skills, are better informed about long-range health effects of consumption patterns, and are, thus, usually able to take better care of their off-spring (Cigno, 1991; Bogin, 1999, p. 308; 2001). Height is a function of income inasmuch as the consumption of nutrients, particularly of proteins, vitamins, and minerals, and the regularity with which they are consumed, influence height at a particular age until adulthood. Income also eases the purchase of medical care. Urban/rural differences are also predictors of health outcomes, because the supply of medical services, particularly specialized ones, is more efficient in metropolitan areas than in rural ones (Komlos and Kriwy, 2003).[3]

Although there is much concern about the obesity epidemic in the US, because of its threatening health consequences (Gordon-Larsen et al., 2003), the fact that the average physical stature of Americans has been lagging well behind Western European levels has all but eluded comment. Within half a century a veritable metamorphosis in the shape of the

[1] The body mass index is defined as: weight in kg/(height in m)^2 and is categorized as follows (Bergmann and Mensink, 1999, p. 18): >20 = underweight; 20–25 kg/m^2 = normal; 25–30 kg/m^2 = overweight; >30 kg/m^2 = obese.

[2] A study found an inverse associations between height and adulthood cardiorespiratory mortality. Much of the association between height and cardiorespiratory mortality was accounted for by lung function, which is also partly determined by exposures acting in childhood. The inverse association between height and stomach cancer mortality probably reflects *Helicobacter pylori* infection in childhood resulting in or being associated with shorter height. [However,] [t]he positive associations between height and several cancers ... could reflect the influence of calorie intake during childhood on the risk of these cancers" (Smith et al., 2000). Another set of results suggest that greater height may be associated with better survival of prostate cancer patients (Chen et al., 2003). According to another study, "taller people and those with better lung function are at reduced risk of coronary heart disease" (Gunnell et al., 2003**)**.

[3] There are also interaction effects among the independent variables not considered here.

Table 1
Height of adult men, mid-19th century

Country	Year	Height (cm)	Sources
America (whites)	1860	174.1	A'Hearn (1998, p. 263)
Australia	1890	172.7	Whitewell et al. (1997, p. 390)
Scotland	1840	170.9	Riggs (1994, p. 66)
America (slaves)	1860	168.7	Komlos (1998, p. 238)
Norway	1855	168.6	Floud (1994, p. 18)
Sweden	1880	168.6	Floud (1994, p. 19)
Bavaria	1860	167.3	Baten and Murray (2000)
The Netherlands	1830	167.2	DeBeer (2004)
England	1860	165.6	Johnson and Nicholas (1995)
Denmark	1850	165.3	Floud (1994, p. 16)

American population took place without much notice: from being the tallest in the world still during World War II, Americans have become one of the most overweight at the onset of the 21st century. Already in colonial times the height of American men reached modern levels of 173 cm—well above European standards for a very long time to come—except those of a tiny segment of the upper aristocracy (Komlos, 2001). The abundant natural resources of the New World combined with the low population density conferred considerable biological advantages on its inhabitants. Yet, as startling as it may appear, Americans have increased in height by only a few centimeters since then. In contrast, many European populations increased by as much as 15 cm in the meanwhile—about 1 cm per decade (Cole, 2003). The American height advantage at the middle of the 19th century reached as much as 3–9 cm (Table 1), and Americans were very far from being overweight: West Point Cadets, for example, had a bmi value of 19—considered underweight by today's norms—in the bottom 5% of today's bmi distribution[4] (Cuff, 1993). In contrast, Americans are now considerably shorter than Western and Northern Europeans, and the Dutch, Swedes, and Norwegians are the tallest, though Danes, British, Germans, and even the East-Germans are also taller[5] (Fredriks et al., 2000; Sunder, 2003) (Figs. 1 and 2). They are as much as 2–6 cm taller than Americans, and the gap is probably slightly greater among females[6] (Figs. 1 and 2). Inasmuch as the US is a high income country with advanced medical services that has enjoyed a practically continuous expansion in economic activity since WW II (Table 2),

[4] Students in South Carolina in the late 19th century were 171.6 cm tall at age 17 and weighed 59.6 kg (0.35 kg/cm). In contrast, youth in the 1970s were 175.8 cm tall and weighed 68.0 kg (Coclanis and Komlos, 1995; Frisancho, 1990). Hence, the 4.2 cm increase in height was accompanied by a 8.4 kg increase in weight—or 2.0 kg/cm. In contrast, the average weight per cm is now 0.39 kg/cm. Thus, the marginal increase in weight per cm was greater than the average, as weight increased much faster than height: a 2.5% increase in height was accompanied by a 14.2% increase in weight. Similarly, west point cadets in the second half of the 19th century at age 17 weighed 57.3 kg and were 169.6 cm tall (0.34 kg/cm) (Komlos, 1987).

[5] The American height data in Figs. 1 and 2 pertain to persons born in the USA with English as the primary language used in the family. We exclude immigrants because they did not grow up in the environment of the United States. The analysis of adolescents is left for another study.

[6] American women are nearly 3 cm shorter than their West-German counterparts, while American men are just 2 cm shorter.

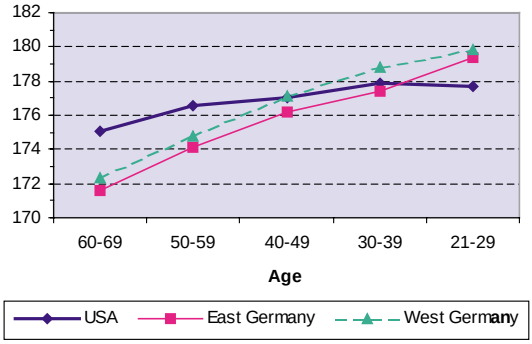

Fig. 1. Height of males (cm). *Source*: NHANES III and BGS'98.

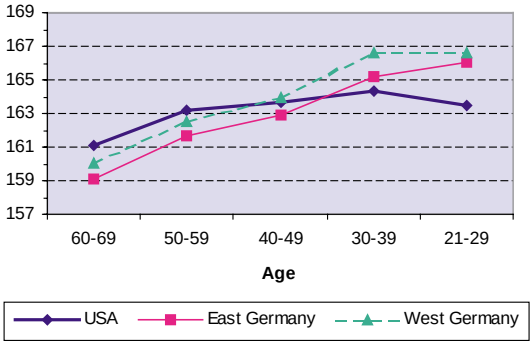

Fig. 2. Height of females. *Source*: NHANES III and BGS'98 (cm).

the fact that heights in particular and health in general have not kept pace with European developments is quite a conundrum.

The bmi values of the US population have been increasing since the 1980s, and as many as 20% are now considered obese (Figs. 3 and 4). Although this is part of a worldwide

Table 2
Per capita income of several countries, 1998 US dollars (thousands)

USA	29.6
Norway	26.3
Denmark	24.1
Japan	23.3
Germany	22.2
The Netherlands	22.1
France	21.2
Sweden	20.6
Italy	20.5
UK	20.3

Source: Human Development Report (2000, p. 157). *Note*: Purchasing power parity exchange rates are used.

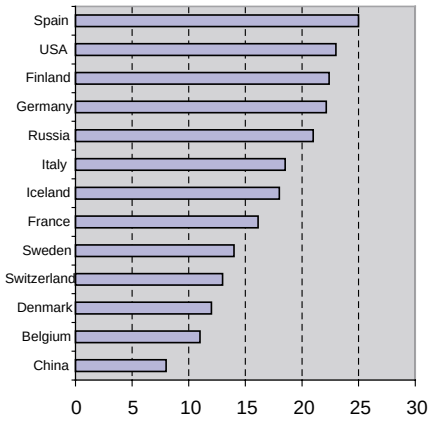

Fig. 3. Female obesity rates (%). *Sources*: Komlos et al. (2004), Molarius et al. (2000).

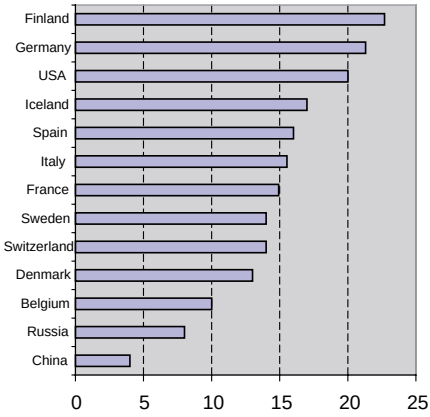

Fig. 4. Male obesity rates (%). *Sources*: Komlos et al. (2004), Molarius et al. (2000).

trend (Ulijaszek, 2003), the American obesity rates are near the top of those obtained in OECD countries.[7] At the same time, the life-expectancy of Americans lags 3.2 years behind that of Japan, and has fallen behind levels prevailing in Western Europe (Table 3, Fig. 5). Moreover, the US infant mortality rate (7.2) is the highest in the OECD countries—twice that of Sweden.[8] This is additional evidence that economic prosperity in America has not translated into the attainment of a comparably high level of biological well-being relative to other economically advanced countries, in spite of the fact that Americans spend a much

[7] A similar result for Germany was obtained by Bergmann and Mensink (1999). The people with the greatest weight for height are found in Oceania (Ulijaszek, 2003).

[8] In contrast, the infant mortality rate in 2000 was 3.4 in Sweden, 3.6 in Finland, and 3.8 in Norway (WHO, European health for all database, http://www.who.dk/hfadb).

Table 3
Life expectancies at birth in several countries, 1998

Japan	80.0
Sweden	78.7
Norway	78.3
Italy	78.3
France	78.2
The Netherlands	78.0
Germany	77.3
UK	77.3
USA	76.8

Source: Human Development Report (2000, p. 157).

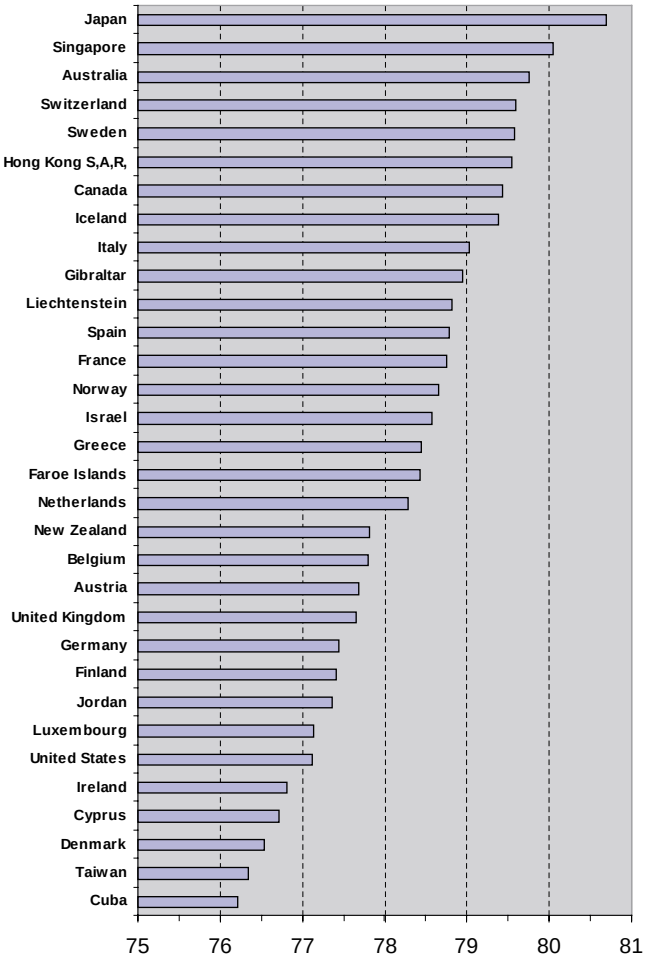

Fig. 5. Life-expectancy 2000.

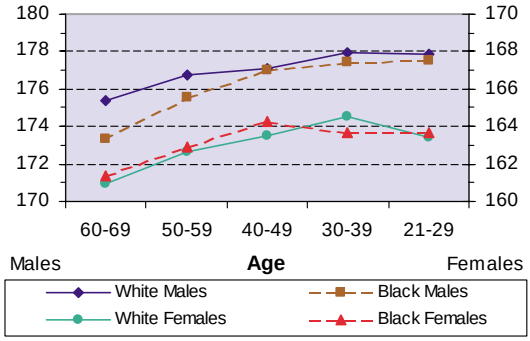

Fig. 6. Height (cm) of Americans by race and gender. *Source*: NHANES III.

larger fraction of their income on health-related services.[9] The US population spends 13.7% of its GNP on health whereas the UK spends 6%, and Japan 7% (WHO, 2000). Some of the inefficiency is due to high administrative costs.

Without claiming to propose a final answer to the above quandary, we explore this puzzle using the NHANES III dataset collected by the National Center for Health Statistics (NCHS) of the Center for Disease Control and Prevention (CDC) of the Department of Health and Human Services. Since 1960 the NCHS has carried out surveys on the health and nutritional status of the US population.[10] The sample used in this study is from the public-use data of the National Health and Nutrition Examination Survey III (NHANES III), collected between 1988 until 1994. The stratified random sample contains information on 33,994 individuals in 81 counties, representative of the US population at large. Hence, the approximate date of birth is obtained by subtracting age from about 1991. We consider the height and bmi of the adult population (ages 21–69) born in the United States. Thus, the sample is reduced to 14,615 observations.

Not only have the average physical stature of Americans not kept pace with European trends, but there is some indication that heights have been stagnating among men and might actually have decreased among females of the youngest adult birth cohort, i.e. those born in the 1960s, both black and white (Fig. 6). Controlling for income and education, the diminution in height appears even more pronounced[11] (Table 4). To be sure, more people obtained a high school and college education among the 1960s birth cohorts than earlier, so that the average decline is not at all as large as one might infer from these results by themselves. Height of white American-born women measured in 1993 (both black and white, and speaking English in the family—but without Hispanics) born in the late 1950s

[9] The US spends more than US$ 4000 per capita per annum—twice as much as the OECD average. In contrast, Sweden spends US$ 1700 per annum.

[10] The subjects were interviewed, and thereafter, another sample was drawn from the first sample that was examined by a doctor. The sample is not representative for the US population: Hispanics, children and old people were over sampled. Hence, weights are used in the analysis to obtain representative averages.

[11] This analysis is merely exploratory inasmuch as height also determines income. If taller people are healthier and healthier people are more productive, then taller people will also earn more.

Table 4
Regression analysis: dependent variable (height (cm) of Americans)

	White		African-American		Mexican-American	
	Male	Female	Male	Female	Male	Female
Constant	172.4[a]	157.8[a]	175.3[a]	161.4[a]	170.5[a]	156.2[a]
Age (years)						
21–29						
30–39	3.1[a]	3.8[a]	1.3[a]	1.1[a]	1.3[a]	1.3[a]
40–49	2.7[a]	3.4[a]	1.3[a]	1.7[a]	0.3	1.3[a]
50–59	2.4[a]	2.9[a]	0.4	0.9	1.2	0.1
Education						
Elementary						
None	−0.7[a]	−1.5[a]	−1.1[a]	−1.0[a]	−2.4[a]	−2.5[a]
High school	1.8[a]	1.7[a]	1.1[a]	0.7[a]	2.4[a]	2.8[a]
University	2.9[a]	3.5[a]	1.5[a]	1.7[a]	2.5[a]	3.3[a]
Income						
None						
Low	−0.8[a]	−0.9	−0.9[a]	0.1	−0.8	−0.7
Middle	0.1	0.3	0.4	0.4	−0.2	−0.1
High	0.8	0.7	0.7	0.3	−0.8	1.3
R^2	0.13	0.19	0.07	0.03	0.08	0.17
F	34.44[a]	60.1[a]	9.9[a]	7.0[a]	10.5[a]	16.8[a]
N	5.240	5.705	686	893	164	184

Source: NHANES III.
[a] Significant at 5% level.

and early 1960s was 164.3 cm. In contrast, those born in the late 1960s and early 1970s were 163.5 cm tall (Figs. 2 and 6). Admittedly, 0.8 cm is not much of a decline—but it is amazing that heights would have declined at all at a time when both income and medical know-how was improving markedly.

The trend and level of average heights of blacks and whites are quite similar except for the earliest birth cohorts among the males (Fig. 6). Actually, average height for the whole population is almost the same as those of whites by themselves (Figs. 1, 2 and 6), inasmuch as whites make up about 85% of the population without Hispanics (U.S. Census Bureau, 2000). Hence, in subsequent analysis the height of whites is not reported separately, only those of the whole sample considered (without Hispanics) and that of the African-Americans are reported.

There is a positive association between height and household income. We are unable to establish causation, however, insofar as final height is not determined by one's income but those of one's parents for which we have neither data nor a suitable instrumental variable. Another issue to consider is that taller people earn more on average, so that the direction of causation works in both directions: not only does income determine height, but height also determines income. This is insofar not a problem in this preliminary analysis, as we do not need to interpret the estimated coefficient of the income variable. The aim, rather, is the more modest one to describe the trend in the height of the US population by various

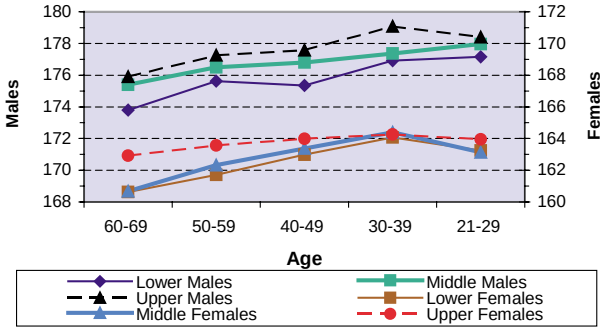

Fig. 7. Height (cm) and income of Americans. *Source*: NHANES III.

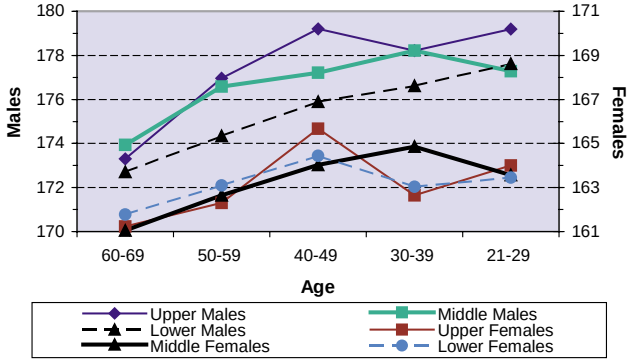

Fig. 8. Height (cm) and income of African-Americans. *Source*: NHANES III.

socio-economic groups in order to demonstrate that in none of them did height keep pace with Western and Northern European developments.

Even the height of the American upper income groups failed to keep up with the Western European averages in recent decades[12] (Figs. 7 and 8). Differences in height by income groups decreased gradually over time among females and disappeared entirely among those in their 30s, only to widen again somewhat among those in their 20s. The difference in height by income group declined slightly among men of the most recent birth cohorts (Fig. 7). This pattern might well imply that there was considerable upward income mobility so that individuals who now find themselves in the upper income bracket had middle or low income parents whose income determined, in the main, the final attained height of their offspring. Own income, in other words, is not a good proxy measure for parents' income in the presence of substantial social mobility. Moreover, Height differences among Americans

[12] In fact, among males the highest income group has become shorter among the most recent cohort (born in the 1960s), perhaps due to social mobility: i.e., people with lower income parents were able to move into the upper income category, while the height of females has declined in all three income categories.

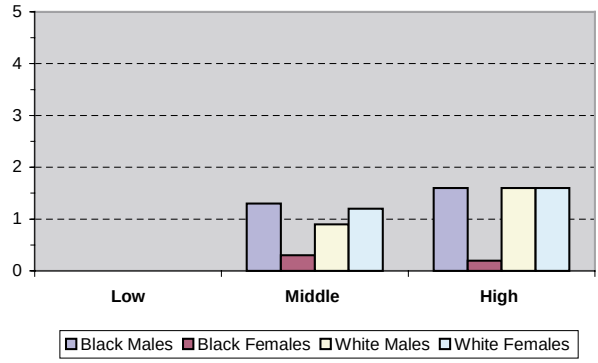

Fig. 9. Height differences among Americans by income (cm).

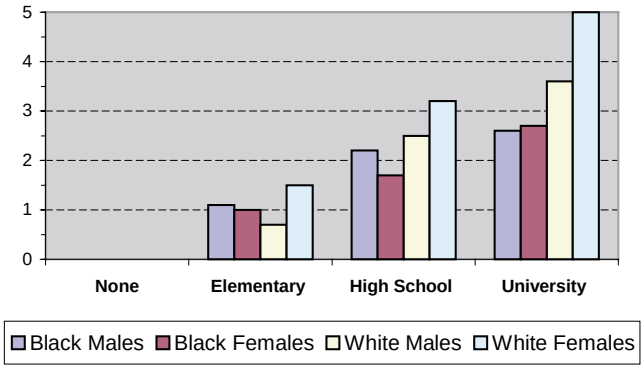

Fig. 10. Height differences among Americans by educational attainment (cm).

by household income are not as high as those obtained by educational attainment[13] (Table 4 and Figs. 9 and 10).

Among African-Americans heights increased markedly especially among upper income groups up to and including the World War II birth cohorts, both male and female. Hence, height differences among the income groups rose substantially among black males (reaching 3 cm), and more modestly among females (Fig. 8). Subsequently, the differences declined as the upper income groups made no further gains in height at all among either males or females. In contrast, lower income black males did continue to experience a positive trend in height after World War II. Black upper income males in their twenties are about as tall as the West-German average, while upper income females are about 2 cm shorter.

The differences in height among black females by income group are negligible (Table 4). Difference in height by educational attainment, in contrast, is more pronounced, implying

[13] The categories per family per year are: low income: below US$ 18,000; middle income: US$ 18,000–60,000; high income: above US$ 60,000.

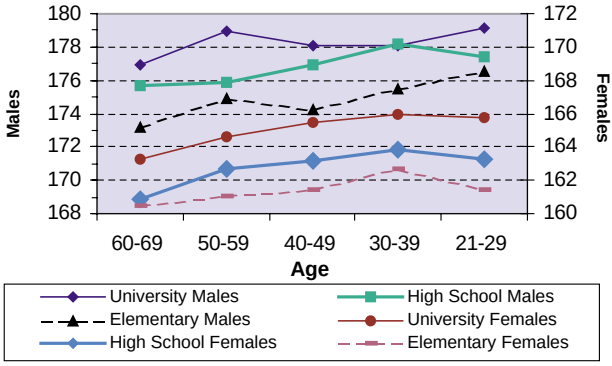

Fig. 11. Height (cm) and education of Americans. *Source*: NHANES III.

that there could be a higher correlation between parents' and children's educational attainment than with income. The height advantage of college students was greater among whites than among blacks, reaching 5 cm among white females compared to those who did not complete elementary school.

The height of men with a university education tended to stagnate, while high-school graduates made some progress in the 1950s but that was reversed among the most recent birth cohorts (Fig. 11). The difference between those with an elementary and university education declined from 4 to about 2.5 cm. Females' height increased parallel to one another by educational attainment until the most recent birth cohorts, which all decreased (Fig. 11). The gap between the lowest and highest educational group widened from about 3 to about 4 cm. Controlling for the influence of other factors, university-educated white men were about 3 cm taller than those with an elementary education, The effect was comparable among Mexican–Americans, but about twice as large as the effect among African-Americans (Table 4).

The only groups that made steady gains in height in recent decades are low income black males, low and middle income white men, white men with an elementary education, and African-American males with elementary and college education (Figs. 9–12). In contrast,

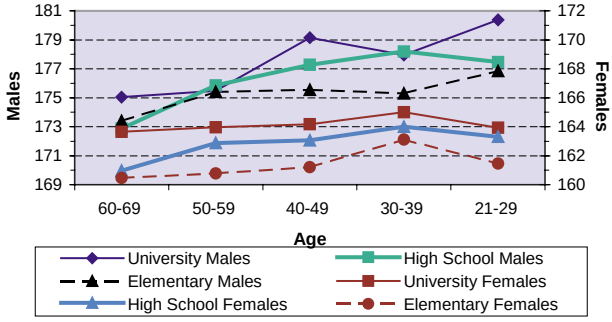

Fig. 12. Height (cm) and education of African-Americans. *Source*: NHANES III.

Table 5
Regression analysis: dependent variable (body-mass-index of Americans)

	White		African-American		Mexican-American	
	Male	Female	Male	Female	Male	Female
Constant	24.8[a]	24.3[a]	25.2[a]	26.5[a]	25.8[a]	25.5[a]
Age (years)						
21–29						
30–39	1.1[a]	1.2[a]	0.5	2.4[a]	1.4[a]	2.5[a]
40–49	1.9[a]	1.5[a]	0.7[a]	3.6[a]	2.7[a]	3.4[a]
50–59	2.1[a]	3.1[a]	1.1[a]	3.2[a]	2.1[a]	2.6[a]
Education						
Elementary						
None	−0.7[a]	−0.5	0.1	−0.3	−0.7	−0.7
High school	0.1	−0.3	0.7[a]	−0.5	0.2	−0.2
University	−0.2	−1.5[a]	2.0[a]	−1.5[a]	−1.6[a]	−2.1[a]
Health						
Excellent						
Very Good	0.7[a]	0.8[a]	0.3	0.3	0.7	1.0
Good	1.2[a]	2.0[a]	0.6	1.5[a]	1.2[a]	1.9[a]
Fair	1.4[a]	3.0[a]	0.9[a]	2.0[a]	1.6[a]	1.9[a]
Poor	0.1	2.9[a]	−0.1	1.9[a]	2.0[a]	4.7[a]
R^2	0.05	0.04	0.06	0.04	0.07	0.09
F	16.0[a]	23.0[a]	2.9	11.8[a]	5.7[a]	7.5[a]
N	5.240	5.705	686	893	164	184

Source: NHANES III.
[a] Significant at 5% level.

all females, as well as upper income and better educated white men tended not to do as well in this respect (Figs. 6, 9–12).

University education has a propitious effect on bmi of all groups with the exception of black males (Table 5). The effect is particularly strong among women. Moreover, people who consider themselves in excellent health have a significantly lower bmi than the other groups. A fast-food culture has developed in the second half of the 20th century in response to the restructuring of work and family life, contributing thereby to the high obesity rates (Offer, 2001).

1. Discussion

Anthropometric indicators are used as a proxy measure for biological welfare. To be sure, they are not indicative of the contribution of all goods and services to well-being, and therefore lay no claim to being a substitute for the conventional standard of living. Nonetheless, they are an important complement, illuminating the extent to which a socio-economic or political system provide an environment—broadly conceived—propitious to the physical growth and longevity of human organisms, so that they can reach their biological growth

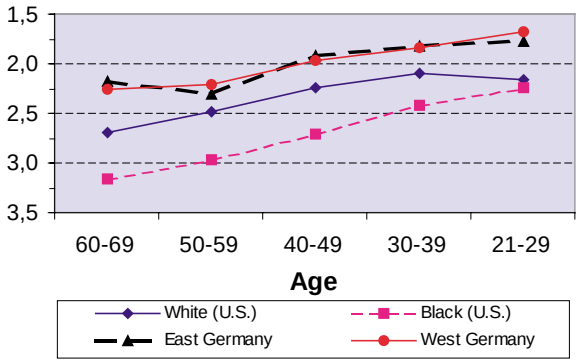

Fig. 13. Health index of males. *Note*: Highest value of the index is 1.0.

potential. In addition, attained height is indicative of the welfare of children for whom few other measures are available. While physical stature ought by no means be conflated with the conventional standard of living, it is associated negatively with mortality from many diseases in a non-linear fashion (Waaler, 1984; Costa, 1993).

It is useful to distinguish between conventional conceptualizations of living standards (based on monetary aggregates), and a population's biological well-being. The biological standard of living is indicative of how well the human organism thrives in its socio-economic and epidemiological environment. The concept is conceived to capture the biologically relevant quality-of-life component of welfare. Insofar as the human experience is multidimensional, a measure of welfare should encompass more than the command over goods and services: it should include, *inter alia*, health in general, the frequency and duration of sickness, the extent of exposure to diseases, and longevity independent of income (Tanner, 1987).

Americans are far from achieving the highest biological standard of living in the world today, in spite of their high average per capita income. Tall and thin between colonial times and the middle of the 20th century, Americans by the 21st century are much more affluent but have fallen well behind Western Europeans and Scandinavians in many aspects of biological well being, even as their body mass has risen beyond most European values. These developments are probably related to the reasons why Americans have a lower life-expectancy compared to many other populations[14] (Fig. 5). Moreover, their subjective evaluation of their own health status also tends to be more pessimistic than those of Germans (Figs. 13 and 14). African-Americans tend to think of themselves as less healthy than whites. This is in keeping with their higher mortality rate, but is puzzling in light of the fact that they tend to be practically as tall as whites (Fig. 6).

Why does the apparent economic prosperity in America manifest itself in greater-than-average weight but not in greater physical stature of the population? Our goal in this survey is not to provide a convincing answer to this uncanny paradox at this stage of research,

[14] In their nutritional status is sub-optimal in childhood, they are less healthy as children and become shorter and less healthier adults, as early health conditions correlate highly with later health status (Case et al., 2003).

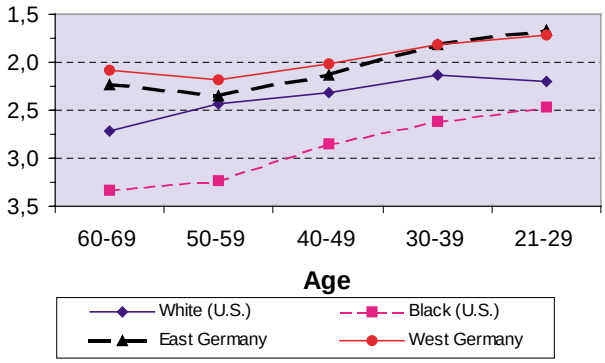

Fig. 14. Health index of females. *Note*: Highest value of the index is 1.0.

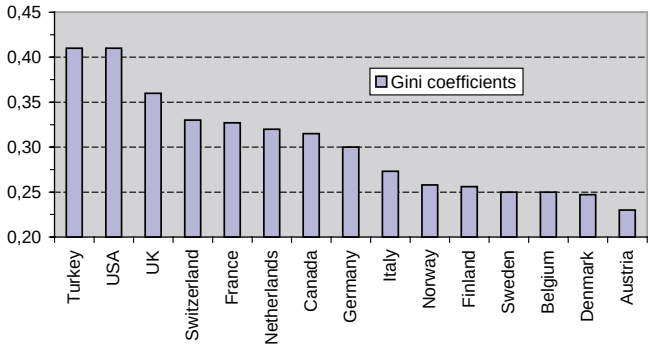

Fig. 15. Income inequality in selected countries. *Source*: World Bank, World Development Report 2000/2001. Attacking poverty (Oxford: Oxford University Press, p. 282).

but the much more modest one of outlining some relevant issues worth investigating if a convincing explanation is eventually to emerge. There are several salient differences between the socio-economic and political systems of the Western and Northern European welfare states and the more market-oriented economy of the US that might provide a solution to this mystery:

(1) Socio-economic inequality in America is greater than in Western Europe[15] (Bohle, 1997, p. 124) and has been increasing at the end of the 20th century[16] (Fig. 15). That the per capita GNP of the bottom 20% of the US population ranks 14th in the world although the mean is the highest is just one indication of the relatively skewed income distribution (Thomas, 2003). Insofar as the lower classes have a higher propensity to

[15] The gini-coefficient is restricted to a range of 0–1. The higher is the coefficient, the more unequal is the distribution of income.

[16] According to official US government figures poverty rate increased from 11.1% in 1973 to 13.8% in 1995 (Triest, 1998).

obesity, the US social structure might be conducive to obesity, but not to the attainment of physical stature. Moreover, income inequality is associated with smaller average physical stature (Steckel, 1995), and with health inequality[17] (Wilkinson, 1996). The question, however, lingers why height within the higher income groups or among the college educated has also failed to increase recently.

(2) Health care systems in Europe provide a much more comprehensive coverage than in the United States (Fogel and Lee, 2003). The share of those who have no health insurance at all has risen from 12.9 to 14.6% of the US population,[18] and the Congressional Budget Office estimates that nearly 60 million Americans were without health insurance at some time during 1998. This is in stark contrast to the nationally guaranteed minimum health insurance in Western and Northern Europe in which virtually all of the population is covered. Perinatal care is probably an important aspect of the overall Western European advantage (Kaestner and Lee, 2003).

(3) Health delivery is complicated and is bogged down in overlapping jurisdictions in the US, so that even those who are insured express considerably more dissatisfaction with health care they do receive than do Europeans. Consequently, in opinion surveys, Americans of all ages tend to judge their health status more negatively than do, for example, Germans (Figs. 13 and 14). A recent survey found that the quality of health care in America is far below recommended levels (McGlynn et al., 2003).

(4) The Western European welfare states, in which a subsistence income is more-or-less guaranteed, provide a more comprehensive social safety net in other respects as well, including unemployment insurance. Although US unemployment rate is much lower than in Western Europe, only about half of the unemployed are insured and receive benefits.[19] Spells of unemployment of a parent without appropriate insurance or savings may well affect adversely the nutritional status of the household's children.

(5) Spatial inequality is much greater in the US than in Europe, as characterized by the suburb-inner city dichotomy that does not have a Western European analogue. Sanitary conditions and health care, especially perinatal care are generally less-than-adequate in disadvantaged neighborhoods and could well lead to stunting (Ben-Shlomo et al., 1996; Kawachi and Kennedy, 1997).

Could genetic factors play a role in the US's falling behind in physical stature? While this possibility cannot be ruled out with the data set under consideration, we tend to think that this is not likely to be the main explanation of the patterns reported above, because we have eliminated those born outside of the US, and imposed the additional restriction that only those who commonly use the English language in the household are included. Hispanics and Asians are also excluded from the analysis. Admittedly, this does not rule out second-generation immigrants from the data set,[20] but there are several reasons to think that this is not very likely to be the cause of the patterns reported here. If this were the main

[17] For an overview with significant controversies over this generalization see Deaton (2003).

[18] http://www.census.gov/hhes/hlthins/historic/hihistt1.html.

[19] http://workforcesecurity.doleta.gov/unemploy/content/chartbook/images/chta11.gif.

[20] However, those among the second-generation who declare themselves Asians or Hispanics are excluded from the analysis.

reason for the US falling behind, one would expect to find that at least African-Americans, among whom immigration has been small (under 1% of the total in the 1950s), would have kept pace with European developments (U.S. Department of Justice, 2002). Yet, this is not the case. In addition, Americans were still the tallest in the world at the turn of the 20th century, at a time when immigration rates had been very high for some time, particularly from the poorer and shorter, populations of Eastern and Southern Europe. Apparently this did not matter in the early-20th century, why would it then matter at its end?[21]

These caveats notwithstanding, the above considerations lead to a hypothesis that perhaps the Western European welfare states have some advantages in providing a higher biological standard of living to their populations than the American more market-oriented one (Lindert, 2003). We do not claim to have provided conclusive evidence in this regard. Nonetheless, there seems to be a very uncanny similarity in the US falling behind the other developed nations of Europe in height, health, and longevity that needs further investigation. The patterns elucidated here imply also that per-capita income is not an exhaustive indicator of the quality-of-life. Instead, other welfare measures, such as those pertaining to the health and biological indicators of the population are relevant in providing a broader perspective on well being. The wealthiest are by no means the tallest or the healthiest, or live the longest. They do appear, however, to be among the heaviest.

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[21] There are other reasons for questioning the validity of the above inferences: it is possible that the poorer segments of the society are systematically more likely to be included in the Nhanes sample, on account of the fact that it includes a free medical examination which may be more attractive to the poor.

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