What Human Stature Has Told Us About the Great Depression in the Pittsburgh Region

by Jialu Wu

Human stature is a reliable index of net nutritional status. This is the case because research by biologists, anthropologists, and physiologists has proven that physical growth "depends on the intake of nutrients, on the amount of nutrients available after the necessary claims of work and other activities, and on the efficiency with which the body converts nutrients into output." The only source of nutrients is the intake of food, and the body's ability to convert nutrients into output for physical growth is affected by clothing, shelter, and environmental conditions, including disease environment and the quality of public sanitation. Before World War II, food, clothing, and shelter accounted for a sizable part of peoples' total living expenses, and environmental conditions were determined to some extent by the kind of socio-economic area in which people lived. Therefore, changes in human stature can be considered as mirroring changes in social and economic conditions.

The relationship between human stature, nutrition, and social and economic conditions was noticed early in the nineteenth century. In 1829 French physician L.R. Villermé pointed out: "Men are the taller and their growth is completed the sooner, when all things being equal, the country is richer and comfort more general: when housing, clothes and above all food are better, and when hardships, the weariness and the deprivation experienced in childhood and youth are less acute." English reformers and professionals such as Edwin Chadwick and D. Bisset Hawkins also noticed "the deleterious effect of industrialization" on workers' physical stature. In 1833, Hawkins, a factory commissioner, reflected, "I believe that most travelers are struck by the lowness of stature, the leanness and paleness which present themselves so commonly to the eye of Manchester, and above all, among the factory class." Such observations were subsequently verified by many independent studies. One of them was done by William W. Greulich in 1956-57, when he and his colleagues measured, weighed, and X-rayed 898 children of Japanese ancestry living in the San Francisco Bay area and found that the American-born Japanese children were significantly taller, heavier, longer-legged, and more advanced in skeletal development than their counterparts in Japan. Greulich and his colleagues attributed these differences to the more favorable environmental conditions in which the American-born Japanese children lived.

By using anthropometric measures such as height and infant baby weight to analyze the ways in which social and economic changes interacted with biological processes, American historians have brought to light some intriguing patterns. For instance, Professor Robert Fogel and his collaborators found that colonial Americans (including black slaves) were much taller than their European contemporaries, suggesting that the New World must have had a better nutritional environment (i.e. food, living, and working conditions, including disease environment) than Europe. That pattern began to change in the early nineteenth century, as pointed out by University of Pittsburgh Professor John Komlos. From 1830 to 1870 the nutritional status of Americans was in fact declining, despite continuous increases in per capita income because during the early stages of industrialization, the economy had to "adjust to sectoral shifts in production." As a result, the relative price of food rose because of urbanization and population growth. More recently, Fogel has revealed that the mean height of native-born white males increased greatly from 1890 to 1930, and that life expectancy of native-born white males at age 10 increased continuously from 1890 to 1970, suggesting that their nutritional intake was improving even during the Great Depression, when all economic indices fell.

This paradoxical phenomenon
raises the following questions: What happened to the general nutritional status of people in Pittsburgh and Allegheny County during the Great Depression? Was it improving as Fogel's findings would suggest, or deteriorating as traditional historical conclusions would imply? What was the nutritional status of different groups of people (i.e., gender, race, occupation, and area of birth)? Who fared better and who fared worse and why? This study seeks answers to the above questions while trying to delineate the anthropometric history of Pittsburgh and Allegheny County from 1890 to 1950.

This study randomly selected 19,204 cases from a total of some two million inactive Voter Registration Cards of Allegheny County from 1934 to 1982. The cards record height, year of birth, sex, race, occupation, residence, party affiliation, and place of birth. In order to minimize regional differences, only those born in Pennsylvania were selected. However, all blacks born in the United States were accepted into the sample because Pennsylvania-born blacks were too few in number.

Analysis of mean height by race and by gender reveal some interesting patterns:

1) The Depression years did not seem to have an adverse effect on the net nutritional status of the people in the Pittsburgh region. As a matter of fact, the mean height of men increased a quarter of an inch during the 1930s, greater than the average increase per decade from 1890 to 1945, for whites and blacks combined. The height of females born in the 1930s was also increasing somewhat (see Table 1 and Figure 1).

However, the decrease of mean height of black females born in the 1920s might indicate this particular group experienced some malnutrition during the Depression years as teenagers.10

2) The gap in the mean height between whites and blacks narrowed after 1939. After 1945 the gap became negligible. (Figure 1)

3) For both blacks and whites, the mean height of males increased steadily after 1890, but that of females increased only slightly. (Table 1)

4) Residents of upper-level socio-economic areas were on the whole the tallest. Residents of lower-level socio-economic areas tended to be the shortest, but the gap gradually narrowed, especially after 1930. (Figures 2 and 3, and Table 2)

5) For both races and genders there was a clear association between occupational status and height. Those in higher paid white-collar jobs were the tallest, followed by those in lower paid white-collar jobs, the skilled blue-collar, the semi-skilled blue-collar, and the unskilled blue-collar. However, the differences in the mean height of those occupational groups became less significant after 1930. (Figure 4 and Table 2)
Reports from 126 Pittsburgh concerns indicate that retailing trade fell in value by 7.4 percent in 1930. But if we decompose total trade into its components, we find that grocery sales dropped only 1.9 percent while most other forms of retail trade showed significant sales reductions. General economic conditions became worse in 1931 and 1932. Total sales in 1931 reported by 361 stores were 14.7 percent less than sales in 1930, but again most other forms of retailing showed sales reductions far greater than grocery store sales. In 1932, when grocery sales decreased by 7.8 percent from the 1931 level, total retail sales reductions, reported by 406 stores, were more than three times that figure. The worst year for grocers was 1933, when sales fell 9.7 percent from the 1932 level. During those years retail food prices declined considerably. Statistically, if the retail food price index for October 1929 is considered 100, then the retail food price indexes for December 1930, December 1931, December 1932, and February 1933 fell to 90, 72, 65, and 57 respectively. The decline of retail food prices was probably enough to account for a large part of the decrease of grocery sales in dollar value.

Starting in 1934, grocery sales began to increase and so did food retail prices. Therefore, we may argue that the Depression did not result in a significant decrease of food consumption by the population in the Pittsburgh region as a whole, although some small segments of the population were undoubtedly affected.

The people in the upper socioeconomic group were generally the tallest because of better living conditions. However, this difference gradually narrowed over time and became negligible after 1945 because inequality thereafter manifested itself less in the con-
sumption of necessities which sustain human physical growth than in the purchase of amenities, luxury and education. According to one survey, in 1950 per-capita expenditure by the richest group ($10,000 annual incomes and over) on food and beverages was only 2.4 times that of the poorest income group (under $1,000), while their expenditure on clothing, recreation, and education was 7.7 times, 9.3 times, and 16.2 times respectively that of the poorest group. When a household is considered as a spending unit, then per spending unit expenditure of the richest income group on housing, furnishings and equipment, and automobiles was 4.8 times, 16.5 times, and 16.2 times that of the poorest group.18

The positive relationship found between people's height and their socio-economic status is also supported by our finding in the dramatic drop of the mean height of male students (especially white male students) after 1946. Before 1945, the mean height of white male students was generally on a par with that of the highest income white-collar group because college students were mostly from the upper socio-economic class. After World War II, the G.I. Bill made it possible for many ex-servicemen to attend college. Thus, people from lower income groups became integral parts of the college student body. The dramatic drop in the mean height of white male students reflected these changes in the male student body.19

The use of human stature to explore human biological well-being and its relationship with social and economic status has demonstrated several advantages over conventional measures. One is that human stature is a composite index which reflects many important aspects of human life: not only the nature of available food, clothing, and shelter, but also the intensity of work and environmental conditions. Another advantage is that height data are abundant. They cover a wide range of socio-economic groups and geographical areas. Therefore, it is possible for us to measure and compare how each of them fared in various historical periods. The third advantage is that height data series are objective and simpler to construct than real wage and real income series.

This study shows that anthropometric measures offer valuable information on human biological well-being and its relationship to socio-economic conditions. In this case, it can be seen that as economic conditions worsened during the Depression, people in this region spent a relatively consistent amount on food. By
the height of an individual reflects mainly the nutritional level of his growing years. See John Komlos, Nutrition and Economic Development in the Eighteenth-Century Hapsburg Monarchy: An Anthropometric History (Princeton, 1989), 23-24; and Fogel, Engerman, and Trussell, “Exploring the Uses of Data,” 405-06, 441. According to Fogel, the conditions of the mother’s and even the grandmother’s lives also affect, to an extent yet to be established, the nutritional status of the individual measured.


2 Human physical growth has a genetic limit and “the degree to which the height of an individual, and of a population, reaches its genetic potential” is determined by “its net cumulative nutritional status.” Human physical growth also has a well-defined pattern: “The average annual increase in height (velocity) is greatest in infancy, falls sharply up to age 3, and then proceeds more slowly through the remaining preadolescent years. During adolescence, velocity rises sharply to a peak approximately one-half of the velocity during infancy, then falls sharply and reaches zero at maturity.” Therefore, the height of an individual reflects mainly the nutritional level of his growing years.


heights, the one with which we have long been familiar, probably began with the cohorts born during the last decade of the nineteenth century and continued for about sixty years."

9 The cards are stored in cartons in the Archives of Industrial Society, Hillman Library, University of Pittsburgh. The cartons, each containing about 2,000 cards, are placed on shelves according to period (1934-1958, 1959-1968, 1969-1972, and various years through 1975, 1976, and 1977-1982), and then in alphabetical order.

10 Although they were born in the 1920s, they grew up in the Great Depression. Malnutrition in their adolescent years might be the cause of the decrease of their mean height.

11 U.S. Department of Agriculture, Consumption of Food in the United States: 1909-48 (Washington, D.C, 1949), 91 columns 1, 2, 4, 5, 10, and 20; 136 col. 7; 137 col. 7; 138 col. 7; 140 col. 5.

12 Pittsburgh Business Review 1 (1939), No. 2: 8-9. Department store sales dropped 7.9 percent, shoe store sales 16.1 percent, men's furnishings 21.5 percent, and women's clothing 10.9 percent.

13 Pittsburgh Business Review 2 (1932), No. 1: 10-11. Department store sales lost 16.2 percent, shoe stores 10.8 percent, men's furnishings 24.2 percent, and women's clothing 22.3 percent. Grocery sales fell only 1.7 percent.

14 Pittsburgh Business Review Vol. 3 (1933), No. 1: 10-11. Total retail sales reductions came to 25.2 percent.


17 Pittsburgh Business Review 5 (1935), No. 1: 11-12; 6 (1936), No. 1: 12; 7 (1937), No. 1: 12; 8 (1938), No. 1: 12.


19 The mean height of white male students fell from 70.84 inches to 70.30 inches, ranking after the high-white-collars (70.90), the low white-collar (70.62), and even the skilled blue-collar (70.52).