



The BMI values of the lower classes likely declined during the Great Depression



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ABSTRACT

The BMI values of inmates in the McNeil Island Penitentiary in Washington State declined between the 1860s and the 1910s birth cohorts by 1.44. Furthermore, those who were imprisoned in the 1930s had significantly lower BMI values (by between 0.72 and 1.01) than those who were incarcerated at the end of the 19th century. This corresponds to a decrease in weight of some 2.25 kg (4.95 lbs) for a man of average height of 173.86 cm (68.5 inches). The diminution in nutritional status among this lower-class sample is hardly surprising, given the high level of unemployment at the time but has not been verified until now. In marked contrast, the BMI values of Citadel cadets increased by 1.5 units in the 1930s. This divergence in BMI values is most likely due to the different social status, to the different regional origins of the two samples or to both.

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1. Introduction

Anthropometric history explores the nutritional status of populations of the past mostly based on their height and weight. Written height records began to appear in large numbers in military records in the early 18th century whereas weight records first appeared in sizeable numbers around the middle of the 19th century (Tanner, 1981; Komlos, 1987). However, data on weight remained relatively rare except in prison populations, in a handful of military samples, and among some students. From these records one can form a broad outline of the trends and levels of the weight of historical populations, mostly pertaining to men in as much as women were generally not found in those institutions in large-enough numbers at the time for reliable statistical analysis.

The pattern that emerges indicates that even in North America with its exceptionally productive agriculture, cadets in the West Point Military Academy and in The Citadel, the military academy of South Carolina, had very low body mass index values (BMI)

throughout the second half of the 19th century, even though they were solidly middle class.¹ For example, the average weight of a typical 20-year-old West Point cadet was c. 60 kg (131 pounds) with a BMI value of just 20.4 (Cuff 1993; Hiermeyer, 2010). In fact, no less than 40% of West-Point Cadets were below the 18.5 threshold at which mortality risk generally increases² (Cuff, 1993).

Furthermore, the BMI values of the population improved only slowly, if at all, and with likely reversals as the 20th century approached (Carson 2009, 2012a,b,c, 2015). There are even hints that BMI values inexplicably declined slightly by the turn of the century and not only among convicts (both male and female)

¹ BMI values below 18.5 are classified as underweight, those between 18.5 and 24.9 are normal, values between 24.9 and 29.9 are overweight, while BMIs over 29.9 are considered obese.

² While these cutoff values might have differed in a historical context, one study did find an uncanny similarity in the relationship between BMI values and mortality risks in modern and historical populations (Costa, 1993, 442). The applicability of these cutoff values to Asian ethnic groups has been under discussion primarily in terms of the upper tail of the BMI distribution rather than pertaining to those underweight (World Health Organization, "BMI Classification" http://apps.who.int/bmi/index.jsp?introPage=intro_3.html accessed October 6, 2016). The mortality of Norwegian men with BMI < 18.5 was elevated by 40% above that obtained for those with normal values (18.5 < BMI < 25) (Koch, 2011, p. 112).

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(Carson, 2011, 2013, 2016 pp. 139, 141) but also among the Citadel cadets³ (Coclanis and Komlos, 1995, p. 104). This pattern is quite a conundrum insofar as real wages were increasing, food prices decreasing, and transportation cost of food products declining during this period (Lebergott, 1984; Craig et al., 2004; Bogart, 2009; Carson, 2009, 2012a,b,c). Perhaps this decline in BMI values were brought about by the decline in the share of the population living on farms where food prices were the lowest; so a larger share of the population was paying the higher urban prices than before even if food prices were declining. While this conjecture is speculative at this point, this issue would be worth pursuing in the future.⁴ The 19th century trend is therefore somewhat ambiguous. However, it is clear that most BMI values were in the normal range of 18.5–25.0 at the beginning of the 20th century.

Although data for the first half of the 20th century remain sparse, there is some evidence that gains in BMI values among those born after World War I accelerated markedly. Both the NHANES national sample as well as records of the Citadel cadets indicates that BMI values began to increase among those born after World War I probably in response to the substantial improvements in public health that included expansion of sanitation networks and the concomitant decline in many contagious diseases (Komlos and Brabec, 2010, 2011; Coclanis and Komlos, 1995).

However, both of these data sets have weaknesses that limit the inferences that should be drawn from them. While the Citadel data indicate that the BMI values of those who were measured during the Great Depression increased, this inference is based on a primarily Southern middle-class sample which may not be representative at all of the nation as a whole. Moreover, although the NHANES sample is representative both socially and nationally, the data consist of measurements recorded in the second half of the century, so it remains unclear in that sample just when the weight gains occurred between birth during the Great Depression and measurement in the 1960s and 1970s. Nonetheless, it is possible that the transition to post-industrial BMI values had begun in the interwar years at least among the middle and upper classes. Of course, during the second half of the 20th century the increase in BMI values have accelerated. The mean BMI value of 20.4 that was reached by 20-year-old West Point Cadets in the middle of the 19th century is reached in the 21st century by both boys and girls at age 16 (CDC, 2002, pp. 27, 28; Cuff, 1993, 176).

Given the limitations of the two extant data sets for the interwar years, it should be useful to explore the trends in BMI values in this period further on the basis of a new data set in order to address the above remaining ambiguities, namely, what was the trend in BMI values in the first half of the 20th century, prior to what is widely acknowledged as the post-World War II uptick in BMI values that accompanied the rise of a fast-food culture, the increase in television viewing, and the new dominance of a generally more sedentary lifestyle (Komlos and Brabec, 2010, 2011; Church et al., 2011). This is particularly the case insofar as the data set about to be analyzed pertains to the lower classes which should be sensitive to the economic adversity experienced during the Great Depression. Of course, this sample may not be representative of the lower class any more than The Citadel students were representative of the middle class. Obviously only a small fraction

³ However, the BMI values of West Point Cadets did improve at age 20 from about 20.6 in the 1850s to 21.6 in the 1880s (Cuff, 1993); Hiermeyer, 2010). (Evidence on West Point Cadets for the 1890s has not been analyzed so we do not know if their BMI values also declined at the very end of the century.)

⁴ Men who grew up on a farm would have benefited from a relatively high nutritional status and become taller than average but if they migrated as adults to urban areas where food prices were higher their weight might have declined implying that their BMI values might have decreased and would have been also lower than the BMI of those men who grew up in urban areas and were shorter.

Table 1
Descriptive Statistics of the McNeil Island Penitentiary Sample.

	N	Percent	Mean BMI	Standard Deviation
Ages				
20s	609	37.02	22.62	2.35
30s	587	35.68	23.31	2.77
40s	278	16.90	23.87	3.96
50s	135	8.21	24.53	3.86
60s	36	2.19	23.60	3.95
Complexion				
White	855	51.98	23.08	3.06
Unknown	790	48.02	23.45	2.60
Marital Status				
Married	527	32.04	23.73	3.31
Not-Married	692	42.07	22.82	2.76
Missing	426	25.90	23.39	2.23
Occupations				
White-collar	247	15.02	23.55	3.36
Skilled	387	23.53	23.42	3.03
Farmers	126	7.66	23.33	2.31
Unskilled	689	41.88	23.08	2.72
No Occupations	196	11.91	23.13	2.56
Birth Decade				
1840s	59	3.59	23.72	2.71
1850s	110	6.69	23.51	2.36
1860s	166	10.09	23.62	2.29
1870s	120	7.29	23.46	3.03
1880s	171	10.40	24.07	3.48
1890s	292	17.75	23.85	3.12
1900s	490	29.79	22.78	2.73
1910s	237	14.41	22.33	2.34
Incarcerated				
1882–1889	73	4.44	23.29	2.83
1890–1895	301	18.30	23.50	1.99
1927–1929	301	18.30	23.58	2.97
1935–1937	970	58.97	23.08	3.03
Total	1645	100.00	23.26	2.86

Notes: 1645 observations are for observations with only known entry dates and ages. Two observations for 1916 are not included in the regressions in which the received dates are the independent variables because they were the only observations for that decade. Source: U.S. National Archives and Records Administration, Record Group RG 129, Microfilm ID no. M1619; McNeil Island Penitentiary Records of Prisoners Received, 1887–1951.

of the lower-class population committed crimes, were caught, and subsequently convicted. Because of these filtering processes, caveats must remain. Nonetheless, it is reassuring that the share of unskilled in this sample is quite similar to the one obtained in the population at large (Rosenblum, 2002).⁵ Of course, there was a world of a difference between the social status of these convicts and the students attending the The Citadel Military Academy.

⁵ Share of unskilled in the U.S. labor force and in our sample diverged to some degree. Their share in the US labor force decreased over time while that of the McNeil prisoners increased somewhat from about 31% to 44%. Furthermore, the unskilled in the McNeil sample had a lower BMI value than the rest of the sample by about 0.4 BMI units. However, the increase in the share of the unskilled would have decreased the average BMI values by just 0.05 BMI units (-0.13×0.4) where 0.13 is the decline in the share of prisoners with some skills and 0.4 is the difference in BMI values between prisoners with skills and those who were unskilled.

Percent of the U.S. labor force and the McNeil prison population was unskilled

	U.S.	McNeil Prison
1880	30.4	10.0
1890		30.8
1900	33.1	
1910	29.5	
1920	23.6	45.5
1930		43.6

Source for U.S.: Rosenblum, 2002, p. 88. Note: U.S. includes apprentices.

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