From Height Premium to Weight Penalty? Evidence from Sweden (1950-2022)

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Human height and body mass index (BMI), as a basic proxy for adiposity, are accessible biological indicators of health that are closely related to the living standard and indicate inequalities within populations. They have also been linked to later socioeconomic outcomes, with a height premium and a weight penalty for individuals in their occupational careers. In this paper, we investigate the trend in the respective premium and penalty across Swedish birth cohorts from the 1950s to the 1980s.

Taller children tend to perform better on cognitive tests and achieve higher educational and labour market outcomes (Case & Paxson, 2008; Cinnirella, Piopiunik, & Winter, 2011). There is consistent evidence of a positive association between height and adult socioeconomic status (SES), although it remains unclear whether this relationship is universal or context-dependent, and whether this relationship has changed over time. Many studies argue that the mechanisms that explain such an association are the fact that height is determined by early-life health and nutrition, factors which also influence adult outcomes such as cognitive skills, self-esteem, and labour market performance. Height may also act as a social signal, conveying dominance or competence, qualities that can be valued in the labour market (Thompson et al., 2023). In Sweden, for instance, Lundborg et al. (2014) found that cognitive and non-cognitive skills, family background, and muscular strength explain most of the height–earnings association.

In contrast, in high-income societies, higher adiposity and obesity are increasingly concentrated among lower socioeconomic groups, reflecting changing social norms and lifestyle patterns (Vazquez & Cubbin, 2020). The direction of this relationship, however, remains debated. The social causation hypothesis suggests that lower income increases obesity risk through limited access to healthy food, healthcare, and greater exposure to psychosocial stressors. The reverse causality hypothesis proposes that obesity leads to lower income due to labor market discrimination and societal stigma against individuals with higher BMI.

Across Europe, average height increased substantially during the second half of the twentieth century, mirroring improvements in living standards (Garcia & Quintana-Domeque, 2007). Yet it remains unclear how changes in height and BMI relate to intergenerational social mobility and occupational achievement over time and across cohorts. Much of the existing research lacks a demographic perspective, such as examining whether height and BMI at different stages of life are more predictive of SES, such as at different ages in adulthood and moments in the labor career. Besides, study designs that overlook gender disparities and family-demographic factors also fail to address the mechanisms underlying these associations. For example, although occupational sorting explains much of the stature premium in Sweden, it is uncertain whether

this results from self-selection by shorter individuals, genetic or health differences, or labor market and within-family discrimination.

This study examines how height and BMI in early adulthood predict occupational prestige and income attainment among Swedish men and women born between the 1950s and 1980s. It explores whether height and BMI independently correlate with adult SES after accounting for parental background and family characteristics. We investigate whether taller stature is associated with higher occupational prestige net of family SES, whether higher BMI is linked to lower prestige, and how these associations have evolved across cohorts. We also assess how stature and adiposity relate to upward and downward mobility, and in which social backgrounds biological traits most strongly affect adult SES.

Data

We use Swedish register data linked with historical sources to trace individuals' social backgrounds across two generations. The core sample includes residents from two regions: one in southern Sweden (Sacania), and the other in the north (Västerbotten) . We follow these individuals and their descendants nationwide from 1967 to 2021. Partners and their parents are included when available in the registers. Linking historical sources enables us to reconstruct parental socioeconomic background even for early cohorts (e.g., those born in the 1950s), for whom contemporary register data lack such information. Parental SES is derived from occupational data: parish registers before 1968 and census or occupational registers thereafter. Occupations are classified using HISCLASS (Van Leeuwen et al., 2011), a socio-occupational system designed for long-term comparisons.

Stature and weight data come from two main sources: conscription records (covering over 350,000 men) and medical birth records (covering over 400,000 women). Universal male conscription in Sweden continued until 2007, covering men born up to 1989. For women, height and weight are recorded in medical birth records. For men, the conscription records also include cognitive test scores and handgrip strength measurements. Adult SES attainment is measured through occupations in the occupational register and we use the standardized occupational prestige index HISCAM (based on CAMSIS) and individual income (Lambert et al., 2013).

Analytical Strategy

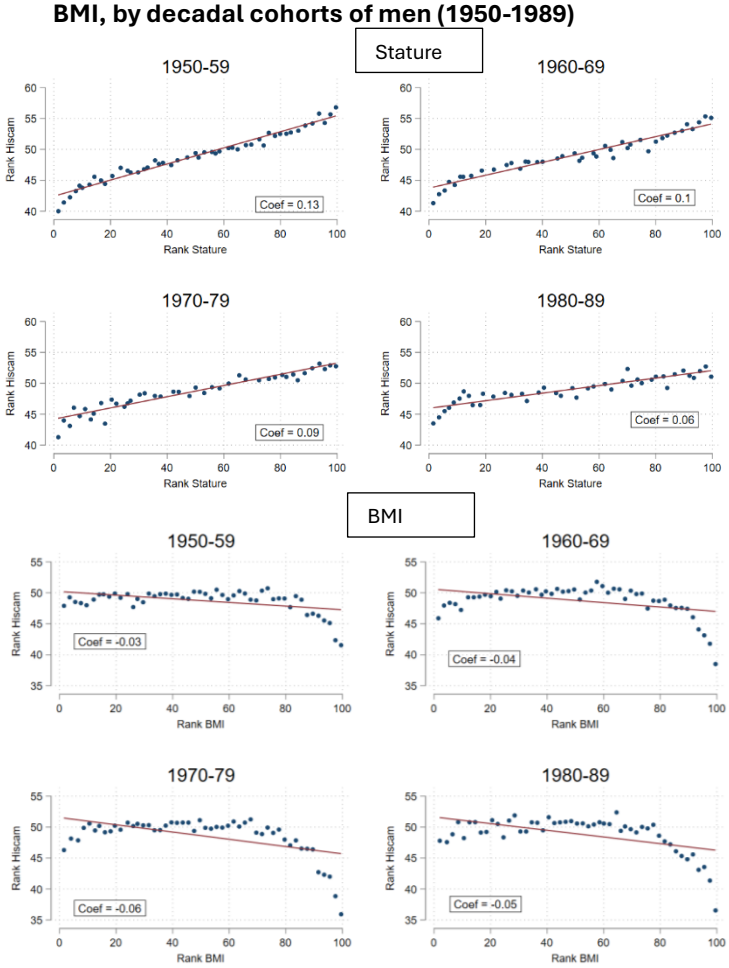
We estimate the effects of height and BMI on SES attainment using regression models that control for parental social class, family size, and demographic factors. SES attainment is measured by the highest and average occupational score achieved between ages 35 and 49, ranked by sex and birth year to reflect relative differences among peers. Height and BMI are analyzed in two ways. First, both are ranked by sex and birth year to account for secular trends. Second, we calculate z-scores by sex, birth year, and social class background to assess deviations within comparable groups. Within-family models (family fixed effects) are applied to account for unobserved familial and genetic factors. Additional controls, including sibship size, birth order, and siblings' sex ratio, are introduced to capture potential within-family inequalities not addressed by sibling fixed-effect models alone.

Preliminary Results

Figure 1 shows a binscatter plot of the linear relationship between occupational attainment (HISCAM scores) and height rank for men, by decadal birth cohorts and controlling for parental SES (1950–59, 1960–69, 1970–79, and 1980–89). A positive relationship between height and SES

attainment is evident across cohorts, though it weakens over time. For men born in the 1950s, the coefficient is about 0.13, declining to roughly 0.06 for those born in the 1980s. Figure 2 illustrates the relationship between occupational attainment and BMI rank, showing a negative association that slightly strengthens over time. The link between BMI and SES is more nonlinear, with the strongest negative association observed among individuals in the highest BMI percentiles (≥80th).

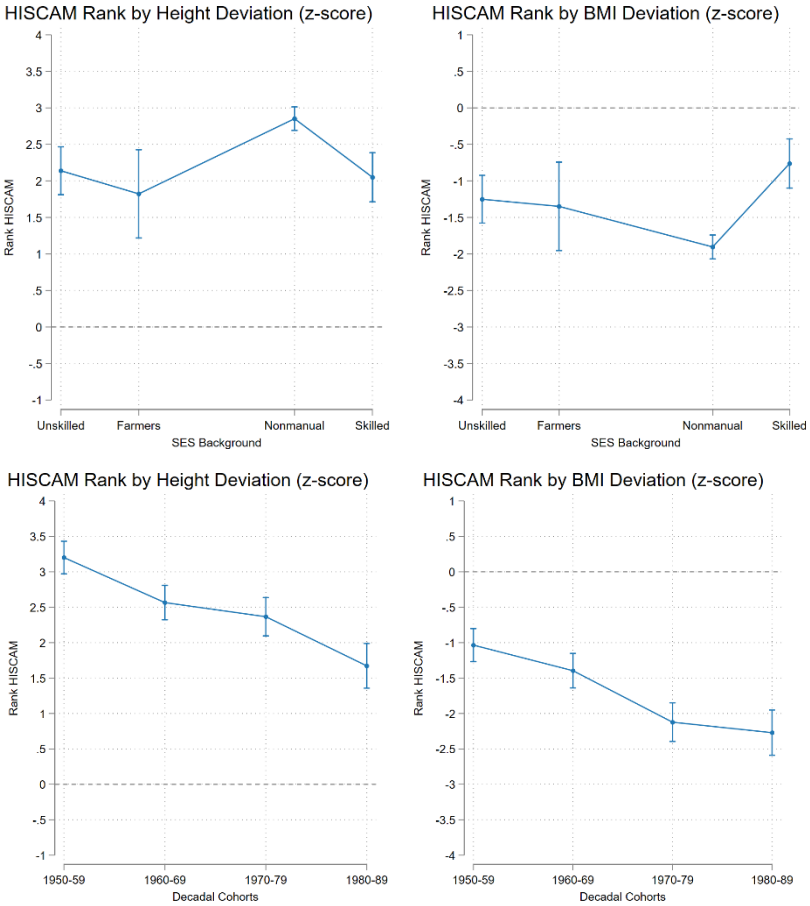
Figure 1and 2: Rank-rank binscatter plot between HISCAM (occupational score) with Stature and BMI, by decadal cohorts of men (1950-1989)



We then estimate models examining the relationship between occupational attainment and deviations in height and BMI within class of origin and birth year. Figure 3 presents marginal effects from interactions between class background and z-scores in height and BMI. The left panel shows that a one-standard-deviation increase in height (about 6.45 cm) is associated with higher occupational scores across all classes. The increase reaches up to two rank positions for children of unskilled and skilled workers, and three for children of non-manual workers. The right panel shows that higher BMI is consistently associated with lower occupational status, with a decline of 0.5 rank positions for children of skilled workers and about two for children of non-manual workers.

Figure 4 displays similar models, this time interacting z-scores with birth decade. The association between stature and occupational attainment remains positive across cohorts, but the disparity narrows over time. Taller individuals achieve higher SES regardless of background, though differences shrink from roughly three rank positions in the 1950s cohort to 1.5 in the 1980s cohort. In contrast, the BMI–SES gap widens, increasing from about one rank position in the 1950s to two in the 1980s.

Figure 3 and 4 : Marginal effects of the association between occupational attainment (HISCAM scores rank) and z-scores (for height and BMI) by SES background and Decadal cohorts



Note: Both binscatters are plotted separately by decadal cohorts. Each rank is measured by birth year, the binscatter model controls for parental social class (background).

Preliminary Conclusions and Next Steps

Preliminary evidence indicates that the positive association between height and occupational prestige among men born between 1950 and 1989 persists but has weakened over time. Taller men, likely reflecting better early-life nutrition and health, still achieve slightly higher occupational prestige, consistent with earlier research linking height, education, and labor market success (Case & Paxson, 2008; Beauchamp et al., 2011). However, as average height increased across cohorts (Garcia & Quintana-Domeque, 2007), the relative advantage of tall stature has diminished. BMI, by contrast, shows a growing negative association with occupational outcomes, especially among younger cohorts, mirroring the modern inverse relationship between SES and adiposity seen in high-income countries (Vazquez & Cubbin, 2020). Interestingly, both the height premium and BMI penalty appear largely stable within social class backgrounds. The evolution of these associations across Swedish cohorts illustrates how biological traits both reflect and shape changing social structures and pathways to inequality.

Next, we will expand the analysis to include income and educational attainment, as well as female height and BMI, to examine which SES dimensions display greater disparities in relation to biological traits. We will also assess these relationships across different stages of the adult life course to determine whether height and BMI are more influential at labor market entry or later in life. Additional measures, including cognitive and non-cognitive skills, will be incorporated to explore mediating pathways. Finally, we will conduct more detailed within-family analyses to investigate whether differences in resource allocation and gender inequality mitigate or amplify height and BMI-related advantages and disadvantages.

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