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The Skinny on Success: Body Mass, Gender and Occupational Standing Across the Life Course

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Abstract

Several studies have analyzed the impact of obesity on occupational standing. This study extends previous research by estimating the influence of body mass on occupational attainment over three decades of the career using data from the Wisconsin Longitudinal Study. In a series of covariance structure analyses, we considered three mechanisms that may alter the career trajectories of heavy individuals: (1. employment-based discrimination, (2. educational attainment, and (3. marriage market processes. Unlike previous studies, we found limited evidence that employment-based discrimination impaired the career trajectories of either men or women. Instead, we found that heavy women received less post-secondary schooling than their thinner peers, which in turn adversely affected their occupational standing at each point in their careers.

Introduction

In recent years, social scientists have devoted much effort to documenting the effects of body mass on socioeconomic status and career outcomes (Averett and Korenman 1996; Baum and Ford 2004; Cawley 2004; Cawley, Grabka and Lillard 2005; Conley and Glauber 2005; Gortmaker et al. 1993; Haskins and Ransford 1999; Mitra 2001; Pagan and Davila 1997). Most of these studies have relied on cross-sectional data to examine the effects of elevated body mass on wages, rather than tracing the cumulative effects of weight on occupational trajectories over the life course. Furthermore, most cross-sectional studies lack a baseline measure of body mass that precedes career entry. As a result, many such investigations are unable to disentangle the precise nature of the relationship between body mass and labor market outcomes.

Several longitudinal analyses that trace the effects of adolescent body mass on career outcomes rely on the National Longitudinal Survey of Youth (Averett and Korenman 1996; Baum and Ford 2004; Cawley 2004; Gortmaker et al. 1993; Register and Williams 1990). Unfortunately, NLSY data only permit analyses of individuals during the earliest career stages, tracing careers up to seven years following career entry. One important exception is the recent analysis by Conley and Glauber (2005) that uses the Panel Study of Income Dynamics to track the influence of obesity on career outcomes up to 15 years following career entry. Consistent with previous

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findings (Averett and Korenman 1996; Baum and Ford 2004; Cawley 2004; Pagan and Davila 1997), Conley and Glauber find that elevated body mass is associated with reductions in women's wages, family income and the probability of marriage. Although Conley and Glauber provide a useful extension of previous work, we argue that the first 15 years of an individual's career is an inadequate time frame in which to trace the effects of body mass on occupational trajectories.

Body Mass & Occupational Standing across the Life Course

Understanding the full impact of body mass on occupational standing requires a life course analysis that follows individuals from career entry through later career stages. We know a great deal about the effects of adolescent body mass on adult health and mortality (Bjørge et al. 2008; Must et al. 1992). By comparison, we know very little about how body mass affects career trajectories over the life course. Consistent with a life course perspective, we define careers as age variations in occupational status that individuals experience during their work lives (Brueckner 2004; Sørensen 1974). A life course perspective permits a comprehensive view of how inequalities accumulate over time and a better understanding of the mechanisms by which inequalities are produced and/or reduced as people progress through their careers.

Why might individual career trajectories vary according to adolescent body mass and why might body mass impact those trajectories differently in the early-, mid- and late-career stages? At least three distinct mechanisms may influence career trajectories over the life course: (1. employment-based discrimination, (2. educational attainment, and (3. marriage market processes.[1] In the United States, body mass is strongly and inversely associated with socioeconomic status (Averett and Korenman 1996;Baum and Ford 2004;Cawley 2004;Cawley, Grabka and Lillard 2005), particularly among women (Register and Williams 1990). To explain how elevated body mass might result in lower SES, recent scholarship has sought to document the labor market and marriage market penalties faced by heavy individuals and how these penalties vary considerably by gender.

Employment-Based Discrimination

Previous research suggests that heavy women tend to earn less than non-heavy women in both professional and blue collar occupations (Conley and Glauber 2005; Mitra 2001; Pagan and Davila 1997; Register and Williams 1990). Compared to their non-heavy peers, heavy women also obtain less education (Gortmaker et al. 1993) and experience more exclusion from managerial positions (Haskings and Ransford 1999; Pagan and Davila 1997). More recent work shows that young white women face especially harsh penalties for elevated body mass (Cawley 2000, 2004; Conley and Glauber 2005).

These findings suggest that heavy women may face employer discrimination, particularly early in their careers. A large body of scholarship suggests that physical attractiveness is strongly associated with higher levels of career success, particularly among young women (Biddle and Hamermesh 1998; Bosman, Pfann and Hamermesh 2006; French 2002; Frieze et al. 1991; Hamermesh and Biddle 1994; Hatfield and Sprecher 1986; Umberson and Hughes 1987). Employers tend to attribute a variety of positive social characteristics to attractive female employees including cooperativeness, intelligence and competence (Feingold 1992; Jackson 1992; Jackson et al. 1995).

[1]For this research we focus on social rather than health-related mechanisms. A large body of scholarship has analyzed the impact of obesity on health-related outcomes over the life course (see Visscher and Seidell 2001 for a review). Given the ages at which we are observing attainment, health-related mechanisms are most likely relevant for 1993, and much less so for first and 1975 job.

Research on the positive effects of physical attractiveness on occupational attainment has found that the so-called beauty myth[2] applies primarily to younger women due to gender-specific socio-cultural preferences and expectations of employers as well as co-workers (Jackson 1992;Wolf 1991). Indeed, unlike attractive women, attractive men are only slightly (if at all) advantaged in terms of career attainment (French 2002;Frieze et al. 1991).

Body mass is one of the primary determinants of evaluations of female attractiveness (Swami and Tovée 2005a; Tovée and Cornelissen 1999; Tovée et al. 1999). Therefore, employers who reward physical attractiveness may be more likely to discriminate against heavy women due to inferences about ability. Research suggests that employers tend to evaluate larger women as less productive and desirable employees. Specifically, employers tend to see heavy women as lacking in self-discipline and professionalism and as having lower supervisory potential (Puhl and Brownell 2001). Additional studies suggest that employers attribute a variety of negative characteristics to heavier women including laziness, mental incompetence and emotional instability (see Puhl and Brownell 2001 for a review of this literature). While the current analysis does not directly measure employer discrimination, we expect to observe a residual direct effect of body mass on occupational standing after controlling for other attainment-related factors.

Most investigations of body mass and men's labor market outcomes have concluded that body mass only minimally or even positively affects men's labor market status. For example, some studies have concluded that body mass has little or no effect on men's wages (Gortmaker et al. 1993; Pagan and Davila 1997; Register and Williams 1990; Sargent and Blanchflower 1994), while others have found a significant positive effect of body mass on men's earnings (Morris 2006). Furthermore, recent studies have found that heavy men are actually more likely than non-heavy men to be in the labor force (Sousa 2005), and that body mass has little or no effect on men's household earnings and poverty rates (Gortmaker et al. 1993). Indeed, body mass is a relatively weak predictor of assessments of men's physical attractiveness (Swami and Tovée 2005b), thus reducing the probability that body mass will have a negative impact on men's career standing over the life course. Therefore, we predict the following:

> *Hypothesis 1a:* Heavy women will experience lower occupational attainment than non-heavy women, particularly during the early career stages.
>
> *Hypothesis 1b:* Body mass will not directly affect occupational attainment among men at any point in the career.

Educational Attainment

In addition to discrimination, adolescent body mass may affect occupational attainment through educational attainment and human capital accumulation. Characteristics that affect academic and occupational achievement, such as socioeconomic background, ability and aspirations, may also be associated with weight-related differences in adolescence. Thus, observed weight-related occupational differences may be due to prior causes.

Conversely, net of these factors, overweight adolescents may face greater social stigma and isolation from peers and educators and, as a result, feel marginalized from educational institutions (Crosnoe and Muller 2004). In fact, some research suggests that the social stigma associated with high body mass is stronger during adolescence than at other times during the life course (Halpern et al. 1998; Quinn and Crocker 1999). In their study of body mass and academic achievement, Crosnoe and Muller (2004) found that in contexts where obesity is

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[2]The “beauty myth” refers to the standards of physical attractiveness that women are held to in public and private spheres (Wolf 1991). We test the hypothesis that standards of feminine beauty affect women earlier in the career and are most likely to negatively affect larger women.

likely to lead to negative peer assessments, body mass is strongly and negatively associated with achievement. This finding suggests that the stigma associated with being overweight can affect academic functioning and, therefore, achievement over the life course. If overweight adolescents are less likely to excel in high school or to obtain post-secondary schooling, their subsequent occupational attainment might suffer. Presuming that elevated body mass reduces years of completed schooling, heavy individuals could actually see early career advantages associated with experience gained via early labor market entry, while their thinner peers forgo labor market entry for additional schooling. However, over the long term, overweight adolescents are likely to face substantial occupational deficits as their more highly educated peers enter the labor market and ultimately surpass them.

Evidence for the association between body mass and academic achievement is mixed (Chondola, Deary, Blane and Batty 2006). Analyses of the Early Childhood Longitudinal Study suggest little difference in academic performance between normal weight and overweight children (Datar, Sturm and Magnabosco 2004). However, other research suggests that overweight adolescents are less likely than their thinner peers to earn a college degree, completing approximately 1 less year of schooling, on average (Gortmaker et al. 1993). Given these findings we predict the following:

> *Hypothesis 2a:* Heavy adolescents will complete fewer years of formal schooling than non-heavy adolescents.
>
> *Hypothesis 2b:* Heavy adolescents will have lower occupational attainment than non-heavy adolescents at each stage of the career, via educational disadvantages.

Marriage Market Processes

Scholars have documented ways that body mass affects the likelihood of success in the marriage market (Averett and Korenman 1999; Conley and Glauber 2005; Gortmaker et al. 1993). The impact of body mass on marriage market processes also varies by gender. While previous research has described the influence of body mass on marriage and labor market outcomes for men and women, it has tended to treat these processes as discrete. Most research in this area has sought to document the *additive* negative effects of marriage and labor market failures for heavy women by specifying differentials in individual earnings and household income between heavy and non-heavy individuals. Few studies have analyzed the mechanisms by which marriage market processes directly or indirectly affect occupational standing. This is puzzling given the abundance of research that documents the wage penalties women pay as wives and mothers (Budig and England 2001; Hersch and Stratton 1997; Korenman and Neumark 1992; Lundberg and Rose 2000; Neumark and Korenman 1994; Waldfogel 1997) as compared to the wage premiums men enjoy as husbands (Allegretto and Arthur 2001; Daniel 1995; Gray and Vanderhart 2001; Korenman and Neumark 1991; Loh 1996). Thus, we argue that marriage market processes are likely to affect men's and women's careers in important yet dissimilar ways.

Previous research suggests that heavy women are less likely to marry, more likely to delay marriage and more likely to divorce than non-heavy women (Averett and Korenman 1996; Conley and Glauber 2005; Gortmaker et al. 1993). Elevated body mass also reduces men's likelihood of marriage, though the impact is less than for women.

Most marriages are characterized by a gender-specific division of labor in which women perform a significantly greater proportion of unpaid household labor (Hersch and Stratton 1997, 2002; Presser 1994; South and Spitze 1993). Hersch and Stratton (1997, 2002) documented the direct negative effects of married women's household labor on earnings. Conversely, men earn significant and robust earnings premiums as a result of the same division of labor (Allegretto and Arthur 2001; Grossbard-Shechtman 2003; Loh 1996). Indeed, Waite and Gallagher (2001) argue that according to some estimates, marriage increases men's earnings even more than a college education. Grossbard-Shechtman and Neuman (2003) further documented that the earning premium men enjoy grows over the life course, increasing every year for the duration of the marriage.

These findings make clear that marriage market “success” – defined as getting married early and staying married – is detrimental to women's but not men's labor market attachment and occupational standing. Taniguchi (1999) found that women who delay family formation pay significantly lower wage penalties than women who bear children earlier. Thus, rather than expecting heavy women to be doubly penalized, we might expect that “failures” in the marriage market may lead to greater successes in the labor market, particularly upon career entry. Because they are more likely to delay family formation, heavy women may experience a more continuous labor market attachment early in the career, and subsequently invest more time accumulating job or career-specific training or credentials. Because marriage market “failures” may advantage heavy women in the early stages of their careers, we predict the following:

> *Hypothesis 3a:* Heavy women will achieve greater occupational attainment than non-heavy women in their early career stages as a result of delays in family formation.

We expect delayed family formation to have the opposite effect for men. If marriage (and childbearing) leads to earning premiums for men, then delayed family formation could hinder occupational attainment. By delaying or avoiding marriage, heavy men may tend to sacrifice the earnings premiums and potential promotion possibilities enjoyed by married men. Although body mass may not affect men's human capital investments or labor market attachment, lesser success in the marriage market could nevertheless have a negative influence on the career trajectories of heavy men. We predict the following:

> *Hypothesis 3b:* Heavy men will experience lower occupational attainment than non-heavy men in their early career stages as a result of delays in family formation.

Data and Methods

The Wisconsin Longitudinal Study

We test our hypotheses using data from the Wisconsin Longitudinal Study. The WLS has unique advantages for testing these hypotheses because it includes a measure of adolescent body mass prior to labor market entry, as well as occupational data covering over three decades of respondents' careers.

The WLS follows a random sample of 10,317 individuals who graduated from a public, private or parochial high school in Wisconsin in 1957 (Sewell et al. 2004). In the initial wave, the WLS collected information on academic ability, socioeconomic background, attitudes toward higher education, educational and occupational aspirations, and a number of contextual factors (Hauser 2005). Subsequent waves in 1964, 1975, 1993 and 2004 collected data on a wide range of issues essential to studies of the life course, including educational and occupational histories, indicators of socioeconomic status, military service, marital status, family characteristics, social participation, psychological well-being, health behaviors and health outcomes (Hauser 2005; Sewell et al. 2004). Although the WLS is not nationally representative, respondents resemble more than two-thirds of Americans who are now entering retirement age in terms of academic achievement and ethnic background (Hauser 2005).

Variables and Measurement

Occupational Standing—Because women tend to have higher levels of education than men employed in the same occupation but lower levels of earnings, analyses of gender differences in occupational stratification require indices of specific occupational features or direct measures of occupational characteristics (Hauser and Warren 1997; Warren, Sheridan and Hauser 1998). Occupational standing has traditionally been measured using composite indices of occupational status (e.g., Duncan 1961) that are based on a combination of occupational characteristics. Recent work by Hauser and Warren (1997) and Warren et al. (1998), however, argues that such global measures have important limitations, particularly in analyses of gender differences in occupational attainment. Instead, they advocate operationalizing attainment in a way that captures gender differences in earnings and education separately. In empirical tests of these measures using both the 1994 General Social Survey and the 1986–1988 Survey of Income and Program Participation, Warren et al. (1998) conclude that composite indices are inadequate when measuring and comparing occupational status by gender.

We estimate the level of occupational attainment in three ways. Occupational education is the proportion of incumbents in an occupation that completed one or more years of post-secondary education. Occupational income is the proportion of incumbents in an occupation that earned $25,000 or more per year. Occupational SES is measured by the Duncan Socioeconomic Index. We use these measures at three time points: respondents' first job after the completion of schooling, and respondents' current/last jobs in 1975 and in 1993. This analytic strategy allows us to trace the effects of gender and body mass, beginning at labor market entry and continuing over several decades of the work career.[3]

Main Predictor Variables—The two predictor variables of primary interest are gender and adolescent body mass. Until very recently, the WLS was limited by the lack of a baseline measure of body mass, disallowing the kind of life course analysis pursued here. To account for this shortcoming, an 11-point scale was recently developed to code the high school senior yearbook photographs of 3,027 randomly selected WLS participants for relative body mass (Reither, Hauser and Swallen 2009). Using separate scales for boys and girls, a team of six coders assigned RBM scores to WLS participants at baseline in 1957. For each of the 3,027 yearbook photographs, each of the six coders recorded a RBM scale score ranging from 1 to 11. RBM scores were combined to form the standardized relative body mass index. SRBMI was calculated separately for male and female photos by (1. generating coder-specific *z* scores, (2. summing *z* scores across coders, and (3. dividing the sum of *z* scores by the number of coders in the study. That is, for an individual WLS participant,

$$\mathrm{SRBMI}_{jk}=\frac{\sum_{i=1}^{n}\left[\left(x_{ijk}-\bar{x}_{ik}\right)/s_{ik}\right]}{n},$$

where *i* is an individual coder, *n* is the number of coders in the study, *j* is one of the 3,027 WLS participants, *k* is the participant's gender and x_{ijk} is the series of RBM scale scores for coder *i* and participant *j* of gender *k*, with mean $\bar{x}_{ik}$ and standard deviation s_{ik}. The RBM scores were standardized in this way to eliminate differences among coders in the location (mean) and variance of the scores that they assigned.

Analyses have demonstrated that the RBM scale is reliable (α = .91) and meets several criteria of validity as a measure of body mass – including the prediction of midlife BMI, obesity, health symptoms, chronic health conditions and premature mortality (Reither et al. 2009). Reliability

[3]We also estimated the impact of SRBMI on earnings in 1975 and 1993. We did not find statistically significant differences in earnings across SRBMI groups for men or women at either wave. When SRBMI was treated as a continuous measure, we found a marginally significant ($p < .10$) negative impact of elevated SRBMI on men's earnings in 1993. This difference was largely mediated by current health status in 1993, suggesting that health selection is important to consider at later stages of the career. Given that SRBMI only modestly affects occupational attainment in 1993, the impact on earnings must largely operate through reduced labor supply and not through reduced quality of job or wage rates.

of the RBM scale was unaffected by gender, as evidenced by equivalent alpha scores ($\alpha = .91$ for male and female photos). Furthermore, the RBM scale is comparable to traditional measures of body mass (e.g., BMI in adolescence) in terms of its ability to predict body mass and health events in mid-life. For example, the correlation between SRBMI (measured at ages 17–18) and BMI (measured at ages 53–54) is .31, similar to a British cohort study that found a correlation of .39 between measures of BMI taken at ages 13 and 50 (Wright, Parker, Lamont and Craft 2001). Among a subsample of 224 WLS respondents who achieved maximum BMI between the ages 16–30, the correlation between SRBMI and this more proximal measure of BMI is substantially stronger, .48 for men and .55 for women.

For our analyses, we divide the WLS sample into four categories based on the SRBMI distribution. *Underweight* WLS participants have SRBMI scores that are one or more standard deviations below the mean (SRBMI ≤ −1); *low-normal weight* participants have SRBMI scores between the mean and one standard deviation below the mean (−1 < SRBMI < 0) (referent group); *high-normal weight* participants have SRBMI scores between the mean and one standard deviation above the mean (0 < SRBMI < 1); and *overweight* participants have SRBMI scores that are one or more standard deviations above the mean (SRBMI ≥ 1). We use these categories to examine possible non-linear associations between SRBMI and occupational outcomes, and to isolate the thinnest and heaviest groups of WLS respondents while still preserving sufficient statistical power.[4] However, we recognize that these terms (particularly *underweight* and *overweight*) are heuristic devices, not precise clinical markers.

Potential Mediators and Confounders

Our analyses include social background variables that could confound the relationship between SRBMI and occupational attainment. These variables include mother's and father's years of completed schooling, father's occupational attainment (occupational education), and a three-year average of family income from 1954–1956, drawn from state tax records. We include two measures of family formation (age at first marriage and age at first birth) and educational attainment of the respondent (years of completed schooling), as potential mediators of the relationship between SRBMI and occupational attainment. Finally, we include baseline measures of adolescent cognitive ability (Henmon-Nelson IQ) and academic performance (high school class rank) to control for the potentially common causal pathway linking ability/achievement to both body mass and occupational attainment.

Analyses

First, we estimate a baseline multigroup (by gender) covariance structure model of occupational attainment over the life course. This covariance structure model is estimated with full information maximum likelihood and is represented by the path diagram shown in figure 1. The model may also be expressed formally via the following equation:

$$\eta = B\eta + \Gamma\xi + \zeta,$$

where η is a vector of endogenous variables, B is a matrix of effects between endogenous variables, Γ is a matrix of effects between exogenous variables (i.e., ξ) and endogenous variables, ξ is a vector of exogenous variables, and ζ is a vector of disturbances for endogenous variables (Jöreskog and Sörbom 1996). Measurement components of covariance structure models are also estimated via the following set of equations:

[4]We tested other categorical specifications of SRBMI. The parameter estimates do not change dramatically, and the substantive conclusions are robust to the use of alternative cut points.

$$y=\Lambda_y\eta+\varepsilon$$
$$x=\Lambda_x\xi+\delta,$$

where y is a vector of endogenous observed variables, Λ_y is a matrix of the effects of endogenous latent variables (η) on endogenous observed variables (y), ε is a vector of measurement errors for y variables, x is a vector of exogenous observed variables, Λ_x is a matrix of the effects of exogenous latent variables (ξ) on exogenous observed variables (x) and δ is a vector of measurement errors for x variables (Jöreskog and Sörbom 1996).

Our model of life course occupational attainment is based on that proposed by Hauser and Warren (1997). In this model we postulate that occupational education plays a central role in inter-and intra-generational stratification processes. Occupational SES at each stage in the life course is a function of the concurrent level of occupational education and occupational income, and occupational income is affected by the level of educational attainment within occupations. Occupational attainment at each age is a function of prior occupational attainment, educational attainment, the timing of family formation, academic/cognitive ability, and adolescent SRBMI. We constrain father's occupational attainment to act exclusively through initial occupational and educational attainment. We also postulate that family income in adolescence and parental education affect occupational attainment only indirectly, through educational attainment. None of these restrictions significantly compromise the fit of the model. Moreover, none of the paths we constrained to zero (e.g., family income → occupational education of first job) were statistically significant when left unconstrained. In addition to the direct effect of SRBMI on occupational attainment, we also estimate indirect effects via educational attainment, family formation and recursive effects through prior occupational attainment for both men and women. This allows us to test our hypotheses concerning the impact of schooling and marriage markets in mediating the impact of adolescent body mass. Again following Hauser and Warren (1997) we allow correlations between the disturbances of occupational SES across the life course and also between the disturbances in occupational income. Formally, this results in the following additional free parameters: $Cov\ \zeta_5\zeta_8=(\psi_{5.8})$; $Cov\ \zeta_5\zeta_{11}=(\psi_{5.11})$; $Cov\ \zeta_8\zeta_{11}=(\psi_{8.11})$; $Cov\ \zeta_4\zeta_7=(\psi_{4.7})$; $Cov\ \zeta_4\zeta_{10}=(\psi_{4.10})$; $Cov\ \zeta_7\zeta_{10}=(\psi_{7.10})$. The model also allows for free inter-correlations among the exogenous variables.

In the second step of the analysis, we formally test whether the gender differences we observe in the baseline model are statistically significant by imposing equality constraints on the effects of relative body mass on educational attainment, family formation, first occupational attainment, 1975 occupational attainment and 1993 occupational attainment. Finally, we present estimates from a final model incorporating those equality constraints that do not cause significant deterioration in model fit. For each model, we use the MLR estimator in Mplus 5.1 (Muthén and Muthén 2008).

Results

Maximum likelihood estimates from the baseline models of occupational attainment over the life course are presented for females and males in tables 2 and 3, respectively. We find that relative to women in the low-normal weight category ($-1 < \text{SRBMI} < 0$), women who were underweight in adolescence ($\text{SRBMI} \leq -1$) held mid-career jobs in which 3.4 percent more incumbents had been to college. Additionally, women with high-normal weight in adolescence ($0 < \text{SRBMI} < 1$) had significantly reduced occupational attainment late in their careers. These differences existed net of academic ability and performance in high school as well as parental socioeconomic status. We also find countervailing indirect effects of adolescent SRBMI via educational attainment and family formation processes. Heavier adolescent girls (SRBMI scores above the mean) went on to complete about .3 fewer years of schooling than their thinner peers, which had a negative impact on their occupational attainment over the work career. However, overweight adolescent girls (SRBMI ≥ 1) also delayed family formation by 1.18 years on average, which had beneficial effects on initial and mid-career attainment, and partially ameliorated the negative impact of reduced schooling. For women, the negative indirect impact of being overweight on initial occupational attainment via reduced schooling was four times larger than the beneficial indirect effect via delayed family formation. Similarly, the relative impact of these two indirect pathways was approximately 3 to 1 at the mid- and late-career stages. Overall, the effects of adolescent SRBMI on occupational attainment over the career were modest. For women, the total impact of being in the high-normal weight category reduced occupational education by .05 standard deviations at labor market entry, .07 standard deviations at mid-career, and .10 standard deviations at late-career relative to the low-normal weight category. Being overweight reduced occupational education by .04 standard deviations at labor market entry and mid-career, and by .06 standard deviations at late-career.

For men, we find that underweight adolescents had significantly reduced occupational attainment at labor market entry compared to their peers with low-normal weight (Table 3). Those whose SRBMI scores were one standard deviation or more below the mean held first jobs in which 5.18 percent fewer incumbents had been to college. This is roughly equivalent to the effect of a half year less schooling. We also find that by the mid-career, men who were overweight as adolescents had significantly reduced occupational attainment relative to their peers who fell into the low-normal weight category. Overweight men held jobs in which the proportion of their peers who had been to college was lower by approximately 3 percentage points. Contrary to our findings for women in the WLS, among men we find no significant indirect effects of adolescent SRBMI on occupational attainment via educational attainment or family formation processes. But similar to our findings for women, the net impact of adolescent SRBMI on occupational attainment was modest for men. Relative to those in the low-normal weight category, being underweight reduced occupational education by .07 standard deviations at labor market entry, and .06 standard deviations at mid- and late-career. Being overweight reduced men's mid-career occupational attainment by .05 standard deviations.

Next, we test for significant gender differences in the impact of adolescent relative body mass by estimating models under various constraints. We first impose gender invariance constraints on the impacts of the adolescent SRBMI categories on initial occupational attainment. Imposing these constraints does not have a significant deleterious effect on model fit using conventional measures. The Satorra-Bentler scaled chi-square increases by 5.4 with 3 additional degrees of freedom. In addition, there is substantial improvement in the BIC statistic ($\chi2 - df * \ln(N)$) (decrease in BIC > 10), suggesting gains in model parsimony without a significant loss of fit. Next we impose gender invariance constraints on the effects of the adolescent SRBMI categories on mid-career attainment (1975). As before, the imposition of these constraints does not significantly alter the fit of the model according to conventional criteria ($\Delta\ \chi^2$=4.8 with 3 additional degrees of freedom) and improves parsimony (Δ BIC = −18.9). Similarly, imposing gender invariance constraints on the direct effects of the adolescent SRBMI categories on late-career occupational attainment (1993) does not cause model fit to deteriorate. These results show that despite the appearance of gender differences in tables 2 and 3, the direct effects of adolescent SRBMI on occupational attainment do not vary significantly for men and women. We then impose gender invariance constraints on the indirect effects of adolescent SRBMI, first via educational attainment and then through family formation. Constraining the effects of the SRBMI categories on educational attainment to be the same for men and women causes significant deterioration in the fit of the model using conventional standards ($\Delta\ \chi^2$ = 9.7 with 3 additional degrees of freedom), though BIC once again is improved. However, imposing similar equality constraints on the delayed marriage pathway does not appreciably alter model fit. This suggests that SRBMI has the same effect on family formation timing for men and women. However, delayed family formation has no impact on the career attainment of men but positively affects women's career standing. Overall this suggests that the indirect impact of adolescent SRBMI – working through educational attainment and, to a lesser degree through the timing of marriage/fertility – varies by gender. Finally, we estimate a model that incorporates all of the previous constraints that did not result in a significant decline in model fit. This model fits the data much better than the baseline models presented in tables 2 and 3. The Satorra-Bentler scaled chi-square increases by a non-statistically significant 18.8 with 12 additional degrees of freedom, which substantially improves model parsimony (Δ BIC = −76.0).

In tables 4 and 5 we present parameter estimates from the final model. This model takes the baseline model presented in tables 2 and 3 and imposes equality constraints from the previous analysis that do not cause significant deterioration in model fit. Specifically, we impose gender invariance constraints on the direct effects of the adolescent SRBMI categories on occupational attainment at each wave, and also between SRBMI and the latent family formation construct. In tables 4 and 5 these constrained parameters are presented in boldface type. The imposition of these constraints has an important influence on the estimated impact of adolescent SRBMI on occupational attainment. Imposing gender invariance on the direct effects of SRBMI on occupational attainment yields no significant direct effects at conventional levels of statistical inference ($p < .05$). We find a small, negative and marginally significant ($p < .10$) direct effect of being underweight in adolescence on initial occupational attainment. Similarly, at mid-career we find a marginally significant deleterious impact of being overweight. However, elevated SRBMI continues to adversely affect the occupational attainment of women indirectly through its inverse association with educational attainment. Again, this is partially offset by the beneficial effects of delayed family formation among heavy women. Overall, the results suggest a statistically significant, though substantively modest negative total effect of elevated adolescent SRBMI on life course occupational attainment for women. For overweight men, we find an even weaker and only marginally significant negative effect of adolescent SRBMI on occupational attainment.

Discussion

Our first set of hypotheses (H1a and H1b) predicted that heavier women would experience lower occupational attainment than normal weight women due to employment-based discrimination, while body mass would not affect men's occupational standing at any point in the career. Findings from baseline models suggest that heavier women experienced lower levels of occupational success in later career stages, while heavier men experienced reduced attainment at the mid-career point. However, when we imposed gender equality constraints we found that adolescent SRBMI does not directly affect career trajectories in gender-specific ways, and only modestly affects the attainment of both men and women.

Despite the lack of substantial direct effects of body mass on occupational attainment, we find gender differences in the indirect impact of adolescent body mass on career trajectories. Heavier women in the WLS obtained less post-secondary schooling, which hindered their careers. This is partially consistent with our second set of hypotheses (H2a and H2b), which predicted that heavier adolescents would complete fewer years of schooling and experience lower occupational attainment at each career stage. We do not find similar indirect effects for men.

Our final set of hypotheses predicted that heavier men and women would experience delays in family formation, and that such delays would improve the early career attainment of women (H3a), but hinder the early career attainment of men (H3b). We do not find gender differences in terms of the effect of SRBMI on family formation timing. However, we do find differences in terms of the indirect effect of SRBMI on occupational attainment through family formation processes. Whereas delayed family formation had no effect on men's occupational attainment, delayed family formation improved women's career standing. Although subsequent analyses with the full sample of WLS respondents might provide sufficient statistical power to detect significant gender differences suggested in the baseline models, it is important to bear in mind that the gender differences we observed were substantively modest compared to prior studies.

Our findings have several implications. First, scant evidence that body mass directly affects the career trajectories of men or women at any point in the career is surprising given the conclusions of previous research as well as the characteristics of the cohort under study. Wisconsin graduates in 1957 entered a labor market that had substantially lower obesity rates compared to more recent decades. Social psychologists have shown that the degree to which obese individuals are stigmatized depends in part on existing normative structures (Crosnoe and Muller 2004). Furthermore, negative social consequences and self-assessments associated with obesity are more common among populations where overweight/obesity is rare (Pinhey et al. 1997; Ross 1994). Consequently, overweight adolescents in the WLS may have been more negatively stigmatized relative to overweight individuals in more recent cohorts (for a review of rising obesity rates since 1960, see Flegal et al. 2002). Under these conditions, we expected to observe a greater impact of adolescent body mass on the career trajectories of WLS participants than analyses of more recent cohorts.

Given the lack of residual direct effects of SRBMI on occupational attainment, we can point to no evidence of employer discrimination against heavy women (or men) at any time point during the career. Furthermore, we find no evidence that women are subject to gender-specific socio-cultural preferences and expectations of employers that affect occupational standing. These findings do not support previous research, which has suggested that the careers of heavy women are hindered by employer attributions about cooperativeness, intelligence and competence.

Finally, our results suggest that the primary way that adolescent body mass affects careers is indirectly through differential educational investments among women. Females with elevated SRBMI obtained lower levels of education compared to their thinner peers, even after controlling for high school academic achievement and ability. While these negative effects on women's careers were partially offset by delayed family formation, early differentials in educational investment limited women's occupational advancement at each point in the career trajectory. This suggests that heavy women may be less encouraged to seek higher levels of education or may self-select out of post-secondary education due to psychosocial complications, such as depressive symptoms or poor self-esteem.

Conclusion

This research challenges previous studies that relied on cross-sectional or shorter-term longitudinal data and found direct effects of body mass on occupational attainment. By controlling for a variety of previously unexplored (or underexplored) confounders and mediators, including social background, family formation processes, and academic ability and achievement, this study isolated several pathways by which body mass may affect career standing over the life course. This study also included a baseline measure of body mass, lacking in some prior studies, and analyzed effects over the course of the career rather than being limited to 7 or 15 years following career entry.

While a long tradition of research has examined the impact of gender, family background and education on occupational attainment (DiPrete and Grusky 1990; Featherman and Hauser

1978; Warren et al. 2002), much less work has analyzed the influence of physical characteristics on occupational outcomes. We find that relative body mass does not have strong direct effects on the career trajectories of either women or men but does affect women's careers indirectly. Overweight women invest less in education compared to non-overweight women, and this negatively affects their career trajectories; delays in family formation only partially offset these negative impacts. We find limited adverse effects of body mass on men's occupational attainment, and these appear to operate independently of educational and family formation processes.

There are at least four limitations of our study that can be addressed by future research. First, ascriptive statuses such as race and ethnicity shape career outcomes in important ways (Browne et al. 2001; Browne and Kennelly 1999; Kaufman 2002; Moss and Tilly 2001; Reskin, McBrier and Kmec 1999) and also influence the likelihood of obesity (Denney et al. 2004; Flegel et al. 2002). Because members of the 1957 cohort of Wisconsin high school graduates are predominantly non-Hispanic white, the WLS does not allow for analyses of race and ethnicity – or the interactions between race/ethnicity and adolescent body mass – on career trajectories. Additional data sources, including subsequent panels of the NLSY and PSID, must be analyzed to determine whether body mass differentially affects the career trajectories of non-Hispanic whites, blacks, Latinos and Asians.

Second, while overweight individuals in the WLS did delay family formation, they did not differ in the probability of ever marrying. WLS respondents married early and tended to remain married irrespective of body mass. However, delayed marriage has a positive effect on occupational attainment for women. In more recent cohorts, in which a greater proportion of women are delaying or forgoing marriage, weight-based discrimination in the marriage market may be more salient, positively affecting career trajectories as predicted. Future analyses of nationally representative samples should examine whether marriage delays grant additional years to invest in career-related capital, thus potentially limiting the negative effects of obesity. Analysis of subsequent panels of the NLSY and PSID could extend our study by identifying the ways in which delayed marriage among obese individuals in recent cohorts affects career attainment.

Third, our estimates of the impact of SRBMI on occupational trajectories may be the lower bounds of the true effect. Because the WLS is comprised entirely of high school graduates, by definition we are not capturing the bottom of the educational and occupational distributions. Given observed negative effects of SRBMI on educational attainment after high school, body mass may also influence the probability of high school completion. If so, the total effects of SRBMI on occupational trajectories presented here are likely underestimates. Conversely, body mass and physical attractiveness may matter more to the success of women in higher status occupations than those at different points in the occupational hierarchy. Future research must also untangle the relationship between body mass and educational attainment in order to specify the mechanisms that lead overweight individuals – particularly girls and women – to invest less in education.

Finally, the WLS did not collect extensive health information until 1993. Thus, our study cannot complete a thorough investigation of the potential effects of health status on occupational attainment among overweight individuals. Previous research identifies strong linkages between body mass and health outcomes (Quesenberry et al. 1998; Thompson et al. 1998; Wolf and Colditz 1998), and between certain obesity-related health outcomes and work-related absenteeism (Burton et al. 1998; Narbro 1996; Thompson et al. 1998; Tucker and Freidman 1998, cited in Finkelstein et al. 2005). Incorporating health measures may specify whether disadvantages overweight workers face are primarily due to employer discrimination, health status or a combination of these. Such mechanisms are likely to be most important in the later stages of the career, when the incidence of chronic disease rises, and individuals begin to bear the burden of multiple accumulated co-morbid conditions.[5]

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[5]In separate analyses not shown we examine whether BMI measured in 1993 mediated the relationship between adolescent SRBMI and occupational attainment in 1993. We find only slight evidence for such mediation. Among women, those who were heavy both in adolescence and in 1993 had the worst occupational attainment in 1993, followed by women who were heavy in adolescence but were no longer heavy in 1993. Women who were thin at both waves had the highest occupational attainment, followed by women who were thin as adolescents but who had become heavy by 1993. This suggests that the influence of adolescent SRBMI is stronger than more contemporaneous measures of body mass, and that it is unlikely that the occupational differences observed in this analysis are driven by BMI-induced health selection, at least in the period of the work career covered here.

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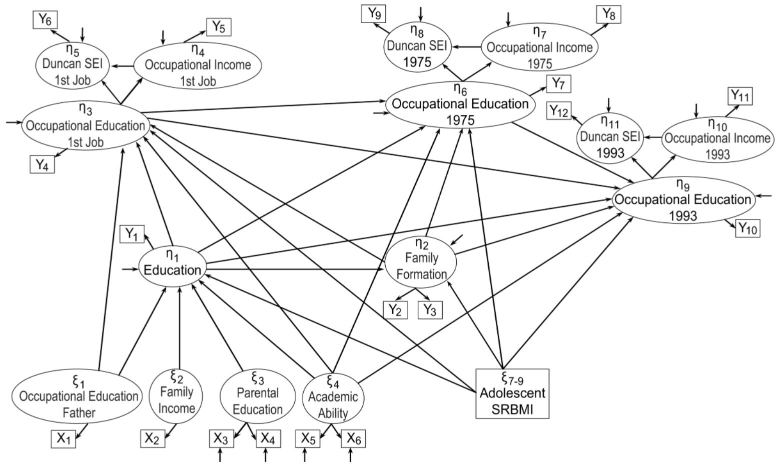

Figure 1. Path Diagram of Life Course Occupational Attainment

X_1 = Father's occupational education; X_2 = Average family income 1954–1956; X_3 = Mother's educational attainment; X_4 = Father's educational attainment; X_5 = Henmon-Nelson IQ; X_6 = High school class rank; $X_{7–9}$ = Adolescent relative body mass categories; Y_1 = Educational attainment; Y_2 = Age at first marriage; Y_3 = Age at first birth; Y_4 = Occupational education of first job; Y_5 = Occupational income of first job; Y_6 = Duncan SEI of first job; Y_7 = Occupational education of current/last job 1975; Y_8 = Occupational income of current/last job 1975; Y_9 = Duncan SEI of current/last job 1975; Y_{10} = Occupational education of current/last job 1993; Y_{11} = Occupational Income of current/last job 1993; Y_{12} = Duncan SEI of current/last job 1993.

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Table 1

Descriptive Statistics by Gender

	Men (N=1406)			Women (N=1621)		
	%	Mean	SD	%	Mean	SD
Occupational education first job		30.2	31.4		32.4	27.5
Occupational income first job		25.1	23.1		8.6	10.7
Duncan SEI first job		38.3	26.9		46.0	18.8
Occupational education current/ last job 1975		36.6	29.7		34.9	27.4
Occupational income current/ last job 1975		38.1	22.2		13.2	15.8
Duncan SEI current/ last job 1975		48.9	24.7		45.3	20.6
Occupational education current/ last job 1993		38.8	29.4		37.7	26.9
Occupational income current/ last job 1993		40.1	23.2		18.7	19.8
Duncan SEI current/ last job 1993		50.8	24.8		48.8	20.7
Adolescent Standardized Relative Body Mass		0	.8		0	.8
Underweight (SRBMI ≤ −1)	9.5			11.7		
Low Normal Weight (−1 < SRBMI < 0) (Referent)	43.8			38.9		
High Normal Weight (1 > SRBMI > 0)	33.4			36.7		
Overweight (SRBM ≥ 1)	13.4			12.8		
Father's education		9.7	3.4		9.6	3.3
Mother's education		10.4	2.9		10.2	2.9
Father's occupational education		19.2	20.7		20.9	22.1
Average family income 1957–1960 ($100s)		58.9	62.8		61.3	53.4
Henmon-Nelson IQ		100.2	15.1		100.2	14.6
High school class rank		42.8	27.5		57.0	28.3
Educational attainment		13.9	2.4		13.3	2.0
Age at first marriage		24.0	4.3		21.9	3.9
Age at first birth		25.6	4.3		23.1	3.7

Table 2a

Model of Occupational Attainment over the Life Course (Females)

			First Job		
Independent Variable	**Educational Attainment**	**Family Formation**	**Occupational Education**	**Occupational Income**	**Duncan SEI**
Father's occupational education	.02 (7.69)***		.08 (2.91)**		
Family income	.00 (4.17)***				
Parental education	−.02 (−1.50)				
Academic ability	.04 (12.65)***		.13 (3.71)***		
SRBMI underweight	.16 (.98)	−.25 (−.85)	−.34 (−.19)		
SRBMI high normal weight	−.32 (−3.14)**	−.11 (−.55)	.62 (.57)		
SRBMI overweight	−.31 (−2.13)*	1.18 (2.77)**	−1.32 (−.98)		
Educational attainment		.61 (7.85)***	10.06 (24.61)***		
Family formation			.74 (5.47)***		
First occupational education				.27 (23.67)***	.50 (34.87)***
First occupational income					.01 (.30)
1975 occupational education					
1975 occupational income					
1993 occupational education					
1993 occupational income					
R^2	.25	.09	.62	.47	.53

Notes: Numbers in parentheses at t-values.

†p < .10

* p < .05

** p < .01

*** p < .001 (two-tailed tests)

Table 2b

	Current/ Last Job 1975			Current/ Last Job 1993		
Independent Variable	**Occupational Education**	**Occupational Income**	**Duncan SEI**	**Occupational Education**	**Occupational Income**	**Duncan SEI**
Father's occupational education						
Family income						
Parental education						
Academic ability	.18 (4.30)***			.01 (.34)		
SRBMI underweight	3.41 (2.04)*			−2.79 (−1.50)		
SRBMI high normal weight	−1.43 (−1.16)			−2.46 (−2.03)*		
SRBMI overweight	−1.21 (−.98)			−1.92 (−.97)		
Educational attainment	3.08 (5.68)***			3.80 (6.85)***		
Family formation	.33 (2.05)*			.26 (1.79)†		
First occupational education	.46 (10.67)***			.08 (1.89)†		
First occupational income						
1975 occupational education		.35 (22.00)***	.53 (38.95)***	.38 (8.86)***		
1975 occupational income			.21 (8.33)***			
1993 occupational education					.44 (23.91)***	.50 (37.50)***
1993 occupational income						.26 (14.39)***
R^2	.55	.35	.63	.49	.35	.65

Table 3a

Model of Occupational Attainment over the Life Course (Males)

			First Job		
Independent Variable	**Educational Attainment**	**Family Formation**	**Occupational Education**	**Occupational Income**	**Duncan SEI**
Father's occupational education	.02 (6.15)***		−.06 (−1.86)†		
Family income	.00 (1.16)				
Parental education	.01 (.64)				
Academic ability	.07 (16.58)***		.03 (.70)		
SRBMI underweight	−.26 (−1.26)	.59 (1.33)	−5.18 (−2.91)**		
SRBMI high normal weight	.02 (.13)	.02 (.09)	−1.26 (−1.12)		
SRBMI overweight	−.04 (−.25)	.56 (1.39)	−1.12 (−.76)		
Educational attainment		.28 (5.21)***	11.38 (42.36)***		
Family formation			.10 (.72)		
First occupational education				.59 (33.34)***	.52 (51.56)***
First occupational income					.46 (32.02)***
1975 occupational education					
1975 occupational income					
1993 occupational education					
1993 occupational income					
R^2	.25	.03	.74	.60	.89

Notes: Numbers in parentheses att-values.

*p < .05

†p < .10

**p < .01

***p < .001 (two-tailed tests)

Table 3b

	Current/Last Job 1975			Current/Last Job 1993		
Independent Variable	Occupational Education	Occupational Income	Duncan SEI	Occupational Education	Occupational Income	Duncan SEI
Father's occupational education						
Family income						
Parental education						
Academic ability	.20 (4.81)***			.04 (1.05)		
SRBMI underweight	−.81 (−.44)			−1.22 (−.62)		
SRBMI high normal weight	−47 (−.40)			1.04 (.82)		
SRBMI overweight	−3.12 (−2.02)*			−1.10 (−.73)		
Educational attainment	2.68 (4.50)***			1.39 (2.53)*		
Family formation	−12 (−.92)			−.16 (−1.25)		
First occupational education	.52 (12.37)***			.17 (3.93)***		
First occupational income						
1975 occupational education		.53 (29.11)***	.50 (49.70)***	.51 (13.79)***		
1975 occupational income			46 (32.76)***			
1993 occupational education					54 (2771)***	49 (48.03)***
1993 occupational Income						47 (34.75)***
R^2	.64	.45	.88	.62	.43	.86

Table 4a

Model of Occupational Attainment over the Life Course (Females)

Independent Variable	Educational Attainment	Family Formation	First Job: Occupational Education	First Job: Occupational Income	First Job: Duncan SEI
Father's occupational education	.02 (7.69)***		.08 (2.88)**		
Family income	.00 (4.17)***				
Parental education	−.02 (−1.50)				
Academic ability	.04 (12.66)***		.13 (3.72)***		
SRBMI underweight	.17 (1.03)	**.05 (.21)**	**−2.45 (−1.93)**†		
SRBMI high normal weight	−.32 (−3.12)**	**−.06 (−.38)**	**−.29 (−.37)**		
SRBMI overweight	−.31 (−2.11)*	**.91 (3.10)****	**−1.24 (−1.24)**		
Educational attainment		.60 (7.88)***	10.06 (24.73)***		
Family formation			.74 (5.47)***		
First occupational education				.27 (23.66)***	.50 (34.87)***
First occupational income					.01 (.30)
1975 occupational education					
1975 occupational income					
1993 occupational education					
1993 occupational income					
R^2	.25	.09	.62	.47	.53

Notes: Numbers in parentheses at t-values.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$ (two-tailed tests)

Table 4b

Independent Variable	Current/ Last Job 1975 Occupational Education	Current/ Last Job 1975 Occupational Income	Current/ Last Job 1975 Duncan SEI	Current/ Last Job 1993 Occupational Education	Current/ Last Job 1993 Occupational Income	Current/ Last Job 1993 Duncan SEI
Father's occupational education						
Family income						
Parental education						
Academic ability	.18 (4.34)***			.01 (.34)		
SRBMI underweight	**1.44 (1.17)**			**−1.92 (−1.42)**		
SRBMI high normal weight	**−1.02 (−1.19)**			**−.72 (−.83)**		
SRBMI overweight	**−2.26 (−1.89)†**			**−1.44 (−1.17)**		
Educational attainment	3.11 (5.72)***			3.83 (6.91)***		
Family formation	.34 (2.10)*			.27 (1.85)†		
First occupational education	.46 (10.59)***			.08 (1.87)†		
First occupational income						
1975 occupational education		.35 (22.00)***	.53 (38.95)***	.38 (8.90)***		
1975 occupational income			.21 (8.33)***			
1993 occupational education					.44 (23.91)***	.50 (37.50)***
1993 occupational income						.26 (14.39)***
R^2	.55	.35	.63	.49	.35	.65

Table 5a

Model of Occupational Attainment over the Life Course (Males)

Independent Variable	Educational Attainment	Family Formation	First Job: Occupational Education	First Job: Occupational Income	First Job: Duncan SEI
Father's occupational education	.02 (6.15)***		−.06 (−1.85)***		
Family income	.00 (1.15)				
Parental education	.01 (.62)				
Academic ability	.07 (16.59)***		.02 (.63)		
SRBMI underweight	−.28 (−1.36)	**.05 (.21)**	**−2.45 (−1.93)** †		
SRBMI high normal weight	.01 (.10)	**−.06 (−.38)**	−.29 (−.37)		
SRBMI overweight	−.04 (−.26)	**.91 (3.10)** **	**−1.24 (−1.24)**		
Educational attainment		.28 (5.21)***	11.39 (42.40)***		
Family formation			.10 (.70)		
First occupational education				.59 (33.34)***	.52 (51.56)***
First occupational income					.46 (32.02)***
1975 occupational education					
1975 occupational income					
1993 occupational education					
1993 occupational income					
R^2	.25	.03	.73	.60	.89

Notes: Numbers in parentheses att-values.

p < .05*

† p < .10

** p < .01

*** p < .001 (two-tailed tests)

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Table 5b

	Current/Last Job 1975			Current/Last Job 1993		
Independent Variable	**Occupational Education**	**Occupational Income**	**Duncan SEI**	**Occupational Education**	**Occupational Income**	**Duncan SEI**
Father's occupational education						
Family income						
Parental education						
Academic ability	.20 (4.79)***			.05 (1.08)		
SRBMI underweight	**1.44 (1.17)**			**−1.92 (−1.42)**		
SRBMI high normal weight	**−1.02 (−1.19)**			**−.72 (−.83)**		
SRBMI overweight	**−2.26 (−1.89)** †			**−1.44 (−1.17)**		
Educational attainment	2.66 (4.48)***			1.41 (2.57)**		
Family formation	−.13 (−1.02)			−.16 (−1.26)		
First occupational education	.52 (12.48)***			.17 (3.90)***		
First occupational income						
1975 occupational education		.53 (29.11)***	.50 (49.70)***	.51 (13.86)***		
1975 occupational income			.46 (32.76)***			
1993 occupational education					.54 (27.71)***	.49 (48.03)***
1993 occupational income						.47 (34.75)***
1993 occupational education					.54 (27.71)***	.49 (48.03)***
1993 occupational income						.47 (34.75)***
R^2	.64	.45	.86	.62	.43	.86