Adding Biomeasures Relating to Fatness and Obesity to the PSID

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Paper outline
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1) Why fatness and obesity are of interest to PSID users

a. Important dimension of physical health: associated with increased morbidity and mortality.
b. Implications for mental health: depression, stigma.
c. Correlated with negative socioeconomic outcomes: lower levels of labor market success, lower SES for women.
d. Correlated with increased demand for: Social Security Disability Insurance, early Old-Age and Survivor Insurance benefits, health care services.
e. Stark differences by gender, race/ethnicity and income levels.
f. Rapid increase since at least 1980 makes it a major public health priority.

2) Concepts of fatness and obesity that may be useful to measure

a. Total mass (weight).
b. Total body fat.
c. Total lean mass.
d. Percent body fat.
e. Central adiposity (fatness around the organs), which is a better predictor of heart attack than BMI.
f. Body mass index – most commonly used in social science but widely regarded in the medical literature as an inferior measure of fatness because it does not distinguish fat from lean mass; other measures like central adiposity better predict health outcomes.
g. Leptin – hormone manufactured in fat cells that inhibits food intake. Absence of leptin or its receptor leads to uncontrolled food intake and obesity.
h. Resistin – hormone manufactured in fat cells that causes liver tissue to be less sensitive to action of insulin (causes Type II diabetes); elevated levels of resistin also associated with obesity.
i. Genetic predisposition to obesity – no single gene for obesity has been definitively identified, but a 2005 update on the obesity gene map reported that 22 genes have been associated with obesity in at least five studies.

3) Biomeasures that can be used to calculate one or more of those concepts

a. Self-reported weight (lbs) and height – collected by PSID in 1986, 1999-2007. Suffers from self-report bias which includes rounding and underreporting.
b. Measured weight and height. Can be converted into body mass index (weight in kilograms divided by height in meters squared).
c. Skinfold thickness. Can be used to calculate body fat because about half of the body's fat content is subcutaneous. Measurement at only one site is a poor predictor of body fat, so measurements are generally made at multiple sites:
    i. Triceps
    ii. Biceps
    iii. Subscapular (under the shoulder blade)
    iv. Suprailiac (between the hip joint and bottom of the rib cage).
d. Waist circumference - a measure of central adiposity.
e. Hip circumference – in conjunction with waist circumference it can be used to compute the waist-to-hip ratio, which is another measure of central adiposity.
f. Bioelectrical impedance analysis (BIA) – can be used to calculate percent body fat, total body fat, total lean mass.
g. Laboratory-based methods: dual-energy x-ray absorptiometry.
h. Genetic tests for presence of genes associated with obesity.
i. Serum tests for levels of leptin and resistin.

4. The value added of including each biomeasure above in the PSID

a. What could be learned that otherwise couldn't be:
    i. Which biomeasures have been found to be the best predictors of various health and socioeconomic outcomes? How are goodness of fit /percent predicted values improved by including new biomeasures?
    ii. Do different measures have different correlations with outcomes of interest? For example, when weight in kg is separated into total body fat and total lean mass, do we find that the two components have opposite effects on outcomes?
b. What regressions if any could be run only if certain measures were included in the PSID?

5. Synergies with the PSID structure of each biomeasure above and the comparative advantage of the PSID verses other social science datasets as the vehicle for its measure

a. The genealogical structure of the PSID means researchers can use one person's fatness/weight as an instrument for a biological relative's fatness/weight.

b. A biological relative's fatness/weight is a valid instrument for fatness/weight because evidence supports that it is powerful (a large percentage of variance in fatness/weight is genetic in origin) and valid (a very small (generally unable to be detected) percentage of variance in fatness/weight is due to shared household environment). This type of IV model can be used to measure the causal effect of weight on labor market outcomes (e.g. employment, wages, and work limitations) and social outcomes (e.g. marriage, divorce) in the PSID.
c. The genealogical structure of the PSID also allows the study of the role of grandparent and parental contributions to childhood obesity – see Davis, McGonagle, and Schoeni.
d. In conjunction with the CDS time diaries, fatness measures would allow one to study how childhood obesity in the PSID is related to the allocation of time, and how changes in time correlate with changes in weight.
e. The PSID includes a rich set of economic / labor market / program participation data not available in NHANES (the dataset that includes the richest set of measurements of fatness).

6. Ethical / legal concerns related to including each biomeasure above in the PSID

a. Minimal for most biomeasures related to fatness such as weight, skinfold thickness, waist circumference, BIA.
b. Genetic records would involve privacy issues.
c. For certain lab-based methods (full-body scan) there would be privacy issues.

7. Additional operational issues related to including each biomeasure above in the PSID

a. Mode and ease of collection.
b. Kinds of interaction (face-to-face?) collection requires.
c. Any special training for interviewers. The NHANES collects several biomeasures related to fatness/weight so can see how they train and instruct their data collectors. For example, NHANES uses a traveling mobile medical van with doctors and nurses to conduct a large number of examinations and lab tests.
d. Inter-reviewer reliability.
e. Refusal rates – check refusal rates in NHANES for weight, waist circumference, skinfold thickness, BIA.
f. Will asking people to be measured in this way increase attrition from the PSID? Respondents may refuse to provide blood samples because of needle phobia but unclear they would quit the entire survey.

8. Cost of including each biomeasure above in the PSID.

In particular, we will provide estimates of the cost for necessary equipment and any lab tests.

9. Potential synergies with biomeasures others in the group are considering

a. Genetics.
b. Metabolism.
c. Stress and physical health – obesity is an important domain of physical health.
d. Respiratory – obesity is a risk factor for asthma and sleep apnea.