

POVERTY, HUNGER, AND OBESITY

ARE THEY RELATED?

HOW?

CAN THIS INFORM CLINICAL CARE?

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Does Hunger Cause Obesity?

Both hunger and obesity occur with an increased frequency among poorer populations in the United States.¹⁻⁶ Because obesity connotes excessive energy intake, and hunger reflects an inadequate food supply, the increased prevalence of obesity and hunger in the same population seems paradoxical. Although a variety of environmental, social, behavioral, or physiologic mechanisms could cause both problems independently, an alternative possibility is that hunger and obesity are causally related. The following case report supports this hypothesis.

Dietz WH. *Pediatrics* 1995;95:766

Dietz: how could hunger cause obesity?

- most likely: the increased fat content of food eaten to prevent hunger at times when the family lacked the money to buy food, or
- obesity may represent an adaptive response to episodic food insufficiency

POVERTY, HUNGER, AND OBESITY

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3. What might explain such an association?
4. How does this fit into the big picture of the obesity epidemic, and can it help to guide our interventions?

A BRIEF HISTORY OF HUNGER IN AMERICA

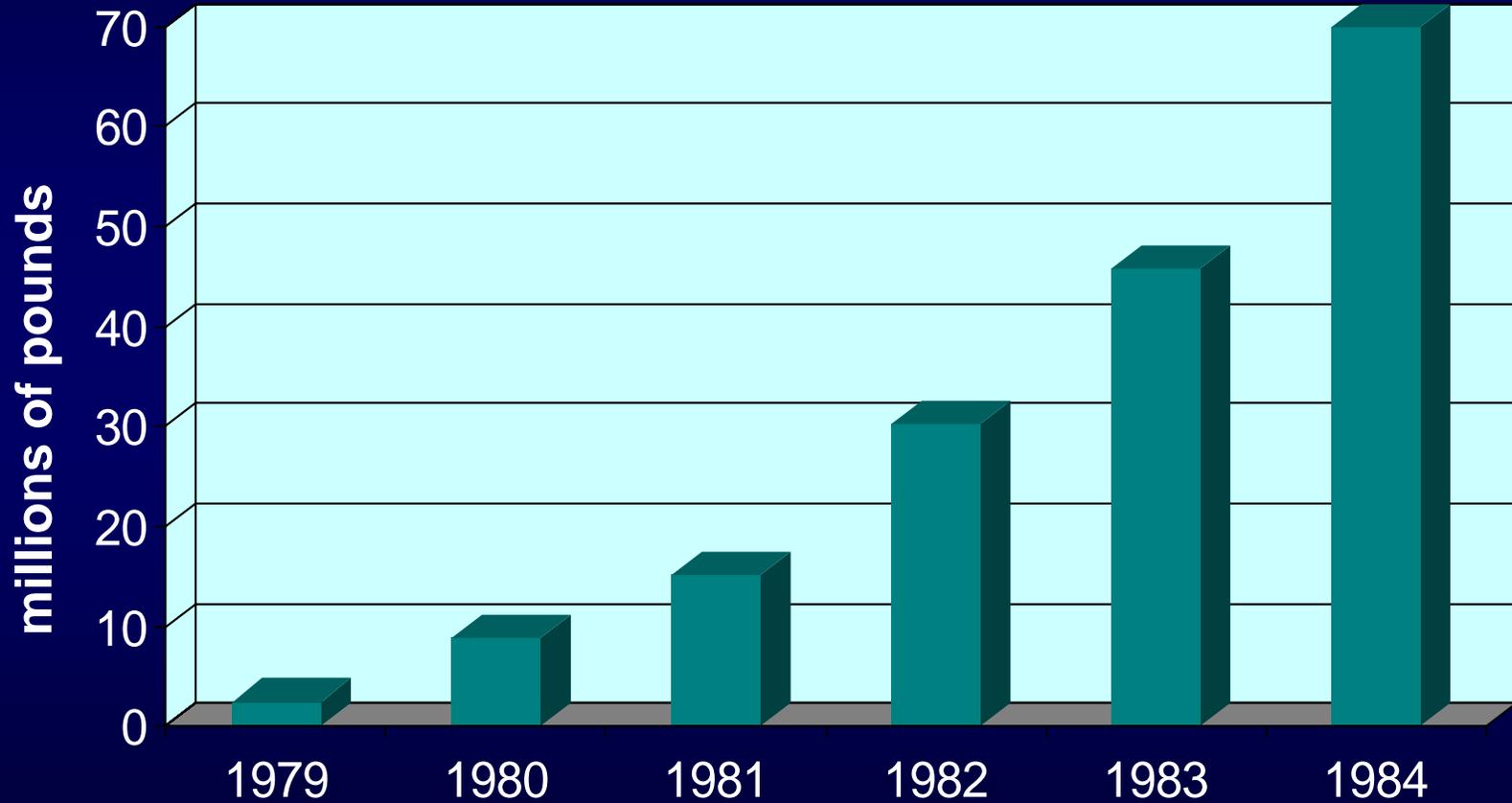
- **1930s:** USA resembles poor countries of today
- **1935:** Commodity Distribution Program begun
- **WWII:** many draftees rejected for malnutrition
National School Lunch Program begun
widespread food fortification begun
- **1960s:** Southern Christian Leadership Conference raises issue of hunger & malnutrition in the South
- **1968:** Citizens Board of Inquiry into Hunger and Malnutrition in the United States (Field Foundation) finds malnutrition widespread; CBS airs findings

- **1969:** White House Conference on Food, Nutrition, and Health, chaired by Jean Mayer. Results:
 - expansion of Food Stamp Program
 - School Breakfast Program, National School Lunch Program expanded
 - WIC created
 - Congregate Feeding Program for the Elderly, Meals on Wheels created
- **1978:** Field Foundation repeats 1968 survey, finds hunger and malnutrition “essentially eliminated”

THE REAGAN ERA: BOOM TIMES FOR HUNGER IN AMERICA

- **1981:** Reagan's OBRA reduces Food Stamps 13%, child nutrition programs 28%, AFDC 13%
- **1982-83:** demand for emergency food begins dramatic rise
- **1984:** Ed Meese tells press that people "go to soup kitchens because the food is free, and that's easier than paying for it"
- **1985:** Physician Task Force on Hunger in America, convened at HSPH, publishes report
- **1986:** Reagan's Task Force on Food Assistance concludes prevalence of hunger cannot be measured

FOOD DISTRIBUTED BY SECOND HARVEST NATIONAL FOOD BANK NETWORK, 1979-84



Physician Task Force on Hunger in America, 1985

“FOOD INSUFFICIENCY”

- question first introduced in the USDA’s 1977-78 *Nationwide Food Consumption Survey*
- “Which one of the following statements best describes the food eaten in your household?”
 - enough of the kinds of food we want to eat
 - enough but not always the kinds of food we want to eat
 - sometimes not enough to eat
 - often not enough to eat?

“FOOD INSUFFICIENCY”

NHANES III (1988-94)

- “An inadequate amount of food intake due to a lack of money or resources.”
- Which one of the following statements best describes the food eaten by (you/your family)?
 - do you have enough food to eat
 - sometimes not enough to eat, or
 - often not enough to eat?

- **1983-85**: Community Childhood Hunger Identification Project (CCHIP) develops survey instrument, an eight-item questionnaire; five or more responses classified as “child hunger”; conducts validation study in New Haven, CT
- **1990**: The *National Nutrition Monitoring and Related Research Act* mandates creation of standardized food security and hunger measures
- **1990**: AIN/LSRO/FASEB expert panel derives consensus conceptual definitions of *food security*, *food insecurity* and *hunger*

Food Security

Access to enough food for a healthy life, including:

- ready availability of nutritionally adequate safe foods
- assured ability to acquire acceptable foods in socially acceptable ways (e.g., not from emergency food supplies, scavenging, stealing, or other coping strategies).

Food Insecurity

Limited or uncertain availability of nutritionally adequate and safe foods or limited ability to acquire acceptable foods in socially acceptable ways.

Hunger

The uneasy or painful sensation caused by a lack of food. The recurrent and involuntary lack of access to food.

Hunger may produce malnutrition over time Hunger . . . is a potential, although not necessary, consequence of food insecurity.

1994: National Center for Health Statistics and U.S. Department of Agriculture convene *Conference on Food Security Measurement and Research* - instrument is developed

1995: U.S. Bureau of the Census administers USDA instrument to 45,000 households as part of its regular Current Population Survey

SHORT FORM OF THE 12-MONTH FOOD SECURITY SCALE - QUESTIONNAIRE

1. "The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more." Was that often, sometimes, or never true for (you/your household) in the last 12 months?
2. "(I/we) couldn't afford to eat balanced meals." Was that often, sometimes, or never true for you/your household) in the last 12 months? Was that often, sometimes, or never true for (you/your household) in the last 12 months?
3. In the last 12 months, since (date 12 months ago) did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?
4. How often did this happen---almost every month, some months but not every month, or in only 1 or 2 months?
5. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?
6. In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?

OPERATIONAL DEFINITIONS OF FOOD SECURITY AND HUNGER

- **Food Secure**

Household shows no or minimal signs of food insecurity

- **Food Insecure Without Hunger**

Food insecurity is evident in household adults' concerns and in adjustments to household food management, including reduced quality of diets. Little or no reduction in household members' food intake is reported.

- **Food Insecure with Moderate Hunger**

Food intake for adults (not children) in the household has been reduced to an extent that adults have *repeatedly* experienced the physical sensation of hunger.

- **Food Insecure with Severe Hunger**

Households with children have reduced the children's food intake to an extent that it implies that the children have experienced the physical sensation of hunger. Adults in households with and without children have repeatedly experienced more extensive reductions in food intake at this stage.

<http://www.ers.usda.gov/publications/fanrr42>

United States
Department of
Agriculture



Economic
Research
Service

Food Assistance
and Nutrition
Research Report
Number 42



Measuring Food Security in the United States

Household Food Security in the United States, 2003

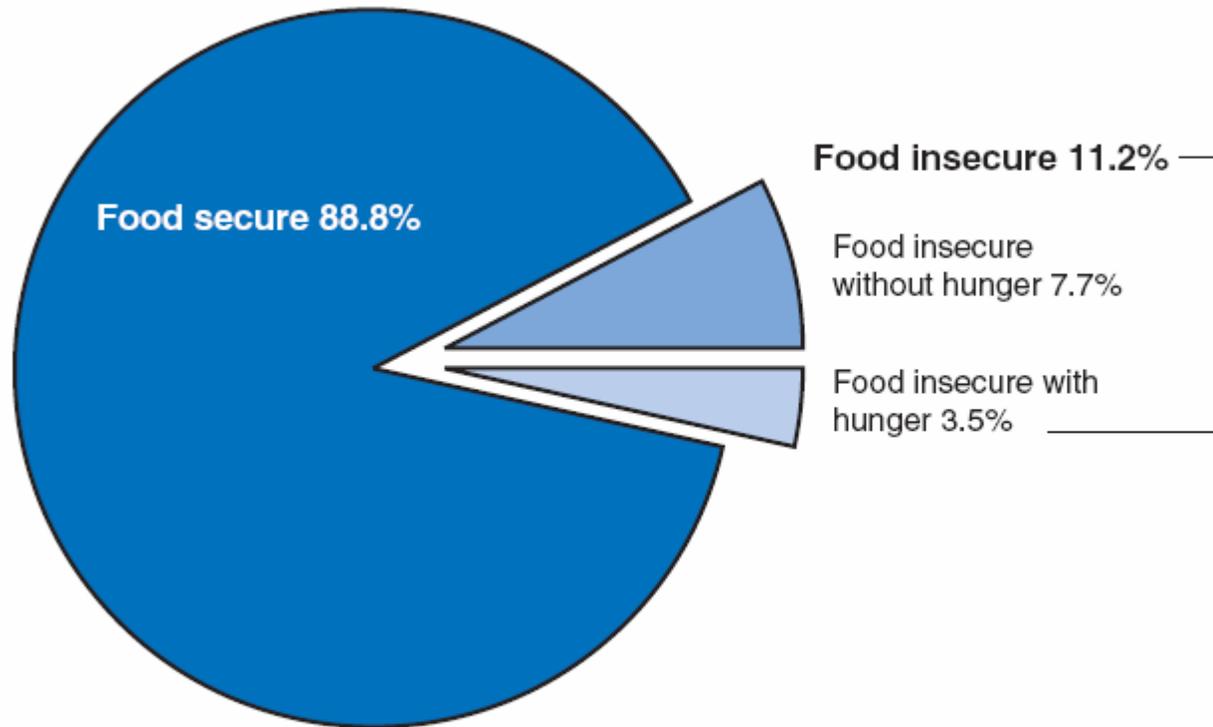
Mark Nord
Margaret Andrews
Steven Carlson



*Food Assistance & Nutrition
Research Program*

Figure 1

U.S. households by food security status, 2003



Source: Calculated by ERS using data from the December 2003 Current Population Survey Food Security Supplement.

FOOD INSECURITY AMONG SELECTED POPULATIONS, 2003

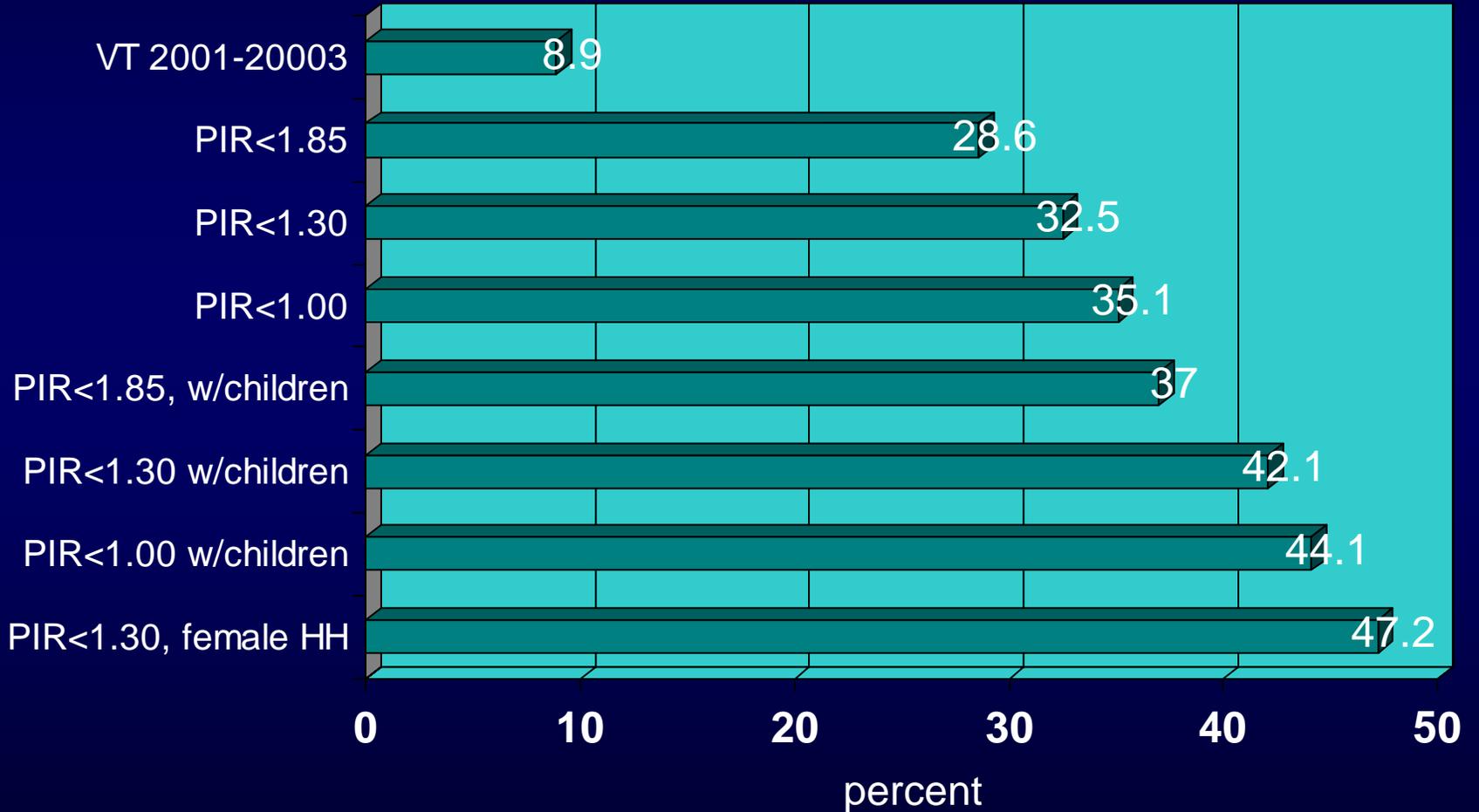
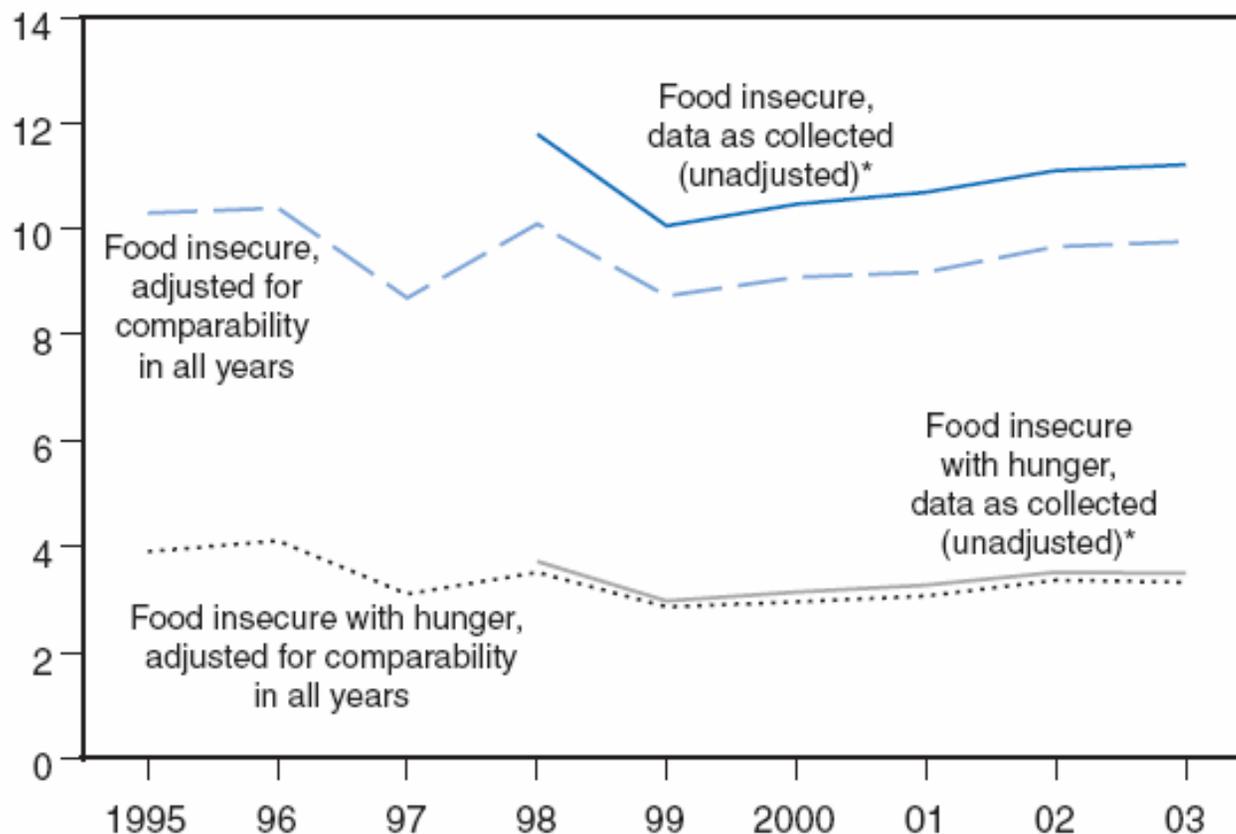


Figure 2

Trends in prevalence of food insecurity and food insecurity with hunger in U.S. households, 1995-2003

Percent of households



*Data as collected in 1995-97 are not directly comparable with data collected in 1998-2003.

Source: Calculated by ERS based on Current Population Survey Food Security Supplement data.

POTENTIAL HEALTH-RELATED OUTCOMES OF FOOD INSECURITY

- Micronutrient deficiencies (iron)
- Growth retardation (FTT)
- Cognitive impairment
- Behavioral dysfunction
- Learning disabilities
- Increased morbidity
- Impaired education attainment
- Overweight and obesity(?)

FOOD INSECURITY



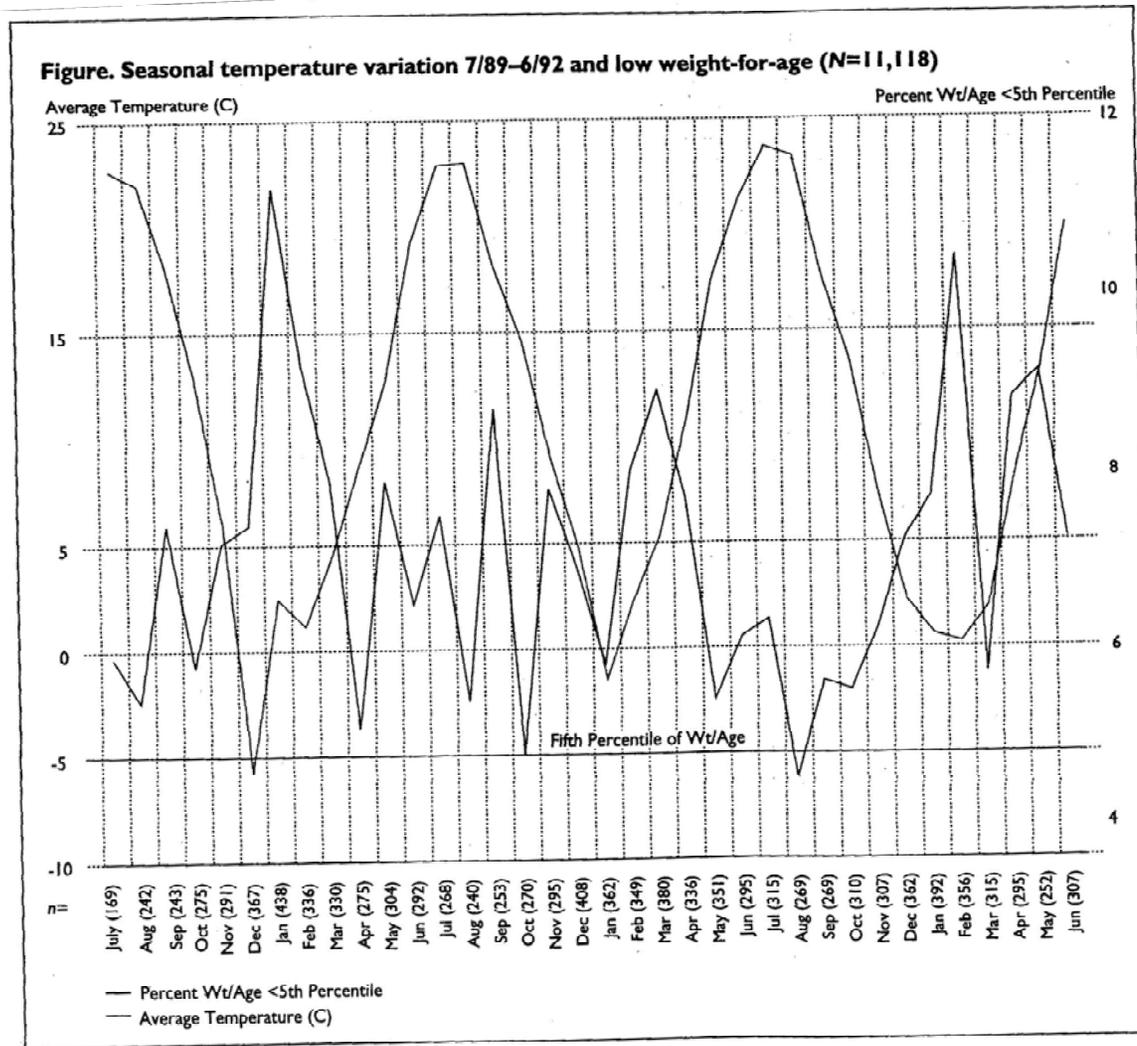
DIETARY INSUFFICIENCY



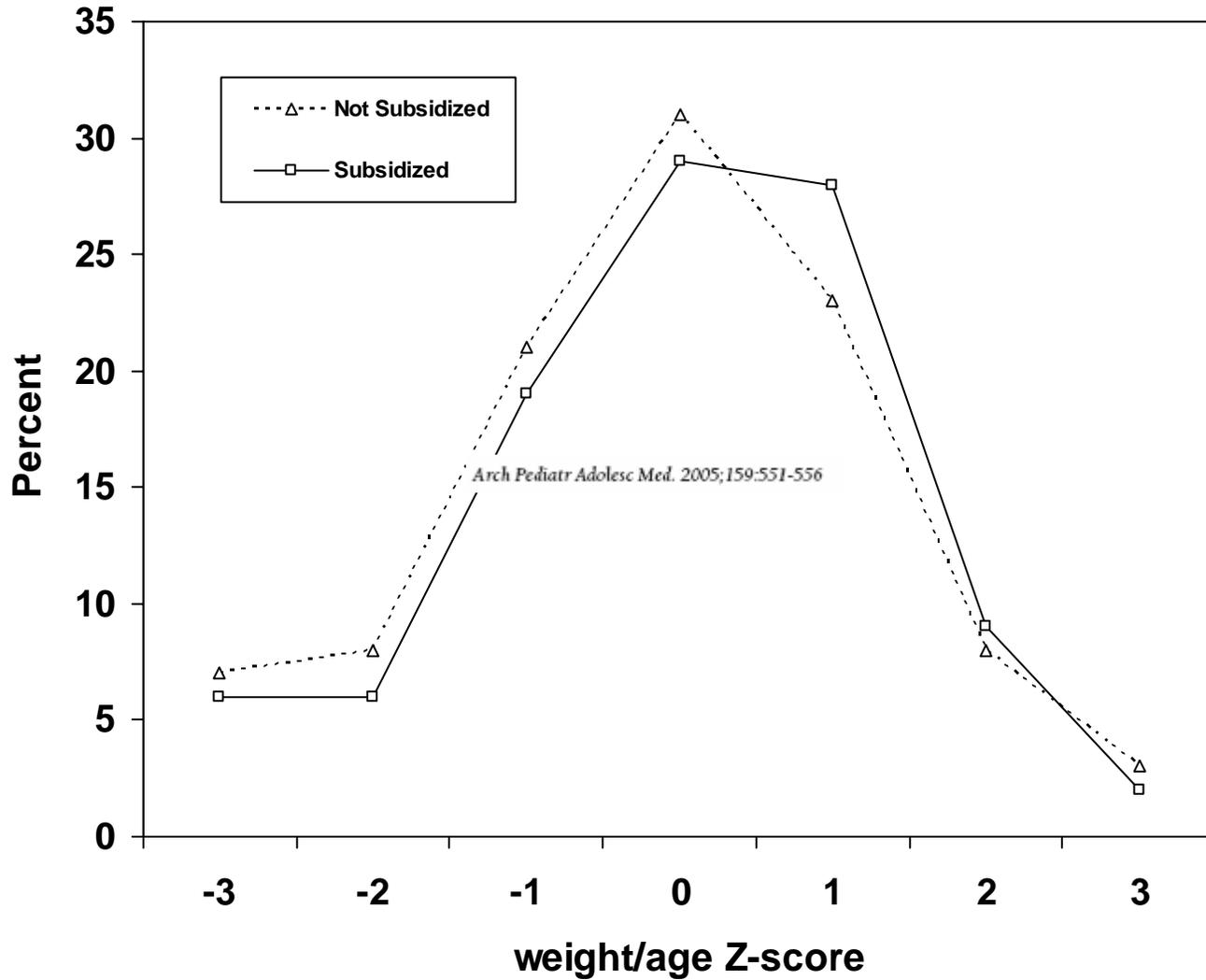
UNDERNUTRITION

THE "HEAT OR EAT" PHENOMENON

data from the Children's Sentinel Nutrition Assessment Program (C-SNAP)



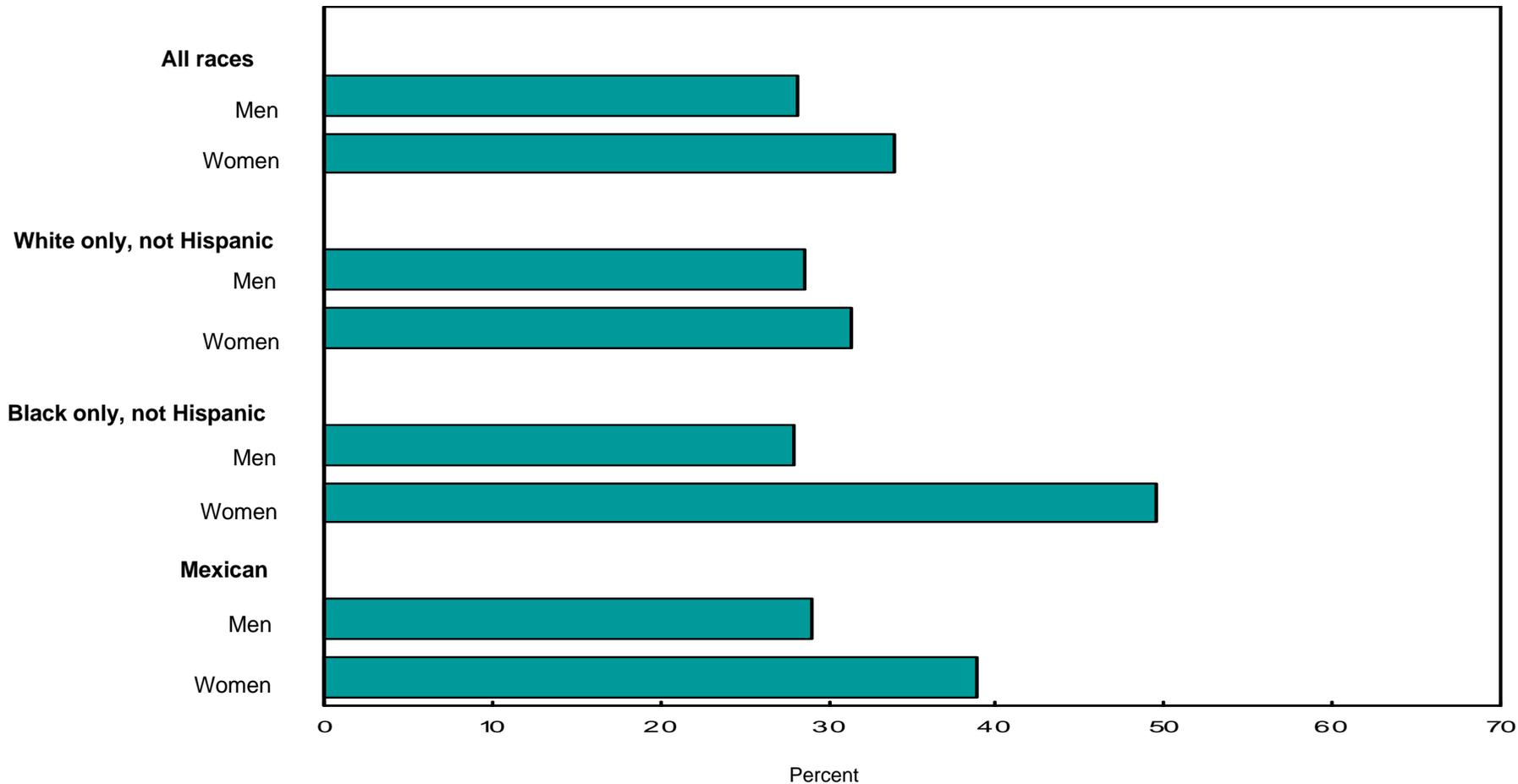
**Unadjusted weight-for-age z-score by housing subsidy status,
food-insecure families (N = 3217)**



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Figure 17. Obesity among adults 20-74 years of age by sex, race, and Hispanic origin: United States, 1999-2002



NOTES: Percents are age-adjusted. Obese is defined as a body mass index (BMI) greater than or equal to 30. Persons of Mexican origin may be of any race. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.

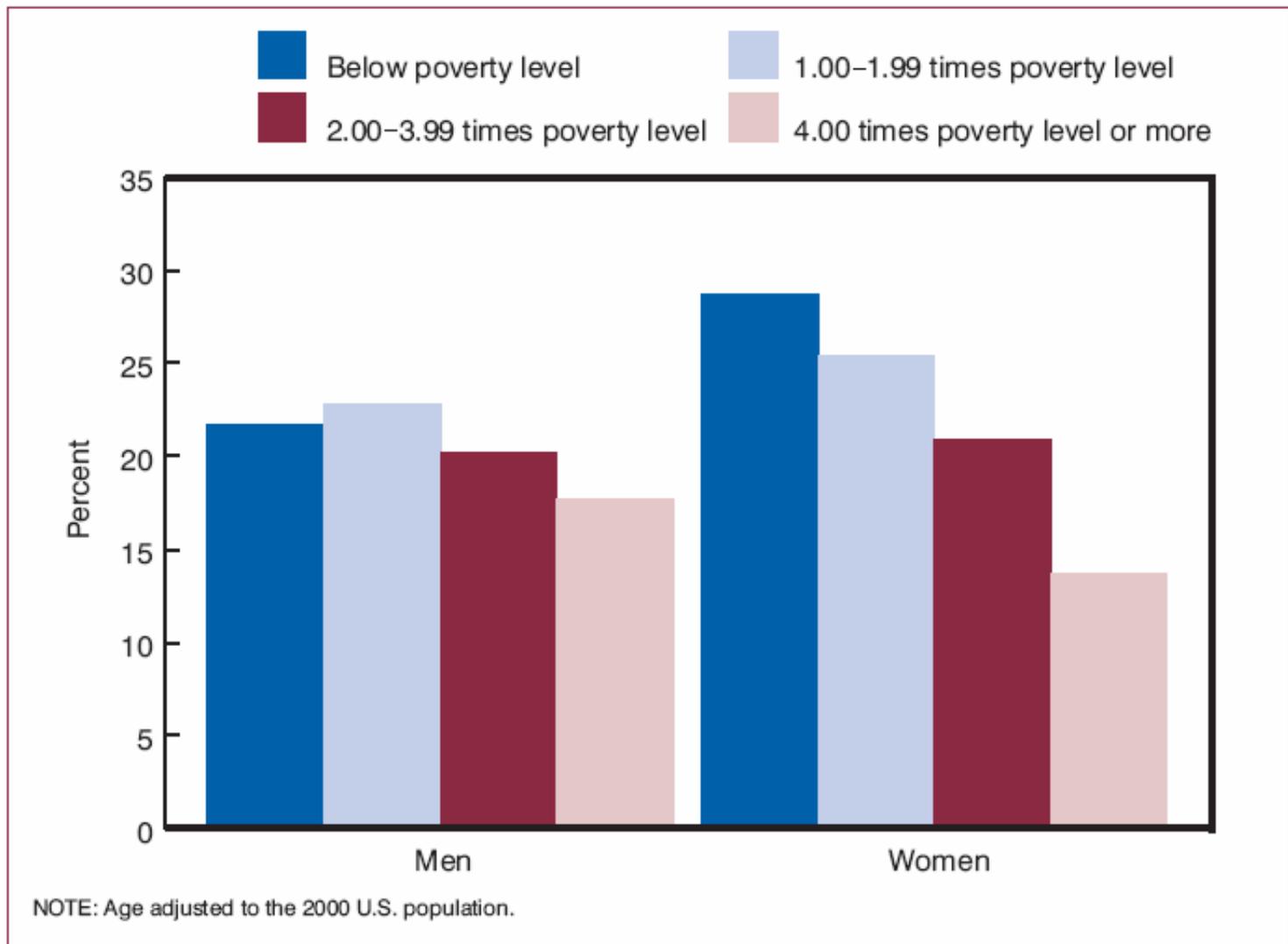
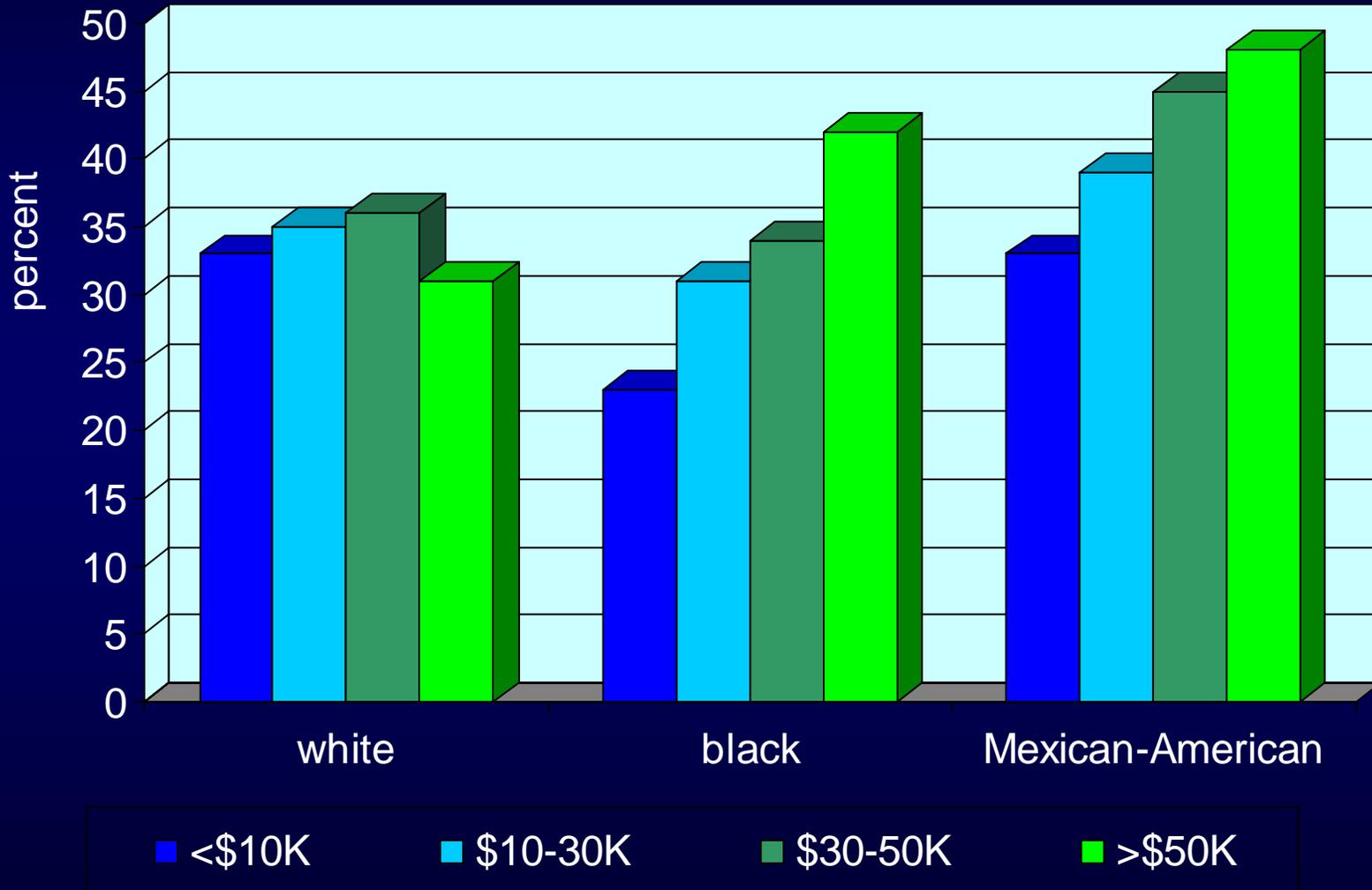


Figure 5. Percent of adults who were obese, by sex and poverty status: United States, 1997-98

PREVALENCE OF OVERWEIGHT, U.S. ADULT MALES BY RACE AND FAMILY INCOME

data from NHANES III phase 1 (1988-91)



**PREVALENCE OF OVERWEIGHT, U.S. ADULT FEMALES
BY RACE AND FAMILY INCOME**
data from NHANES III

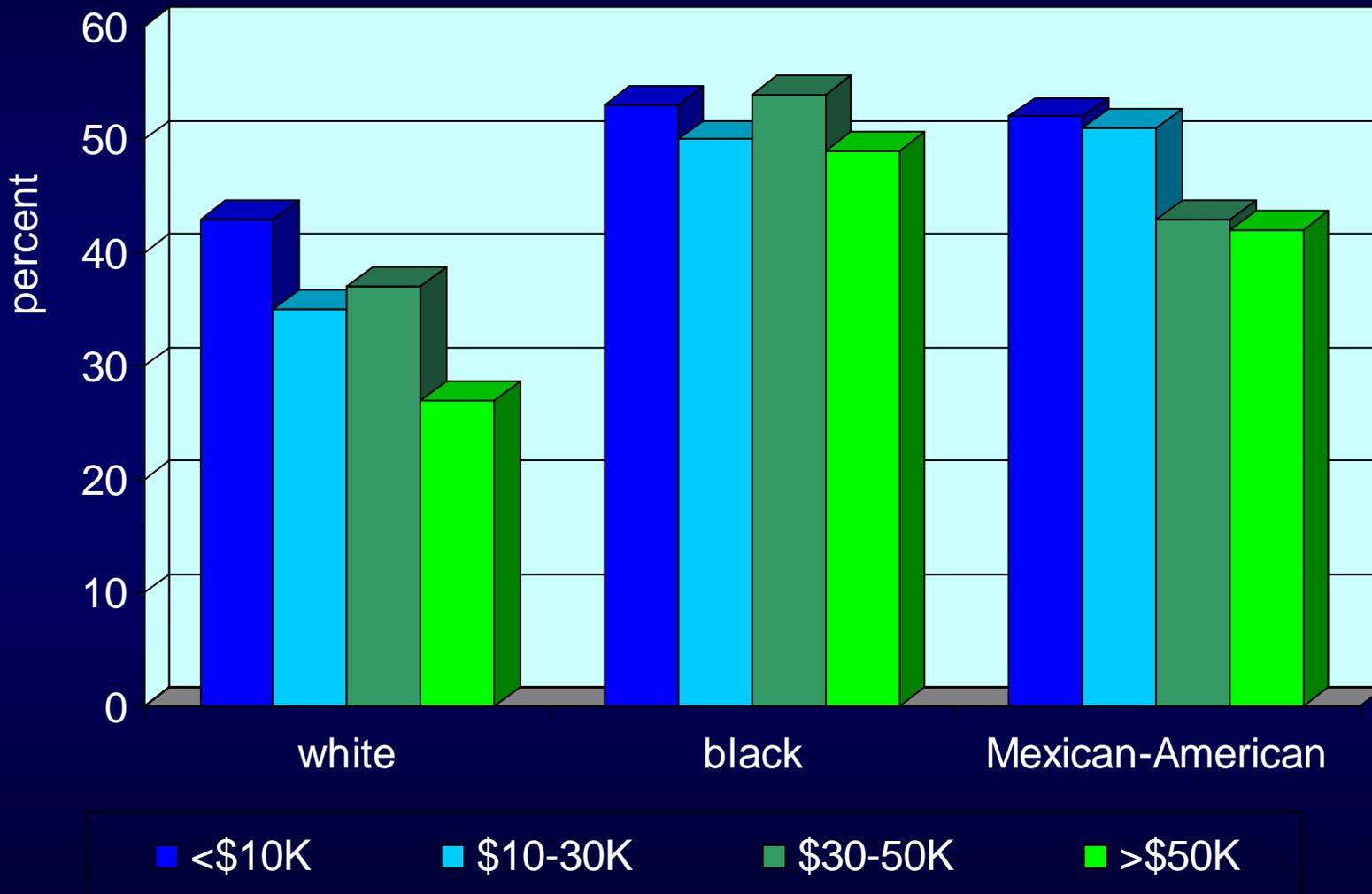
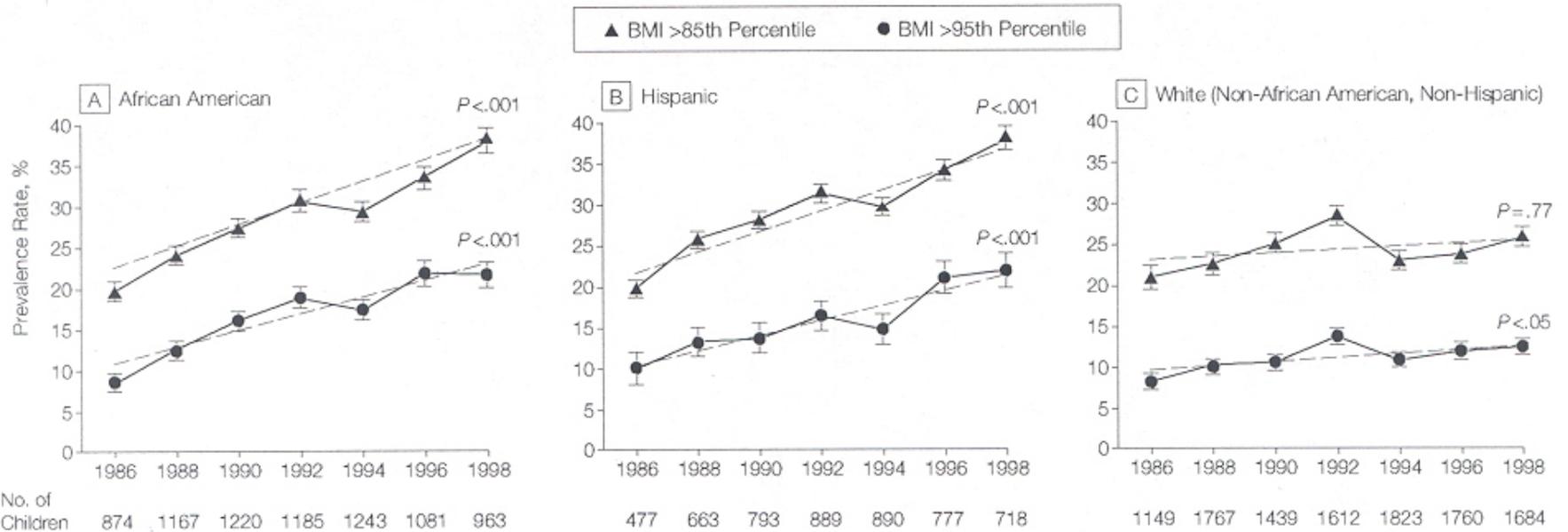


Figure. Prevalence Rates of BMIs Greater Than the 95th Percentile and 85th Percentile, National Longitudinal Survey of Youth, 1986-1998, Weighted Sample



In each graph, the dashed line and significance value represents linearized trends for each subgroup after adjusting for child's age. By 1998, prevalence rates of overweight among African Americans, Hispanics, and whites were 21.5%, 21.8%, and 12.3%, respectively. By 1998, prevalence rates for children with body mass indexes (BMIs) greater than the 85th percentile among African Americans, Hispanics, and whites were 38.4%, 37.9%, and 25.8%, respectively. Error bars indicate SEs.

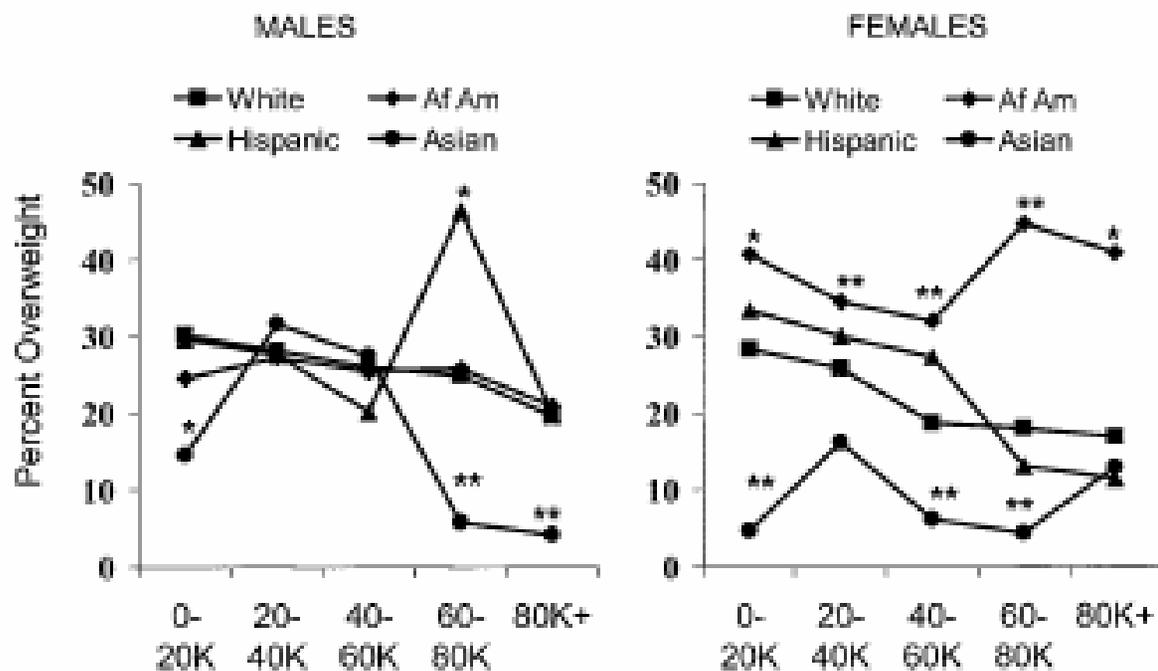


Figure 2: Overweight prevalence by category of family income. *White vs. given ethnic group, $p < 0.05$. **White vs. given ethnic group, $p < 0.01$. The x axes of both panels indicate parental income ranges. Af Am, African American.

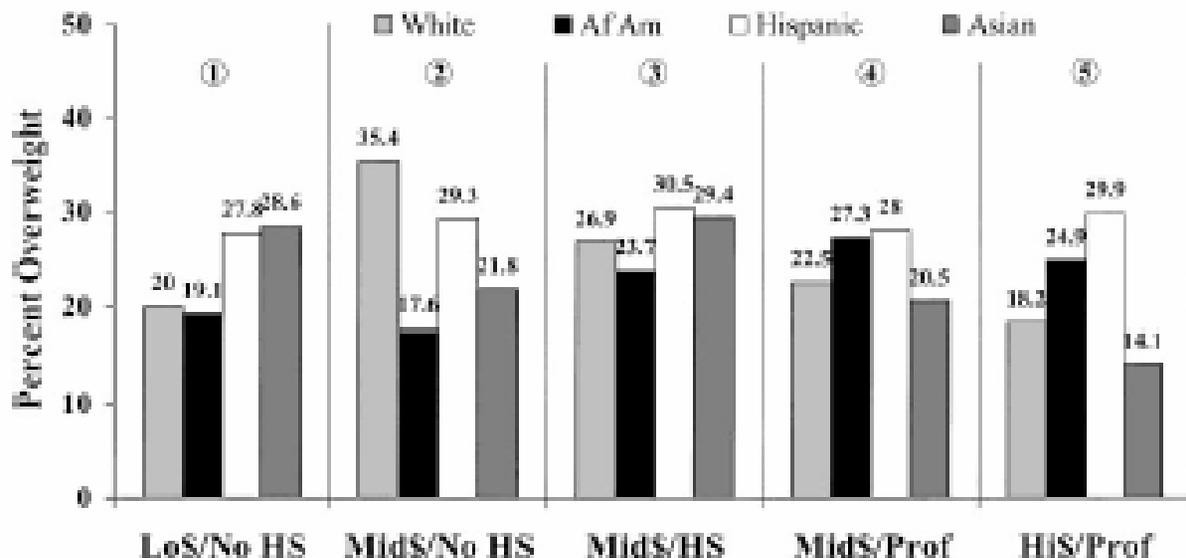


Figure 4: Predicted overweight prevalence among males by ethnicity and categories of family income and parental education. Low income (Lo\$): \$10,000 in continuous models; \$0 to \$20,000 in categorical models. Middle income (Mid\$): \$50,000 in continuous models; \$40,000 to \$60,000 in categorical models. High income (Hi\$): \$100,000 in continuous models; \$80,000+ in categorical models. No HS, no high school; HS, high school (or GED) diploma; Prof, college or professional degree; Af Am, African American.

Ethnicity, SES, and Overweight, Gordon-Larsen, Adair, and Popkin

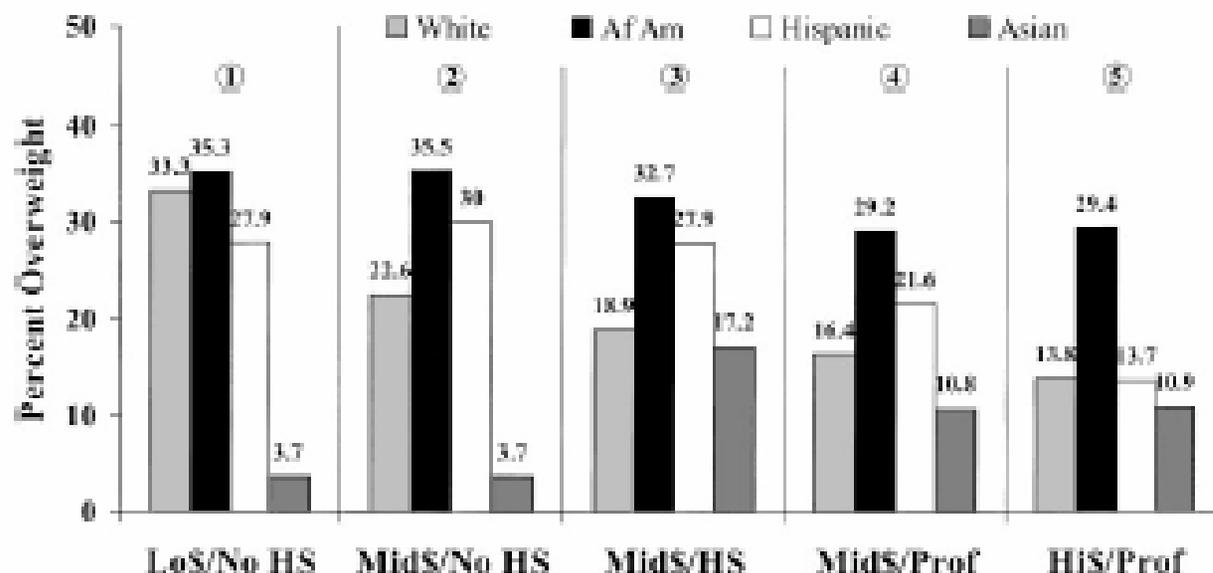


Figure 5: Predicted overweight prevalence among females by ethnicity and categories of family income and parental education. Low income (Lo\$): \$10,000 in continuous models; \$0 to \$20,000 in categorical models. Middle income (Mid\$): \$50,000 in continuous models; \$40,000 to \$60,000 in categorical models. High income (Hi\$): \$100,000 in continuous models; \$80,000+ in categorical models. No HS, no high school; HS, high school (or GED) diploma; Prof, college or professional degree; Af Am, African American.

SO, IS FOOD INSECURITY ASSOCIATED WITH OBESITY?

- **Olson 1999** random survey, women 20-39y, rural upstate NY: more obese in food insecure HH (37% v 26%)
- **Townsend 2001** 1994-96 CSFII: food insecure women (not men) 30% more likely to be overweight (AOR 1.3)
- **Casey 2001** 1994-96 CSFII: no difference in overweight rates between food-sufficient and food-insufficient low-income children
- **Alaimo 2001** NHANES III (1988-94): food insufficient 2-7 yr girls 1.6 times less likely to be overweight than food sufficient; 8-16 yr old white girls 3.5 times more likely to be overweight if food insufficient
- **Basiotis 2002** NHANES III (1988-94): among women 19-55y, more overweight in food insufficient HH (58% v 47%)
- **MMWR 2003** Washington State BRFSS 1995-99: food insecure individuals 30% more likely to be overweight (AOR 1.3)
- **Jones 2003** 1997 Panel Study of Income Dynamics: low-income food-insecure children less likely to be overweight than food secure; among food-insecure girls, participation in Food Stamps and school meals associated with 68% reduced odds of at-risk for overweight

- **Vozoris 2003** 1996-97 National Population Health Survey (Canada): men in food insufficient HH more likely to be underweight; no significant association of food insufficiency with overweight
- **Kaiser 2003** convenience sample of 211 CA Mexican-American preschoolers: more overweight among food insecure than food secure (48% v 41%), but NS
- **Adams 2003** 1998-99 CA Women's Health Survey: obesity more prevalent in food insecure than food secure women (31% v 16%); food insecurity without hunger associated with increased OR 1.36 for obesity in whites and 1.47 in others; food insecurity with hunger associated with increased obesity risk OR 2.81 for Asians, blacks, Latinos, but not whites
- **Laraia 2003** 1999 BRFSS NY, LA: concern about enough food associated with morbid obesity (RR 2.20-2.23) but NS after controlling for multiple potential confounders
- **Kaiser 2004** 2001 survey of low-income Latino HH in CA: food insecurity with hunger associated with twofold increased risk of obesity (AOR 1.98); food insecurity without hunger NS

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ENGELS' PHENOMENON

The habitual food of the individual working-man naturally varies according to his wages. The better-paid workers... have good food as long as this state of things lasts; meat daily and bacon and cheese for supper. Where wages are less, meat is used only two or three times a week, and the proportion of bread and potatoes increases. Descending gradually, we find the animal food reduced to a small piece of bacon cut up with the potatoes; lower still, even this disappears... until on the lowest round of the ladder, among the Irish, potatoes form the sole food. ...And, if the week's wages are used up before the end of the week, it often enough happens that in the closing days the family gets only as much food, if any, as is barely sufficient to keep off starvation. Of course such a way of living unavoidably engenders a multitude of diseases, and ...when the father is utterly disabled, then misery reaches its height, and then the brutality with which society abandons its members, just when their need is greatest, comes out fully into the light of day.

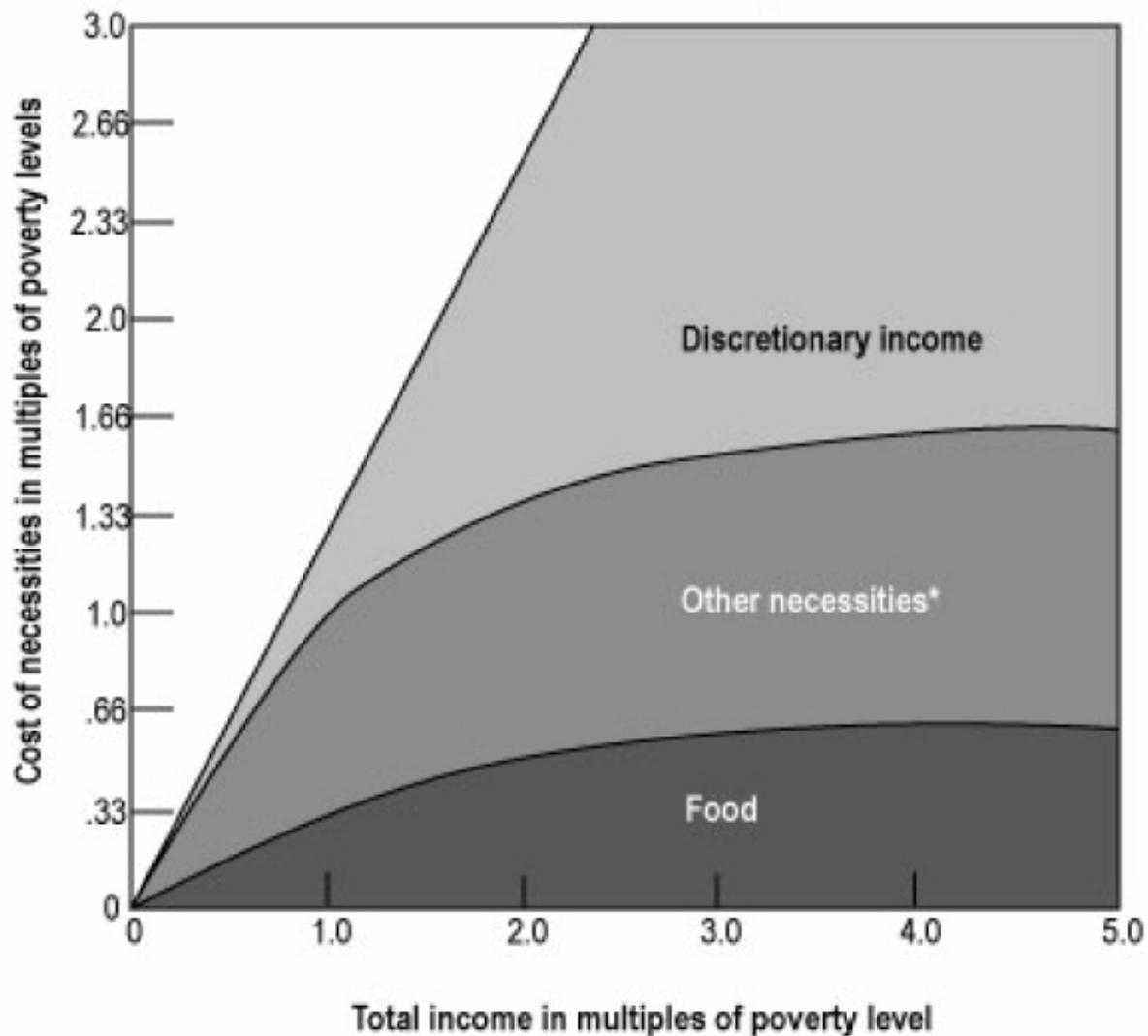
Friedrich Engels, *The Condition of the Working Class in England* (1845)

ENGEL'S LAW

German statistician Ernst Engel, 1857

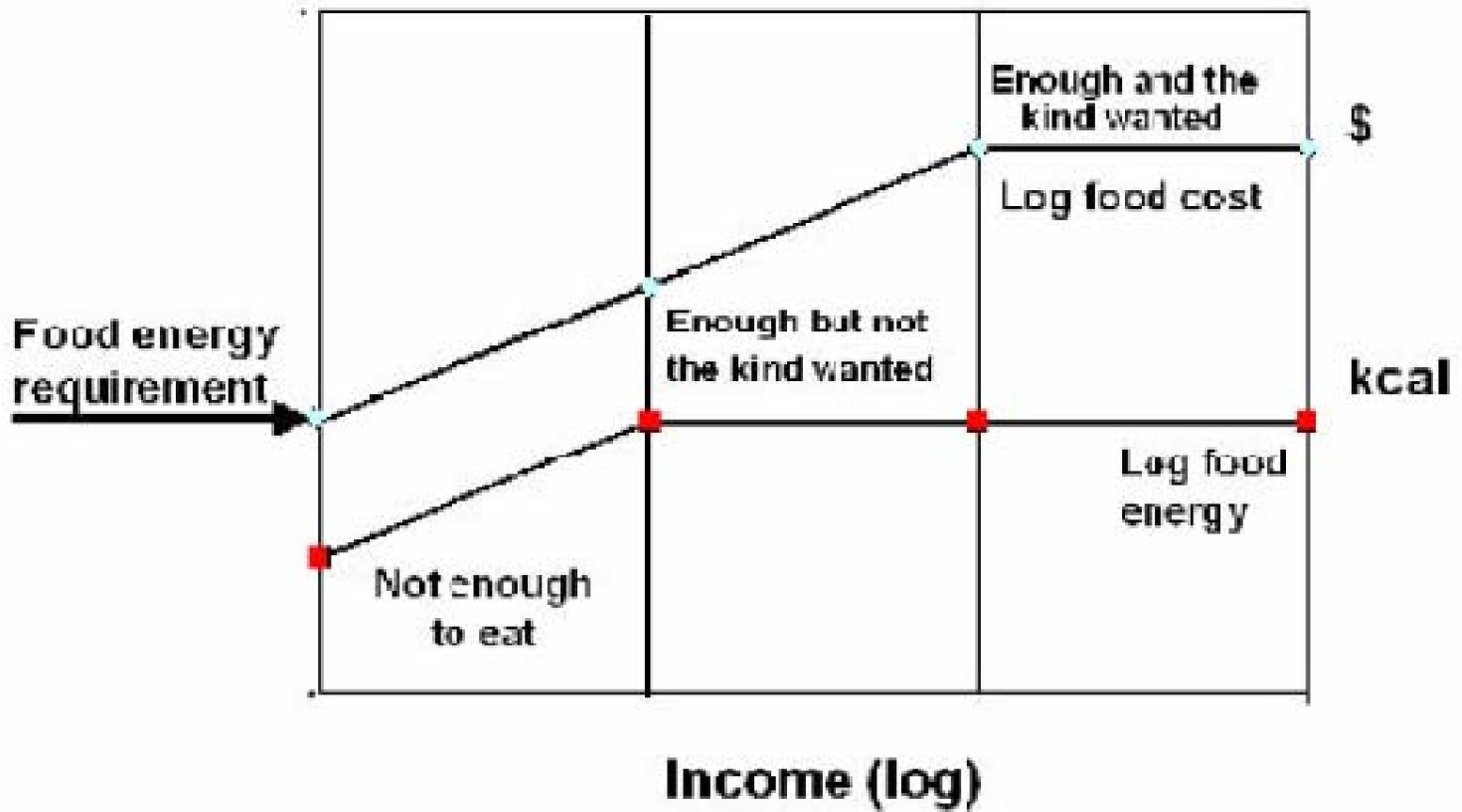
With a given set of tastes and preferences, as income rises, the *proportion* of income spent on food falls, even if *actual* expenditure on food rises.

Harvard economist Hendrik Houthakker: "Of all the empirical regularities observed in economic data, Engel's Law is probably the best established."



* Housing, transport, clothing, day-care and educational expences needed to work.

THE FOOD INSUFFICIENCY CURVE



Source: Basiotis, 1992.

POVERTY, FOOD INSECURITY, AND OBESITY: THE HYPOTHESIZED LINK

The observed links between poverty and obesity are primarily accounted for by purely economic variables.

Limited economic resources shift dietary choices toward an energy-dense, highly palatable diet that provides maximum calories per the least volume and the least cost.

Energy-dense foods, which may in turn promote overconsumption, have low energy cost due in large part to added sugar and fat.

Drewnowski A, Specter SE. *Am J Clin Nutr* 2004;79:6

Drewnowski A, Darmon N. *Am J Clin Nutr* 2005;82(suppl):265S

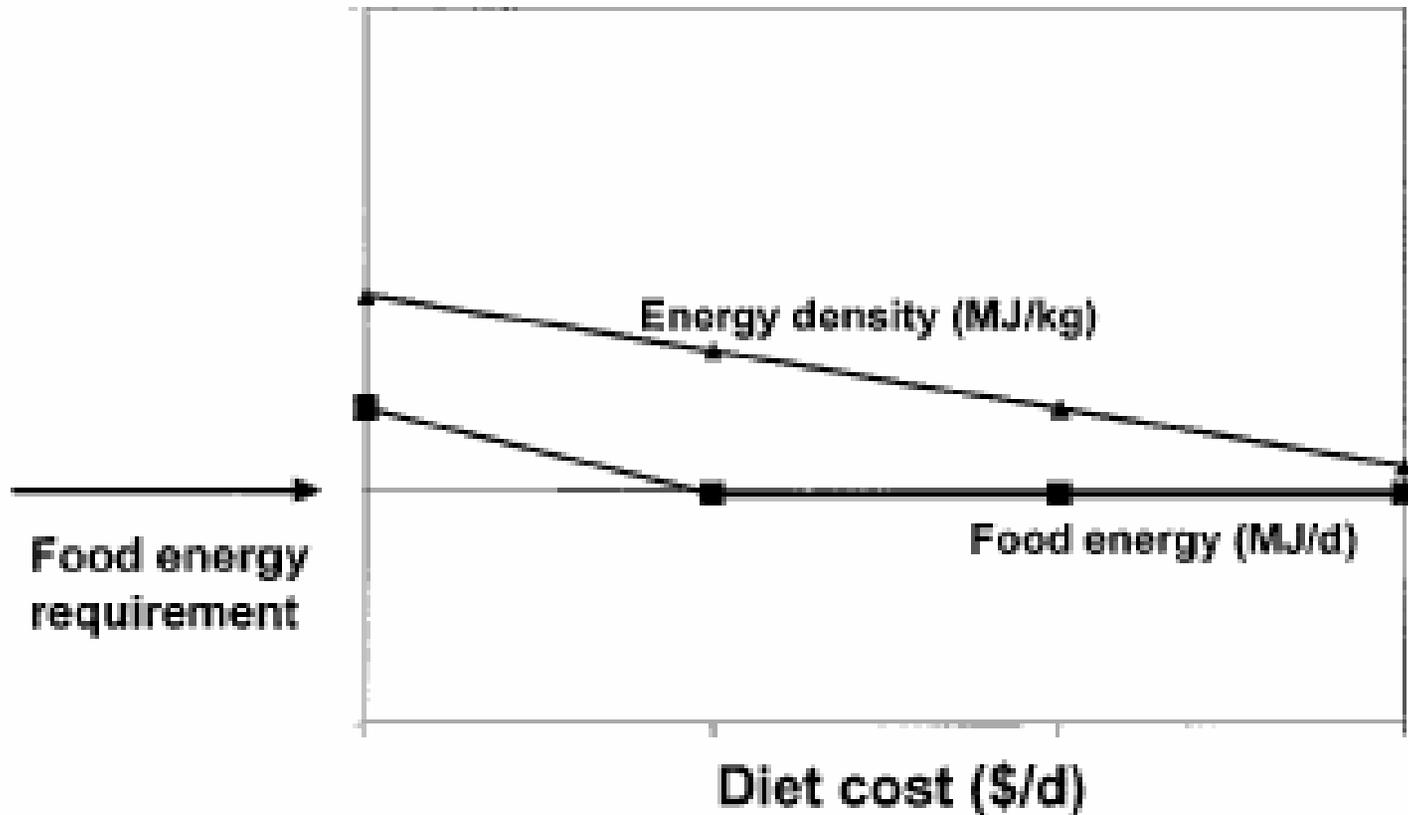
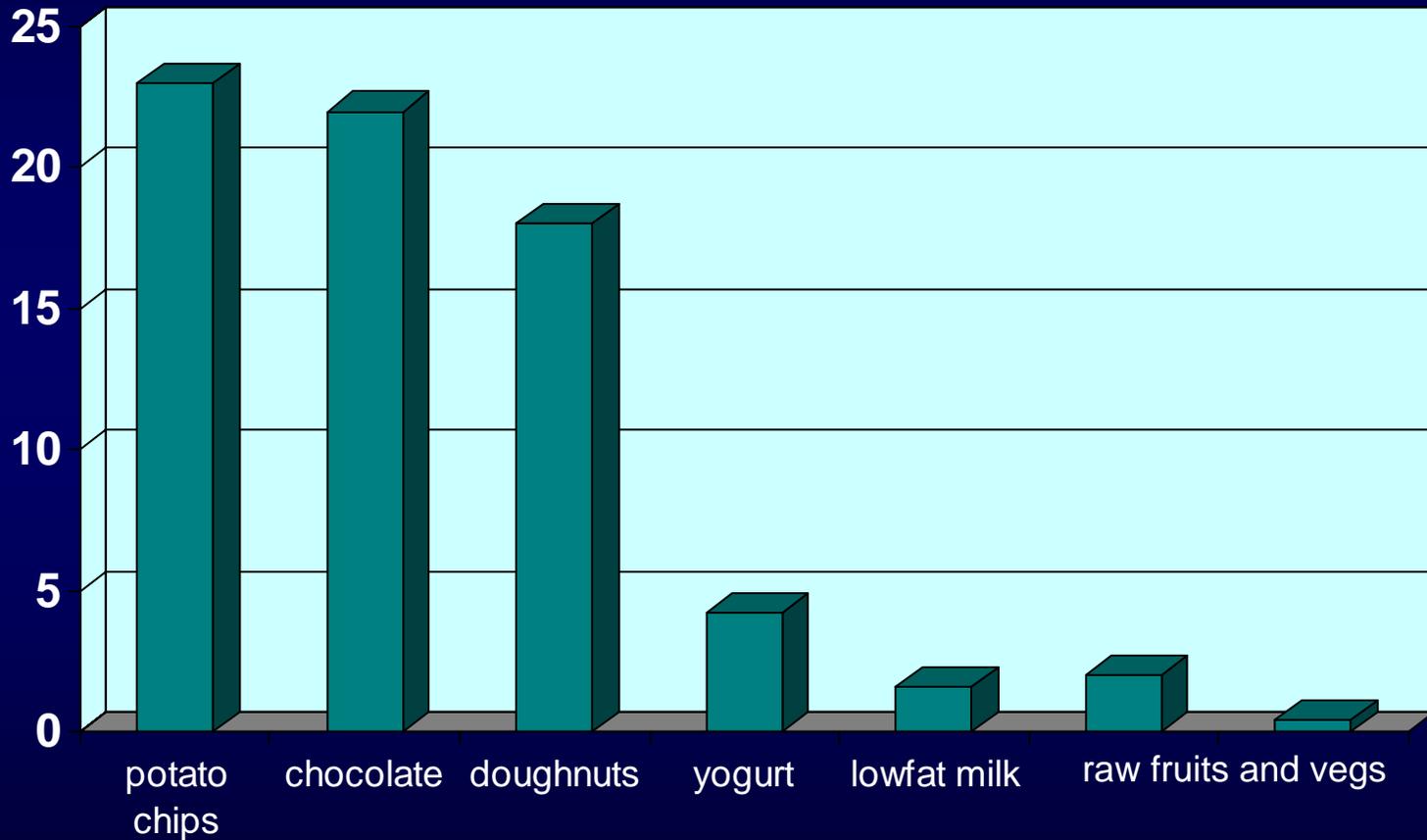


FIGURE 3. Energy density–cost curve showing the relation between diet costs, dietary energy density, and energy intakes.

ENERGY DENSITY OF SELECTED FOODS

energy density (kJ/g)



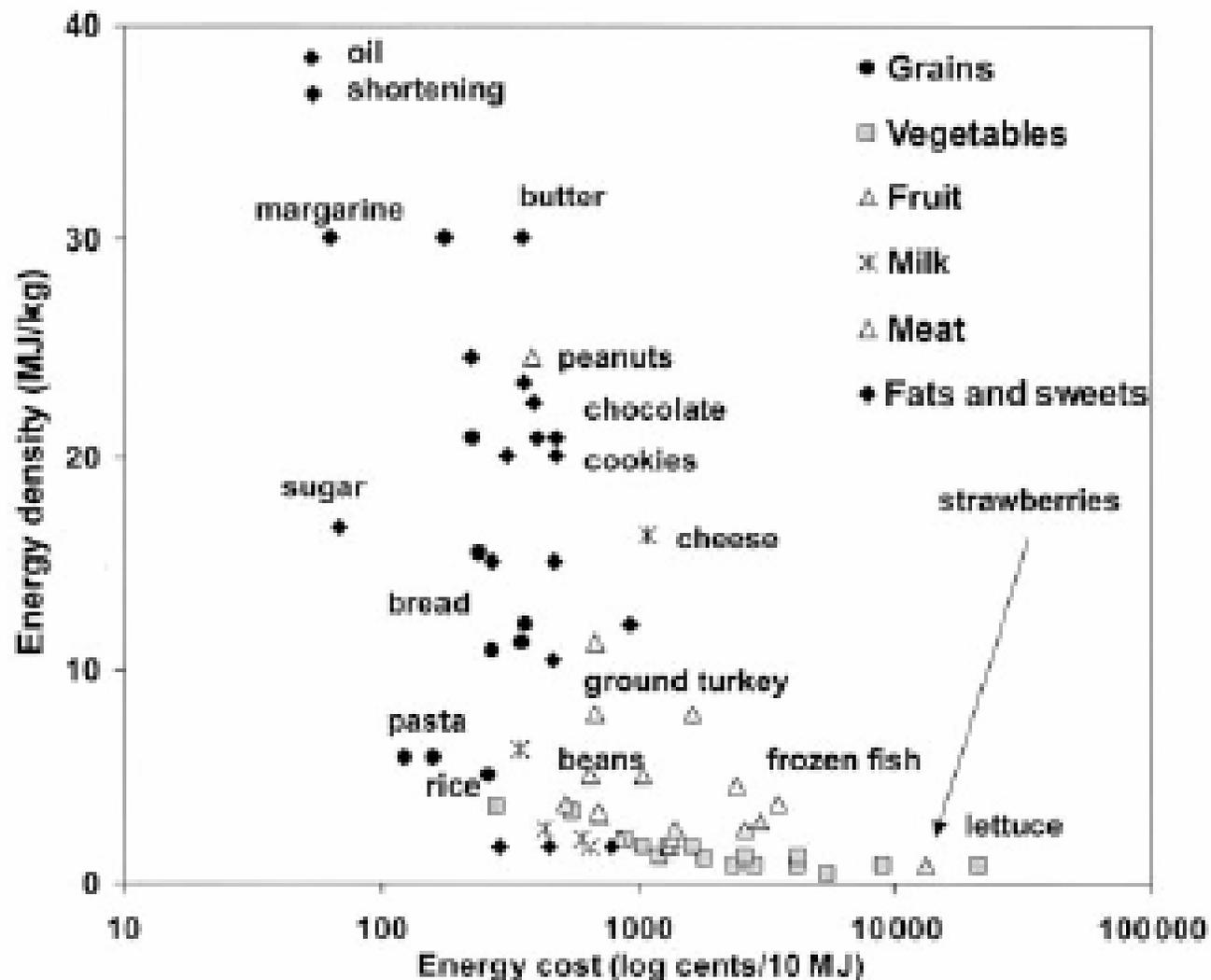


FIGURE 4. Relation between the energy density of selected foods and energy costs (\$/MJ). Food prices were obtained from Quality Food Centers supermarket, Seattle, winter 2003. Note that the energy cost differential between added sugars and fats and fresh vegetables and fruit can be several thousand percent, as indicated by the logarithmic scale.

Women in food-insufficient households have poorer quality diets

- NHANES III (1988-94): women in food insufficient HH had lower HEI score (58.8 v 62.7), especially for vegetables, fruits, milk, and food variety, and they consumed 4.6% more calories/d(58% v 47%) (Basiotis PP, Lino M. *Nutrition Insights*, July 2002)

Poor-quality diets are associated with overweight

- CSFII 1994-96: women and men with poor diets had higher BMI than those with good diets (26.4 v 24.8 for women, 26.8 v 25.7 for men) (Bowman SA et al. USDA 1998; CNPP-5)

Wealthier households spend more on food, and buy higher-quality food (especially fresh fruit, vegetables, salads)

- Poor families spend a higher percentage of their income on food; healthful diets cost more; food costs influence food purchases (Drewnowski and Specter, 2004)

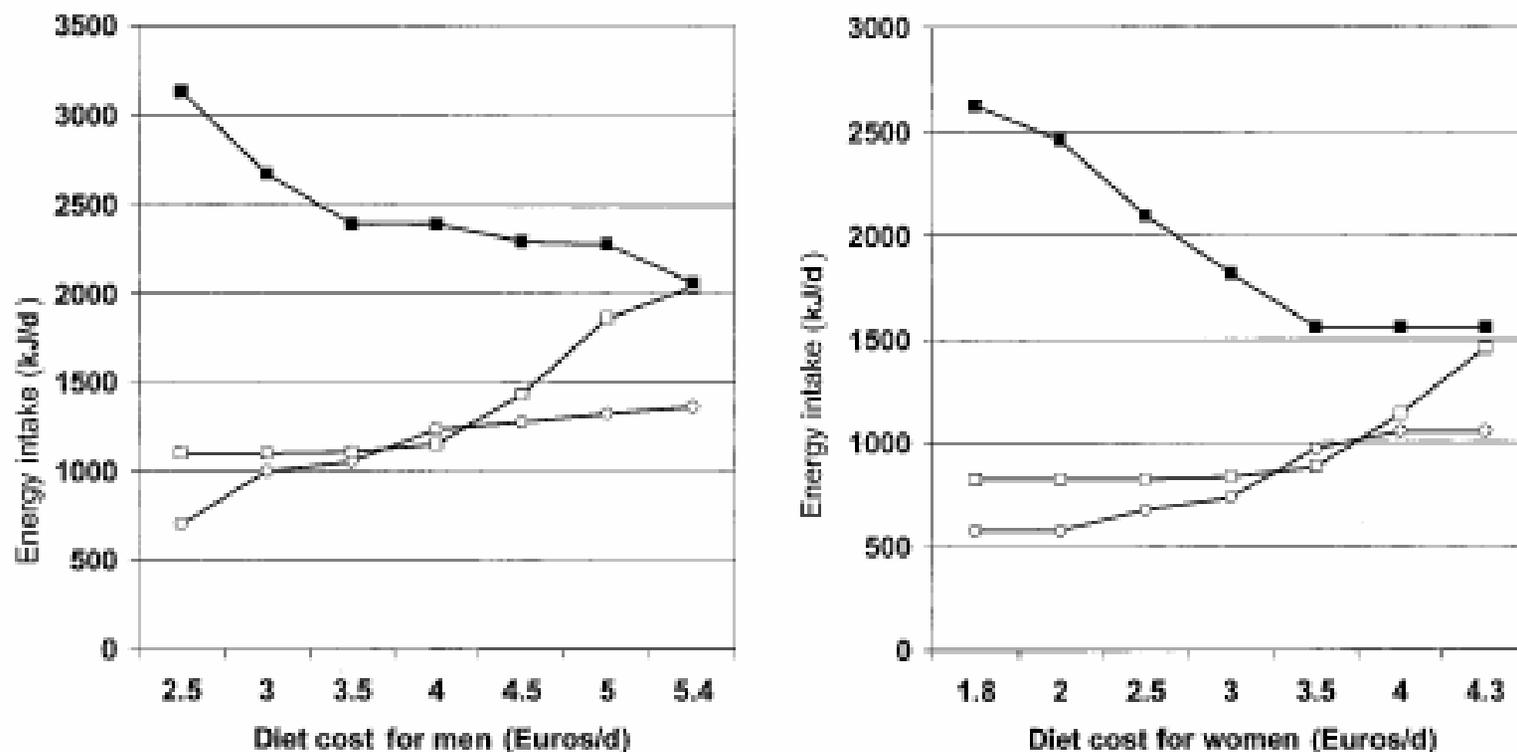


FIGURE 7. Change in energy intakes from different food sources in men and women from the Val-de-Marne data set after the imposition of cost constraints. ○, fruit and vegetables; □, meat, fish, and eggs; ■, fats and sweets. 1 Euro = US\$1.1. Adapted from reference 106.

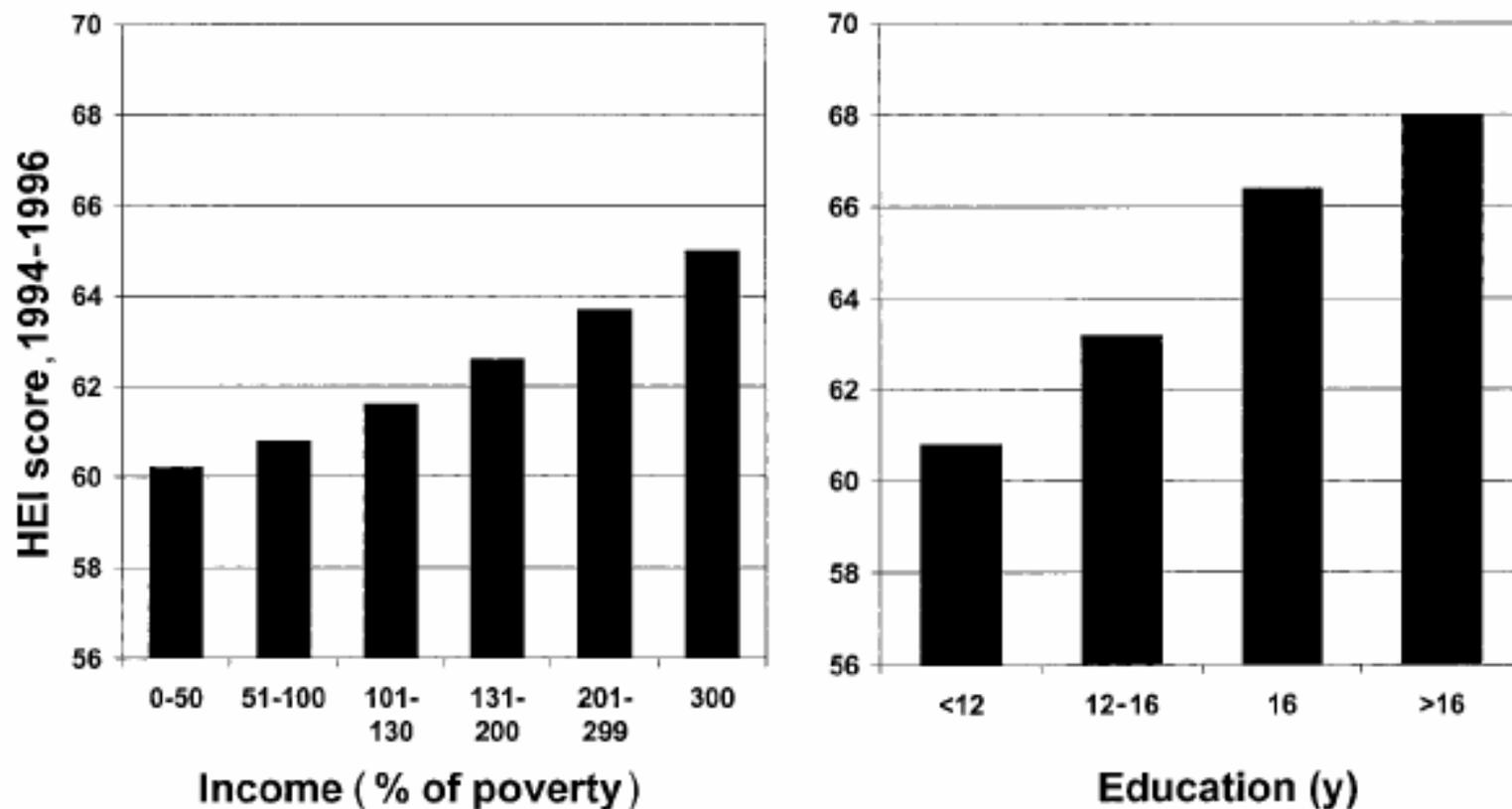


FIGURE 5. Diet quality, on the basis of Healthy Eating Index (HEI) scores, as a function of income and education. Adapted from reference 75.

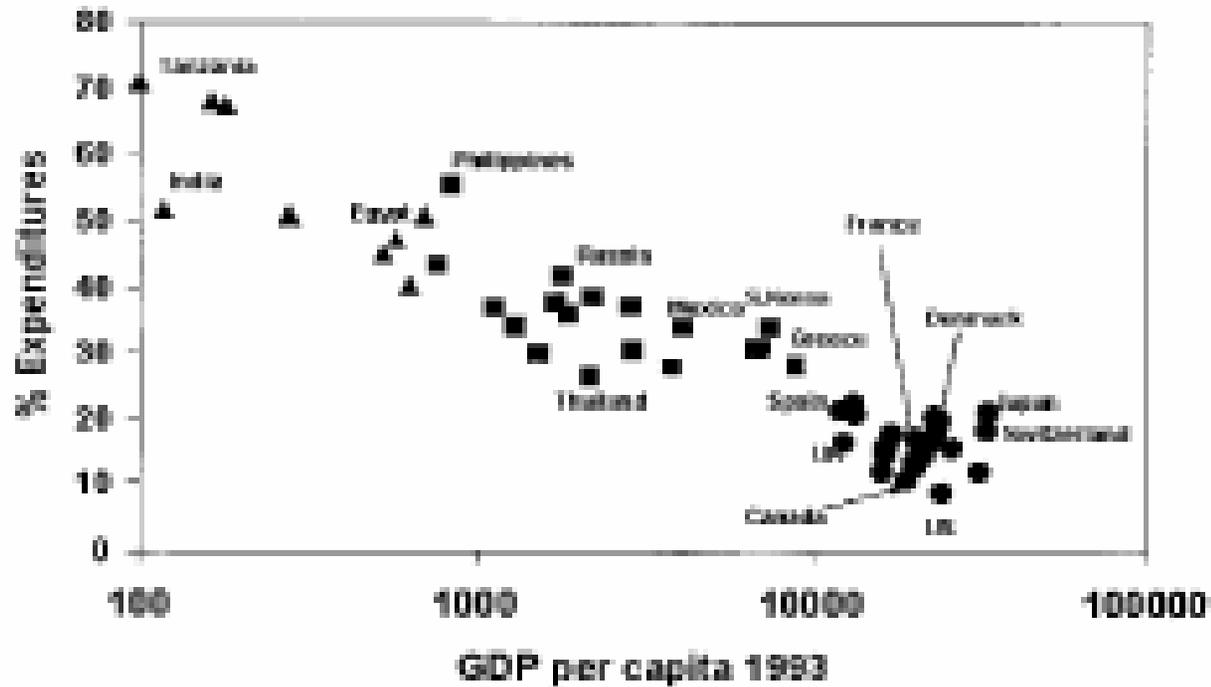


FIGURE 1 Spending on foods at home (as percent of consumption expenditures) in relation to the per capita gross domestic product (GDP) (1993). Data based on Meade and Rosen (17).

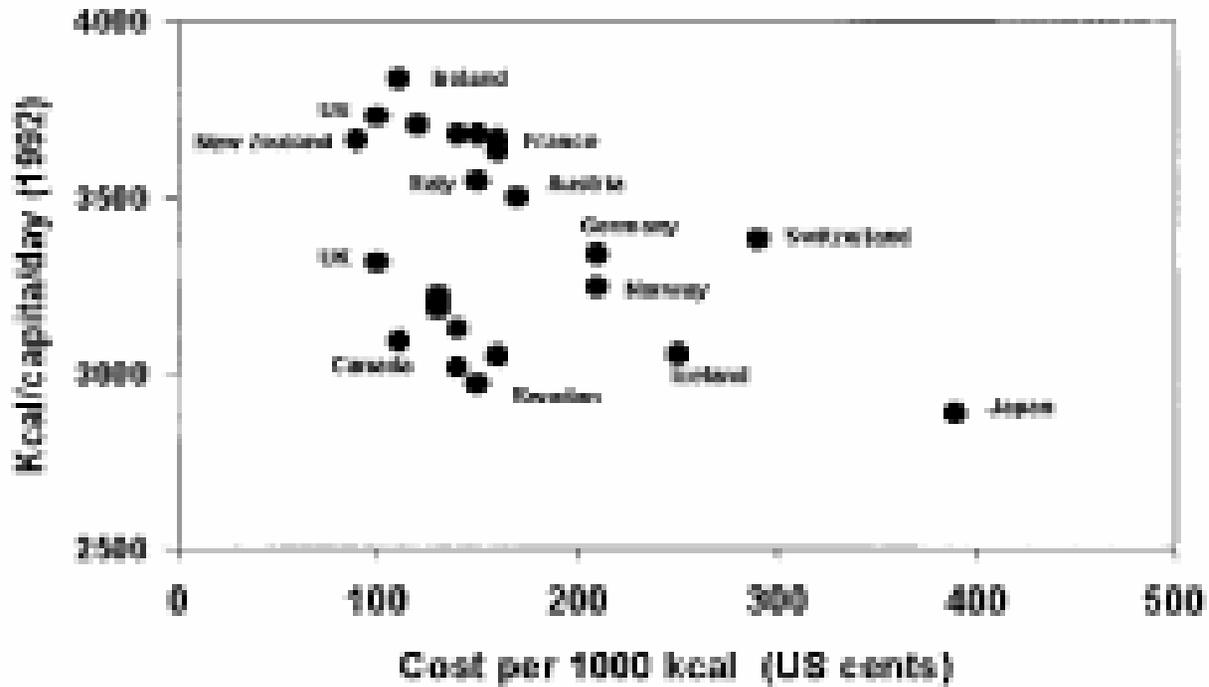


FIGURE 2 Energy costs (U.S. \$/1,000 kcal) and estimated per capita energy intakes for high income nations. Data based on Meade and Rosen (17).

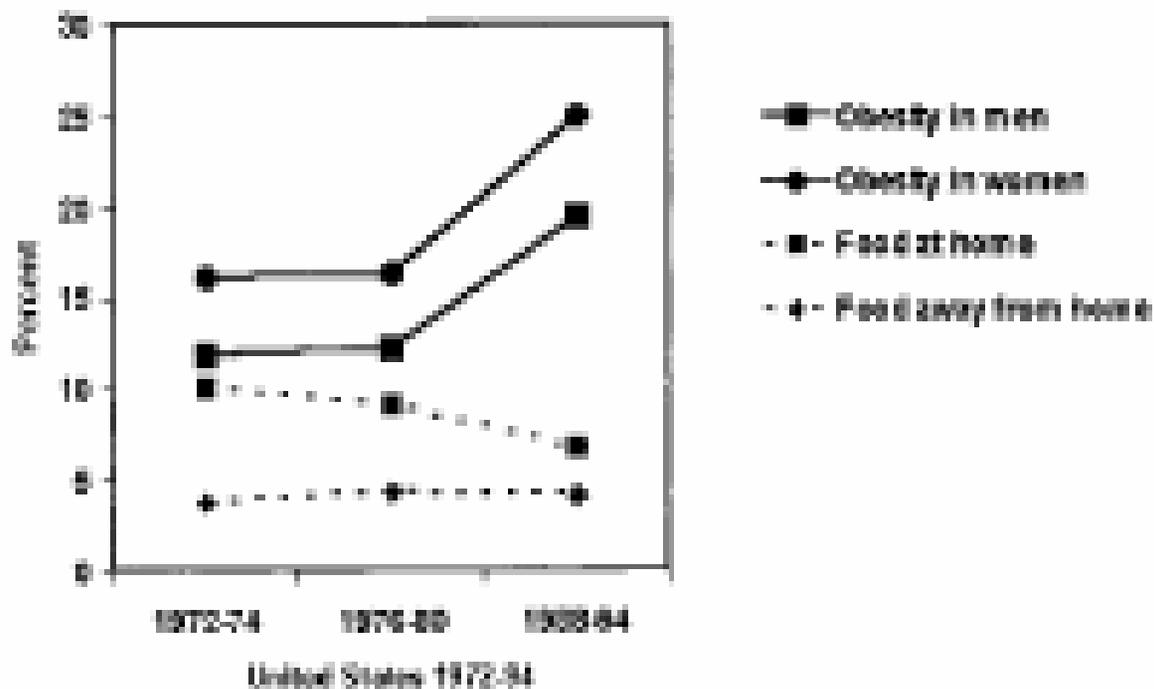


FIGURE 4 Changes in food expenditures (as percentage of income) and the percentage of population that is obese, 1971–1991.

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**JUDGE ROBERTS
AND ROE**
Kate Michelman

**AFTER
THE AFL-CIO
SPLIT**
JoAnn Wypijewski

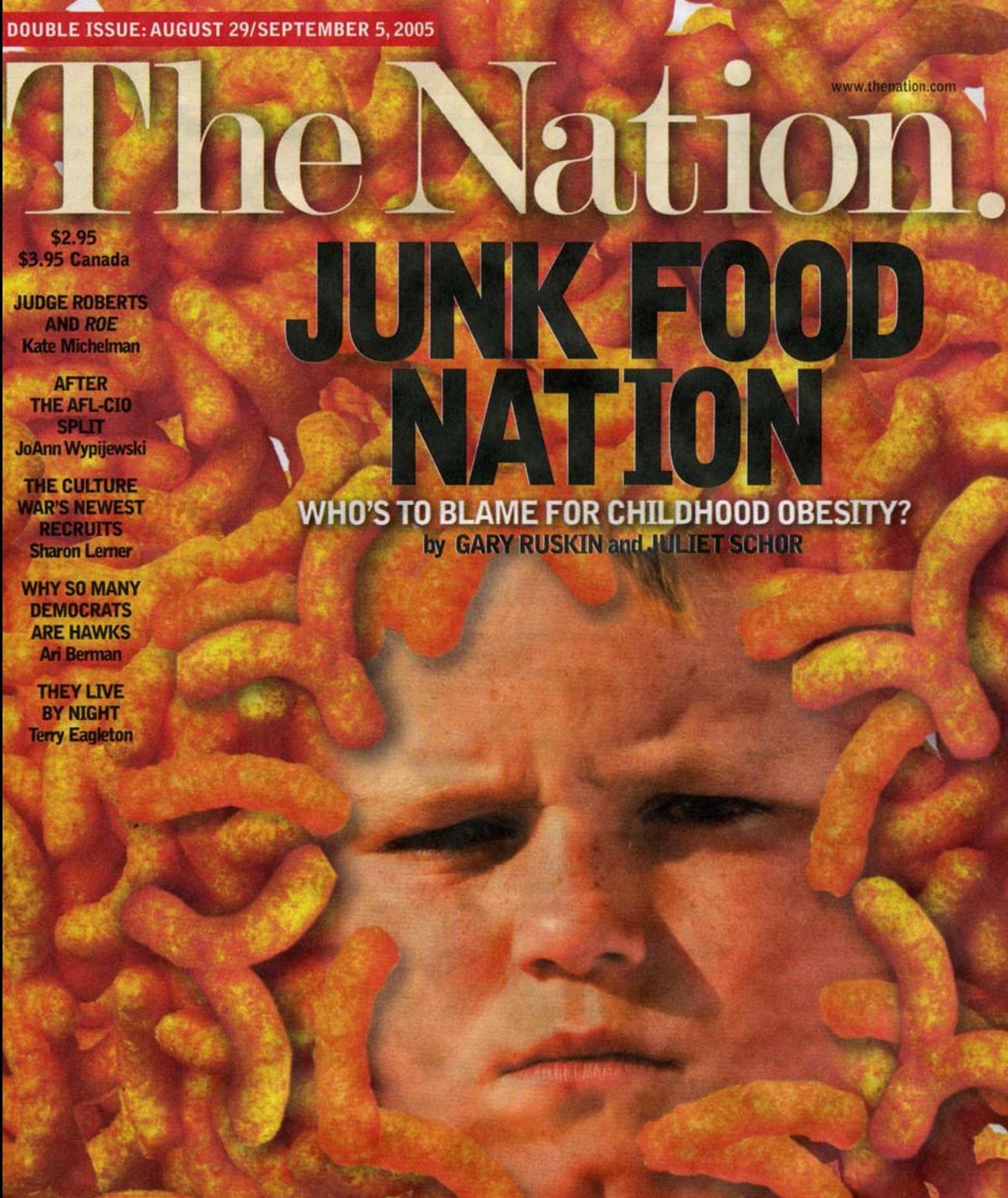
**THE CULTURE
WAR'S NEWEST
RECRUITS**
Sharon Lerner

**WHY SO MANY
DEMOCRATS
ARE HAWKS**
Ari Berman

**THEY LIVE
BY NIGHT**
Terry Eagleton

JUNK FOOD NATION

WHO'S TO BLAME FOR CHILDHOOD OBESITY?
by GARY RUSKIN and JULIET SCHOR



ENERGY DENSITY: THE ROLE OF THE FOOD INDUSTRY

- The current US diet derives over 50% of energy from added sugars and fat
- Per capita availability of caloric sweeteners and fats and oils each increased by 20% between 1977 and 1997
- Foods identified as accounting for the greatest increase in energy intake by Americans during that time were salty snacks, desserts, soft drinks, fruit drinks, hamburgers and cheeseburgers, Mexican food, and pizza
- Retail price increases during that time were much lower for sweets and fats than for vegetables and fruit.

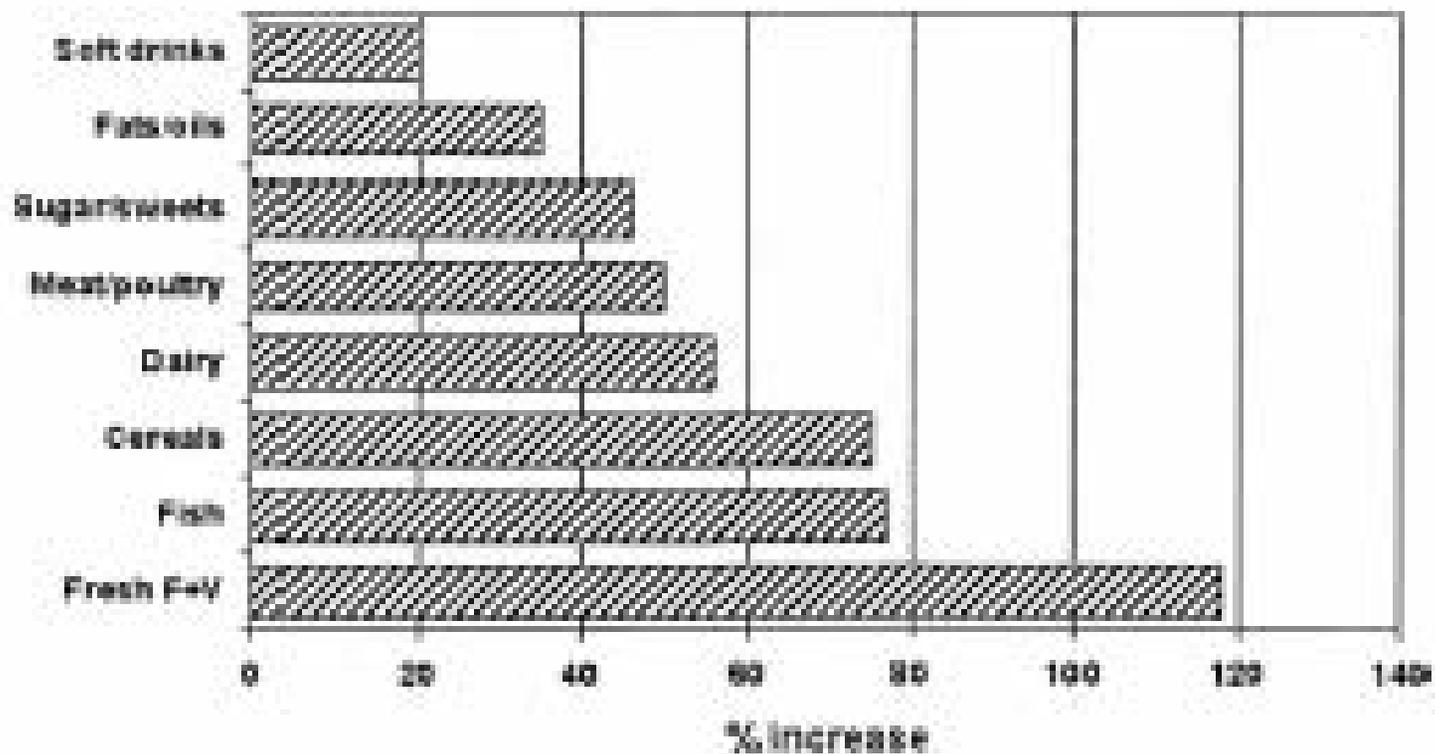


FIGURE 6. Increase in retail prices in 1985–2000 for foods in different categories. Data source: Economic Research Service of the USDA, *FoodReview* 2002 (108).

THE PERFECT STORM

- Nixon-Butz promotion of high-fructose corn syrup
- “McDonalds-ization” of beef production
- relentless marketing by food industry
- increasing portion sizes
- working parents, more fast food meals
- public schools in financial squeeze: forced to cut gym & sports teams, sign pouring contracts
- more dangerous neighborhoods
- rise of computer gaming, Internet, cable, videos
- poor getting poorer

THE FINAL WORDS

Dietz, 1995

“Confirmation of this hypothesis...that obesity is associated with hunger... would suggest that the prevention of obesity in impoverished populations may require increased food supplementation rather than food restriction to achieve a more uniform pattern of food consumption.”

Drewnowski and Darmon, 2005

“...Is it possible that the rising obesity rates reflect an increasingly unequal distribution of incomes and wealth...Stemming the obesity epidemic cannot be separated from stemming the tide of poverty.”

THREE RECOMMENDED TITLES

- *Fast Food Nation: The Dark Side of the All-American Meal*
Eric Schlosser, 2001
- *Fat Land: How Americans Became the Fattest People in the World*
Greg Critser, 2004
- *Food Politics: How the Food Industry Influences Nutrition and Health*
Marion Nestle, 2002