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Misperceptions in Self-Assessed Weight Status Vary Along Demographic Lines

Fred Kuchler and Jayachandran N. Variyam

Body mass index (BMI) describes relative weight for height and is significantly correlated with total body fat content. Differences between adults' weight status (as measured by BMI) and their perceptions of their weight status show how many and which individuals are mistaken about their weight status. A recent analysis by USDA's Economic Research Service found that women tend to make more accurate self-assessments, and men and women often make different types of mistakes in perceiving weight status. Mistakes have a systematic component, and are associated with demographics, socioeconomic status, and knowledge and attitudes toward diet and health.

The extent of misperception about weight status has important implications for health information

programs that might be used to reduce the prevalence of obesity. For example, the 2001 Surgeon General's report on overweight and obesity draws the connection between weight status and health risks. Upon receiving this information, a rational individual might make diet and lifestyle changes to lose weight, hoping to reduce the health risks. However, public information programs might fail to induce this type of behavior if many overweight individuals do not believe they are overweight. These individuals will assume the message is intended for someone else. In this case, the people most in need of changing their diet and lifestyle will not do so. An entirely different strategy would be necessary to induce desired diet and lifestyle changes.

To examine the agreement between adults' weight status and



Men are about three times more likely than women to underestimate their weight status. Many overweight or obese men say their weight is about right.

Credit: Eyewire.

perceptions of such, we compare two variables drawn from the 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII) and the Diet and Health Knowledge Survey (DHKS), a followup survey. For almost every individual who completed both surveys, we have a measure of BMI, based on self-reported height and weight, and the individual's self-assessed weight status.

We used BMI to classify each individual as obese, overweight, healthy weight, or underweight. BMI is calculated as weight in kilograms divided by height in meters squared. Adults with BMI at or above 30.0 are classified as obese and those with BMI at or above



Women tend to make more accurate self-assessments of their weight status than men, but they are also more likely to err on the side of overestimating, that is, they think they are overweight but they are not.

Credit: Digital Stock.

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Table 1—Some Who Are Obese Say Their Weight Is About Right

Item	Individuals who are obese ¹			Individuals who are overweight but not obese ²			Individuals who are not overweight or obese ³		
	All	Men	Women	All	Men	Women	All	Men	Women
People who say they are overweight	87.0	83.2	90.2	59.4	47.8	77.1	17.4	8.5	23.9
People who say they are about right or underweight	13.0	16.8	9.8	40.6	52.2	22.9	82.6	91.5	76.1

¹Body mass index greater than or equal to 30.

²Body mass index greater than or equal to 25 but less than 30.

³Body mass index less than 25.

Source: USDA's Economic Research Service.

25.0, but less than 30.0 are classified as overweight. BMI of 18.5 or greater, but less than 25.0, is defined as healthy weight. BMI less than 18.5 is defined as underweight.

The individual perspectives were provided by responses to a separate question in DHKS: "Do you consider yourself to be overweight, underweight, or about right?" We compared these responses with each individual's BMI classification. As the BMI classes are not intended to give guidance to women who are pregnant, we deleted from our sample all women who were pregnant and/or lactating. We used sampling weights to make our estimates representative of the U.S. population.

Differences Between Self-Assessed Weight Status and BMI Are Large

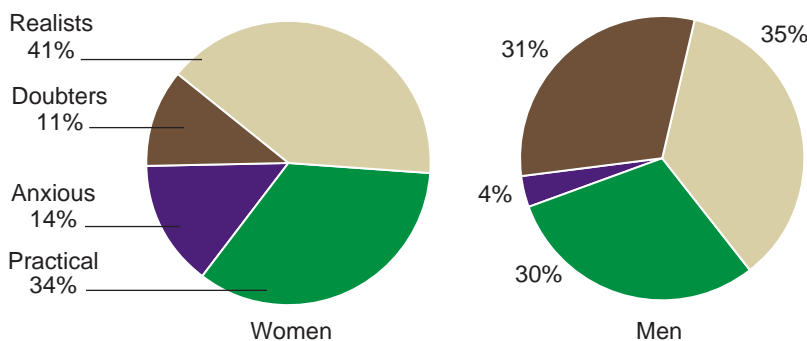
According to CSFII data and classifications based on BMI cutpoints, 55.1 percent of the U.S. population is overweight or obese, with 19.5 percent obese. The survey showed more men (61.6 percent) than women (48.8 percent) are overweight or obese. On the basis of self-assessed weight status, 40.8 percent of men and 59.3 percent of women believe they are overweight. Clearly, misperceptions are commonplace. And, the misperceptions are not all at the margin, that is, individuals slightly over the overweight cutpoint say their weight is about right. Instead, many of the mistakes are much larger.

Among those who are overweight but not obese, 40.6 percent do not agree that they are overweight (table 1). Instead, they say their weight is about right or that they are underweight. The error rate for this type of mistake is lower among the obese subpopulation, with 13 percent saying their weight is about right or that they are underweight. Therefore, being a little above the cutpoint for overweight makes a person more likely to say his or her weight is about right than a person who is obese. However, with 13 percent of the obese subpopulation misjudging their weight status by two or three

weight classes, it is clear that misperception admits a wide variety of possibilities.

While misperceptions about weight status are commonplace, the mix of misperceptions is entirely different for men and women. Women who are obese or overweight are more likely to correctly assess their weight status than men. However, women are also more likely to believe they are overweight when they are not overweight. Only 8.5 percent of men who are healthy weight or underweight believe they are overweight. The share for women is 23.9 percent.

Figure 1—Women Are More Accurate Than Men at Assessing Weight Status



Note: Realists are those who are overweight or obese and say they are overweight. Practical are those who are healthy weight and say their weight is about right. Practical also include those who are underweight and say they are underweight. Doubters are those who are obese or overweight and say their weight is about right, as well as those who are obese, overweight, or healthy weight and say they are underweight. Anxious include those who are healthy weight and say they are overweight, as well as those who are underweight and say they are healthy or overweight.

Source: USDA's Economic Research Service.

Two Ways To Be Right and Two Ways To Be Wrong

The four weight classes based on BMI provide a public health view of each individual's weight status. The three self-assessed weight classes provide the individual's view. We used a two-way classification to divide the respondents into four groups—two that accurately assess their weight status and two that do not.

We refer to the groups that accurately assess weight status as Realists or Practical. Realists are those who are overweight or obese and say they are overweight. Practical are those who are healthy weight and say their weight is about right. Practical also include a relatively small group whose members are underweight and say they are underweight.

We refer to those who under-assess their weight status as Doubters. Doubters include those who are obese or overweight and say their weight is about right, as well as those who are obese, overweight, or healthy weight and say they are underweight. Anxious are those who overassess their weight status. Anxious include those who are healthy weight and say they are overweight, as well as those who are underweight and say they are healthy or overweight.

Characterizing the population in terms of weight perception accuracy is useful for forecasting the impacts of an information program that explains the health risks of being overweight. Realists will recognize the message is intended for them and may or may not make diet and lifestyle changes. Doubters are unlikely to believe the message pertains to them. The message will not be relevant to Practical and, by unnecessarily generating health concerns, it could be harmful to Anxious.

Realists and Practical are more numerous among women, indicating fewer misperceptions overall among women than among men (fig. 1). As 14 percent of women but

only 4 percent of men fall into the Anxious class, we can unsurprisingly conclude women are more likely to err on the side of overestimating their weight than men. Men, on the other hand, are more likely to underestimate their weight—31 percent of men but only 11 percent of women are Doubters.

Accuracy of Assessments Varies Along Demographic and Socioeconomic Lines...

Researchers analyzing health surveys, such as the National Health and Nutrition Examination Survey and the Behavioral Risk Factor Surveillance Survey, have found that the prevalence of overweight and obesity has a systematic component, varying along demographic and socioeconomic lines. The prevalence of overweight and obesity in the United States is gen-

erally higher for men and women in racial/ethnic minority populations than for Whites, with the exception of Asian-Americans, for whom overweight and obesity prevalence is lower than in the general population. Women with low incomes or low education are more likely to be obese than women of higher socioeconomic status.

That demographic and socioeconomic factors are associated with the prevalence of overweight and obesity suggests that those same factors might be associated with perceptions about overweight and obesity. Here, we refine the characterization of Doubters, Realists, Practical, and Anxious by showing that population shares in these groups vary along demographic and socioeconomic lines. While gender is clearly associated with shares, education, race/ethnicity,

Table 2—There Are Fewer Doubters But More Anxious at Higher Education Levels

Characteristic	Doubters	Population shares		
		Realists	Practical	Anxious
<i>Percent</i>				
Education:				
Less than high school	28.4	39.2	27.1	5.3
High school	21.5	41.5	28.0	9.0
Some college	18.1	37.6	33.6	10.7
4 or more years of college	17.6	33.9	38.9	9.7
Race/Ethnicity:				
Non-Hispanic White	18.6	38.8	32.3	10.3
Non-Hispanic Black	30.4	44.8	22.9	1.9
Asian	22.6	6.4	62.4	8.6
Hispanic	26.0	33.2	33.2	7.6
Age (years):				
Less than 30	23.2	23.9	42.9	10.0
30-49	19.5	40.7	30.7	9.2
50-69	18.3	48.1	24.8	8.8
70 and older	27.1	29.8	35.9	7.2
Percent of poverty level:				
Less than 130%	23.2	37.6	31.5	7.8
131-350%	22.9	36.0	32.3	8.9
Over 350%	17.8	40.3	32.3	9.6

Note: Numbers may not add to 100 percent due to rounding. Realists are those who are overweight or obese and say they are overweight. Practical are those who are healthy weight and say their weight is about right. Practical also include those who are underweight and say they are underweight. Doubters are those who are obese or overweight and say their weight is about right, as well as those who are obese, overweight, or healthy weight and say they are underweight. Anxious include those who are healthy weight and say they are overweight, as well as those who are underweight and say they are healthy or overweight.
Source: USDA's Economic Research Service.

age, and income also demonstrate their influence.

We classified each surveyed individual into one of four educational attainment classes—less than high school, high school, some college, or college and advanced degrees. Increasing educational attainment is associated with several effects on the accuracy of self-assessed weight status: Doubters decrease in share and Anxious increase, changing the mix of perceptions (table 2). In total, accuracy increases because the combined shares of Realists and Practical increase.

When the sample is divided along racial/ethnic lines, the population shares among the four categories vary enormously. Asians are unique in having a majority share of Practical. Among the other three racial/ethnic groups, the mix of misperceptions is striking. Among non-Hispanic Whites and Blacks, non-Hispanic Blacks include relatively more Doubters but fewer Anxious. Hispanics fall between Blacks and Whites in shares of Doubters and Anxious.

Age has a substantial influence on the distribution of classes. The shares of Practical display a U-shaped relation, taking on larger values during their twenties and old age and smaller values during middle age. The shares of Realists move in opposition to the Practical and display an inverted U-shape, with the largest share in the 50-69 age class.

We defined three broad income classes, relative to the poverty level. The three income classes show relatively small differences in shares of weight assessment accuracy, which suggests that the association between weight assessment and income is weak. In many studies, the effects of education and income are difficult to disentangle. Here, however, the changing shares associated with educational attainment may be largely attributed to education and not to income.

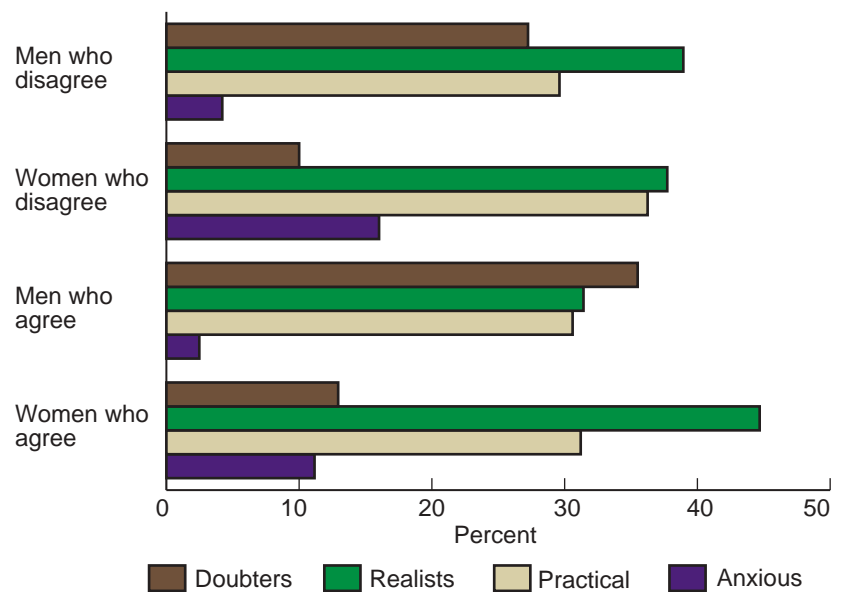
...And by Knowledge and Attitudes Toward Diet and Health

With misperception of weight status widespread, designing an information program to combat overweight is difficult. It is not enough to establish the linkage between weight status and health; many people have to be informed that they are or are not overweight. Like all advertising, information programs can be designed to appeal to specific demographic and socioeconomic groups. The demographic and socioeconomic patterns of weight status misperceptions suggest a target audience for an information program designed to overcome the misperception problem.

Before designing a program to communicate with a particular group, it would be beneficial to determine if those who are misjudg-

ing their weight are amenable to change. If they are ill informed about relations between diet and health or if their attitudes toward diet and health are open to change, information programs may yield behavioral changes and reduced health risks. To some extent, understanding how individuals' attitudes and knowledge influence overweight and obesity is more important and useful from a policy perspective than understanding demographics and socioeconomics of obesity or patterns of inaccuracy in judging weight. Socioeconomic variables, such as average household income or education patterns, are difficult to manipulate. In contrast, attitudes and opinions admit the possibility of a policy lever. Demonstrating which types of attitudes are most influential in determining BMI suggests a direction for information to yield its biggest impact.

Figure 2—Realists Make Up the Largest Share of Women Who Agree That a Person's Weight Status Is Predetermined



Note: Realists are those who are overweight or obese and say they are overweight. Practical are those who are healthy weight and say their weight is about right. Practical also include those who are underweight and say they are underweight. Doubters are those who are obese or overweight and say their weight is about right, as well as those who are obese, overweight, or healthy weight and say they are underweight. Anxious include those who are healthy weight and say they are overweight, as well as those who are underweight and say they are healthy or overweight.

Source: USDA's Economic Research Service.

A unique feature of DHKS is that it allows us to further refine the picture of the four classification groups, showing how attitudes and knowledge toward diet and health influence perceptions of weight status. Several questions from DHKS address respondents' beliefs in their ability to control their weight, the importance they assign to maintaining a healthy weight, their awareness of health problems associated with being overweight, and their overall knowledge of relations between diet and health.

Scientists differ on the relative importance of the factors that determine weight status, whether people's weight status results from their genetic makeups or their diet and exercise choices. DHKS asked survey respondents their opinions on weight control: "Please tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the state-

ment: Some people are born to be fat and some thin; there is not much you can do to change this."

As the statement alludes to genetics, we refer to the statement as the gene theory. Thirty-nine percent of the population are adherents to the gene theory and do not believe they can change their weight status. There are proportionately more Realists among women who adhere to the gene theory than among women who disagree (fig. 2). Among women who adhere to the gene theory, the largest share is Realists. In effect, there is a relatively large group of women whose members correctly assesses their overweight status and reject the notion that weight status is controllable.

Among the majority of respondents who disagree with the gene theory, Realists constitute the largest shares of both men and women. Thus, among those who be-

lieve they can adjust their weight status, many recognize they are overweight. It is not known whether this group is not attempting to lose weight or whether it has not yet been successful at weight loss.

DHKS also asked respondents to rate the importance of maintaining a healthy weight: "To you personally, is it very important, somewhat important, not too important, or not at all important to maintain a healthy weight?"

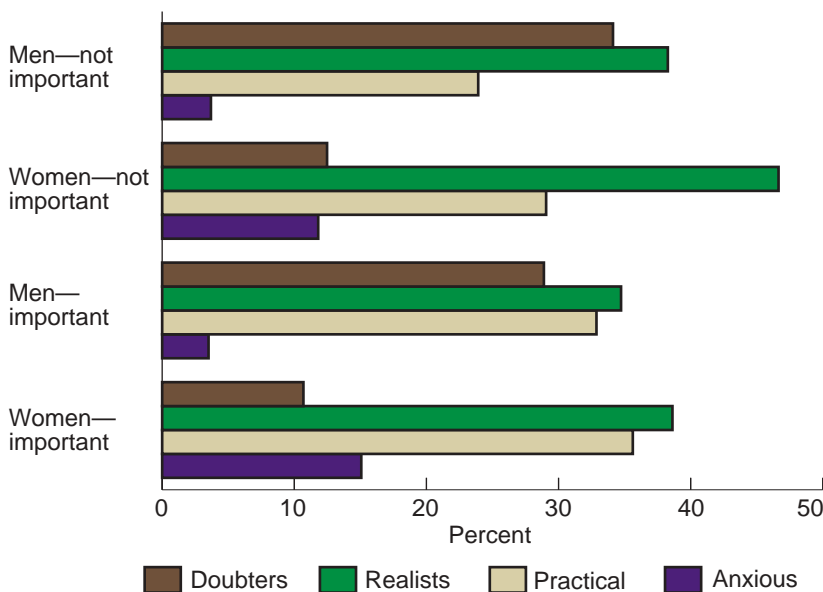
We split the respondents into two groups: those who said maintaining a healthy weight is very important and all others. Differences exist between the groups that believe it is important to maintain a healthy weight and those who do not (fig. 3). Realists are the largest proportion of each group. The largest share of Realists appears among women for whom maintaining a healthy weight is unimportant. Members of this group recognize their overweight status and would know that an information program identifying the linkage between weight and health risk was intended for them. If the program's message were convincing, we could expect this group to make different diet and lifestyle choices.

Seventy-three percent of the respondents said that maintaining a healthy weight was important. Only 5.1 percent of respondents indicated that they believed maintaining a healthy weight was unimportant; 21.9 percent were ambivalent, saying weight is somewhat important. Therefore, the group whose behavior might be changed may be relatively small.

The survey also asked respondents if they were aware of linkages between being overweight and any other health problems: "Have you heard about any health problems caused by being overweight?"

Responses revealed that many individuals may be making diet and lifestyle decisions because they understand the linkage between weight status and health risks.

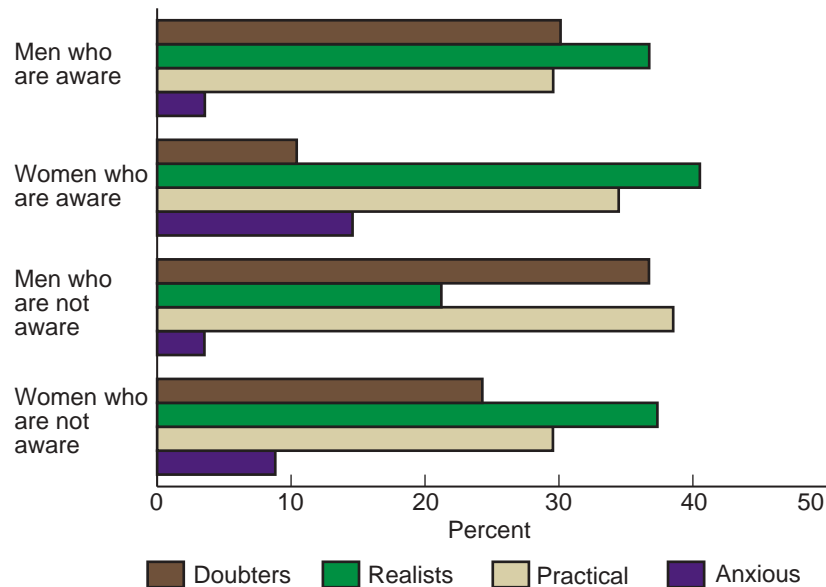
Figure 3—Realists Are Numerous Among the Group That Does Not Believe It Is Important To Maintain a Healthy Weight



Note: Realists are those who are overweight or obese and say they are overweight. Practical are those who are healthy weight and say their weight is about right. Practical also include those who are underweight and say they are underweight. Doubters are those who are obese or overweight and say their weight is about right, as well as those who are obese, overweight, or healthy weight and say they are underweight. Anxious include those who are healthy weight and say they are overweight, as well as those who are underweight and say they are healthy or overweight.

Source: USDA's Economic Research Service.

Figure 4—Women Who Are Aware of Health Problems From Overweight Assess Their Weight More Accurately Than Women Who Are Not Aware



Note: Realists are those who are overweight or obese and say they are overweight. Practical are those who are healthy weight and say their weight is about right. Practical also include those who are underweight and say they are underweight. Doubters are those who are obese or overweight and say their weight is about right, as well as those who are obese, overweight, or healthy weight and say they are underweight. Anxious include those who are healthy weight and say they are overweight, as well as those who are underweight and say they are healthy or overweight.

Source: USDA's Economic Research Service.

Among women, those who are aware of health problems from overweight make more accurate weight assessments than those who are unaware—the shares of Realists and Practical are larger (fig. 4). The mix of misperceptions about weight status changes with awareness. While there are fewer Doubters among women who are aware, there are relatively more Anxious. Many women are aware of the links between diet and health. Thus, an information program might have only a small effect on women's diet and lifestyle choices.

For men, the shares among the aware and unaware differ. The share of Realists is dramatically larger among aware men than among unaware men. There are a couple of possible explanations. Information programs that have successfully communicated to some men that they are overweight and that there are adverse health con-

sequences to being overweight may have failed to communicate the severity of those consequences. That is, some overweight men may assume that the risks of overweight are relatively inconsequential. Alternatively, those men with the greatest difficulty losing weight may be those most interested in learning about the adverse consequences of being overweight. Among men, it may be typical to seek health information to help mitigate existing adverse health consequences rather than to prevent the causes.

Lastly, DHKS surveyed respondents about their knowledge of the relations between diet and health. The survey included questions on the appropriate number of servings of different food groups and on the nutrient content of foods, asking respondents to identify foods highest in fat and in saturated fat, characteristics of fats, and relations between fat and cholesterol,

and to define food label information on fat and cholesterol. Respondents were asked to identify health problems associated with being overweight. Respondents were quizzed about their awareness of problems associated with overconsumption of fat, sodium, cholesterol, and sugar, and underconsumption of fiber and calcium.

We treated the 27 questions as a test of diet and health knowledge. We calculated the number of correct answers for each respondent and used the scores to divide respondents into four groups, from most to least knowledgeable. (Each group was approximately one-quarter of the respondents.) For each knowledge group, we segmented the group into four weight assessment accuracy classes. While levels differ for men and women, the overall patterns are similar, so we present combined information. As knowledge, as monitored by the quiz, increases, the mix of errors changes, with Doubters decreasing in share and Anxious increasing (fig. 5). Additionally, the share of Realists increases with knowledge. In this case, the Realists show up most frequently in the most knowledgeable group. The group most likely to make use of information linking weight status and health risks is already familiar with the information. Again, the fact that many Americans are fairly knowledgeable about diet and health limits the impacts of a new information program.

One Information Program Is Not the Answer

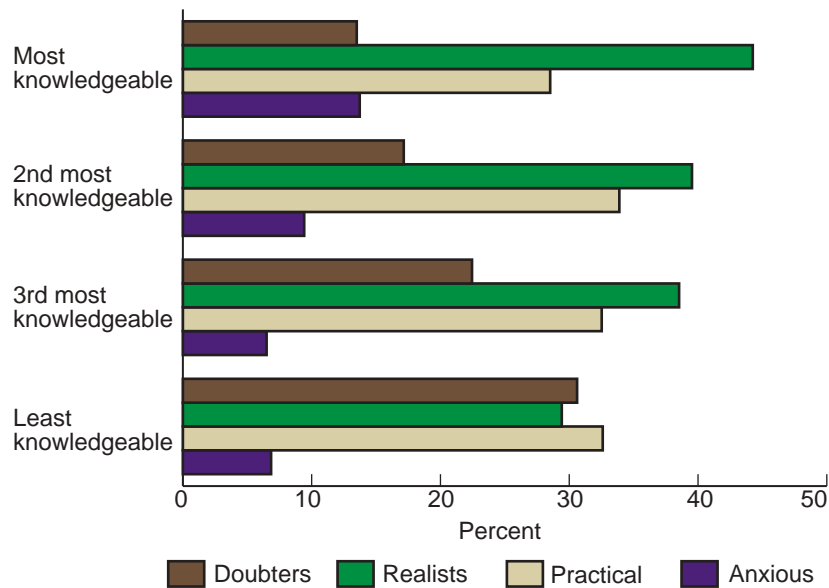
While publicly provided information programs are often promoted as a means of addressing the obesity problem, such programs may not be instantly successful. Even if received, the information may not be able to overturn attitudes that develop over a lifetime. People may have already incorporated health recommendations into their diet and lifestyle choices and may have little room for additional changes. Some individuals may not

be troubled by extra pounds and may not be concerned if the medical and public health community calls them obese or overweight. Others will make diet and lifestyle choices to maintain weight in ranges identified as healthy. The systematic differences in the prevalence of overweight and obesity among subpopulations may reflect that individuals' ideas about thresholds for obesity and overweight vary along demographic lines. However, the association between socioeconomic status and obesity suggests that some may not yet understand they are overweight and may not understand the risks they run by being obese.

This analysis suggests that Federal information programs toward obesity will be more likely to influence diet and lifestyle choices if the programs issue distinct types of messages to different subpopulations. Until Doubters, who are relatively more concentrated among men, middle-aged adults, and those with lower education levels, agree they are overweight, they are unlikely to act on a message linking overweight and health risks.

Designing a message for Realists that induces diet and lifestyle changes may be even more challenging. Realists tend to have a variety of qualities that suggest they are unlikely to change. Many Realists are knowledgeable about diet and health. In fact, they make up a large share of those who are aware of health risks associated with being overweight, despite being overweight themselves. Some qualities appear to conflict with awareness and knowledge but add to the

Figure 5—Realists Increase in Share With the Number of Correct Diet Knowledge Answers



Note: Realists are those who are overweight or obese and say they are overweight. Practical are those who are healthy weight and say their weight is about right. Practical also include those who are underweight and say they are underweight. Doubters are those who are obese or overweight and say their weight is about right, as well as those who are obese, overweight, or healthy weight and say they are underweight. Anxious include those who are healthy weight and say they are overweight, as well as those who are underweight and say they are healthy or overweight.

Source: USDA's Economic Research Service.

reluctance to change. For example, Realists form a large share of women who agree with the gene theory, and they are highly concentrated among women who discount the importance of maintaining a healthy weight. Realists are relatively more numerous in non-Hispanic Black, female, and middle-aged subpopulations. But the ability to identify Realists along demographic lines may be inconsequential to designing a program until the public health community can construct a message that resonates

with a group that is both fairly well informed and discounts the possibility and importance of change.

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