

## THE EFFECT OF QUESTION FRAMING AND RESPONSE OPTIONS ON THE RELATIONSHIP BETWEEN RACIAL ATTITUDES AND BELIEFS ABOUT GENES AS CAUSES OF BEHAVIOR

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**Abstract** Prior research suggests that the attribution of individual and group differences to genetic causes is correlated with prejudiced attitudes toward minority groups. Our study suggests that these findings may be due to the wording of the questions and to the choice of response options. Using a series of vignettes in an online survey, we find a relationship between racial attitudes and genetic attributions when respondents are asked to make causal attributions of *differences between racial groups*. However, when they are asked to make causal attributions for *characteristics shown by individuals*, no such relationship is found. The response scale used appears to make less, if any, difference in the results. These findings indicate that the way questions about genetic causation of beha-

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avior are framed makes a significant contribution to the answers obtained *because it significantly changes the meaning of the questions*. We argue that such framing needs to be carefully attended to, not only in posing research questions but also in discourse about genetics more generally.

## Introduction and Theoretical Background

The pace of scientific development in the field of genetics threatens to outstrip the ability of both scientists and nonscientists to grasp its implications for health and society. And the understanding of nonscientists is not helped by the mass media, which tend to trumpet the newest and most sensational discoveries without waiting for their replication and to emphasize their potential benefits rather than their risks (Singer 1990; Nelkin and Lindee 1995; Bubela and Caulfield 2004). In part, this tendency is fueled by scientists themselves, whose need for research funding leads them to “hype” their results.

One of the consequences of the explosion of news about genetics, some writers believe, is an exaggerated belief on the part of the public in the “potency” of the gene (to use Nelkin’s phrase) in determining personality and behavior (Nelkin and Lindee 1995), even though there is general agreement among scientists that these are shaped by complex interplays among multiple genes and environmental stimuli. There is a close resemblance between “psychological essentialism” (Medin and Ortony 1989), which concerns itself with the consequences of ascribing a fixed, underlying nature to members of social categories, and the belief that the characteristics of social category members are determined by their genetic inheritance. In both cases, the “essence” of the category is regarded as relatively immutable, difficult to change, and beyond the control of the individual or, by implication, society.<sup>1</sup>

The consequences of such beliefs for social attitudes have been shown to be variable. On the one hand, genetic or essentialist explanations may absolve people from blame for characteristics considered socially undesirable (e.g., Ernulf and Innala 1989; Sakalli 2002; Tygart 2000; Haslam and Levy 2006; Jayaratne et al. 2006; Prentice and Miller 2007); on the other hand, belief in genetic determinism might signify that these undesirable characteristics are unchangeable, and that efforts to improve the environment—for example, to improve educational opportunities for Blacks and Latinos—are futile and unnecessary (Apostle et al. 1983; Kluegel 1990; Prentice and Miller 2007).

There is also a clear resemblance between the concept of “psychological essentialism” and prejudice (see Prentice and Miller 2007). Prejudice entails

1. This does not mean that characteristics influenced by the environment are necessarily changed more easily than those influenced by genes, and the amount of control the individual is able to exercise may be negligible in either case. Furthermore, the route by which genes and the environment (including drugs) influence behavior may in fact be identical—that is, both may modify biological structures or neurological connections (see, e.g., Duman, Heninger, and Nestler 1997; Chen et al. 2006).

stereotyped, often negative, beliefs about the characteristics of a social category, whether that category is based on race, ethnicity, gender, or some other (usually ascribed) social status. Like beliefs in genetic causation and essentialism, prejudiced beliefs are often accompanied by the conviction that the characteristics attributed to the group or category are unchangeable and differentiate it from other groups. Although such beliefs are often negative, they need not be—for example, the conviction that Blacks as a group are better athletes than Whites can be seen as a stereotyped positive belief.

Many causes have been proposed for the origins of negative racial attitudes. Harding et al. (1969, 5:5) argue that for writers like Allport (1954), Kelman and Pettigrew (1959), and Simpson and Yinger (1965), violations of the norm of rationality are basic to a definition of prejudice. This norm “enjoins a persistent attempt to secure accurate information, to correct misinformation, to make appropriate differentiations and qualifications. ... Prejudice ... may occur in the form of hasty judgment or prejudgment, over generalization, thinking in stereotypes, ... and refusal to admit or take account of individual differences.” Adorno et al. (1950) locate the origins of ethnocentrism (in their view, a more inclusive term than prejudice) primarily in authoritarian child-rearing practices, which they argue encourages hatred of, and discrimination against, less powerful social groups. Kinder and Sanders (1996), among other more recent writers, locate the sources of prejudice in competition for scarce economic resources. Nevertheless, most writers about intergroup attitudes agree that such attitudes are learned, that they are multi-causal, and that they meet some psychological needs for the individual (Harding et al. 1969, p. 26).<sup>2</sup>

This article does not examine the fundamental causes of prejudice. Rather, we investigate whether and how the formulation of questions and of answer categories influences the measured relationship between specific racial attitudes and other beliefs, such as genetic determinism. We thus follow in the tradition of social psychologists who have long examined the role of measurement in investigating the relationship between attitudes and attitudes or attitudes and behavior (e.g., Christie and Jahoda 1954; Schuman 1972).

Given the increasing importance of genetic research and the role that attitudes about genetics will play in the use and misuse of this research, it is critical to understand what the public knows and believes about this area. At the same time, it is equally critical to recognize how apparent artifacts, such as question wording and framing, might influence the responses obtained.

The findings of the present study indicate that the way questions about genetic causation of behavior are framed does indeed make a significant contribution to the answers obtained. We argue that such framing needs to

2. Harding et al. (1969, p. 13) also argue that the correlations among attitude scales designed as measures of prejudice according to some conceptual definition and other attitude scales constructed on an ad hoc basis “are sufficiently high that either type of scale can be treated for most practical purposes as a measure of prejudice.”

be understood and attended to, not only in posing research questions but also in the discourse about genetics more generally.

#### HYPOTHESES FOR THE PRESENT STUDY

This study was designed specifically to investigate discrepancies in findings about the relationship of prejudice to beliefs about genetic causation of behavior. Work by Jayaratne et al. (2006), as well as others cited there, suggests that the attribution of individual and group differences to genetic causes is greater among Whites than among Blacks, and is correlated with measures of “traditional” (e.g., “How bothered would you be if your son or daughter married a Black person?”) as well as “modern” (e.g., “If Blacks don’t do well in life, they have only themselves to blame”) prejudice. However, in a study that asked about the attribution of behavioral characteristics of individuals (e.g., “A substantially overweight Black woman who has lost weight in the past but always gains it back again”) rather than for the sources of differences in these characteristics between individuals or groups, Singer et al. (2007) found no evidence for an association between genetic attribution and scores on a different measure of racial prejudice, nor was there a difference in genetic attribution between Whites and Blacks. These discrepancies led us to speculate that the way questions were framed—that is, the wording of questions and response alternatives—in the two studies might be contributing to their different conclusions (see, e.g., Schwarz 1996, 1999; Schwarz and Sudman 1992; Tourangeau, Rips, and Rasinski 2000).

Specifically, we hypothesized that asking about the sources of *differences* between groups presupposes that such differences exist and encourages their attribution to genetic causes. On the other hand, asking about the differentiated characteristics of specific individuals would, we hypothesized, discourage genetic attributions by emphasizing the fact that there are differences among the individuals making up a group and by making situational contexts salient. We also hypothesized that using a binary scale to ascertain genetic beliefs (“Is any part of this characteristic determined by genes?”) would be more likely to lead to an association with prejudiced beliefs than a 21-point scale that labeled the environmental as well as the genetic ends of the continuum (“How much of the characteristic below is determined by genes, and how much by the environment?”). Although the two scales are intended to measure the same construct, the 21-point scale encourages respondents to consider both genes and environment by explicitly labeling both ends of the continuum, and it also permits finer gradations in the response.

## Methods

This study investigates the contribution of question wording and response scales to the relationship between beliefs about genetic determinism and racial attitudes. The study was designed explicitly to test whether the different find-

ings by Jayaratne et al. (2006) and Singer et al. (2007) could be explained by such features of the research design. The research design described below treats beliefs in genetic attribution as the dependent variable and our measure of racial attitudes as an independent variable. Question wording and response alternatives, which we hypothesize to be conditioning variables, are treated as grouping variables in the analysis. These concepts, and their measures, are described in detail below, as are the sample and method of administration.

#### SAMPLE AND ADMINISTRATION

The sample for the study was a self-selected sample from Survey Sampling International (SSI), an online panel vendor. The questionnaire, fielded by Market Strategies Inc., was self-administered on the Web and completed by 4,553 out of 182,503 invited members of SSI's SurveySpot online panel in June 2006, for a "response rate" of three percent. The sample included 3,636 (79.9 percent) Whites, 363 (8.0 percent) Blacks, 367 (8.1 percent) Hispanics, 63 (1.4 percent) Asians, and 124 (2.7 percent) persons of other race/ethnicity; 2,288 (50.3 percent) were female, and 2,258 (49.7 percent) were male. The focus of the study was on the effects of the experimental manipulations, rather than on estimating the beliefs about genetic causes of behavior in a sample of the general population. In Kish's (1987) terms, we focus on randomization rather than representation. Nevertheless, we should be cautious about inferences beyond this set of volunteer respondents.

#### RESEARCH DESIGN

Respondents were randomly assigned to one of two question wordings and one of two response scales in a two-by-two experimental design. One question wording asked about the effect of genes on perceived differences in the generalized characteristics of abstract groups (e.g., differences in intelligence between Blacks and Whites; see Jayaratne et al. 2006); the other asked about the influence of genes on the perceived differentiated characteristics of specific individuals (e.g., a highly intelligent Black person who did very well in school and is now a partner in a large law firm; see Singer et al. 2007). The first of these wordings is referred to henceforth as the "Group" frame; the second, as the "Individual" frame. These experimental conditions replicate those in the two studies cited above.

The second experimentally manipulated variable consisted of two response scales. One scale was a binary yes/no scale, replicating one used by Jayaratne et al. (2006).<sup>3</sup> This scale identified only the genetic end of the comparison.

3. Jayaratne et al. (2006) followed the binary question with one asking how much of the difference was attributable to genes, with four qualitative response alternatives: very little, some, a lot, or just about all; they then combined these with the response to the binary question to create a five-point numeric scale. We focus only on the initial binary response in the analyses here, since this determines the respondents who will be asked the follow-up questions.



**Figure 1. 21-Point Rating Scale.**

The second scale, used by Singer et al. (2007), asked respondents to indicate, along an unnumbered 21-point scale ranging from 0 percent environment (and 100 percent genes) to 100 percent environment (and 0 percent genes), what percent of each characteristic, or of the difference between groups with respect to a characteristic, was attributable to genes, and what percent was attributable to the environment. A graphic representation of the 21-point scale appears in figure 1. Although the scales measure the same concept, the wording of the binary scale encourages respondents to focus on an absolute difference between some genetic influence and none, whereas the wording of the continuous scale encourages respondents to think how much of the expression of a characteristic is determined by genetic inheritance versus environmental influence.

Within each cell of the two-by-two design, respondents were randomly assigned to a set of four vignettes. Each set contained one vignette for each of four behavioral characteristics, two of them socially desirable (athletic ability, intelligence) and two undesirable (alcoholism, obesity). These four characteristics had been asked about in an earlier study about genetic versus environmental attributions of behavior (Singer et al. 2007).<sup>4</sup> Each of the four characteristics was assigned to a different race and gender. Respondents assigned to the Individual condition were asked to rate a White person, a Black person, a man, and a woman, with each person randomly assigned to a different trait (see example below). Those assigned to the Group condition received vignettes asking them to compare Blacks and Whites, Whites and Blacks, females and males, and males and females, again with each comparison randomly assigned to a different trait. Because no trait was repeated within the set assigned to a respondent, no within-subject analyses are possible. All four vignettes assigned to a respondent used the same rating scale—either the binary or the 21-point scale. For example, one set of Individual vignettes might consist of the following descriptions:

“A substantially overweight Black person who has tried to lose weight in the past but always gains it back again.

4. The behavioral characteristics were drawn from two sources: (1) lists of traits that had been rated as desirable and undesirable in various psychological studies (Kirby and Gardner 1972; Bochner and Van Zyl 1985; Hampson, Goldberg, and John 1987); and (2) characteristics that had been rated as primarily influenced by genes, or primarily by the environment, in public opinion studies (Singer, Corning, and Lamias 1998). From these sources, we chose characteristics that (a) were clearly positive or negative; (b) had small standard deviations around the ratings; (c) could be considered either environmental or genetic in origin; and (d) could apply equally well to men and women.

A White person who gets drunk several times a week and often can't remember what happened during these drinking episodes.

A highly intelligent woman who did very well in school and is now a partner in a large law firm.

A man who's a good all-around athlete, was on the high school varsity swim team, and still works out several times a week."

If this set of vignettes was assigned to the binary scale condition, the set was preceded by the following introduction:

"Many things influence people's character, personality, and behavior. For each of the descriptions on the following pages, please indicate whether you think the characteristic or behavior is due at least partly to the genes the person inherits."

Then, before each vignette was presented, the respondent was asked:

"Do you think any part of the behavior below is due to the genes the person inherits?

Yes  
No"

If this vignette set was assigned to the 21-point scale condition, the set was preceded by the following introduction:

"Many things influence people's character, personality, and behavior. For each of the descriptions on the following pages, please indicate what percent of the characteristic or behavior you think is due to the genes the person inherits, and what percent is due to learning and experience and other aspects of the environment.

The scale following each description is arranged so that the first button on the left represents 100% genetic influence (and 0% environmental influence). The next button represents 95% genes (and 5% environment), and so on. The rightmost button represents 100% environmental influence (and 0% genetic influence)."

Then, before each vignette was presented, the respondent was asked:

"Using the scale below, indicate what percent of the behavior you think is due to the genes the person inherits, and what percent is due to learning and experience and other aspects of the environment."

As already noted, corresponding vignettes asked respondents about the *causes of differences* between Blacks and Whites, Whites and Blacks, men

and women, and women and men with respect to the four characteristics, again with each comparison randomly assigned to a different trait and all four vignettes to be rated by a respondent assigned to either the binary or the 21-point scale. If respondents were assigned to the binary scale condition, the introduction to these Group vignettes read:

“Many things influence differences between people in character, personality, and behavior. For each of the descriptions on the following pages, please indicate whether you think the difference is due at least partly to the genes people inherit.”

As in the case of the Individual vignettes, the four characteristics were randomly paired with the four different groups, and each respondent made judgments about all four characteristics and all four groups. One set of vignettes, for example, might read as follows:

“Do you think any part of the difference below is due to the genes people inherit:

Differences in intelligence between Black people and White people?

(If yes) How much of the difference do you think is due to the genes they inherit?

Differences in athletic ability between White people and Black people?

(If yes) How much of the difference do you think is due to the genes they inherit?

Differences in obesity between men and women?

(If yes) How much of the difference do you think is due to the genes they inherit?

Differences in alcoholism between women and men?

(If yes) How much of the difference do you think is due to the genes they inherit?”

In the 21-point scale Group condition, the introduction read as follows:

“Using the scale below, indicate what percent of the difference you think is due to the genes people inherit, and what percent is due to learning and experience and other aspects of their environment.”

In addition to the four vignettes seen by each respondent, we included a four-item measure of racial attitudes (RACEDIFF) that had been used on the 2004 General Social Survey and was included in our earlier study (Singer et al. 2007). The questions were as follows: “On average, Blacks have worse jobs, income, and housing than White people. Do you think these differences are: (a) Mainly due to discrimination (Yes/No); (b) Because most Blacks have less inborn ability to learn? (Yes/No); (c) Because most Blacks don’t have the



chance for education that it takes to rise out of poverty (Yes/No); (d) Because most Blacks just don't have the motivation or willpower to pull themselves up out of poverty (Yes/No)?" The responses coded as biased against Blacks were No, Yes, No, and Yes, and the score on the scale was the sum of biased responses; mean = 1.84, S.D. = 1.15, raw alpha = 0.52. Although many other measures of racial attitudes are available, we selected this because of its repeated inclusion on the GSS and because it has been used in many analyses of racial attitudes. Most of these articles analyze the four items individually (e.g., Lacy and Middleton 1981; Schuman, Bobo, and Krysan 1992; Mitchell 1996) or a subset of the four (e.g., Jelen 1990; Kluegel and Bobo 1993; Schuman and Krysan 1999). In the present analysis, the four items are used as a single indicator of prejudice, with the coding reversed on items a and c to account for the negative correlation. We also discuss the results of alternative analyses in the Results section.

Respondents were also asked a series of questions about their demographic characteristics, which are used as controls in the analyses. All of these questions were administered after the vignettes themselves, in order to avoid influencing the responses to the vignettes.

Our focus in the present article is on the two vignettes involving race to which each respondent was exposed. As already noted, we hypothesized that a request for the causal attribution of differences in behavior between groups would produce a significant relationship between race prejudice and the attribution of differences to genetic causes, whereas a request for causal attribution of individual characteristics would not produce such a relationship. We also hypothesized that the binary scale would be more likely to show a relationship between prejudice and the attribution of genetic causes than the 21-point scale, for reasons already discussed.

## ANALYSIS

As noted above, the dependent variable in all analyses is the measure of belief in the genetic causes of characteristics or behavior, with each respondent receiving a score on the two race vignettes to which s/he was exposed. Each vignette is treated as a separate record in the multilevel (clustered) analysis. The specific characteristics asked about (i.e., obesity, alcoholism, intelligence, athleticism) as well as the race of the vignette subject are included as control variables.

In analyses involving the binary scale, the beliefs measure is the response to a yes/no question, with 1 indicating the attribution of any part of a particular characteristic to genetic causes and 0 the complement (no genetic attribution). Across all cases in the analysis, 52.6 percent of respondents answered in the affirmative. These analyses use logistic regression.

In analyses involving the 21-point scale, the beliefs measure is the scale score, which indicates how much of the characteristic is attributed to genes and how much to the environment. Across all cases, the average score on

the scale is 10.5 (just below the midpoint of 11), with a standard deviation of 5.47. The distribution approximates a normal distribution (skewness = 0.055, kurtosis = -0.93) and is thus suitable for use in linear regression. As we expected, many more respondents (94.6 percent) selected a scale point corresponding to some genetic attribution; only 5.4 percent (compared with 47.4 percent of those answering the binary scale) said that differences (or individual characteristics) were entirely determined by environmental factors, suggesting that the people who selected these answers might differ in other respects as well. To facilitate comparisons between the binary and the 21-point scales, scores on the latter were reversed so that higher scores signify greater genetic attribution.

The independent variable of interest in all analyses is our measure of prejudice, the four-item scale. We also report the results of alternative analyses involving this variable.

Because our hypotheses specify that the relationship between prejudice and beliefs about genetic causation will vary depending on the wording of questions and on response alternatives, these two variables are used as grouping variables in the analyses below. Although they could have been entered into the analysis as dummy variables instead, this would have entailed multiple interaction terms and greatly complicated the interpretation. Accordingly, we show the relationship between the measure of prejudice and beliefs in genetic causation separately for the four cells of the experimental design.

For the analyses in this article, which focus on race prejudice, the sample was limited to Black and White respondents.

All analyses were conducted using SAS PROC MIXED and IVEware (see Raghunathan, Solenberger, and Van Hoewyk 2000) to reflect the fact that each respondent rated two race vignettes by correcting for the non-independence of the observations.

## Results

### RACIAL ATTITUDES AND GENETIC ATTRIBUTIONS

The results of analyses for vignettes that ask respondents to indicate whether any, or how much, of the difference between Blacks and Whites (or Whites and Blacks) is accounted for by genes (the Group condition) are shown in table 1 for both the binary and the 21-point scales. The models also control for respondent race, gender, age, and education,<sup>5</sup> and for the four character-

5. We tested the interaction between race of respondent and the racial attitudes measure, but because the parameter for the interaction was not significant in any of the individual tables, we retained the full sample in the analysis instead of restricting it to White respondents only. The coefficients for Black and White respondents are in the same direction and do not differ significantly from each other.

**Table 1. Coefficients from Regression Models: Predictors of Genetic Attribution When Differences Between Groups Are Asked About, by Response Scale** (standard errors in parentheses)

Variable	Binary scale (logistic regression)	21-point scale (linear regression)
Intelligence	-1.397 ** (0.127)	-6.012 ** (0.305)
Obesity	-0.422 ** (0.120)	-3.159 ** (0.317)
Alcoholism	-1.044 ** (0.125)	-4.846 ** (0.317)
(Athletic ability)	—	—
RFemale	-0.087 (0.115)	0.412 (0.264)
RWhite	0.040 (0.190)	0.221 (0.520)
Some college	0.024 (0.154)	0.081 (0.353)
College grad	0.341 * (0.151)	-0.582 (0.354)
(High school or less)	—	—
Age	0.006 (0.004)	0.024 * (0.009)
RACEDIFF	0.240 ** (0.050)	0.433 ** (0.119)
Intercept	-0.445	11.829 **
Standard errors	(0.302)	(0.766)
<i>n</i>	2,023	2,005
Replicates	1,017	1,005

\**p* < 0.05.\*\**p* < 0.01.

istics described in the vignettes. Because all the ratings in the Group condition involve comparisons between Blacks and Whites, separate ratings by race of the vignette subject cannot be shown.

Regardless of which scale is used, the relationship between racial attitudes and genetic attributions of differences between groups is significant and in the same direction: The higher (more biased) the score on the racial attitudes variable, the greater the likelihood that some part of the difference between racial groups will be attributed to genetic causes.

Again, regardless of which scale is used, intelligence, obesity, and alcoholism are significantly less likely to be attributed to genes than is athletic ability. There is no difference between Black and White respondents in their tendency

**Table 2. Coefficients from Regression Models: Predictors of Genetic Attribution When Individuals Are Asked About, by Response Scale (standard errors in parentheses)**

Variable	Binary scale (logistic regression)	21-point scale (linear regression)
Intelligence	0.122 (0.120)	-0.096 (0.309)
Obesity	1.219 * (0.146)	1.911 ** (0.318)
Alcoholism	-0.205 (0.125)	-1.339 ** (0.322)
(Athletic ability)	—	—
RFemale	0.163 (0.116)	-0.035 (0.256)
RWhite	0.956 ** (0.195)	0.488 (0.459)
Some college	-0.013 (0.156)	-0.330 (0.353)
College grad	0.456 ** (0.159)	-0.286 (0.355)
(High school or less)	—	—
Age	0.003 (0.004)	0.025 ** (0.008)
RACEDIFF	-0.105 (0.062)	-0.183 (0.148)
VBLACK	0.080 (0.144)	-0.359 (0.383)
RACEDIFF*VBLACK	-0.122 (0.072)	-0.068 (0.188)
Intercept	-0.842 ** (0.331)	9.425 ** (0.737)
<i>n</i>	1965	1931
Replicates	985	967

\*  $p < 0.05$ .\*\*  $p < 0.01$ .

to attribute racial differences on these characteristics to genetic causes. When the binary scale is used, college graduates are significantly more likely to attribute differences between Blacks and Whites to genetic causes; this is true of older people when the 21-point scale is used.

Table 2 shows the analysis of vignettes in which, instead of being asked whether any part of the *difference* between groups with respect to a particular characteristic is attributable to genetic causes, respondents are asked whether

any part of a *particular characteristic* is attributable to genetic causes (the Individual condition). Column 1 of table 2 shows the relationship between racial attitudes and genetic attribution when the binary scale is used with vignettes about Whites (VBLACK = 0) and about Blacks (VBLACK = 1), respectively; column 2 shows the same analysis for the 21-point scale, again with a higher score (or positive coefficient) indicating greater genetic attribution.

When the binary scale is used, there is no significant relationship between the measure of racial attitudes and whether respondents attribute some part of the characteristic to genes or inheritance. The main effect of vignette race is not significant, and neither is the interaction between vignette race and the measure of racial attitudes.

Unlike the analyses of vignettes asking about differences between groups (table 1), column 1 of table 2 indicates that when the subject of the vignette is an individual and the binary scale is used, White respondents (RWHITE = 1) are consistently more likely than Black respondents (RWHITE = 0) to attribute some part of the characteristic to genetic causes. In addition, respondents with a college education are significantly more likely to attribute some part of the characteristic to genetic causes than are high school graduates.

Column 2 of table 2 shows results for the 21-step scale. Once again, there is no significant relationship between the measure of racial attitudes and genetic attribution, and vignette race as well as the interaction between racial attitudes and vignette race are also nonsignificant. With the linear scale, White respondents do not differ significantly from Black respondents, nor is the effect of college education significant. However, older respondents are significantly more likely to attribute behavior to genetic causes.

For all the analyses in tables 1 and 2, we also tested individual models for each of the separate items of the racial attitudes measure. When groups are asked about and the binary scale is used, all the items except item 3 (chance for education) are significantly associated in the predicted direction with a belief that at least some part of the difference between Blacks and Whites in the four characteristics asked about is due to genes. When the 21-point scale is used, all except item 1 (discrimination) are significantly associated in the predicted direction with such beliefs. When individuals are asked about, item 3 is significant in the opposite direction with the binary scale; none of the items are significant with the 21-point scale. In other words, analyses of the disaggregated prejudice measure yield results equivalent to those for the combined racial attitudes measure. The same is true when we substitute an ordinal scale (data not shown).

## Discussion and Conclusions

The findings of the present study indicate that the way questions about genetic causation of behavior are framed makes a significant contribution to the answers obtained *because it significantly changes the meaning of the questions*.

Framing of the question determines whether a relationship will be detected between genetic attributions of behavioral characteristics and racial attitudes.<sup>6</sup> In the current study, two features of questions were varied: (1) Whether respondents are asked for causal attributions of differences between Black and White groups or whether they are asked to make such attributions for the characteristics of Black and White individuals; and (2) the scale used to measure the responses. The predicted significant positive relationship between race prejudice and genetic attributions is found only when respondents are asked to make causal attributions for differences between racial groups. Prentice and Miller (2007, p. 205) suggest a similar conclusion when they note that “human characteristics become the basis for essentialized categories only to the extent that they are used to explain differences.” When respondents are asked to make causal attributions for characteristics shown by individuals, no such relationship is found with either scale. The relationships between a measure of racial prejudice and genetic attribution in table 2 are nonsignificant for both scales.

Far fewer respondents acknowledge that genes play any part in the characteristic in question when the Yes/No version of the question is asked, and attempts to refine the answer further, by asking how much of the characteristic is determined by genes, are limited by the response to the initial question. However, despite the substantially different response distributions to the two different response scales used, these scales appear to make no difference in the findings of primary interest.

The reason for the effect of question framing appears to be that the two types of questions—questions about the causes of differences between groups with respect to a behavior or characteristic, and questions about the causes of individual behaviors or characteristics—are not equivalent in meaning. Geneticists seem to agree that most characteristics vary more *within* racial groups than *between* them. Hence, asking about the genetic origins of observed differences between Blacks and Whites implies that, contrary to fact, there are such differences and seems to invite a prejudiced (stereotyped) response. The emergence of such a relationship is therefore perhaps not surprising. Asking about the causes of individual characteristics carries no such implications.

The study has at least two limitations, both of them already alluded to. First, the study uses a volunteer sample, which limits the generalizability of results. Second, the findings derive from a particular measure of race prejudice and, given our findings concerning the effects of question framing, it is

6. We are certainly not the first to investigate the role of question wording in findings about prejudice. Schuman and Krysan (1999), for example, point out that about half the substantial change between 1963 and 1968 in responses to a question about whether Whites or Blacks are responsible for Blacks' disadvantaged position can be attributed to changes in the wording of the question.

possible that other measures would show different relationships between prejudice and causal attribution. The measure we used as an indicator of race prejudice also suffers from the fact that the four items are not highly intercorrelated, and two of them (inborn ability and willpower) are similar to the dependent variable. Nevertheless, when we disaggregate the scale and examine the items one at a time, our predictions are supported: Three of the four items are significantly correlated with a belief in genetic determination when group differences are asked about, regardless of which response scale is used, whereas none of the items are significant in the predicted direction when individuals are asked about, again regardless of which response scale is used; nor does including all four items as an ordinal scale change our conclusions. Furthermore, the same relationship between genetic attribution of group differences and race prejudice has been found by Jayaratne et al. (2006), using very different measures of prejudice.

Despite their limitations, we believe that these findings have important implications for how discourse about the role of genes and environment in shaping human behavior should be conducted. Race in the United States is a social classification, based on highly variable and biologically questionable criteria. As we have noted elsewhere (Singer et al. 2007), an emphasis on observed differences between groups, and an attempt to explain those differences, may well lead to an overemphasis on genetic influence and consequently to stereotyping and the reinforcement of prejudiced attitudes. On the other hand, an emphasis on individuated descriptions of human behaviors and characteristics may help reduce the likelihood of stereotyped judgments and the prejudiced attitudes that often accompany them. As Royal and Dunston (2004, p. 55) note in their commentary on a special issue of *Nature Genetics* devoted to the relationships among race, genetics, and health, resolving “apparent paradoxes in relating biology to ‘race’ and genetics requires thinking ‘outside of the box.’”

We do not want to be misunderstood as claiming that prejudice is “only” a function of question framing. It seems quite plausible that the rigid stereotypical thinking that is part of what is commonly regarded as prejudice should be associated with a belief in the unchangeability of behavior that is also characteristic of genetic determinism. Still, as Hyman and Sheatsley (1954) demonstrated more than 50 years ago in their methodological critique of *The Authoritarian Personality*, some of what is captured by verbal measures of authoritarianism is a *response style* associated with social class and, especially, with education. Along the same lines, we believe that at least some of the association between measures of race prejudice and genetic attribution found by Jayaratne et al. (2006) and others is a function of the way questions are framed and of the response options offered. More importantly, such question framing in turn has consequences for the way people think about race and genetics. Hence researchers, writers, and scholars have an obligation to incor-

porate the best current science into their work in order to avoid perpetuating the very racism they are trying to measure.

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