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ARTICLES

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Consumers' judgments of the frequency with which members of an ethnic minority are represented in advertisements can depend on the processing strategies they employ both at the time the ads are first encountered and at the time the judgments are reported. These strategies, in turn, can depend on whether the consumers personally belong to the minority group in question. European American and African American participants received a series of advertisements that varied in terms of the relative numbers of Black and White models that were portrayed. European Americans overestimated the number of Black models that appeared in the ads when the actual incidence of these models was low, but this overestimation decreased (and thus they became more accurate) as the number of ads containing these models increased. In contrast, African Americans were accurate when only a small number of Black models were presented, but became less accurate as the actual incidence of the models became greater. European Americans apparently based their estimates on the ease of recalling individual instances at the time of judgment, whereas African Americans appeared to perform an online tally of the number of Black models shown at the time they encountered them.

The past three decades have witnessed a marked increase in the number of ethnic minority members that appear in advertisements. This increase has undoubtedly been stimulated by social demands to ensure that minority members are adequately represented in visible media positions. However, it is important to know whether these efforts are perceived as successful by the particular minority group in question as well as by the public at large. This question may be of concern to companies who want to ensure that their ads are not perceived as discriminatory by the consumers they want to attract. The question also has important public policy implications. If majority and minority members' perceptions of the incidence of minority members differ, their conclusions about the success of programs intended to promote equality are also likely to differ.

This research investigated the nature of these between-group differences and the reasons why they occur, focusing on African American models appearing in advertisements. We assumed that African Americans, who have historically been underrepresented in the media, would be especially concerned about whether their representation in advertisements is adequate. Thus, we expected their reactions to the ads to differ from those of the European American majority.

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People's frequency estimates can sometimes be influenced by lay or implicit theories, or their own internally generated propositions about their social worlds, that they apply independently of their exposure to instances of the event being judged (Ross, 1989). If European Americans and African Americans have acquired different implicit theories about the representation of Blacks in the media, their frequency estimates could differ correspondingly.

Between-group differences can also exist in the cognitive responses that people have to advertisements containing Black and White individuals. These responses could occur at the time the ads are encountered. On the one hand, European Americans are likely to have relatively little a priori interest in the frequency of Blacks' occurrence in advertisements per se, which is neither personally relevant nor relevant to an evaluation of the products being advertised. Thus, these individuals may not estimate this frequency at the time they view the ads. Consequently, if they later have occasion to make this estimate, they must compute it at the time of judgment based on information they retrieve from memory and other criteria that happen to be available.

African Americans, on the other hand, may be intrinsically motivated to ensure that their group is being adequately represented and that the discrimination they have encountered in the past no longer exists. Thus, these individuals may spontaneously make an online, stimulus-based assessment of the incidence of minority individuals in advertisements at the time they encounter them, without being explicitly asked to do so (for further discussion of memory-based vs. stimulus-based judgments, see Lichtenstein & Srull, 1987). This research explored these possibilities and their implications.

THEORETICAL BACKGROUND

Memory-Based Frequency Estimates

People may not spontaneously estimate the frequency with which events occur unless they have a particular interest in doing so. Rather, they compute this estimate after the fact, at the time the estimate is requested. Such estimates may not always depend on the implications of the information they can recall. Schwarz (2004) provided substantial evidence that people base their judgments on the subjective ease with which judgment-relevant information comes to mind rather than the implications of the recalled information itself (Schwarz et al., 1991; Tversky & Kahneman, 1973). Ease of retrieval is likely to increase with the frequency and recency with which relevant information has been encountered. Shrum and colleagues, for example, showed that people tend to overestimate the incidence of real-world events that are shown frequently on television because frequent exposure to events on television can increase the accessibility of the events in memory (Shrum, Wyer, & O'Guinn, 1998; for a review, see Shrum, 2002).

Other factors come into play as well. For one thing, the ease of recalling a specific instance is determined in part by the amount of thought and attention that was devoted to it at the time it was first encountered (Craik & Lockhart, 1972; Wyer & Hartwick, 1980). This attention, in turn, may be influenced by the distinctiveness of the instance in the specific context in which it is encountered (McGuire & McGuire, 1988; Swan & Wyer, 1997; see Park & Wyer, 1984, for evidence in the consumer domain).

These findings suggest that if stimuli are relatively novel (either in the specific context in which they occur or more generally), they stimulate greater cognitive processing and, therefore, are more easily recalled and used as a basis for judgments to which they are relevant. Frequency estimates may be among these judgments. A study by Hamilton and Gifford (1976) confirmed this conclusion using procedures similar to those employed in the research to be reported. Participants received information about two groups of persons. One group contained a numerical majority (18 individuals) who were described favorably and a minority (8 individuals) who were described unfavorably. The second, smaller group contained 9 persons who were described favorably and 4 who were described unfavorably. (In two other conditions, the frequencies of favorable and unfavorable descriptions were reversed.) Thus, the proportion of "minority" members of each group was the same in all conditions. Nevertheless, participants later overestimated the number of minority individuals in the groups. Furthermore, their overestimation was greater when the number of members presented was small than when it was large.

These results have direct implications for the issues of concern in this article. Participants in our research saw a series of print ads in which the number of Black models varied but the proportion of these models (relative to White models) was held constant. Black models may be more distinctive, and thus may be more easily recalled, when a small number is presented than when a larger number is conveyed. Therefore, if these participants use the ease of retrieving instances of Black models as a basis for estimating their frequency, they are more likely to overestimate this frequency when a small number is presented than when a large number is presented, as Hamilton and Gifford's (1976) findings suggest. Note, however, that this prediction assumes that participants do, in fact, use ease of retrieval as a basis for their estimates. As discussed in the next section, this is not always the case.

Stimulus-Based Frequency Estimates

People are likely to make memory-based estimates of the incidence of an event when they have encountered these instances without any specific goal in mind. In some instances, however, people may have an a priori interest in the frequency of the events' occurrence. Then, they may keep a running tally of the number of events that occur at the time they encounter them, and may use this tabulation as a basis for the estimate they report later. If so, their estimates should be

particularly accurate when a small number of instances are encountered and, therefore, are easy to count. As the number becomes larger, these people are more likely to lose track of the actual number and, therefore, to rely on other criteria. For example, they might default to an implicit theory they have acquired about the occurrence of instances of these events in the context under consideration, and base their judgments in part on this criterion.

The effects on accuracy of using these online computations contrast with the effects of using memory-based judgment processes. In this context, for example, people who make memory-based judgments of the incidence of Blacks in a series of ads are particularly likely to overestimate this incidence when the number presented is small. However, they should overestimate less (and thus be more accurate) as the actual number increases (Hamilton & Gifford, 1976). In contrast, people who make stimulus-based judgments should show the opposite pattern. That is, they should be relatively accurate when a small number of instances are presented because a small number of instances are easy to count, but should become less accurate as the actual number increases.

The Impact of Ethnicity

We expected that memory-based frequency estimates would be evident among European American participants. These individuals are often less likely than minority members to be personally concerned about the representation of Blacks in advertisements. At the same time, they encounter Blacks relatively infrequently not only in these contexts but also, perhaps, in other contexts as well. Consequently, they may find these models fairly distinctive and may pay relatively more attention to them than to their White counterparts (for evidence that European Americans are generally more sensitive to the presentation of Black individuals than to Whites, see Zarate & Smith, 1990). Their more extensive processing of Black models should increase the ease of retrieving them later (Craik & Lockhart, 1972; Wyer & Hartwick, 1980). As the number of models presented increases (and novelty thus decreases), however, their interest is likely to wane, and so the amount of thought devoted to any particular model is likely to decrease. Consequently, the ease of retrieving individual instances should decrease, and so overestimates of the frequency of these instances should decrease correspondingly. Thus, we expect that European Americans will tend to overestimate the number of Black models presented in a series of advertisements when the actual number presented is small, but this tendency will decrease (the accuracy of their estimates will improve) as the number of models presented becomes greater (H1a).

In contrast, we expected that stimulus-based frequency estimates would be evident among African Americans. African Americans, as compared to European Americans, are typically more conscious of their ethnic identity and more motivated to identify with their ethnic group (Grier & Deshpande, 2001). Therefore, they are likely to be more sensitive to information that is relevant to this group (Coats, Smith, Claypool, & Banner, 2000; see Whittler & Spira, 2002 for a demonstration in the advertising domain), including how many group members are present in social situations (Wooten, 1995). If so, they may have a greater a priori interest in estimating their representation in advertisements as well as in the media more generally.

The accuracy of this tally may depend on the overall number of models presented, however. When only a few models are presented, and the Black ones are easy to count, this tally may provide an accurate estimate of the number of these models. When the total number of models presented increases, however, keeping track of the Black models may be more difficult, and so participants may lose count. This could lead them to be less confident of the accuracy of their tally when they are asked to make a frequency estimate later, and to rely in part on their implicit theory that Blacks are typically underrepresented in the media (see Williams, Qualls, & Grier, 1995). Thus, we expect that African Americans will make accurate estimates of the number of Black models presented when only a small number are shown, but will increasingly underestimate their incidence (and become less accurate) as the number presented becomes greater (H1b).

An ambiguity in evaluating this hypothesis should be noted. It was unclear a priori whether African Americans would base their inferences about proportional representation on the number of Black models they encounter per se or, alternatively, on the number of ads that contain these models, independently of the total number that are shown. (Certainly a series in which Black models are evenly distributed over ads may elicit quite different reactions than a series in which the same number of Black models are all concentrated in a single ad.) Although we had no clear hypotheses concerning this matter, it seemed worth examining in the research to be reported. Thus, both the number of Black models and the number of ads containing them were manipulated independently.

Recognition Memory

Although African Americans may be more attentive than European Americans to the presence of Black models, this does not necessarily mean that they will scrutinize these models very carefully. In fact, we expected the opposite. Although African Americans may consider Black models to be relatively uncommon in an advertising context, they are unlikely to regard them as particularly novel stimuli in their own right, and so the individuating features of the models may not receive much attention. Thus, we expected African American participants to keep a subjective tally of the number of Black models presented without devoting much attention to the details of models' appearance.

We further assumed that European Americans' estimates of the incidence of Black models would be based on the ease with which specific models came to mind at the time of

judgment. If this is so, their estimates should be related to their ability to recognize the Black models they saw. That is, European Americans' recognition accuracy should be relatively high, particularly when a small number of Black models are actually presented. In contrast, because African Americans are expected to keep an online count of the number of Black models shown in the ads, we expected that their ability to recognize the Black models they saw should be low and unrelated to their subjective frequency estimates. Thus, we expect that European American participants' recognition of the individual Black models presented in a series of advertisements will be high, particularly when the number of instances presented is low. However, African American participants' recognition of Black models will be low regardless of the number presented (H2). In addition, we expect that European Americans' estimates of the frequency of occurrence of Black models will be correlated positively with their accuracy of recognizing them. However, African Americans' estimates of the frequency of occurrence of the models will be uncorrelated with their recognition accuracy (H3).

Numerical Estimates Versus Subjective Judgments

In daily life, people typically do not communicate their judgments of frequency in terms of numbers. Rather, they convey their general impressions of frequency in subjective units (e.g., high or low). Individual and situational differences in the external standards that people use as a basis for judgment can influence their subjective estimates independently of the numerical values to which these estimates refer (Adaval & Monroe, 2002; Wyer, 1974). Furthermore, once these subjective judgments are formed and stored in memory, they can be retrieved and used as a basis for later judgments and decisions independently of the specific information on which they were based (Carlston, 1980; for a discussion of these effects, see Wyer & Srull, 1989).

These possibilities are also important in conceptualizing the phenomena of concern in this article. For example, if African Americans typically believe that Black models *should* be represented with relatively high frequency, they might evaluate their numerical estimates of their incidence in relation to this idealized standard. These beliefs could lead them to judge the incidence of Black models to be generally lower than European Americans do. However, this tendency alone could not in itself account for the combination of effects we hypothesize (e.g., differences in the accuracy of numerical estimates or in recognition accuracy). We consider these matters more fully after the results of our studies are reported.

Summary

To reiterate, the number of Black (vs. White) models in the ads we presented, and the number of ads containing these models, varied over condition. These variables could influence participants' ease of retrieving these models from memory (as reflected in recognition accuracy) and this, in turn, could influence estimates of the incidence of these models. If participants keep a running tally of the number of Black models presented, however, these variables could also have direct effects on numerical frequency estimates. In each case, participants' subjective judgments of the incidence of Black models are presumably based on these numerical estimates. As we have noted, the magnitude of these relations were expected to depend on participants' own ethnicity. The interrelations among these variables, and the different expectations as a function of ethnicity, are reflected in the two path models shown in Figure 1. The following study confirmed these expectations.

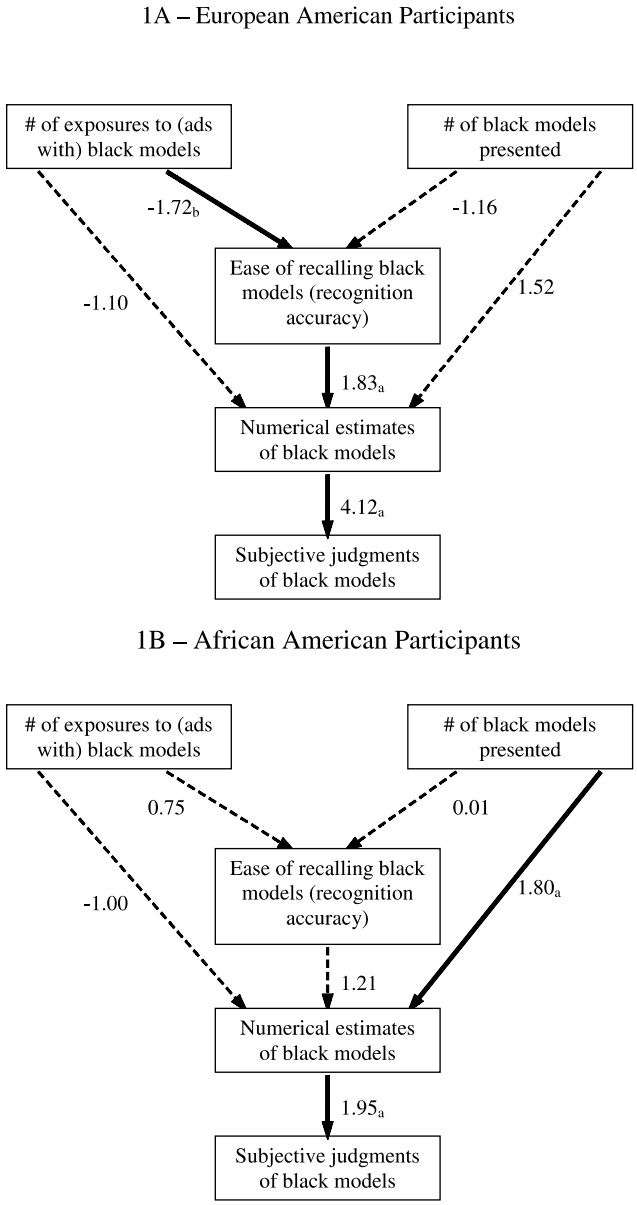

FIGURE 1 Path analysis results from experiment 1. Standardized coefficient estimates are shown next to paths. Subscript *a* indicates paths that are significant at $p < 05$; subscript *b* indicates paths that are significant at $p < .07$.

EXPERIMENT 1

Participants viewed a series of clothing ads containing both Black and White models in one of three randomly assigned presentation conditions. Both the proportion of Black models and the proportion of ads that contained these models were the same in all conditions (10% and 20%, respectively). These proportions were similar to the overall representation of Blacks in the population (13%, U.S. Census Bureau, 2002). However, the number of Black models presented and the number of ads that included Black models varied. Participants were presented with either a small number of Black models distributed over a small number of ads (low-model/low-ad), a large number of models distributed over a small number of ads (high-model/low-ad), or a large number of Black models distributed over a large number of ads (high-model/high-ad). The specific configuration for each of these three conditions is shown in Table 1.

Thus, a difference between low-model/low-ad and high-model/low-ad conditions indicates the effect of increasing the number of Black models, holding constant the number of ads containing Blacks. A difference between high model/low ad and high-model/high-ad conditions indicates the effect of increasing the number of ads, holding constant the number of Black models. Note also that the average number of Black models in the ads that contained them was greater in the high-model/low-ad conditions ($M=3.0$) than in either of the other two conditions ($M=1.5$). The importance of this difference will be discussed presently.

Method

Participants. Undergraduates at two North American universities were offered course credit for participating in an advertising study. One of these universities had a predominately Black student population and the other had very few Black students. In each case, the recruitment information made no references to ethnicity. We obtained 56 African American participants from the former school, and 39 European American participants from the latter. (We classified as African Americans U.S. citizens who identified themselves as Black or African American, and classified as European American U.S. citizens who identified themselves as White, Caucasian, or European American.) To increase the size of the European American sample, an additional 12 participants in an overseas student exchange program were added. On the variables of interest, the responses of the two European American samples did not differ significantly; therefore, we pooled these two groups. Participants of each ethnicity were distributed fairly evenly over the three stimulus presentation conditions described earlier.

Construction of stimulus materials. Print advertisements for fictitious fashion brands were constructed according to the criteria described above. Each advertisement contained color pictures of from two to six models who were either Black or White, along with a (fictitious) brand name. The pictures, which were collected from the Web sites of fashion designers, were pre-tested to ensure that all models were similarly attractive. An equal number of male and female models of each ethnicity were included.

Procedure. Participants were told that we were interested in their reactions to some fashion advertisements that were being developed by an advertising agency in another North American city, and that their responses would help the agency to ensure the effectiveness of its advertising. With this preamble, participants were shown a series of advertisements on an overhead projector. Each ad was presented for 15 sec. On completion of the stimulus series, participants were given a short filler task (some unrelated scale measures) to clear working memory and then asked a number of questions about the ads they had seen. First, they listed their (open-ended) reactions to the advertisements with instructions to note any aspects that had caught their attention. Next, they estimated frequencies for various characteristics of the ads and the models contained in them. For example, participants estimated the number of models who

TABLE 1
Configuration of the Three Study Conditions: Number of Black (vs. White) Models and Number of Advertisements With Some Black (vs. all White) Models

	Low Model/Low Ad Condition		*High Model/Low Ad Condition*		*High Model/High Ad Condition*	
	n	%	*n*	%	*n*	%
Models						
Black models	6	10%	12	10%	12	10%
White models	54	90%	108	90%	108	90%
Total	60	100%	120	100%	120	100%
Advertisements						
Ads containing some Black models	4	20%	4	20%	8	20%
Ads containing all White models	16	80%	16	80%	32	80%
Total	20	100%	20	100%	40	100%

were male, female, and bald, and the number of advertisements for pants, shirts, and shoes. Our primary dependent measures were embedded among these questions. Specifically, participants were asked to estimate the actual number of both Black and White models included in the ad series and then later to judge the incidence of both Black and White models along a scale from 1 (*very small*) to 10 (*very large*).

Recognition memory. On completion of these estimates, participants were shown pictures of 16 models and indicated whether they recalled seeing each of them in the ads. Eight of these models had actually appeared in the ad series, and 8 were decoys. Each group of models comprised 2 Black men, 2 White men, 2 Black women, and 2 White women. Although the pictures of models in the advertisements were full-body shots, the pictures used in the recognition task displayed only the head and shoulders of each model. Therefore, accurate recognition required that participants attend to the models' physical features rather than to their clothing or poses.

Supplementary data. Participants indicated how much attention they had paid to male and female models of each ethnic group along a scale from 1 (*very little*) to 10 (*a lot*). They also indicated whether they noticed the ethnicity of the models and the similarity of the models to themselves, both along a scale from 1 (*not at all*) to 10 (*very much*). Then, participants provided basic demographic information that included their ethnicity and then indicated how strongly they identified with their ethnic group along a scale from 1 (*not strongly*) to 7 (*strongly*). Finally, they were asked to guess at the purpose of the study (none could), debriefed, and dismissed.

Results

Subjective frequency estimates. We expected that European Americans' subjective perceptions of the incidence of Black models would be greater when the actual number presented was low than when it was high (H1a). In contrast, we expected that African Americans' estimates, which are based on an online frequency count of the number presented, would increase with the number presented (H1b). Data bearing on this hypothesis are shown in the top half of Table 2, which summarizes participants' subjective estimates of the frequency with which Black models were presented. (Estimates of the incidence of White models are shown in the bottom half of the table.) Data for each type of model were analyzed separately.

European Americans judged Black models to have been presented more often (M=3.26) than African Americans did (M=2.47), $F(1, 101)=3.40$, $p < .05$. However, the magnitude of this difference varied over the three presentation conditions, as evidenced by an interaction of conditions and participant group, $F(2, 101)=3.61$, $p < .05$. Specifically, African American participants judged Black models to have been presented less often in low-model/low-ad conditions (M=2.05) than in either of the two high-model conditions (M=2.68), $F(1, 101)=4.87$, $p < .05$, which did not appreciably differ from one another (2.70 vs. 2.65), $F < 1$ (supporting H1b). This suggests that African Americans' subjective responses were guided by the actual number of Black models presented but were not particularly influenced by the number of ads over which the models were distributed.

In contrast, European American participants' estimates were *greater* when a small number of ads contained Black models (M=3.51, averaged over low-model/low-ad and high-model/low ad conditions) than when a large number of ads contained these models (M=2.75), $F(1, 101)=3.21$, $p < .05$, and this was true regardless of the actual number of Black models that were presented (supporting H1a). Thus, European Americans' estimates appeared to be influenced primarily by the number of ads containing Blacks but not the actual number of such models presented. This result might seem to contradict the assumption that these participants based their judgments on the ease of recalling individual exemplars. It seems likely, however, that these

TABLE 2
Subjective Estimates of the Frequency of Black and White Models as a Function of Presentation Condition and Participant Ethnicity

	Actual Number of Models Presented	*European American Participants*	*African American Participants*	*M*
Judgments of Black models				
Low model, low ad	6	3.33[a]	2.05[c]	2.89
High model, low ad	12	3.69[a]	2.70[b]	3.20
High model, high ad	12	2.75[b]	2.65[b]	2.70
Judgments of White models				
Low model, low ad	54	8.50[d]	8.84[d]	8.67
High model, low ad	108	7.77[d]	7.62[d]	7.70
High model, high ad	108	8.25[d]	9.45[d]	8.65

Note. Subjective estimates are on a scale from 1 (*very small*) to 10 (*very large*). Cells in the same row or column with unlike superscripts different at $p < .05$, based on separate analyses of estimates of Black and White models.

participants' attention to individual Black models varied with the number of ads presented. That is, they apparently paid close attention to the individual models when a relatively small number of ads were presented, but their interest waned when a large number was shown. Other data to be reported reinforce this interpretation.

Analyses of data pertaining to White models yielded no significant effects ($p > .10$). One aspect of these data is nonetheless noteworthy. As we mentioned earlier, the number of Black models per ad was higher in the high-model/low-ad condition than in either of the other two conditions. This factor appears to have influenced participants' estimates over and above the effects of other factors. Both groups of participants judged Black models to have occurred more often in the high model/low ad condition ($M=3.20$) than in either low-model/low-ad conditions ($M=2.89$) or high-model/high-ad conditions ($M=2.70$). Furthermore, they judged White models to have occurred less often in the former condition ($M=7.70$) than in the latter two ($M=8.67$ and 8.65, respectively). These differences are confirmed by an interaction of presentation conditions and model type in a post-hoc analysis involving both participant groups, $F(2, 100)=2.78$, $p < .05$. Further, a comparison of estimates under high-model/low-ad conditions with estimates under the other two conditions combined approached significance in separate analyses of the estimates pertaining to both Black models, $F(1, 100)=3.19$, $p < .07$, and White models, $F(1, 100)=4.01$, $p < .05$. Thus, both European Americans and African Americans were generally sensitive to the relative density of Black models in the ads and their estimates were influenced by this factor as well as the factors mentioned earlier.

In addition, it is worth noting that African Americans' subjective estimates of the incidence of Black and White models were negatively correlated ($r=-.39$, $p < .005$), whereas European Americans' estimates were uncorrelated ($r=-.09$, $p > .20$). Thus, African American participants appeared to compare the number of Black and White models they saw when arriving at their estimates, whereas European Americans responded to Black and White models independently. This pattern is consistent with the notion that African Americans were more concerned about fair representation than European Americans were.

Numerical frequency estimates. The different criteria used by European American and African American participants to judge the frequency of Black models in the ads they were shown should also be reflected in their direct estimates of the number of these models that were presented. Our results for this judgment also were consistent with hypotheses H1a and H1b. The left half of Table 3 summarizes the number of Black models that participants estimated under each of the three presentation conditions. Not surprisingly, both groups of participants estimated the number of Black models to be higher when 12 were presented than when only 6 were presented. However, European Americans made consistently higher estimates than African Americans did ($M=11.44$ vs. 7.46, respectively), $F(1, 101)=3.70$, $p=.05$. This difference is consistent with the assumption that European Americans generally think more extensively about Black models than African Americans do. More direct evidence is provided presently.

A comparison of participants' numerical estimates with their subjective estimates is revealing. African Americans' numerical estimates and subjective judgments both increased with the actual number of Black models presented, consistent with the assumption that these participants used their online tally of the number of these models as a basis for both judgments. In contrast, although European Americans also estimated the number of Black models to be greater when the number presented was high than when it was low, their subjective estimates were *lower* in the former condition. This suggests that the two groups of participants based their judgments on different criteria.

TABLE 3
Mean Estimates of the Number of Black and White Models Presented, and Estimates Relative to the Actual Number Presented, as a Function of Participant Ethnicity and Presentation Condition

	Actual Number of Models Presented	*Numerical Estimates*			*Estimates Relative to Number Presented (Bias)*		
		European American Participants	*African American Participants*	*M*	*European American Participants*	*African American Participants*	*M*
Black models							
Low model, low ad	6	9.00	5.70	7.38	1.50[a]	0.95[b]	1.22
High model, low ad	12	14.95	9.12	11.82	1.25[a]	0.76[b]	0.98
High model, high ad	12	10.80	8.00	9.40	0.90[b]	0.66[b]	0.78
White models							
Low model, low ad	54	32.40	34.02	33.21	0.60[c]	0.63[c]	0.61
High model, low ad	108	50.76	70.20	60.48	0.47[c]	0.65[c]	0.56
High model, high ad	108	55.09	36.72	45.91	0.51[c]	0.34[c]	0.42

Note. Bias means in the same row or column with unlike superscripts differ at $p < .05$, based on separate analyses of estimates of Black and White models.

The nature of this difference is suggested by the data reported in the right half of Table 3, which shows the ratio of the estimated number of models presented in each condition to the number actually presented. Therefore, values greater than 1.0 denote overestimates and values less than 1.0 denote underestimates. European Americans consistently overestimated the number of Black models presented (M=1.23) whereas African Americans typically underestimated this number (M=0.82), $F(1, 101)=7.17$, $p < .01$. Furthermore, the magnitude of these estimates was contingent on presentation conditions, $F(2, 101) = 2.95$, $p < .05$. As hypothesized (H1a), European Americans greatly overestimated the incidence of Black models when a small number of such models was presented (M=1.50), but the magnitude of this overestimation decreased when the number of models and ads was large (M=.90), $F(1, 101)=3.90$, $p < .05$. As also hypothesized, however (H1b), African Americans were quite accurate when a small number of Black models was presented (M=0.95), but became *less* accurate when the number of such models and ads increased (M=0.66), $F(1, 101)=2.83$, $p < .10$. Corresponding differences in estimates of the number of White models were not evident, and participants generally underestimated the number of White models presented (M=.53).

Recognition accuracy. We assumed that European Americans' overestimation of the number of Black models in the ads was a result of their tendency to base estimates on the ease with which individual instances of the models could be retrieved from memory. If so, the ability of European American participants to recognize these models at a later point should be high, particularly when the number of models is low. Correspondingly, African American participants, who presumably based their estimates on an online computation, should be relatively inaccurate in their later recognition of Black models regardless of the number that was presented.

Participants' accuracy in identifying the models that were shown is consistent with this conjecture. To obtain an estimate of recognition accuracy that was uncontaminated by guessing bias, we used an index described in Hilgard (1951). According to this index, the probability of identifying a stimulus trace in memory, *P(T)*, is given by the expression:

$$P(T) = \frac{P(hits) - P(false\ alarms)}{1 - P(false\ alarms)}$$

where *P(hit)*=the probability of reporting that a stimulus is presented if it was in fact presented, and *P(false alarm)* is the probability of reporting a stimulus as present if it was not presented. This index was computed for each participant separately and analyzed as a function of stimulus conditions, the ethnicity of the model being judged, and participants' own ethnicity.

European American participants identified Black models more accurately than African American participants did (M=.61 vs. .39, respectively), $F(1, 101)=12.84$, $p < .001$. Furthermore, European Americans' accuracy was greater when the number of ads presented was small (M=.68) than when it was large (M=.48), $F(1, 103)=5.45$, $p < .025$. (Their accuracy was similar when the number of ads presented was small, regardless of whether the number of models was low (M=.73) or high (M=.62), $F < 1.5$). This difference is consistent with our earlier speculation that European Americans would be attentive to idiosyncratic attributes of the Black models when only a few ads were presented but that their attention would decrease as the number of ads presented increased. As expected, however, African Americans' accuracy was low in all three stimulus conditions (M=.38, .36, and .43), which did not differ significantly from each other (F's < 1). This confirms our assumption that these individuals, unlike European Americans, simply noted the presence or absence of Black models in the ads without paying much attention to their individuating features.

Although European Americans were much better able to recognize Black models than African Americans were, their accuracy in identifying White models was non-significantly poorer (.19 vs. .43), $F(1, 101)=1.98$, $p > .10$. Furthermore, this difference was particularly evident when a small number of ads was presented (.07 vs. .42), $F(1, 101)=2.45$, $p < .07$. Although these individual effects were not significant, the pattern suggests that when relatively few ads contained Blacks, European Americans apparently directed their attention to the Black models to the exclusion of White models, whereas African Americans devoted equal attention to models of both types.

Correlational analyses. If European Americans based their estimates of the incidence of Black models on the ease with which relevant exemplars came to mind, this estimate should be correlated with their ability to recognize these models. In contrast, if African Americans performed an online count of the number of models presented without paying much attention to the models' specific features, this correlation should not be evident. Data support this reasoning. European Americans' recognition accuracy was significantly correlated with their subjective estimates of the frequency of Black models in the ads (r=.28, p=.05), their numerical estimates (r=.35, $p < .05$), and the amount of their overestimation of the incidence of Black models (r=.44, $p < .05$). In contrast, African Americans' recognition accuracy was not significantly correlated with any of these three indices (.11, .24, and .21, respectively; p's > .10).

Path analyses. Path analyses provide further support for our general proposition that the differences in frequency judgments of European and African American participants can be traced to differences in underlying processes. We

assumed that both the number of Black models and the number of ads containing them might influence the ease with which Black models came to mind (reflected in recognition accuracy), and that this in turn might influence numerical estimates of the incidence of these models. However, the number of Black models and the number of ads containing them could also have direct effects on these estimates. Regardless of how they are determined, these numerical estimates should provide the basis for subjective estimates of the incidence of Black models. This model was applied separately to European American and African American samples using maximum likelihood estimation procedures.

Figure 1 shows the standardized coefficient estimates for each group of participants. Not surprisingly, participants' numerical estimates of the number of Black models were predictive of their subjective impressions, regardless of the participants' ethnic group. However, the way in which these estimates were developed differed. European Americans appeared to draw on the ease of recalling instances of Black models (as reflected in recognition accuracy) which, in turn, was a decreasing function of the number of ads that contained these models. In contrast, African Americans did not draw on their memory of models to make estimates. Rather, they based their estimates on the actual number of models shown in the advertisements.

Further evidence of these processing differences was obtained by comparing the fit of the path model when regression parameters were allowed to differ across participant samples to its fit when these parameters were forced to be equivalent for both participant groups. If the processes employed by European Americans and African Americans are indeed distinct, then the unconstrained model should perform substantially better than the constrained one. This was indeed the case. The unconstrained model has acceptable fit ($\chi^2(24)=6.45$, $p > .35$), whereas the constrained model can probably be rejected ($\chi^2(47)=16.18$, $p < .06$).

Concern about one's ethnic group. Self-report data support our account that African Americans were concerned about whether the models they encountered were from their own ethnic group and, therefore, kept an online tally. African Americans identified more strongly with their ethnicity ($M=6.16$) than European Americans did ($M=5.29$), $F(1, 105)=9.24$, $p < .005$. In addition, they were more likely than European Americans to notice the ethnicity of models (7.67 vs. 5.28, respectively), $F(1, 105)=22.67$, $p < .001$, and paid marginally more attention to the similarity of models to themselves (5.40 vs. 4.18, respectively), $F(1, 105)=2.96$, $p < .08$.

If African Americans keep a tally of Black models because they are concerned about in-group representation, they should be more inclined to count if they are sensitive to their ethnicity than if they are less so. This was the case. Among African Americans, greater sensitivity to models' similarity to oneself led to lower percentage error in judgments of the number of Black models ($b=-.022$), $F(1, 49)=5.20$, $p < .05$. Also, consistent with our theorizing, this main effect is qualified by an interaction with experimental condition, $F(2, 49)=3.71$, $p < .05$. In the low model/low ad condition, in which the number of Black models was small and therefore easy to count, African Americans' sensitivity scores predicted the accuracy of their estimates ($b=-.048$), $F(1, 18)=12.50$, $p < .005$. When the number of Black models was large, however, this was not the case (for high model/low ad conditions, $b=-.050$, $F(1, 14)=3.39$, $p > .10$; for high model/high ad conditions, $b=.019$, $F < 1$). Finally, European Americans' sensitivity to ethnicity was not predictive of their accuracy in judging Black model frequencies in any condition ($F < 1$).

Supplementary data. An assistant who was blind to our hypotheses and experimental conditions coded each participant's comments in terms of whether they mentioned any aspect of models' features (e.g., thinness), the ethnicity of the models, the frequency with which either Black or White models had appeared, or ethnicity more generally. European Americans and African Americans did not differ in either the total number of reactions they reported (3.12 vs. 3.52, respectively, $F < 1.4$), or in the overall proportion of these reactions that mentioned models' features (11% in each case). However, African Americans were significantly more likely than European Americans to refer to the models' ethnicity (10.0% vs. 1.9%, respectively) or to ethnicity more generally (16.8% vs. 2.1%, respectively); in each case, $F > 5.65$, $p < .05$. Moreover, whereas several African Americans referred specifically to the frequency of Black versus White models in the ads, no European American did so.

Finally, we speculated that the implicit theories that our participants held regarding their expectations of encountering minorities in advertisements might influence their judgments independently of frequency of exposure in the experiment. For example, if African Americans' estimates of the real-world incidence of Black models in advertisements are less than European Americans' estimates, it could at least partially explain some of the results we observed. However, this does not seem to be the case. African American and European American participants did not differ in their estimates of the proportion of Blacks that currently appear in the media (22.8% vs. 23.3%, respectively, $p > .50$).

Discussion

The pattern of results we observed is consistent with expectations concerning the different factors that underlie African Americans' and European Americans' reactions to the Blacks they see in advertisements. As we noted earlier, however, factors other than distinctiveness might influence reactions to Black models. The rather peculiar history of African Americans in the United States—and the consequent strained relationship between them and the European

American majority—could contribute to these patterns. To ensure against these possibilities, we obtained data from Hong Kong Chinese participants. These participants had no a priori interest in the relative incidence of Black and White models in the ads being shown. However, they were likely to perceive African American models to be uncommon in clothing advertisements, and therefore distinctive. We therefore expected these individuals' frequency estimates to resemble those of European Americans.

EXPERIMENT 2

Method and Results

Participants were 111 Chinese university students in Hong Kong. The stimulus materials, presentation conditions, and instructions to participants were the same as those employed in Experiment 1. The results are summarized in Table 4. Participants' subjective estimates did not vary substantially over conditions ($F < 1$). Like European Americans in Experiment 1, however, Chinese participants consistently overestimated the actual number of Black models presented ($M = 1.84$), and this tendency was greater when either the number of Black models presented or the number of ads containing these models was low ($M = 2.10$) than it was in high-model, high-ad conditions ($M = 1.32$), $F(1, 109) = 3.81$, $p < .05$. Furthermore, these participants' accuracy at recognizing Black models paralleled their tendency to overestimate these models' incidence (.36 vs. .16) when the number of ads containing Black models was low vs. high, respectively, $F(1, 109) = 3.50$, $p < .06$).

Although Chinese participants' recognition of Black models was positively correlated with the magnitude of their overestimations ($r = .16$), this correlation was not significant ($p > .10$). This correlation could suggest that Chinese participants' estimates of the number of Black models were not governed by ease of retrieval. However, it is more likely the result of their generally poor recognition (see Table 4). Black models may have been relatively novel stimuli to Hong Kong Chinese, and so the cognitive elaboration that was stimulated by their novelty increased the ease of retrieving them from memory. Nevertheless, the models were apparently not represented in memory in sufficient detail that they could later be distinguished from others.

It is noteworthy that our findings are consistent with those reported by Henderson, Williams, Grantham, and Lwin (1999). They also found that Chinese had better recognition of Black than White faces, and attributed this difference to the fact that Black faces are more familiar to their Singaporean participants because of their exposure to South Asian "people of color" (e.g., Malays and Indians). However, the number of South Asians is much less in Hong Kong (3.2%) than it is in Singapore (23.5%), according to census data. Therefore, it seems more appropriate to attribute Hong Kong Chinese' recognition of Black faces to their novelty.

TABLE 4
Frequency Estimates and Recognition Memory Data for Hong Kong Chinese Participants (Experiment 2)

	Subjective Estimates	*Numerical Estimates*		*Recognition Accuracy*
		Actual	*Bias*	
Judgments of Black models				
Low model, low ad	3.29	13.92	2.32[a]	0.38[x]
High model, low ad	3.52	22.44	1.87[a]	0.34[x]
High model, high ad	3.40	20.91	1.32[b]	0.16[y]
Judgments of White models				
Low model, low ad	7.34	41.04	0.76	0.12
High model, low ad	7.67	68.04	0.63	0.22
High model, high ad	7.80	65.88	0.61	0.35

Note. Cells in the same row or column with unlike superscripts differ at $p < .05$.

GENERAL DISCUSSION

Perceptions of the frequency with which minority group members are represented in advertisements clearly depend on whether the perceivers are themselves members of the minority group in question. Moreover, this contingency appears to result from differences in the cognitive responses to individual exemplars of the group at the time they are encountered. African Americans, who appear to have an a priori interest in determining their representation in various social capacities (Mallorie, 2004; see also Wooten, 1995), may spontaneously conduct a subjective tally of the number of times they encounter Blacks in the ads to which they are exposed. Thus, their estimates are fairly accurate when a small number of Blacks are presented, but decrease in accuracy as the number becomes larger and more difficult to count. In the latter condition, they may rely more heavily on a general implicit theory that Blacks are probably underrepresented, which could be more salient than theories regarding specific expectations about the proportion of Black models in ads (e.g., the expectation reported in Experiment 1). This general theory could bias their judgments. African Americans engage in this online computation without paying much attention to the particular features of the members they are counting. Consequently, although their estimates of the number of members they encounter increase with the actual number presented, their ability to recognize individual members is low regardless of how many they have been shown.

In contrast, members of the European American majority have little a priori interest in the number of Blacks

presented per se, and so they do not engage in this online activity. Nevertheless, they devote more thought to these relatively uncommon stimuli than they do to the White models that accompany them, and this relatively extensive processing increases the accessibility of the Black models in memory and the ease with which they later come to mind. Their later frequency estimates are then based on the ease with which these specific instances can be recalled (Schwarz, 2004; Shrum, 2002). Thus, they overestimate the actual number of instances to which they were exposed, and this is particularly true when the actual number of ads containing Black models was relatively small. The ease of retrieving Black models decreased substantially when the models were contained in a large number of ads, as suggested by the decrease in recognition accuracy under these conditions. Consequently, their numerical frequency estimates were actually more accurate under these conditions than they were when a small number of models and ads were presented (see Table 2).

Alternative Interpretations

Other interpretations of our findings should be considered. For one thing, a possible ambiguity in our interpretation arises from the fact that European American participants' subjective frequency estimates were a function of the number of ads in which Black models were contained rather than the number of models presented. This could indicate that these participants based their judgments on the ease of retrieving ads rather than individual exemplars. If this were true, however, there would be no reason to expect participants' estimates to be correlated with the accuracy of their recognition of the individual models presented. As noted earlier, however, this correlation was quite significant. Therefore, it seems reasonable to assume that White participants paid particular attention to Black models when a relatively small number of these ads were presented, as evidenced not only by their accurate recognition of Black models but also their very poor recognition of the White models that accompanied them. When a large number of ads were presented, however, participants' interest in Black models may have waned, as evidenced by a decrease in their recognition accuracy as well as their frequency estimates.

A second consideration is that European American and African American individuals have different implicit theories about the representation of Blacks in the media and base their estimates on these theories independently of the information they receive. Supplementary data obtained in Experiment 1 indicate that African Americans and European Americans reported similar expectations concerning the proportion of Blacks they expect to see in mainstream media advertisements. The fact that these theories were similar does not mean that the two groups of participants applied them equally, however. African Americans may in fact have applied a theory to their estimates when the number of Black models was large and hard to count accurately. However, the assumption that participants are basing their judgments on implicit theories alone cannot account for our data as a whole. (This notion is bolstered by the estimates of White models, which did not differ between the two groups and were uniformly underestimated).

An alternative possibility is that African Americans and European Americans have different standards of comparison for evaluating the incidence of Blacks' representation in the media. For example, African Americans may believe that Blacks *should* be represented more frequently than European Americans do, and may judge their actual frequency in relation to this idealized standard. The general tendency for African Americans to judge the frequency of Black models to be subjectively lower than European Americans (Table 2) would be consistent with this conjecture. However, a difference in standard alone could not account for either between-group differences in effects of the number of models presented on subjective judgments or the differences in numerical estimates of the number presented in these conditions. For example, European Americans' estimates of the frequency of Black models were lowest when the number of Black models presented, and the number of ads containing them, were both high. In contrast, African Americans' subjective estimates were lowest when the number of Blacks presented, and the number of ads containing them, were both low. General differences in the standard of comparison used as a basis for judgments could not easily explain these contingencies.

The subjective frequency data nevertheless raise an additional consideration. That is, participants' subjective estimates were generally greater in high-model, low-ad conditions (when the average number of Black models per ad was highest) than in other conditions. Thus, both African Americans and European Americans appeared to be sensitive to the average concentration of Black models in the ads they saw, and based their subjective estimates (although not their numerical estimates) in part on this criterion. This factor may contribute to subjective ratings over and above the effects of ease of retrieval (in the case of European Americans) and online counting (in the case of African Americans).

Finally, note that estimates of the number of models shown (relative to the number presented) decreased as the number of models presented increased, and this was true of both European American and African Americans (see Table 3). Psychophysical principles (e.g., Fechner's Law) imply that the effect of a given difference in objective values of a stimulus has less impact on subjective values when the values in question are large. Note, however, that although this tendency could contribute to participants' actual frequency estimates, it could not account for the between-group difference in subjective estimates (Table 2), which were highest among European Americans when the actual number of Black models presented was small, but was highest among African Americans when the actual number was large.

Further Considerations

Some caution should be taken in generalizing our conclusions. First, the African Americans in our sample were typically drawn from a predominantly Black university. On the one hand, this had the advantage of decreasing the likelihood that the participants, who were run in small groups, would be conscious of the fact that their ethnic identity was of concern to the experimenters. On the other hand, it could have introduced other social demands that produced a bias in participants' reported judgments, though the manner in which such a bias would compromise our conclusions is not immediately obvious. Second, other minority groups may respond differently than African Americans, who may be particularly sensitive to their representation in the media as a result of their historical disenfranchisement in American society and the social restrictions that have confronted them in the past. Members of other minorities might be less concerned with their representation in the media, and consequently might be less inclined to engage in online frequency estimation.

A perhaps more important consideration in generalizing the conclusions we have drawn surrounds the restriction of our study to clothing advertisements. The representation of Blacks in the media may vary considerably over different domains of media experience. The representation of Blacks and Whites in television shows, for example, may vary with the social role they are assigned, and the frequency of their use in advertisements may depend on the type of product being advertised. To this extent, the processes that we have identified may likewise depend on these factors. This research calls attention to these processes and to the fact that their use may depend on characteristics of the perceiver. However, further research is obviously required in order to conceptualize more fully the conditions in which these processes predominate.

Our findings should be considered in the context of other research on the effects of ethnicity on responses to the media. For example, consumers are often more persuaded by advertisements that portray members of an ethnic minority or otherwise distinctive social group if they personally belong to the in-group than if they do not (Grier & Deshpande, 2001). At the same time, minority group models in this study received attention from *out-group* members, as evidenced by their relatively strong recognition memory performance. Perhaps the benefit of using members of an ethnic minority in advertisements lies not only in increasing the attractiveness of the advertised product to members of the minority group, but also in increasing the attention paid to the ad by members of the majority. Among majority members, this increased attention might help to offset any alienation felt by individuals who feel that an ad is not targeted at them (Aaker, Brumbaugh, & Grier, 2000).

Our findings may also qualify the "other-race effect." That is, people are often better at recognizing members of their own race than members of another race (e.g., Chance, Goldstein, & McBride, 1975). In contrast, we found that European Americans were much better at recognizing Black models than recognizing White models in ads and that African Americans recognized Black and White models equally well. The difference between our results and those of past studies may derive from differences in the processing objectives that participants are given. In previous studies, participants were typically instructed to memorize the faces with the expectation of performing a later recognition task. In these cases, where similar learning strategies are likely to be used regardless of the race of the participants, there may indeed be an own-race advantage in terms of recognition. When people are not given any expectation that they will have to remember the models, European American may have better recognition of Blacks than of Whites for the reasons noted earlier.

Implications for Public Policy

Our results could have more general implications for the extent to which attempts to ensure a proportionate representation of minority members in the media are perceived to be successful. When the number of advertisements presented was relatively low, African American participants typically underestimated the number of Black models presented by 14%, whereas European Americans overestimated this number by 38%. Thus, majority members and others might be inclined to perceive the media as complying with demands to ensure proportionate representation to a greater extent than is actually the case, and thus may conclude that greater representation for minorities is unneeded at best, or reverse discrimination at worst. In contrast, minority individuals may be inclined to perceive the media as less responsive to social demands than they actually are, leading to conclusions that certain policies are not working when they may in fact be effective.

Apart from the pattern of findings and its implications for public policy, the findings regarding why differences in perceptions of representation between majority and minority members occur have implications as well. On the surface, the tendency for majorities to think that minority representation is appropriate, or even excessive, and for minorities to think the opposite, could be explained by each group's self-interests: The implementation of a policy on the basis of each group's beliefs would increase the representation of this group. Moreover, majority group members might even be deemed racist, as they would appear to use their perceptions as a convenient excuse for denying access and representation for minorities. In reality, based on the results of our research, the differences may be due to the way people process relevant information when it is encountered, how easily the information is recalled when needed at a later time, and how it is used at this later time to construct

a judgment. These conclusions offer a more encouraging view of race relations, in that racial differences in support for equal representation initiatives apparently derive at least in part from cognitive biases rather than ill-regard for members of other races. It is obviously risky to generalize from our results to perceptions that develop outside the laboratory. Nevertheless, the implications of our findings seem worth pursuing.

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